Environmental Assessment for Strike Fighter Realignment at Naval Air Station Lemoore, California

October 2011

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DEPARTMENT OF THE NAVY
UNITED STATES FLEET FORCES COMMAND

FINDING OF NO SIGNIFICANT IMPACT FOR PROPOSED STRIKE FIGHTER REALIGNMENT, NAS LEMOORE, CALIFORNIA

INTRODUCTION

Pursuant to section 102(2) of National Environmental Policy Act (NEPA) of 1969, as amended, the Council on Environmental Quality regulations (40 CFR Parts 1500-1508) implementing the NEPA, Department of the Navy Regulations (32 CFR Part 775), and Chief of Naval Operations Instruction 5090.1C, the Department of the Navy gives notice that an Environmental Assessment (EA) has been prepared and a Finding of No Significant Impact (FONSI) has been signed for the relocation of two 12-plane East Coast FA-18E/F Super Hornet squadrons to NAS Lemoore, and the in-place transition of up to five Strike Fighter squadrons currently based at NAS Lemoore from older FA-18C Hornet aircraft to newer FA-18E/F Super Hornets.

PURPOSE AND NEED

The purpose of the proposed action is to provide Strike Fighter community assets needed to meet the changing operational demand in the Pacific and to mitigate shortfalls in Strike Fighter community assets due to the age of the FA-18C Hornet aircraft. The relocation of two East Coast Strike Fighter squadrons is needed to geographically align Strike Fighter assets with current air wing deployment demands.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action would relocate two Fleet FA-18E/F squadrons from the East Coast and transition five existing FA-18C squadrons to FA-18E/F squadrons, resulting in an additional 26 aircraft, 420 enlisted personnel, and 81 officers at NAS Lemoore. These actions are anticipated to occur in the 2013 to 2015 timeframe. East Coast Strike Fighter squadrons would be identified based on operational availability to execute the relocation to NAS Lemoore tentatively planned in 2014. The timing of the in-place transitions is dependent on FA-18E/F acquisition schedules and the availability of training resources, assumed to be 2013-2015. The transition from FA-18 to F-35C is not part of this Proposed Action and will be evaluated in separate NEPA documentation. Modifications to Hangars 1, 2, and 4 would be required, but no new facilities and no changes to ranges or airspace are proposed.

During the same timeframe as the proposed action, the Navy also plans to reduce the Fleet Replacement Squadron (FRS) at NAS Lemoore to eliminate the FA-18C/D aircraft from the FRS. This action is not part of the proposed action, but reduces the number of FRS aircraft at NAS Lemoore by 30 during the 2012-2013 timeframe. Therefore, while the proposed action would add 26 Fleet aircraft compared to baseline conditions (2011), the FRS reduction would eliminate 30 FRS aircraft compared to the baseline, for an overall net reduction from 238 to 234 Strike Fighter aircraft at NAS Lemoore in the end state year (2015). Combined actions at NAS Lemoore (proposed action and FRS reduction) would include a net reduction of four aircraft, a net increase of approximately 182 personnel (+236 enlisted; +26 officers; -80 contractors), and modifications to Hangars 1, 2, and 4.

Between the baseline state in 2011 and the end state in 2015, the FRS reduction would decrease NAS Lemoore airfield operations by 55,669, while the proposed action would add 5,105 operations. As such, NAS Lemoore airfield operations would decrease from 209,421 in 2011 (baseline) to 158,858 in 2015 (end state), a 24% decrease in flight operations. The primary reason for the decrease in operations is that the FRS generates approximately three times more operations per aircraft than a Fleet squadron. This is due to different training requirements (i.e., the FRS trains more frequently than Fleet squadrons) and deployments of Fleet squadrons for portions of the year during which those Fleet squadrons would not fly at NAS Lemoore.

ALTERNATIVES

In developing alternatives for this requirement, the Navy considered operational cost, risk, and synergy factors. Previous NEPA documents for homebasing of Navy FA-18C/D Hornet and FA-18E/F Super Hornet Strike Fighter aircraft considered alternative homebasing locations for those aircraft. However, the Records of Decision for those actions established NAS Lemoore as the West Coast homebase location for those aircraft, which concentrated operational functions and related infrastructure at NAS Lemoore. Relocating the two Strike Fighter squadrons to NAS Lemoore provides the necessary support without duplication of existing homebase support or Command and Control functions. Therefore, no additional alternatives were considered for analysis in the EA.

Under the No Action Alternative, two East Coast Strike Fighter squadrons would not relocate to NAS Lemoore, and the in-place transition of up to five squadrons from FA-18C to FA-18E/F aircraft would not occur. Related personnel changes and modifications to Hangars 1, 2, and 4 also would not occur. However, reduction of the FRS would still occur, eliminating 30 FRS aircraft compared to baseline conditions. Aircraft operations would decrease to 153,752, or a 27% reduction compared to baseline conditions. In addition, FRS reduction would decrease personnel loading at NAS Lemoore by 319 (-184 enlisted personnel, -55 officers, and -80 contractors).

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Direct, indirect, and cumulative environmental impacts that may occur with implementation of the proposed action would range from no impact to minor impact, with no significant impacts to the human environment.

Strike Fighter relocation and in-place transition would add 26 aircraft and an associated 5,105 operations to the airfield and airspace associated with NAS Lemoore. However, during this timeframe the FRS reduction would result in a decrease of 30 aircraft and an associated reduction at the end state (2015) by approximately 24% compared to the baseline condition (2011). There would be no impact to local civil and commercial airspace since the FA-18E/F would be operating within the same flight parameters currently used for NAS Lemoore airspace.

The proposed action would not result in significant noise impacts. Under the Proposed Action, FA-18C/E/F operations would total 158,858 annually with the same proportion of day, evening, and night operations as baseline operations. Although the number of operations would decrease, FA-18E/F aircraft operations would increase and FA-18E/F aircraft operations are somewhat louder than FA-18C/D operations. The proposed action would result in an overall decrease in on-base areas affected by noise greater than or equal to 65 dB CNEL by 8 ac (3.2 ha). However, the shape of the zones would change such that some land uses would experience reduced exposure and others, greater. Off-base, only open space, agricultural, and unclassified lands would be exposed to noise levels of 65 dB CNEL or greater. Therefore, the proposed action would result in no incompatible land use off-base.

Determination of applicability with the General Conformity Rule (GCR) (40 CFR 93.153) was made by Navy. Estimated air emissions associated with the proposed action would be below the *de minimis* threshold levels specified under the GCR and would not result in an exceedance of the San Joaquin Valley Air Pollution Control District's emission budgets. Although Carbon monoxide (CO) emissions would increase under the Proposed Action beginning in 2014 (445 tons of CO per year) and reaching the static population and operations in 2015 (574 tons of CO per year), the local area meets CO attainment standards and an increase in emissions with implementation of the proposed action would not be expected to affect attainment. Therefore, a formal Conformity Determination is not required. Navy has prepared a Record of Non-Applicability for Clean Air Act Conformity.

Implementation of the proposed action would not significantly affect airfield safety at NAS Lemoore. A 24% decrease in airfield flight operations would reduce the potential for aircraft incidents. In addition, current airspace safety procedures, maintenance, training, and inspections would continue to adhere to established safety procedures.

The proposed action would have no effect on existing land use and would have minor economic benefits. These benefits would include the net increase of 182 personnel at NAS Lemoore and spending in the regional economy for materials and supplies. There would be no impacts to NAS Lemoore on-base or off-base land use due to hangar renovation activities, and no additional facilities construction is proposed.

Negligible impacts to infrastructure and utility use may occur from the approximately 4% increase in new personnel and their families (if we assume they all reside on-base) or the approximately less than 1% increase in local population in King and Fresno Counties (assuming they all live off-base).

The additional building space associated with modifications to Hangars 1, 2, and 4 would potentially result in an increased demand for electricity and natural gas; however, these impacts would be partially offset from the installation of more modern, energy efficient systems and impacts would be less than significant. These hangar modifications would result in less than significant impacts to solid waste management due to the generation of small amounts of construction and demolition debris. The hangar modifications would have no impact on water, wastewater, or stormwater drainage.

Resulting socioeconomic impacts at the end state scenario would potentially occur from the net increase of 262 military personnel (+236 enlisted, +26 officers) and 341 family members. Further, there would be a decrease of 80 civilian contractor positions and 177 of their family members as a result of the FRS reduction. Combined with the change in numbers of family members for military and contractor personnel, the study area would experience a maximum net gain of 346 people, or less than 1% of the study area population. The proposed action would result in less than significant impacts to short-term or long-term regional population trends. Military payrolls would increase by approximately $13.4 million annually (Defense Financing Accounting Service 2011). Civilian contractor payrolls would decrease by approximately $4.3 million annually (U.S. Office of Personnel Management 2011). The net increase of approximately $9.1 million in salaries would represent less than 1% of total study area personal income.

Based on the analysis of environmental impacts, the proposed action would not result in disproportionately high and adverse human health or environmental effects on minority or low income populations or environmental health or safety risks that would disproportionately affect children.

Negligible impacts to community services would result from the approximately 4% increase in new personnel and their family members if all personnel live on-base or less than 1% increase if all personnel live off-base.

Under the proposed action, a total of 182 daily round trips would be added to the local transportation system if all new personnel live off-base. This would result in a 2.4% increase over existing conditions for the current base population of 7,600. Given the minor increase in daily trips to regional transportation system, it is anticipated that the proposed action would have a less than significant effect on traffic and level of service of area roads.

Wildlife habitats and vegetation would not be directly affected by the proposed action because construction would be limited to modifications to existing structures (Hangars 1, 2, and 4) that are along the flight line and in existing disturbed areas. The only special status species known to occur in the area is the burrowing owl (federal and state species of concern), which is well-known to be an adaptable species that often occupy open space areas at airfields, apparently unperturbed by aircraft noise or human presence. Because the number of air operations is not expected to increase, there should be no additional impacts from bird/wildlife-aircraft strikes. In addition, installation personnel would continue to manage habitats pursuant to the Integrated Natural Resources Management Plan (INRMP), which is designed to protect and benefit threatened and endangered species.

Based on the personnel increase, the proposed action may result in a slight increase in the amount of water used for industrial and domestic purposes, but would have no direct impacts on surface or groundwater quality. With the implementation of best management practices and stormwater management, soil erosion and sedimentation would not occur or would be minimized.

The Navy has determined that no historic properties would be affected by the implementation of the proposed action, with concurrence from the California State Historic Preservation Officer. Three structures, Hangars 1, 2, and 4, constructed in 1959, would be directly impacted by interior and exterior modifications including reconfiguration, modernization, new construction, and expansion under the proposed action. All three hangars have been determined not eligible for nomination to the NRHP, thus no historic properties would be affected and no further steps would be required.

With incorporation of the appropriate procedures for handling of hazardous materials during renovation of Hangars 1, 2, and 4 and the application of BMPs for the management of hazardous substances and spill response at NAS Lemoore, the proposed action would have no significant impacts related to hazardous materials and waste.

The analysis of past, present, and reasonably foreseeable cumulative impacts indicates the proposed action would contribute minimally to effects associated with aircraft operations (noise, air quality) and an increase in personnel (infrastructure, utilities, community services, traffic, socioeconomics, waste). The combined impacts from these other federal, state and local actions were not significant because impacts are minor or short-term temporary impacts. Additional analysis will also be completed in the F-35C West Coast Homebasing EIS for noise, air quality, and other relevant impacts.

PUBLIC OUTREACH

The Navy released the Draft EA for public review on July 26, 2011, and provided the public until August 29, 2011 to submit comments. The public comment period was initiated with the publication of a Notice of Availability of the Draft EA in local and regional English and Spanish language newspapers starting on July 26, 2011. The Draft EA was available on the Navy's website at www.cnic.navy.mil/cnrsw, and at local libraries.

A total of eight comments were received during the public review period. All comments were written in English, expressed support for the Proposed Action and did not raise concerns with regard to the Proposed Action or activities at NAS Lemoore. Of these eight, two were concurrence letters from the San Joaquin Valley Air Pollution Control District (SJVAPCD) and from the California State Historic Preservation Officer (SHPO).

FINDING

After review of the EA prepared in accordance with the requirements of NEPA and Department of the Navy regulations for implementing NEPA (32 CFR 775), the Navy finds that implementing the Proposed Action of Strike Fighter Realignment will not significantly affect the quality of the human environment. Therefore, an Environmental Impact Statement will not be prepared.

A copy of the EA, including this FONSI, can be obtained from: Strike Fighter Realignment EA Project Manager, Naval Facilities Engineering Command, Southwest, Attn: Code EV21.AK, 1220 Pacific Highway, Bldg. 1, 5th Floor, San Diego, CA 92132.

12 October 2011

DATE

J. W. MURPHY
Deputy Chief of Staff
For Shore and Environmental Readiness
United States Fleet Forces Command

ENVIRONMENTAL ASSESSMENT
FOR STRIKE FIGHTER REALIGNMENT
AT NAS LEMOORE, CALIFORNIA

Kings County and Fresno County, California

October 2011

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Prepared by Department of Navy

In accordance with Chief of Naval Operations Instruction 5090.1C
Pursuant to National Environmental Policy Act Section 102(2) (C)

Environmental Assessment for Strike Fighter Realignment at Naval Air Station Lemoore, California
October 2011

Lead Agency:	Department of Navy
Title of Proposed Action:	Naval Air Station Lemoore Strike Fighter Realignment
Designation:	Environmental Assessment
Prepared By:	United States Fleet Forces, Department of Navy

Point of Contact: Navy Strike Fighter Realignment EA Project Manager
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Abstract

The Department of Navy is proposing to realign Strike Fighter community assets at Naval Air Station (NAS) Lemoore to more efficiently support operational requirements in the Pacific. NAS Lemoore is the West Coast Master Jet Base, hosting the Navy's entire United States West Coast Strike Fighter community. The purpose of the Proposed Action is to provide Strike Fighter community assets needed to meet the changing operational demand in the Pacific and to mitigate shortfalls in Strike Fighter community assets due to the age of FA-18C aircraft. The Proposed Action would relocate two 12-plane, East Coast FA-18E/F Super Hornet squadrons to NAS Lemoore and transition up to five Strike Fighter squadrons currently based at NAS Lemoore from older, FA-18C Hornet aircraft to newer FA-18E/F Super Hornets. During the same timeframe as the Proposed Action, the Navy plans to reduce the Fleet Replacement Squadron (FRS) to eliminate FA-18C/D aircraft and associated personnel from NAS Lemoore. The FRS reduction is not part of the Proposed Action, but reduces the number of FRS aircraft by 30 during the 2012-2013 timeframe. Under the Proposed Action and taking into account the FRS reduction, aircraft operations at NAS Lemoore would decrease by about 24% by 2015 compared to baseline (2011) conditions, and aircraft loading would decrease by four aircraft. The Proposed Action and FRS reduction would also include a net increase of 182 personnel (+236 enlisted, +26 officers, -80 contractors). Hangars 1, 2, and 4 would undergo modifications to accommodate Super Hornet aircraft. This would include interior modifications to Hangar 1; construction of an addition, which includes a second story, and interior modifications to Hangar 2; and reconfiguration and construction of a second story to Hangar 4; no new facilities are proposed. The Proposed Action is scheduled to occur from 2012 to 2015. This Environmental Assessment (EA) analyzes the effects of the proposed aircraft realignment and the effects of the decrease in aircraft operations, the increase in personnel, and modifications to Hangars 1, 2, and 4. The EA evaluates the direct, indirect, and cumulative effects of the Proposed Action on airfields and airspace, noise, air quality, safety, land use, infrastructure and utilities, socioeconomics, community services, transportation, biological resources, water resources, cultural resources, and hazardous materials and waste. Effects are analyzed for the Proposed Action and the No Action Alternative. Under the No Action Alternative, the Proposed Action would not occur but the planned FRS reduction would be completed. The EA concludes that impacts from the Proposed Action would not be significant.

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EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Assessment (EA) analyzes the United States (U.S.) Department of Navy's (DoN) proposed Strike Fighter Realignment at Naval Air Station (NAS) Lemoore. NAS Lemoore is the West Coast Master Jet Base, hosting the Navy's entire West Coast Strike Fighter community. The mission of NAS Lemoore and of the Commander, Strike Fighter Wing, U.S. Pacific Fleet, is to support Navy fleet carrier Strike Fighter squadrons through realistic operational training of personnel, maintaining proficiency of personnel who are already qualified, and maintaining Strike Fighter readiness in the Pacific Fleet.

The DoN proposes to realign Strike Fighter Community assets at NAS Lemoore to more efficiently support operational requirements in the Pacific. This includes:

- Relocating two 12-plane East Coast FA-18E/F Super Hornet squadrons to NAS Lemoore.
- Performing the in-place transition of up to five Strike Fighter squadrons currently based at NAS Lemoore from older FA-18C Hornet aircraft to newer FA-18E/F Super Hornets.

PROJECT PURPOSE AND NEED

The purpose of the Proposed Action is to provide Strike Fighter community assets needed to meet the changing operational demand in the Pacific and to mitigate shortfalls in Strike Fighter community assets due to the age of the FA-18C Hornet aircraft.

Relocation of two East Coast Strike Fighter squadrons is needed to geographically align Strike Fighter assets with current carrier air wing deployment demands. The current Strike Fighter laydown was derived in 1998 to support operational scheduling at that time, but does not match current and planned carrier air wing deployment schedules. Currently, to meet Global Force Management scheduling requirements, two East Coast squadrons must conduct multiple cross-continental U.S. transits for multiple deployments and their associated work-up cycles to train and certify with the aircraft carrier and Carrier Strike Group. These cross-continental U.S. transits place an unnecessary burden on East Coast squadrons and their sailors, increase operational costs, use valuable aircraft service life on extended transits, and increase the time squadron personnel are away from home.

Relocating the East Coast Strike Fighter squadrons to NAS Lemoore would provide necessary support without duplication of existing homebase support functions and would realign the Fleet with east/west operational commitments. Relocating these squadrons to any other West Coast base would incur considerable costs, increase operational risk associated with potential timeline impacts of relocation, and reduce operational synergies with the Strike Fighter community.

The in-place transitions of up to five Strike Fighter squadrons from FA-18C Hornet to FA-18E/F Super Hornet squadrons is needed to address the projected shortfall in Strike Fighter aircraft due to age of FA-18C Hornets, to align Strike Fighter community assets to meet carrier air wing deployment schedules, and to ensure sufficient Strike Fighter capability is present in the short term. The in-place transitions would be a temporary measure until these 10-plane squadrons are eventually transitioned into the F-35C Joint Strike Fighter (JSF) in the 2015-2025 timeframe.

Modifications to Hangars 1, 2, and 4 are needed because currently no available hangars at NAS Lemoore are configured properly to support FA-18E/F squadrons. To accommodate FA-18E/F squadrons, modifications would be needed to Hangars 1, 2, and 4 to provide command administrative space and operational squadron space and to provide additional space for ready room, brief and de-brief, seat maintenance, flight equipment, and administrative personnel.

PROPOSED ACTION AND ALTERNATIVES CONSIDERED

Proposed Action

The Proposed Action would relocate two Fleet FA-18E/F squadrons from the East Coast and transition five existing FA-18C squadrons to FA-18E/F squadrons, resulting in an additional 26 aircraft, 420 enlisted personnel, and 81 officers at NAS Lemoore. These actions are anticipated to occur in the 2013 to 2015 timeframe. East Coast Strike Fighter squadrons would be identified based on operational availability to execute the relocation to NAS Lemoore tentatively planned in 2014. The timing of the in-place transitions is dependent on FA-18E/F acquisition schedules and the availability of training resources, assumed to be 2013-2015. The in-place transitions of up to five Strike Fighter squadrons from FA-18C Hornet to FA-18E/F Super Hornet squadrons is needed to address the projected shortfall in Strike Fighter aircraft due to age of FA-18C Hornets, to align Strike Fighter community assets to meet carrier air wing deployment schedules, and to ensure sufficient Strike Fighter capability is present in the short term. The in-place transitions would be a temporary measure to remain operationally efficient until these 10-plane squadrons are eventually transitioned into the F-35C JSF in the 2015-2025 timeframe. Transitions from FA-18 to F-35C are not part of this Proposed Action and will be evaluated in separate National Environmental Policy Act (NEPA) documentation. Modifications to Hangars 1, 2, and 4 would be required, but no new facilities, and no changes to ranges or airspace, are proposed.

Specifically, the proposed Strike Fighter realignment would consist of the following primary actions:

- Two East Coast Strike Fighter (VFA) squadrons (designated VFA-R1 and VFA-R2) arrive at NAS Lemoore in 2014 as a 12-plane FA-18E squadron and a 12-plane FA-18F squadron, respectively.
- Three existing VFA squadrons (designated VFA-T1, VFA-T2, and VFA-T3) transition from 10-plane FA-18C squadrons to 10-plane FA-18E squadrons in 2013.
- One existing VFA squadron (designated VFA-T4) transitions from a 10-plane FA-18C squadron to a 10-plane FA-18E squadron in 2014.
- One existing VFA squadron (designated VFA-T5) transitions from a 10-plane FA-18C squadron to a 12-plane FA-18F squadron in 2015.

During the same timeframe as the Proposed Action, the Navy also plans to reduce the Fleet Replacement Squadron (FRS) at NAS Lemoore to eliminate the FA-18C/D aircraft from the FRS. This action is not part of the Proposed Action, but reduces the number of FRS aircraft at NAS Lemoore by 30 during the 2012-2013 timeframe. Therefore, while the Proposed Action would add 26 Fleet aircraft compared to baseline conditions (2011), the FRS reduction would eliminate 30 FRS aircraft compared to baseline, for an overall net reduction from 238 to 234 Strike Fighter aircraft at NAS Lemoore in the end state year (2015). Combined actions at NAS Lemoore (Proposed Action and FRS reduction) would include a net reduction of four aircraft, a net increase of approximately 182 personnel (+236 enlisted; +26 officers; -80 contractors), and modifications to Hangars 1, 2, and 4.

Between the baseline state in 2011 and the end state in 2015, the FRS reduction would decrease NAS Lemoore airfield operations by 55,669, while the Proposed Action would add 5,105 operations. As such, NAS Lemoore airfield operations would decrease from 209,421 in 2011 (baseline) to 158,858 in 2015 (end state), a 24% decrease in flight operations. Although the Proposed Action would result in a reduction of four based aircraft relative to the baseline, annual aircraft operations would decrease by about 50,562. The FRS generates approximately three times more operations per aircraft than a Fleet squadron. This is due to different training requirements (i.e., the FRS trains more frequently than Fleet squadrons) and deployments of Fleet squadrons for portions of the year during which those Fleet squadrons would not fly at NAS Lemoore.

Alternatives Considered

To achieve the alignment of Strike Fighter aircraft to match current and planned carrier air wing deployment schedules, relocation of two existing Strike Fighter squadrons from the East Coast to the West Coast is required. In developing alternatives for this requirement, the Navy considered operational cost, risk, and synergy factors. Previous NEPA documents for homebasing of Navy FA-18C/D Hornet and FA-18E/F Super Hornet Strike Fighter aircraft considered alternative homebasing locations for those aircraft. However, the Records of Decision for those actions established NAS Lemoore as the West Coast homebase location for those aircraft, which concentrated operational functions and related infrastructure at NAS Lemoore. Consistent with previous analysis and decisions, consideration of any other bases to receive the two East Coast Strike Fighter squadrons would require significant infrastructure development costs to provide hangar, parking, and maintenance facilities for the specialized Strike Fighter aircraft. Further, the time required for infrastructure development would delay the relocation activities, which would thus decrease operational efficiency. Finally, the operational synergies gained by collocating all West Coast FA-18 squadrons at a single location would be lost by any split-basing alternative. The Navy considered split-basing at multiple locations on the West Coast; however, this alternative would require duplicating support services and facilities which would increase manpower, equipment, construction, and operating costs and was thus eliminated from further discussion. Relocating the two Strike Fighter squadrons to NAS Lemoore provides the necessary support without duplication of existing homebase support or Command and Control functions.

No Action Alternative

Under the No Action Alternative, two East Coast Strike Fighter squadrons would not relocate to NAS Lemoore, and the in-place transition of up to five squadrons from FA-18C to FA-18E/F aircraft would not occur. Related personnel changes and modifications to Hangars 1, 2, and 4 also would not occur. However, reduction of the FRS would still occur, eliminating 30 FRS aircraft compared to baseline conditions. Aircraft operations would decrease to 153,752, or a 27% reduction compared to baseline conditions. In addition, FRS reduction would decrease personnel loading at NAS Lemoore by 319 (-184 enlisted personnel, -55 officers, and -80 contractors). The No Action Alternative does not meet the purpose and need described above with regard to meeting West Coast carrier air wing deployment demands; however, it represents a change from baseline conditions and is carried forward for analysis in the EA.

ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

Direct, indirect, and cumulative environmental impacts that may occur with implementation of the Proposed Action would range from no impact to less than significant impact, with no significant impacts to the human environment. Five resource areas (vegetation, wetlands, topography and soils, archaeological resources, and visual resources) have been eliminated from detailed consideration in this EA because ground-disturbing activities would be limited to a small portion of existing pavement along the flight line under the Proposed Action; therefore, no disturbance to any of these resources is anticipated. While the No Action Alternative would not result in significant environmental impacts, it would also not fulfill the purpose and need of the Proposed Action and therefore is considered an unacceptable alternative. The environmental impacts of the Proposed Action are summarized below.

Airfields and Airspace

Strike Fighter relocation and in-place transition would add 26 aircraft and an associated 5,105 operations at NAS Lemoore. However, during this timeframe the FRS reduction would result in a decrease of 30 aircraft and an associated reduction of over 50,000 annual airfield operations, decreasing operations at the end state (2015) by approximately 24% compared to the baseline condition (2011). The net change would reduce the use of Class D airspace surrounding NAS Lemoore due to the decrease in average annual aircraft operations. This decrease does not consider reductions or fluctuations that may occur between years as a result of budget impacts, aircraft realignments, and changes in the number, composition, and duration of the different exercises. The Proposed Action would not require any modification to the current airspace or operational procedures, or any changes to the departure and arrival route structures. These routes were established by considering terrain and obstacle clearance, civil air traffic routes and available airspace, and navigational aid coverage, as well as aircraft operational characteristics similar to those of the FA-18E/F. There would be no impact to local civil and commercial airspace since the FA-18E/F would be operating within the same flight parameters currently used for NAS Lemoore airspace.

Noise

Strike Fighter relocation and in-place transition would add 26 aircraft and an associated 5,105 operations at NAS Lemoore. However, during this timeframe the FRS reduction would result in a decrease of 30 aircraft and an associated reduction of over 50,000 annual airfield operations, decreasing operations at the end state (2015) by approximately 24% compared to the baseline condition (2011). Although the total number of operations would decrease, FA-18E/F aircraft operations are somewhat louder than FA-18C/D operations. Therefore, the noise zones would remain approximately the same as current baseline conditions. When compared to baseline conditions, the Proposed Action noise levels of 65 decibel (dB) Community Noise Equivalent Level (CNEL) or greater would affect 1,445 fewer total acres (ac) (585 hectares [ha]). Off-base, only open space, agricultural, and unclassified lands would be exposed to noise levels of 65 dB CNEL or greater. A total of 10 additional people would be affected by noise levels above the 65 dB CNEL noise zone under the Proposed Action. Most of the current populations affected by Potential Hearing Loss noise levels greater than 80 dB CNEL would be exposed to the same or slightly reduced noise levels as a result of the Proposed Action. The mean number of speech interfering events across all receptors would be 3.1 and 2.3 per hour for windows open and closed, respectively, with an average decrease of 3 or 2 less events per hour relative to baseline windows open and closed respectively. With regard to speech interference related to classroom criteria, noise levels decrease slightly and no additional schools would exceed any of the classroom criteria. DoN occupational noise exposure prevention procedures such as hearing protection and monitoring would continue to be required at NAS Lemoore in compliance with all applicable Occupational Safety and Health Administration and DoN occupational noise exposure regulations. The proposed construction projects would occur on the flight line, between active runways, so that aircraft related noise would likely dominate construction noise. No residential areas or other sensitive receptors are located in the vicinity, and construction noise would be intermittent and short term (e.g., 12 months).

Air Quality

Air quality impacts were assessed by comparing the net change in operational emissions associated with the retirement of legacy FA-18C/D aircraft, relocation and transition of FA-18E/F aircraft, and associated construction activities. These emissions include: aircraft operations within the airfield and surrounding airspace environs under the 3,000 feet (ft) (914.4 meters [m]) above ground level mixing height; ground support equipment operations; fleet vehicles used for squadron operations and for on-base commuting from base housing; and personally owned vehicle use by commuting staff stationed at NAS Lemoore. Air emissions from aircraft also took into account the drawdown of the FA-18C/D FRS stationed at NAS Lemoore. This action, while not part of the Strike Fighter realignment, was included because their implementation would result in changes to operational mobile source emissions as compared to baseline (2011) operations.

Airfield operations at the completion of the realignment show a reduction in all pollutant emissions, with the exception of carbon monoxide (CO). These emissions are a result of the retirement/transition of FA-18C fleet aircraft and the addition of FA-18E/F aircraft. A total of 234 based fixed wing aircraft would be based at NAS Lemoore. CO emissions would increase as a result of the Proposed Action based on the aircraft population and operations beginning in 2014 (445 tons of CO per year) and reaching the static population and operations in 2015 (574 tons of CO per year). Although the Proposed Action would result in an overall increase in CO emissions, the local area meets CO attainment standards. While the increase in CO would produce a negative impact to the local ambient air quality, the increase in CO emissions would not be expected to alter the attainment status, and therefore would not be considered significant. The emissions of volatile organic compounds, nitrogen oxides, and particulate matter all decrease compared to the baseline so the Proposed Action is exempt from the Clean Air Act General Conformity Rule requirements. The Navy has prepared a Record of Non-Applicability for Clean Air Act Conformity.

Safety

Implementation of the Proposed Action would not measurably affect airfield safety at NAS Lemoore. NAS Lemoore maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to major mishaps, whether on- or off-base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The initial response element usually consists of the Fire Chief, who would normally be the first on-scene Commander, fire-fighting and crash-rescue personnel, medical personnel, security police, and crash-recovery personnel. The second phase is the mishap investigation, which is comprised of an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoD 2000).

To complement flight training, all DoN pilots use next generation state-of-the-art simulators extensively. Simulator training includes all facets of flight operations and comprehensive emergency procedures, which minimizes risk associated with mishaps due to pilot error. Additionally, highly trained maintenance crews perform routine inspections on each aircraft in accordance with Navy regulations, and maintenance activities are monitored by senior technicians to ensure the aircraft are equipped to withstand the rigors of operational and training events safely.

The Proposed Action would not result in any public health or safety impacts, including those related to aviation safety from a small decrease in operations at NAS Lemoore. Given the low likelihood for a mishap to occur and even lower likelihood for civilians to be impacted, the realignment would not be expected to have a significant impact to safety. The addition and relocation of FA-18E/F aircraft would not introduce a new activity within the NAS Lemoore airfield. Since the FA-18E/F is an existing airframe at the base, it would not require an update to response plans specific to the FA-18E/F and associated equipment, including the emergency and mishap response plans. As such, the NAS Lemoore airfield safety conditions would be similar to existing conditions. No significant safety impacts from the FA-18E/F operational training actions would be expected for NAS Lemoore airfield airspace.

With the slightly lower aircraft operations, the overall potential for bird/wildlife-aircraft strikes is not anticipated to be significantly different under the Proposed Action. FA-18E/F aircrews operating in NAS Lemoore airspace would follow procedures outlined in the NAS Lemoore Bird/Wildlife Aircraft Strike Hazard (BASH) Management Plan. Therefore, no significant BASH-related impacts would occur.

Land Use

The Proposed Action would include modifications to Hangars 1, 2, and 4. No additional facilities construction or modification projects are proposed. There would be no impacts to NAS Lemoore on- or off-base land use due to hangar renovation activities. In addition, the Accident Potential Zones at the airfield would not change.

Infrastructure and Utilities

Impacts to infrastructure and utilities at the end state scenario would potentially occur from the net increase of 262 military personnel (+236 enlisted, +26 officers) and 341 family members on-base, or approximately a 4% increase in the on-base population if all new Navy personnel and their family members live on-base. This 4% increase in the on-base population would translate to a 4% increase in utilities use. The existing utility infrastructure would be able to supply the increased demand. Assuming that all 262 military personnel and their families lived off-base, the increase in population would be less than 1% of that of Kings and Fresno counties. Therefore, there would not be any adverse impacts from the Proposed Action. No impacts are anticipated to occur to infrastructure and utilities from the transition of the type of aircraft stationed at NAS Lemoore or the 24% decrease in flight operations.

There also would be a decrease of approximately 80 contractors and 177 of their family members under the FRS reduction. As the contractors and their families live off-base, and some would possibly move out of the area, there would possibly be a decrease in demand for infrastructure and utilities off-base. Modifications to Hangars 1, 2, and 4 would potentially result in an increased demand for electricity and natural gas; however, these impacts would be offset somewhat from the installation of more modern, energy efficient systems. The hangar modifications would have no impact on water, wastewater, stormwater drainage, or solid waste management.

Since the existing utilities systems at NAS Lemoore operate under capacity, existing community services would be able to supply the increased demand. The base's total water demand would not exceed its contract with the Westlands Water District, and a potential reallocation of existing water would not cause a reduction in surface water availability for agricultural use. Therefore, there would not be adverse impacts from the Proposed Action. No impacts are anticipated to occur from the transition in the type of aircraft stationed at NAS Lemoore under the Proposed Action.

Socioeconomics

Socioeconomics impacts at the end state scenario would potentially occur from the net increase of 262 military personnel (+236 enlisted, +26 officers) and 341 family members on-base, or approximately a 4% increase in the on-base population (assuming all new Navy personnel and their family members reside on-base). Combined with the change in the number of family members for military and contractor personnel (603 military personnel and family members minus 80 civilian contractor positions and 177 of their family members), the study area would experience a maximum net gain of 346 people, or less than 1% of the study area population. Therefore, the Proposed Action would not result in any changes to short- or long-term regional population trends. The changes in personnel would also affect less than 1% of regional employment and income trends. The net increase of personnel at NAS Lemoore would result in approximately $9.1 million in salaries, and expenditures for proposed modifications to Hangars 1, 2, and 4 would be approximately $10 million.

The total population, minority population, and low-income population underlying 65 dB CNEL noise zones and greater would increase compared to the baseline condition. However, the proportion of minority population and low-income population exposed to aircraft noise would remain proportional relative to the total population. For all populations, the vast majority of the increased noise exposure would be in the 65-70 dB CNEL noise zone. There would be a decrease, or no change, to populations affected by the 70-85+ dB CNEL noise zones compared to baseline conditions.

Community Services

Community services impacts at the end state would potentially occur from a 4% increase in demand for community services on-base such as schools, fire protection, police protection, health services, and recreational facilities if all new personnel live on-base. This minor increase would not be expected to impact the capability of these services or exceed operational capacity. There would also be a decrease of approximately 80 contractors and 177 of their family members. As these contractors and their families live off-base, and would potentially move out of the area, this would likely offset any impacts to community services off-base.

Transportation

To provide a conservative analysis of potential traffic impacts, this analysis assumes that all military personnel would reside off-base and commute to and from NAS Lemoore on a daily basis. As such, a total of 182 daily round trips (or 364 total trips) would be added to the local transportation system. This number is based on the addition of 262 military personnel and subtraction of 80 contractor personnel since all contractors live off-base and would have commuted to NAS Lemoore. This would result in a 2.4% increase over existing conditions for the current base population of 7,600. It is likely that these trips would be dispersed somewhat with regard to accessing NAS Lemoore gates. In addition, military operations usually begin and end earlier in the day than typical peak hour commute times. As such, it is anticipated that the Proposed Action would have a less than significant effect on traffic and level of service of area roads.

Biological Resources

There would be no direct impacts to biological resources (i.e., wildlife, migratory birds, or threatened and endangered species) from the Proposed Action since there would be no new construction, and construction would be limited to modifications to existing hangars, which are located along the flight line. The footprint of any ground-disturbing activities would be limited to existing paved areas. Noise associated with aircraft operations would generally be similar to existing conditions; therefore, no impacts to wildlife, migratory birds, or threatened and endangered species are anticipated.

Water Resources

As there would be no new construction associated with the Proposed Action, there would be no effect on sedimentation, erosion, floodplains, and wetlands. The Proposed Action may result in a slight increase in the amount of water used for industrial and domestic purposes, but would have no direct impacts on surface or groundwater quality. The reduction in aircraft operations would reduce the potential for uncontrolled or unpermitted releases of hazardous substances, decreasing the potential for surface water contamination. NAS Lemoore would comply with established best management practices (BMPs) and programs for the management of hazardous substances and spill response. The existing water infrastructure is capable of accommodating the increase in personnel under the Proposed Action. Proposed surface disturbance is limited to a small portion of existing paved area, and personnel would continue implementation of BMPs; therefore, the Proposed Action would have no significant impact on surface or water resources at NAS Lemoore.

Cultural Resources

Hangars 1, 2, and 4, which date to 1959, would be directly impacted by facility modifications under the Proposed Action. These modifications would include interior renovation and modernization of all three hangars, including the addition of a second story to Hangars 2 and 4. Hangars 1, 2, and 4 are recommended not eligible for the National Register of Historic Places (NRHP), thus no historic properties would be affected, and no further steps would be required. A letter of concurrence on this finding was received from the California State Historic Preservation Officer (SHPO) and is provided in Appendix A.

Other impacts to historic structures from the Proposed Action are expected to be indirect and less than significant. There would be a small change in noise associated with the end state (Proposed Action and FRS reduction) as compared to existing conditions. The small decrease in noise would not impact the physical or NRHP integrity of historic structures at NAS Lemoore.

As no Traditional Cultural Properties have been identified within the boundaries of NAS Lemoore, no impacts to this resource type are anticipated as a result of the Proposed Action.

The DoN consulted with interested parties (Appendix A) regarding the proposed undertaking per 36 Code of Federal Regulations 800.4. No concerns were identified by interested parties in the course of consultation. A letter of consultation was sent by the DoN to the California SHPO on June 23, 2011 requesting concurrence with the finding that no historic properties would be affected from the Proposed Action (Appendix A). A letter of concurrence on this finding was received from the California SHPO and is provided in Appendix A.

Hazardous Materials and Waste

The Proposed Action would not result in significant impacts with regard to the handling, use, storage, or disposal of hazardous materials and waste at NAS Lemoore. NAS Lemoore would continue to comply with established BMPs and programs for the management of hazardous substances and spill response. Possible oil or other material spills from the aircraft would be minimized by appropriate management techniques such as requiring all equipment in good condition and properly maintained

Given the age of Hangars 1, 2, and 4, which were built in 1959 (DoN 2005a), the renovations may require disposal of small quantities of asbestos containing materials or lead based paint, which would be removed and disposed of in accordance with applicable federal, state, and local regulations, as outlined in the Hazardous Waste Management Plan (DoN 2005b).

Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous waste at NAS Lemoore, and implementation of the Proposed Action would not result in significant hazardous materials related impacts.

Since none of the Installation Restoration (IR) sites are located within 1,000 ft (304.8 m) of Hangar 1, 2, or 4, no impacts associated with IR sites would occur.

With incorporation of the appropriate procedures for handling of hazardous materials during renovation of Hangars 1, 2, and 4 and the application of BMPs for the management of hazardous substances and spill response at NAS Lemoore, the Proposed Action would have no significant impacts related to hazardous materials and waste.

NO ACTION ALTERNATIVE

The FRS reduction would result in a decrease of 30 aircraft and an associated reduction of about 55,000 annual airfield operations, decreasing operations at the end state (2015) by approximately 27% compared to the baseline condition (2011). The FRS reduction would also remove 239 military personnel, 80 contractors, and 488 associated family members from NAS Lemoore and possibly the region. Therefore, implementation would reduce impacts to resources at NAS Lemoore and the region compared to the baseline (2011), including airfields and airspace, noise, air quality, safety, land use, infrastructure and utilities, socioeconomics, community services, transportation, biological resources, water resources, cultural resources, and hazardous materials and waste. The No Action Alternative would also remove 319 jobs (military and contractor) associated with NAS Lemoore.

CUMULATIVE IMPACTS

Based on a review of past, present, and reasonably foreseeable actions at NAS Lemoore and the region (Fresno and Kings counties), it was determined that several actions be considered when analyzing the potential cumulative impacts of the actions. The projects listed in this section are those that have the greatest potential to cumulatively impact the resources assessed in this EA. These projects include relocation of VFA-86, potential Navy F-35C homebasing at NAS Lemoore, search and rescue, and several construction and master plan projects occurring at NAS Lemoore. Four non-Navy projects that have the potential for cumulative impacts include potential basing of F-15 aircraft at Fresno-Yosemite Airport, the California High-Speed Rail Line, the State Route 198/19th Avenue Interchange, and the Avenal power plant project.

Based on the analysis in this EA, the Proposed Action would contribute incrementally to cumulative impacts due to effects associated with aircraft operations (e.g., noise, air quality), personnel increases (e.g., infrastructure and utilities, socioeconomics, community services, transportation/traffic), and construction activities (e.g., air quality, socioeconomics, hazardous materials and waste). No impacts of the Proposed Action were found to be significant for any resource.

SUMMARY OF FINDINGS

The proposed realignment of the Strike Fighters at NAS Lemoore would not result in significant adverse direct, indirect, or cumulative environmental impacts, and no mitigation is proposed for the Proposed Action.

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ACRONYMS AND ABBREVIATIONS

ac	acres
ACM	asbestos containing material
afy	acre-feet per year
AGL	Above Ground Level
AICUZ	Air Installations Compatible Use Zone
BASH	Bird/Wildlife Aircraft Strike Hazards
BMPs	Best Management Practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm	centimeters
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	GHG emissions as CO_2 equivalent
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoN	Department of Navy
DWR	Department of Water Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FA	Fighter/Attack
FAA	Federal Aviation Administration
FCLP	Field Carrier Landing Practice
FRS	Fleet Replacement Squadron
ft	feet
ft^2	square feet
FY	Fiscal Year
gal	gallons
GCA	Ground Controlled Approach
GHGs	Greenhouse Gases
GWP	global warming potential
ha	hectares
HAP	Hazardous Air Pollutant
in	inches
INRMP	Integrated Natural Resources Management Plan
IR	Installation Restoration
JLUS	Joint Land Use Study
JSF	Joint Strike Fighter
km	kilometers
kV	kilovolt
LBP	lead based paint
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Noise Level
m	meters
m^2	square meters
MBTA	Migratory Bird Treaty Act
MBTU	Million British Thermal Units
mgpd	million gallons per day
mgy	million gallons per year
mi	miles
MSAT	mobile source air toxic
msl	mean sea level
MWh	megawatt hours
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIPTS	Noise-Induced Permanent Threshold Shift
NO_2	nitrogen dioxide
NO_x	Nitrous Oxides
NPDES	National Pollutant Discharge

	Elimination System
NRHP	National Register of Historic Places
PCB	polychlorinated biphenyl
PHL	Potential Hearing Loss
PL	Public Law
PM_{10}	particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 micrometers in diameter
ROI	Region of Influence
SAR	Search and Rescue
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
SR	State Route
TCP	Traditional Cultural Properties
TGO	touch-and-go
tpy	tons per year
U.S.	United States
USC	United States Code
USCB	U.S. Census Bureau
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VFA	Strike Fighter
VFR	visual flight rules
VOC	volatile organic compound

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

Naval Air Station (NAS) Lemoore is the West Coast Master Jet Base, hosting the entire United States (U.S.) Navy West Coast Strike Fighter community. NAS Lemoore is located in the central portion of the San Joaquin Valley, approximately 80 miles (mi) (129 kilometers [km]) east of the Pacific Ocean, in Kings County and Fresno County, California (Figure 1.1-1). NAS Lemoore encompasses 18,784 acres (ac) (7,602 hectares [ha]) of Department of Navy (DoN)-owned land of which 15,744 ac (6,372 ha) are within Kings County and 3,040 ac (1,230 ha) are within Fresno County.

The mission of NAS Lemoore and of the Commander, Strike Fighter Wing, U.S. Pacific Fleet, is to support Navy fleet carrier strike fighter squadrons. A strike fighter is a multi-role combat aircraft designed to operate primarily in the air-to-surface attack role while also incorporating certain performance characteristics of a fighter aircraft.

1.2 THE PROPOSED ACTION

The DoN proposes to realign strike fighter community assets at NAS Lemoore to more efficiently support operational requirements in the Pacific. This includes:

- Relocating two 12-plane, East Coast FA-18E/F Super Hornet squadrons to NAS Lemoore; and
- Performing the in-place transition of up to five Strike Fighter squadrons currently based at NAS Lemoore from older FA-18C Hornet aircraft to newer FA-18E/F Super Hornets.

The proposed realignment of Strike Fighter squadrons at NAS Lemoore is planned to be accomplished in the 2012-2015 timeframe. The Proposed Action would relocate two existing Fleet FA-18E/F squadrons and transition up to five existing FA-18C squadrons to FA-18E/F squadrons, resulting in an additional 26 Fleet aircraft, 420 enlisted personnel, and 81 officers at NAS Lemoore (Section 2.1). Modifications to Hangars 1, 2, and 4 would be required to accommodate FA-18E/F aircraft, but no new facilities construction, and no changes to ranges or airspace, are proposed. During the same timeframe as the Proposed Action, the Navy also plans to reduce the Fleet Replacement Squadron (FRS) at NAS Lemoore to eliminate the FA-18C/D aircraft from the FRS. This action is not part of the Proposed Action, but reduces the number of FRS aircraft at NAS Lemoore by 30, from 74 to 44 aircraft, during the 2012-2013 timeframe. Taken into context of the independent aircraft reduction action (i.e., FRS) occurring at NAS Lemoore during the same period, this would result in an overall net decrease of four aircraft and a net increase of approximately 182 personnel (+236 enlisted, +26 officers, -80 contractors) stationed at NAS Lemoore by the end state year of 2015.

1.3 PURPOSE AND NEED FOR PROPOSED ACTION

The purpose of the Proposed Action is to provide Strike Fighter community assets needed to meet the changing operational demand in the Pacific and to mitigate shortfalls in Strike Fighter community assets due to the age of the FA-18C Hornet aircraft.

Figure 1.1-1. Regional Map of NAS Lemoore

Relocation of two East Coast Strike Fighter squadrons is needed to geographically align Strike Fighter assets with current carrier air wing deployment demands. The current Strike Fighter basing was derived in 1998 to support operational scheduling at that time, but does not match current and planned carrier air wing deployment schedules. Currently, to meet Global Force Management scheduling requirements, two East Coast squadrons must conduct multiple cross-continental U.S. transits for multiple deployments and their associated work-up cycles to train and certify with the aircraft carrier and Carrier Strike Group. These cross-continental U.S. transits place an unnecessary burden on East Coast squadrons and their sailors, increase operational costs, use valuable aircraft service life on extended transits, and increase the time squadron personnel are away from home.

Relocating the East Coast Strike Fighter squadrons to NAS Lemoore would provide necessary support without duplication of existing homebase support functions and would realign the Fleet with east/west operational commitments. Relocating these squadrons to any other West Coast base would incur considerable costs, increase operational risk associated with potential timeline impacts of relocation, and reduce operational synergies with the Strike Fighter community.

The in-place transitions of up to five Strike Fighter squadrons from FA-18C Hornet to FA-18E/F Super Hornet squadrons is needed to address the projected shortfall in Strike Fighter aircraft due to age of FA-18C Hornets, to align Strike Fighter community assets to meet carrier air wing deployment schedules, and to ensure sufficient Strike Fighter capability is present in the short term. The in-place transitions would be a temporary measure to remain operationally efficient until these 10-plane squadrons are eventually transitioned into the F-35C Joint Strike Fighter (JSF) in the 2015-2025 timeframe.

Modifications to Hangars 1, 2, and 4 are needed because currently no available hangars at NAS Lemoore are configured properly to support FA-18E/F squadrons. To accommodate FA-18E/F squadrons, modifications would be needed to Hangars 1, 2, and 4 to provide command administrative space and operational squadron space and to provide additional space for ready room, brief and de-brief, seat maintenance, flight equipment, and administrative personnel.

1.4 THE ENVIRONMENTAL REVIEW PROCESS

1.4.1 The National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 requires consideration of environmental issues in federal agency planning and decision making. Under NEPA, federal agencies must prepare an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) for any federal action, except those actions that are determined to be "categorically excluded" from further analysis.

An EIS is prepared for those federal actions that may significantly affect the quality of the natural or human environment. An EA is a concise document that provides sufficient analysis for determining whether the potential environmental impacts of a Proposed Action are significant, resulting in the preparation of an EIS, or not significant, resulting in the preparation of a Finding of No Significant Impact.

The intent of this EA is to assess the potential environmental effects of realigning (relocation and in-place transition) Strike Fighter aircraft, changing aircraft operations and personnel, and modifications to Hangars 1, 2, and 4 at NAS Lemoore.

1.4.2 Scope of Analysis

The primary focus of this EA is air operations, noise, air quality, and land use because these are the main issues relevant to realigning aircraft and changing aircraft operations. Ground-disturbing activities under the Proposed Action would be limited to a small portion of existing pavement along the flight line; therefore, five resource areas (vegetation, wetlands, topography and soils, archaeological, and visual resources) have been eliminated from detailed consideration. There would be changes in personnel levels, thus, other analyses include socioeconomics, community services, safety, infrastructure and utilities, traffic, biological resources (wildlife, vegetation, and sensitive species), water resources, cultural resources, and hazardous materials and waste.

1.4.2.1 Environmental Resources

This EA provides the basis for well-informed decisions to be made before the Proposed Action begins. There are 13 resource areas that are evaluated in detail in this EA.

- Airfields and Airspace
- Noise
- Air Quality
- Safety
- Land Use
- Infrastructure and Utilities
- Socioeconomics (and Environmental Justice)
- Community Services
- Transportation
- Biological Resources
- Water Resources
- Cultural Resources
- Hazardous Materials and Waste

Some resources were eliminated from detailed analysis in the EA because the Proposed Action would not affect these resources or would not result in noticeable effects to these resources. The resources eliminated from detailed analysis include:

- **Vegetation** - Ground-disturbing activities under the Proposed Action would be limited to a small, paved area; therefore, no impacts to vegetation resources would occur.
- **Wetlands** - Ground-disturbing activities under the Proposed Action would be limited to a small, paved area; therefore, no impacts to wetlands are anticipated.
- **Topography and Soils** - Ground-disturbing activities under the Proposed Action would be limited to a small, paved area; therefore, no impacts to topography or soils are anticipated.
- **Archaeological Resources** - Ground-disturbing activities under the Proposed Action would be limited to a small, paved area; therefore, no impacts to archaeological resources would occur.
- **Visual Resources** - Because there are limited ground-disturbing activities and facility modifications are both interior and exterior renovations and additions, there would be a negligible change to visual resources. The Proposed Action would not increase the number of take-offs and landings, which are already conducted as part of current training activities. No

impacts on scenic vistas, visual quality, scenic highways, or sources of light or glare would result from the Proposed Action.

1.4.3 Public Involvement

The Navy released the Draft EA for public review on July 26, 2011 in order to inform the public of the Proposed Action and allow for opportunity for public comment. The Draft EA public comment period began with the Notice of Availability that was published in the Federal Register indicating the availability of this Draft EA and locations of public review copies. This information was also published in The Fresno Bee, The Hanford Sentinel, and Vida en el Valle (Spanish language newspaper). A press release was also distributed to television outlets serving the area surrounding NAS Lemoore. Notice of Availability letters or postcards were also sent directly to elected officials and known interest groups.

Copies of the Draft EA were placed in the following public locations for review:

- Kings County Library
  Lemoore Branch Library
  457 “C” Street, Lemoore, California 93245
- Kings County Library
  Hanford Branch Library (Main)
  401N. Douty Street, Hanford, California 93230
- Fresno County Public Library
  Central Library
  2420 Mariposa Street, Fresno, California 93721
- Riverdale Branch Library
  20975 Malsbary, Riverdale, California 93656
- West Hills Community College
  555 College Avenue, Lemoore, California 93245

The Draft EA was also made available on the Navy Region Southwest Website (www.cnic.navy.mil/cnrsw). Spanish language informational materials were also available on the website. The public review period ended on August 29, 2011.

During the public review period, additional public outreach efforts were also completed:

- July 26, 2011 – The NAS Lemoore Commanding Officer contacted key stakeholders by telephone.
- August 1, 2011 –The NAS Lemoore Commanding Officer, Community Plans and Liaison Officer, Judge Adjutant General, and Public Affairs Officer met with the group known as “Friends of NAS Lemoore” to provide an update on the EA.
- August 4, 2011 – The NAS Lemoore Community Plans and Liaison Officer attended the public scoping meeting for the ongoing EIS for the Proposed F-15 Aircraft Conversion at the 144^{th} Fighter Wing, California Air National Guard, and discussed this EA with the 144^{th} Fighter Wing Commander.
- August 10, 2011 – The NAS Lemoore Community Plans and Liaison Officer presented information on this EA to the Kings County Association of Governments Technical Advisory Committee, including instructions on how to submit written comments on the EA.

- August 17, 2011 – The Lemoore City Council adopted Resolution #2011-32, unanimously supporting this EA.
- August 19, 2011 – The NAS Lemoore Public Affairs Officer presented information on this EA to the Hanford Chamber of Commerce, including instructions on how to submit written comments on the EA.

1.4.3.1 Public Comments

A total of eight comments were received during the public review period. All comments were written in English and expressed support for the Proposed Action and did not raise concerns with regard to the Proposed Action or activities at NAS Lemoore. Five of these letters indicated that local governments/entities have adopted resolutions in support of the Proposed Action at NAS Lemoore: the Kings County Board of Supervisors (Resolution No. 11-048); the City of Lemoore (Resolution No. 2011-32); the City of Corcoran (Resolution No. 2584); the Kings County Economic Development Corporation (Resolution No. 67); and the West Hills Community College District (Resolution CO-6). In addition, concurrence letters were received from the San Joaquin Valley Air Pollution Control District (SJVAPCD) and from the California State Historic Preservation Officer (SHPO) (Appendix A). Sections 4.3.1.1 and 6.1.2.2 of this EA have been updated to address comments provided by the SJVAPCD.

1.4.4 Related Environmental Documents

A number of environmental studies and assessments have been conducted at NAS Lemoore. These have been considered in the preparation of this document and are summarized below.

1.4.4.1 U.S. Navy F-35C West Coast Homebasing EIS

An EIS is being prepared to identify and evaluate the potential environmental consequences associated with providing facilities and functions to homebase the F-35C JSF aircraft on the west coast of the U.S. NAS Lemoore is one of the locations being considered for homebasing of the F-35C. On January 28, 2011, the Navy published a Notice of Intent to prepare this EIS in the Federal Register and announced public scoping meetings. The 45-day scoping period for the project began on January 28, 2011 and ended on March 14, 2011. The Draft EIS is currently being prepared. Public and agency comments received during the scoping period are being addressed in the EIS.

Under this proposed action, a total of seven Fleet FA-18 aircraft squadrons would progressively transition from FA-18 aircraft to the more advanced F-35C JSF beginning in 2015 and an F-35C FRS would be established. This transition is expected to be completed by 2025. The Navy will evaluate two basing options (plus a No Action Alternative) to efficiently and economically transition the F-35C aircraft into the fleet. The Proposed Action would provide facilities and functions to support homebasing of one hundred (100) F-35C aircraft (seven squadrons of 10 aircraft each, plus up to 30 aircraft in the FRS) at the selected west coast homebasing location. If NAS Lemoore is selected as the West Coast homebase for the F-35C JSF, all of the FA-18C and a portion of FA-18E/F aircraft currently homebased at NAS Lemoore would be replaced by F-35C and a new F-35C FRS would be established to complement the existing FA-18E/F FRS. The selected homebase installation may require some construction, facility renovations, and utility upgrades in order to accommodate the new aircraft. Facility construction and modification would occur prior to and continue throughout arrival of F-35C aircraft. The F-35C would operate within existing airspace and at existing training ranges.

The Proposed Action in the F-35C West Coast Homebasing EIS is independent of and separate from the Strike Fighter Realignment EA. It is in the early data collection phase, and will not be complete before the Strike fighter Realignment Proposed Action would be well underway. Specific requirements associated with quantity and quality of flight operations, manpower, equipment and facilities are still in development and will not be available in time to support this Proposed Action.

1.4.4.2 NEPA Record of Categorical Exclusion for the Relocation of Strike Fighter Squadron Eighty Six to NAS Lemoore, California

This Record of Categorical Exclusion to relocate Strike Fighter squadron Eighty Six (VFA-86) was approved in 2010. It analyzed the potential impacts from the relocation of VFA-86 from Marine Corps Air Station Beaufort, South Carolina to NAS Lemoore to provide better geographic alignment of Strike Fighter assets in support of deployment demands. It included the relocation to NAS Lemoore of one 10-plane FA-18C squadron including 22 officers and 195 enlisted personnel and the in-place transition of that squadron to a 10-plane FA-18E squadron including 22 officers and 191 enlisted personnel. Aircraft and personnel associated with VFA-86 are analyzed as part of the baseline operations at NAS Lemoore for the purpose of this EA.

1.4.4.3 EIS on the Development of Facilities to Support Basing U.S. Pacific Fleet FA-18E/F Aircraft on the West Coast of the U.S. (West Coast FA-18E/F EIS)

The Record of Decision for the Super Hornet Homebasing West Coast FA-18 E/F EIS was signed in 1998. This EIS analyzes impacts from the homebasing of 164 FA-18E/F aircraft, an associated increase of 1,856 military personnel and 3,044 family members, facilities construction in support of the homebasing, and provision of associated training functions at NAS Lemoore (preferred alternative) or Naval Air Facility El Centro. The Proposed Action included an additional 92 aircraft, and an associated increase of 1,856 military personnel and 3,044 family members, at NAS Lemoore. The Record of Decision selected the preferred alternative of NAS Lemoore as opposed to Naval Air Facility El Centro. In addition to aircraft, personnel, and training, the Proposed Action increased Navy activity and flight operations. The EIS provided analysis for conditions that are similar to those which exist today.

1.4.4.4 Final EIS for Base Realignment of NAS Lemoore

The Record of Decision for the NAS Miramar and NAS Lemoore Base Realignment and Closure EIS was signed in 1994. The EIS analyzes impacts from the relocation of facilities and operations from NAS Miramar to NAS Lemoore. The EIS addressed construction and operations impacts of all Defense Base Closure and Realignment Act military construction projects at NAS Lemoore, as well as associated flight operations increases and impacts from added personnel. The relocation consisted of 56 F-14 aircraft, 16 E-2 aircraft, 12 FA-18 aircraft, related facilities, 3,993 military personnel, and 484 civilians. The relocation to NAS Lemoore resulted in an 84% increase in military personnel and a 57% increase in civilian personnel. As a result of the relocation, the number of aircraft supported by NAS Lemoore increased from 179 in 1990 to 251 in 1997, an approximate 40% increase. Associated aircraft sorties increased from 20,500 to 27,800, an increase of 36%. A sortie is defined as a takeoff, performance of a mission, and a landing, to include a minimum of two operations.

1.4.4.5 Lemoore Military Operating Area EA

The Finding of No Significant Impact for the Lemoore Military Operating Area EA was signed in 2006. This EA analyzed the potential impacts associated with establishing and training in proposed airspace at and in the vicinity of NAS Lemoore. The subject airspace consists of five Military Operations Areas up to 18,000 feet (ft) (5486 meters [m]) above mean sea level (msl) and would be 30 nautical mi (56 km) by 70 nautical mi (130 km) in size. The Military Operations Areas are currently used for aircraft training at NAS Lemoore. The Proposed Action enhances the ability of NAS Lemoore to support DoN fleet carrier Strike Fighter squadrons and the operations training of personnel, maintains the proficiency of personnel who are already qualified, and creates frontline Strike Fighter capability.

1.4.4.6 Categorical Exclusion for Search and Rescue at NAS Lemoore

A Categorical Exclusion is being prepared to address addition of two MH-60 helicopters and associated personnel, as well as construction associated with Search and Rescue (SAR) operations at NAS Lemoore schedule for Fiscal Year (FY) 13. Personnel included with the SAR function would include a 42 person contract maintenance unit. This project would involve the construction of a 6,000 square foot (ft^2) (557 square meter [m^2] addition at the northern end of Building 180 and would include space for SAR helicopter hangar maintenance and administrative services. Structural features for the addition would include a concrete slab, spread footings on engineered compacted fill material, structural concrete wall and steel frame with insulated metal siding, and a steel truss system supporting a membrane roof system supported on metal roof decking with rigid insulation.

1.4.5 Related Planning Documents

1.4.5.1 Air Installations Compatible Use Zone Plan

The NAS Lemoore Air Installations Compatible Use Zone (AICUZ) Plan was finalized and approved in 2010. This report helps guide a variety of planning efforts to provide smart growth opportunities in the San Joaquin Valley and avoid conflicts with current and future military operations at NAS Lemoore. The AICUZ Program recommends community land uses that are compatible with noise levels, accident potential, and flight clearance requirements associated with military airfield operations. A goal of the AICUZ program is that the information will be incorporated into local, county, and regional planning.

As required by Office of the Chief of Naval Operations Instruction (OPNAVINST) 11010.36C, the AICUZ considers expected changes in mission, aircraft, operational levels, and other aspects that may occur within the next ten-year planning cycle. The original AICUZ for NAS Lemoore was prepared in 1978 and was last updated in 2010. The AICUZ Plan presents and evaluates:

- How aircraft noise zones are determined, what changes have occurred, and what measures have been implemented by the Navy in response to noise complaints.
- Noise levels at specific geographic points in the vicinity of NAS Lemoore.
- Aircraft safety issues, including changes in the accident potential zones (APZ) and pilot safety.
- Compatibility of surrounding land uses and aircraft operations, and
- The Navy's recommendations for promoting land-use compatibility consistent with the goals of the AICUZ Program.

1.4.5.2 Joint Land Use Study

The Joint Land Use Study (JLUS) was a collaborative effort initiated in 2009 by the communities in the vicinity of NAS Lemoore to develop a comprehensive compatible development plan for the region. The decision was made to conduct a JLUS to respond to the rapid population growth in California's Central

Valley region and the potential for conflicts among regional stakeholders that might arise from this growth. While not a Navy action, as a stakeholder, NAS Lemoore participated in this study to achieve the following goals:

- Identify land use issues in the region that might impact the operational utility of NAS Lemoore;
- Identify actions the City of Lemoore, Kings County, and Fresno County can pursue to ensure that incompatible development does not impact the operational utility of NAS Lemoore; and
- Create an action plan to guide future planning from which all involved parties will benefit.

1.5 ORGANIZATION OF EA

This EA identifies, evaluates, and documents the environmental effects of the Proposed Action and No Action Alternative on potentially affected environmental and economic resources.

- **Chapter 1** provides background information relevant to the Proposed Action, and discusses its purpose and need.
- **Chapter 2** describes the Proposed Action, alternatives considered, and the No Action Alternative.
- **Chapter 3** describes the baseline conditions (i.e., the conditions against which potential impacts of the Proposed Action and alternatives are measured) for each of the potentially affected resources.
- **Chapter 4** describes the potential environmental consequences to the resources described in Chapter 3.
- **Chapter 5** describes cumulative impacts.
- **Chapter 6** describes other considerations required by NEPA.
- **Chapter 7** contains references.
- **Chapter 8** contains a list of the persons and agencies contacted during the preparation of this document.
- **Chapter 9** lists the preparers of this document.

1.6 CHANGES FROM THE DRAFT EA TO FINAL EA

The following updates have been made to the Final EA.

- Chapter 1
  - Public outreach activities associated with the EA process and ongoing public outreach by NAS Lemoore have been included in Section 1.4.
- Chapter 3
  - Based on input from NAS Lemoore personnel, emissions calculations for aircraft engine testing activities and aircraft departure profiles were revised slightly to more accurately reflect these activities. These changes affected emissions for airfield operations in Table 3.3-2. However, these changes did not cause emissions at NAS Lemoore to exceed any thresholds.

- Chapter 4
    - A description of the Proposed Action's compliance with SJVAPCD Rules 4102, 4601, and 4641 has been added to Section 4.3.1.1.
    - Based on input from NAS Lemoore personnel, emissions calculations for aircraft engine testing activities and aircraft departure profiles were revised slightly to more accurately reflect these activities. These changes affected emissions for airfield operations in Tables 4.3-1, 4.3-2, 4.3-3, 4.3-4, 4.3-5. However, these changes did not cause emissions at NAS Lemoore to exceed any thresholds.
    - An explanation for the difference between total acreage affected by noise presented in Section 4.2.1.1 (Noise) and Section 4.5.1 (Land Use) has been added to Section 4.5.1.
    - An explanation has been added to Section 4.9.1 indicating that the Proposed Action would result in a 2.4% increase in base personnel loading.
    - Section 4.12.1.1 has been updated to indicate the California SHPO has provided a concurrence letter on the finding that no historic properties would be affected by the Proposed Action.
- Chapter 5
    - Section 5.3.12 has been updated to indicate the California SHPO has provided a concurrence letter on the finding that no historic properties would be affected by the Proposed Action.
- Chapter 6
    - A description of the Proposed Action's consistency with SJVAPCD Rules 4102, 4601, and 4641 has been added to Section 6.1.2.2.

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

2.1 DESCRIPTION OF PROPOSED ACTION

The Proposed Action would relocate two Fleet FA-18E/F squadrons from the East Coast to NAS Lemoore and transition five existing FA-18C squadrons to FA-18E/F squadrons at NAS Lemoore, resulting in an additional 26 aircraft, 420 enlisted personnel, and 81 officers at NAS Lemoore. East Coast Strike Fighter squadrons would be identified based on operational availability to execute the relocation to NAS Lemoore, tentatively planned to occur in 2014. The timing of the in-place transitions is dependent on FA-18E/F acquisition schedules and the availability of training resources, and is assumed to be 2013-2015. The in-place transitions would be a temporary measure until these 10-plane squadrons are eventually transitioned into the F-35C during the 2015-2025 timeframe. Transitions from FA-18 to F-35C are not part of this Proposed Action and will be evaluated in separate NEPA documentation. Modifications to Hangars 1, 2, and 4 would be required (Figure 2.1-1), but no new facilities, and no changes to ranges or airspace, are proposed.

Specifically, the proposed realignment would consist of the following primary actions:

- Two East Coast VFA squadrons (designated VFA-R1 and VFA-R2) arrive at NAS Lemoore in 2014 as a 12-plane FA-18E squadron and a 12-plane FA-18F squadron, respectively.
- Three existing VFA squadrons (designated VFA-T1, VFA-T2, and VFA-T3) transition from 10-plane FA-18C squadrons to 10-plane FA-18E squadrons in 2013.
- One existing VFA squadron (designated VFA-T4) transitions from a 10-plane FA-18C squadron to a 10-plane FA-18E squadron in 2014.
- One existing VFA squadron (designated VFA-T5) transitions from a 10-plane FA-18C squadron to a 12-plane FA-18F squadron in 2015.

During the same timeframe of the Proposed Action, the Navy also plans to reduce the FRS at NAS Lemoore to eliminate the FA-18C/D aircraft from the FRS. This action is not part of the Proposed Action, but reduces the number of FRS aircraft at NAS Lemoore by 30 during the 2012-2013 timeframe. Therefore, while the Proposed Action would add 26 Fleet aircraft compared to baseline, defined as the current state of NAS Lemoore in 2011, the FRS reduction would eliminate 30 FRS aircraft compared to baseline, for an overall net reduction from 238 to 234 Strike Fighter aircraft at NAS Lemoore in the end state year (2015). Combined actions at NAS Lemoore would include a net reduction of four aircraft, a net increase of approximately 182 military and civilian personnel (+236 enlisted; +26 officers; -80 contractors), and modifications to Hangars 1, 2, and 4. Between the baseline state in 2011 and the end state in 2015, the FRS reduction would reduce NAS Lemoore airfield operations by 55,669, while the Proposed Action would add 5,105 operations. As such, NAS Lemoore airfield operations would decrease from 209,421 in 2011 (baseline) to 158,858 in 2015 (end state), a 24% decrease in flight operations.

2.1.1 Aircraft Loading at NAS Lemoore

NAS Lemoore hosts more than 40 aviation tenants, including Commander Strike Fighter Wing, U.S. Pacific Fleet, which comprises seven Fleet FA-18C squadrons and eight Fleet FA-18E/F squadrons. In addition, NAS Lemoore hosts an FRS (VFA-122/125) consisting of FA-18C/D/E/F aircraft.

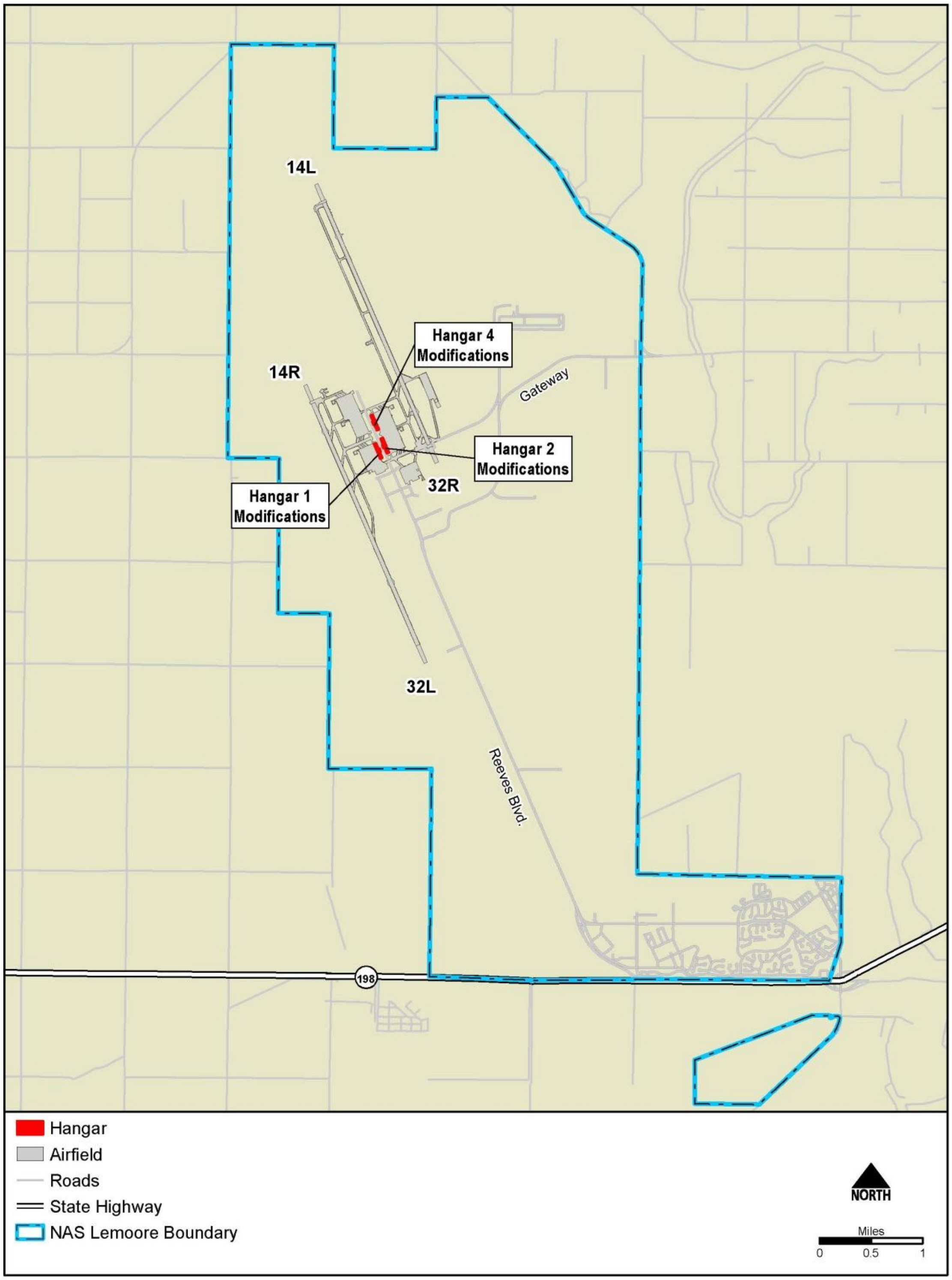

Figure 2.1-1. NAS Lemoore and Location of Hangars 1, 2, and 4

The FA-18C/D Hornet is the older variant, twin-engine, multi-mission fighter/attack (FA) aircraft that can operate from either aircraft carriers or land bases. The "C" has a single-seat, while the "D" is a twin seat version. The FA-18E/F Super Hornet is the newer variant, twin-engine, multi-mission FA aircraft that fulfills the same types of roles as the C/D models. The "E" has a single-seat, while the "F" is a twin seat version.

Table 2.1-1 provides a detailed breakdown of current aircraft and personnel loading by squadron for the baseline year of 2011. The 15 Fleet squadrons based at NAS Lemoore account for 164 aircraft and the FRS consists of 74 aircraft for a total of 238 aircraft under baseline conditions.

Table 2.1-1. Baseline (2011) Aircraft and Personnel Loading at NAS Lemoore

Squadron[1]	T/M/S[2]	# of Aircraft	Enlisted	Officers	Contractors
Fleet Squadrons					
VFA-T1	FA-18C	10	195	22	0
VFA-T2	FA-18C	10	195	22	0
VFA-T3	FA-18C	10	195	22	0
VFA-T4	FA-18C	10	204	22	0
VFA-T5	FA-18C	10	195	22	0
VFA-C1	FA-18C	10	195	22	0
VFA-C2	FA-18C	10	195	22	0
	Total "Cs"	**70**	**1,374**	**154**	**0**
VFA-E1	FA-18E	10	191	22	0
VFA-E2	FA-18E	12	204	23	0
VFA-E3	FA-18E	12	204	23	0
VFA-E4	FA-18E	12	204	23	0
	Total "Es"	**46**	**803**	**91**	**0**
VFA-F1	FA-18F	12	218	40	0
VFA-F2	FA-18F	12	218	40	0
VFA-F3	FA-18F	12	218	40	0
VFA-F4	FA-18F	12	218	40	0
	Total "Fs"	**48**	**872**	**160**	**0**
TOTAL FLEET		**164**	**3,049**	**405**	**0**
Fleet Replacement Squadron (FRS)					
VFA-122/125[3]	FA-18C	20	NA[4]	NA[4]	NA[4]
	FA-18D	10	NA[4]	NA[4]	NA[4]
	FA-18E	13	NA[4]	NA[4]	NA[4]
	FA-18F	31	NA[4]	NA[4]	NA[4]
	TOTAL FRS	**74**	**584**	**115**	**191**
Baseline Total					
		238	**3,633**	**520**	**191**

Notes:

[1] Actual Squadron designations are not used in this EA because actual squadrons have not yet been identified for transitions in place or for relocation. The squadron naming convention is as follows: T1 through T5 designate existing FA-18C squadrons that would transition in place, once identified, under the Proposed Action. C1 and C2 are two FA-18C squadrons that would remain at NAS Lemoore under the Proposed Action. E1 through E4 are four existing FA-18E squadrons that would remain at NAS Lemoore under the Proposed Action. F1 through F4 are four existing FA-18F squadrons that would remain at NAS Lemoore under the Proposed Action.

[2] T/M/S - type/model/series

[3] VFA-122/125 designates the existing FRS at NAS Lemoore, which is a combined squadron that consists of FA-18C/D/ E/F aircraft.

[4] Personnel supporting the FRS are consolidated into an FRS total.

Table 2.1-2 provides a detailed breakdown of aircraft and personnel loading by squadron for the end state year of 2015. With regard to aircraft loading, the Proposed Action would add two Fleet FA-18E/F squadrons from the East Coast (designated as VFA-R1 and VFA-R2) to NAS Lemoore, resulting in 24 additional aircraft at NAS Lemoore. The Proposed Action would also transition up to five existing FA-18C squadrons to five FA-18E/F squadrons (designated as VFA-T1, T2, T3, T4, and T5), resulting in the addition of 2 more aircraft by 2015. Overall, the Proposed Action would result in an additional 26 Fleet Squadron aircraft compared to baseline conditions. By 2015, NAS Lemoore Fleet Squadron composition would change from seven FA-18C and eight FA-18E/F squadrons to two FA-18C squadrons and fifteen FA-18E/F squadrons.

Table 2.1-2. End State (2015) Aircraft and Personnel Loading at NAS Lemoore

Squadron[1]	T/M/S[2]	# of Aircraft	Enlisted	Officers	Contractors
Fleet Squadrons					
VFA-C1	FA-18C	10	195	22	0
VFA-C2	FA-18C	10	195	22	0
	Total "Cs"	**20**	**390**	**44**	**0**
VFA-E1	FA-18E	10	191	22	0
VFA-E2	FA-18E	12	204	23	0
VFA-E3	FA-18E	12	204	23	0
VFA-E4	FA-18E	12	204	23	0
VFA-T1	FA-18E	10	191	22	0
VFA-T2	FA-18E	10	191	22	0
VFA-T3	FA-18E	10	191	22	0
VFA-T4	FA-18E	10	191	22	0
VFA-R1	FA-18E	12	204	23	0
	Total "Es"	**98**	**1,771**	**202**	**0**
VFA-F1	FA-18F	12	218	40	0
VFA-F2	FA-18F	12	218	40	0
VFA-F3	FA-18F	12	218	40	0
VFA-F4	FA-18F	12	218	40	0
VFA-T5	FA-18F	12	218	40	0
VFA-R2	FA-18F	12	218	40	0
	Total "Fs"	**72**	**1,308**	**240**	**0**
	TOTAL FLEET	**190**	**3,469**	**486**	**0**
Fleet Replacement Squadron (FRS)					
VFA-122/125[3]	FA-18E	13	NA[4]	NA[4]	NA[4]
	FA-18F	31	NA[4]	NA[4]	NA[4]
	TOTAL FRS	**44**	**400**	**60**	**111**
End State Total					
		234	**3,869**	**546**	**111**

Notes:
[1] Actual squadron designations are not used in this EA because actual squadrons have not yet been identified for transitions in place or for relocation. The squadron naming convention is as follows: R1 and R2 designate two East Coast squadrons (one FA-18E and one FA-18F) that would relocate to NAS Lemoore under the Proposed Action. T1 through T5 designate existing FA-18C squadrons that would transition in place, once identified, under the Proposed Action. C1 and C2 are two FA-18C squadrons that would remain at NAS Lemoore under the Proposed Action, eventually transitioning directly to F-35C squadrons. E1 through E4 are four existing FA-18E squadrons that would remain at NAS Lemoore under the Proposed Action. F1 through F4 are four existing FA-18F squadrons that would remain at NAS Lemoore under the Proposed Action.
[2] T/M/S is type/model/series
[3] VFA-122/125 designates the end state FRS at NAS Lemoore, which is a combined squadron that would consist of FA-18E/F aircraft.
[4] Personnel supporting the FRS are consolidated into an FRS total.

The relocations are tentatively planned for 2014. The timing of the in-place transitions is dependent on FA-18E/F acquisition schedules and the availability of training resources. These transitions are anticipated to occur in 2013 (T1, T2, and T3), 2014 (T4), and 2015 (T5). It is important to note that the in-place transitions would be a temporary measure until these 10-plane squadrons are eventually transitioned into the F-35C JSF during the 2015-2025 timeframe. Transition activities from FA-18 to F-35C in the future are not part of this Proposed Action and will be evaluated by the Navy in separate NEPA documentation.

During the same timeframe as the Proposed Action, the Navy also plans to reduce the FRS at NAS Lemoore to eliminate FA-18C/D aircraft from the FRS. This action is not part of the Proposed Action, but reduces the number of FRS aircraft at NAS Lemoore by 30 in the 2012-2013 timeframe.

Therefore, while the Proposed Action would add 26 Fleet aircraft compared to baseline, the FRS reduction would eliminate 30 FRS aircraft compared to baseline, reducing the total number of Strike Fighter aircraft at NAS Lemoore from 238 in the baseline year to 234 in the end state year, a net reduction of 4 aircraft. Table 2.1-3 shows total aircraft loading by year for 2011 (baseline) through 2015. As shown in this table, aircraft loading at NAS Lemoore would peak at 238 aircraft during the baseline year and decline to a low of 225 in 2013, primarily because of the planned FRS reduction. By 2015, when all proposed aircraft relocations and transitions would be complete, 234 total Strike Fighter aircraft would be stationed at NAS Lemoore.

Table 2.1-3. Total Aircraft Loading by Year at NAS Lemoore, 2011-2015

	2011	2012	2013	2014	2015
# of Aircraft	238	229	225	232	234

2.1.2 Aircraft Operations

Current operations at NAS Lemoore are largely comprised of training operations for FA-18C and FA-18E/F squadrons based there. These training operations are driven by: syllabi requirements for training replacement pilots for fleet squadrons, and advanced syllabi for fleet squadrons conducting advanced tactics, proficiency, and currency training with pilots assigned to those squadrons. Since the Proposed Action does not involve introduction of new type/model/series aircraft, the nature of operations would be generally the same as they are in the baseline scenario.

2.1.2.1 NAS Lemoore Airfield

Airfield operations associated with the Proposed Action would continue at NAS Lemoore. An operation represents a single movement or individual segment of a flight in the base airfield or airspace environment, such as one take-off or one landing, or a closed pattern. Each take-off or landing represents one operation. A sortie is defined as a takeoff, performance of a mission, and a landing, to include a minimum of two operations. Types of airfield operations conducted at NAS Lemoore under the Proposed Action would include, but not be limited to the following:

<u>Departure</u>

An aircraft takes off to a local training area, a non-local training area, or as part of a training maneuver (e.g., pattern work).

Arrival (Straight In/Full Stop)

On approach, an aircraft lines up on the runway centerline, descends gradually, lands, comes to a full stop, and then taxis off the runway.

Overhead Break Arrival

This event consists of an expeditious arrival using visual flight rules (VFR). An aircraft enters a high pattern at 1,770 ft (539 m) above ground level (AGL) and approaches the runway at less than 250 knots. . Approximately halfway down the runway, the aircraft performs a 180-degree turn and slows to enter the downwind leg of the landing pattern at 970 ft (296 m) AGL. Once established in the pattern, the aircraft lowers landing gear and flaps and performs an 180-degree descending turn to land on the runway. The carrier break pattern is similar to a high pattern, but is entered at 970 ft (296 m) AGL and the downwind leg is 570 ft (174 m) AGL. The direction of break turn to downwind depends on the runway. On runway 32R, it is a right turn, which most of the pilots use as an option for the higher pattern. The break for runway 32L is a left-hand break, which most pilots use for the lower, carrier break.

Closed Patterns

A touch-and-go (TGO) or a ground controlled approach (GCA) would represent the most common FA-18E/F closed pattern event.

- **TGO.** An aircraft lands and takes off on a runway without coming to a full stop. After touching down, the pilot immediately goes to full power and takes off again. A TGO is counted as two operations because the landing is counted as one operation and the take-off is counted as another.
- **GCA Box.** A radar or "talk down" approach directed from the ground by Air Traffic Control personnel. Air Traffic Control personnel provide pilots with verbal course and glide slope information, allowing them to make an instrument approach during inclement weather. The GCA is counted as two operations because the landing is counted as one operation and the take-off is counted as another.
- **Field Carrier Landing Practice (FCLP)**. Is a VFR TGO to simulate landing on an aircraft carrier at a land-based field.

In performing these events and others in the syllabus, the DoN estimates that aircraft would conduct a maximum of 158,858 operations per year at the NAS Lemoore airfield during the 2015 end state (Table 2.1-4). Operations would occur during acoustic day (7 AM to 7 PM), evening (7 PM to 10 PM), and night hours (10 PM to 7 AM). Aircraft operations are defined by day, evening, and night for the purposes of noise analysis, with operations during evening and night getting a noise penalty of 5 decibel (dB) and 10 dB Community Noise Equivalent Level (CNEL) respectively. Although the Proposed Action would add an estimated 5,106 operations, when combined with the FRS reduction these operations represent a total decrease of about 24% compared to baseline conditions (209,420 baseline operations). Although the Proposed Action would result in a reduction of four based aircraft relative to the baseline, annual aircraft operations would decrease by about 50,562. The FRS generates approximately three times more operations per aircraft than a Fleet squadron. This is due to different training requirements (i.e., the FRS trains more frequently than Fleet squadrons) and deployments of Fleet squadrons for portions of the year during which those Fleet squadrons would not fly at NAS Lemoore.

Table 2.1-4. Total Annual NAS Lemoore Airfield Operations for Baseline and the Proposed Action End State

	Baseline (2011)				Proposed Action End State (2015)			
Operation Type	**Day 7 AM - 7 PM**	**Evening 7 PM - 10 PM**	**Night 10 PM - 7 AM**	**Total**	**Day 7 AM - 7 PM**	**Evening 7 PM - 10 PM**	**Night 10 PM - 7 AM**	**Total**
Departure	35,721	7,001	557	**43,279**	28,547	5,961	555	**35,063**
Straight-In Arrival	6,201	1,155	592	**7,948**	5,202	963	504	**6,669**
Overhead Break Arrival	26,504	5,097	2,951	**34,552**	21,260	4,091	2,493	**27,844**
TGO*	24,437	3,598	2,416	**30,451**	13,689	2,346	1,404	**17,439**
FCLP*	44,177	28,580	14,661	**87,418**	34,132	21,022	11,805	**66,959**
GCA Box*	4,183	915	674	**5,772**	3,709	705	470	**4,884**
Total	**141,223**	**46,346**	**21,851**	**209,420**	**106,539**	**35,088**	**17,231**	**158,858**

Source: Wyle 2011.
Refer to Appendix C, Air Quality, for aircraft operations for the 2012-2014 timeframe. General Aviation (non-military) operations were not included in the air quality analysis. Also, 172 GCA Box pattern operations for transient C-40A Clipper aircraft was not included in the air quality analysis as this pattern is not included in emission profiles for this aircraft.
Notes: *Pattern counted as two operations
Operation: An operation represents a single movement or individual segment of a flight in the base airfield or airspace environment, such as one take-off or one landing, or a closed pattern.

2.1.3 Personnel

The baseline personnel level at NAS Lemoore is approximately 7,600 military and civilian personnel (DoN 2009a). Table 2.1-1 (shown previously) provides detailed personnel loading associated with the Fleet Squadrons and FRS under baseline conditions. In 2011, the number of personnel associated with Fleet Squadrons at NAS Lemoore included 3,049 enlisted and 405 officers. For the FRS, there are 584 enlisted, 115 officers, and 191 contractor personnel. This totals 3,633 enlisted, 520 officers, and 191 contractor personnel associated with the Fleet Squadrons and FRS under baseline conditions.

As shown previously, Table 2.1-2 provides detailed personnel loading associated with the end state 2015. Tables 2.1-5 and 2.1-6, below, illustrate changes to personnel levels (enlisted and officers, respectively) by year for each of the squadrons affected under the Proposed Action. These include those squadrons designated VFA-R1 or R2 (proposed for relocation from the East Coast) and VFA-T1 through T5 (proposed for the in-place transitions). The other existing Fleet squadrons at NAS Lemoore would not change from baseline and are not shown on the tables below. As indicated, the Proposed Action would result in an increase of 420 enlisted personnel and 81 officers by 2015 compared to the baseline.

However, during the same timeframe as the Proposed Action, the Navy also plans to reduce the FRS at NAS Lemoore to eliminate the FA-18C/D aircraft from the FRS. This action is not part of the Proposed Action, but reduces the number of FRS aircraft at NAS Lemoore by 30 in the 2012-2013 timeframe. The FRS reduction will reduce the number of personnel associated with the FRS by a total of 319 personnel, including 184 enlisted, 55 officers, and 80 contractors (Table 2.1-7).

Taken in context of this independent FRS reduction action, the overall end state personnel loading levels at NAS Lemoore would increase by a net of 182 personnel (+262 officers and enlisted; -80 contractors) at the completion of realignment (2015), which represents a net increase of less than 1.8% over the baseline level.

Table 2.1-5. Changes to Enlisted Personnel by Squadron under the Proposed Action, 2011-2015

Squadron	2011	2012	2013	2014	2015	Net Gain/Loss (+/-)
VFA-R1	0	0	0	204	204	+204
VFA-R2	0	0	0	218	218	+218
VFA-T1	195	195	191	191	191	-4
VFA-T2	195	195	191	191	191	-4
VFA-T3	195	195	191	191	191	-4
VFA-T4	204	204	204	191	191	-13
VFA-T5	195	195	195	195	218	+23
Enlisted Total Net Change from Baseline						**+420**

Table 2.1-6. Changes to Officers by Squadron under the Proposed Action, 2011-2015

Squadron	2011	2012	2013	2014	2015	Net Gain/Loss (+/-)
VFA-R1	0	0	0	23	23	+23
VFA-R2	0	0	0	40	40	+40
VFA-T1	22	22	22	22	22	0
VFA-T2	22	22	22	22	22	0
VFA-T3	22	22	22	22	22	0
VFA-T4	22	22	22	22	22	0
VFA-T5	22	22	22	22	40	+18
Officer Total Net Change from Baseline						**+81**

Table 2.1-7. Personnel Changes to FRS, 2011-2015

Category	2011	2012	2013	2014	2015	Net Gain/Loss
Enlisted	584	487	430	400	400	-184
Officers	115	75	68	60	60	-55
Contractors	191	170	151	111	111	-80
FRS Personnel Net Change						**-319**

2.1.4 Facilities

No new facility construction, including runways or taxiways, is proposed under this project. The only facilities related projects under the Proposed Action would be reconfiguration and modernization of and/or additions to Hangars 1, 2, and 4 (refer to Figure 2.1-1). These improvements would include compliance with anti-terrorism/force protection and Leadership in Energy and Environmental Design/Energy Policy Act requirements.

Modifications to Hangar 1 would include reconfiguration and modernization of an estimated 11,081 ft^2 (1,029 m^2) to support a single Super Hornet squadron. All reconfiguration and modernization would occur within the existing hangar (no additions would be made to the building) and would include improvements to building finishes, construction of interior secure areas, and upgrades to mechanical, plumbing, electrical, and communication systems. Under this proposed reconfiguration and modernization, the footprint of the existing building would not be changed. The project cost is an estimated $2.0 million and is scheduled to occur in FY 13.

Modifications to Hangar 2 would include a 2,500 ft^2 (232 m^2) addition (with a second story) and reconfiguration and modernization of 2,500 ft^2 (232 m^2) of existing interior space. The new addition and associated second story would require new footings, and the transformers and air conditioning may require new concrete foundations. Reconfiguration and modernization would occur within the existing hangar and would include improvements to building finishes, construction of interior secure areas, and upgrades to mechanical, plumbing, electrical, and communication systems (pad mounted transformers and air conditioning equipment are required). The area of disturbance, including the building addition, would occur within an existing paved parking area. The project cost is an estimated $3.0 million and is scheduled to occur over a 12-month timeframe.

Modifications to Hangar 4 would include reconfiguration and modernization of 9,630 ft^2 (895 m^2) of existing shops and administrative space, as well as reconfiguration of another 8,025 ft^2 (746 m^2) of the existing "D" module and construction of a 6,685 ft^2 (621 m^2) second story above the "D" module. All reconfiguration and modernization would occur within the existing hangar and would include improvements to building finishes, construction of interior secure areas, and upgrades to mechanical, plumbing, electrical, and communication systems (pad mounted transformers and air conditioning equipment are required). The new second story would require reinforced and enlarged footings, and the transformers and air conditioning may require new concrete foundations. The area of disturbance would be limited to within 50 ft (15 m) of the existing hangar and its existing paved parking area. The project cost is an estimated $5.0 million and is scheduled to occur over a 12-month timeframe.

2.2 ALTERNATIVES

In order to achieve realignment of Strike Fighter aircraft to match current and planned carrier air wing deployment schedules, relocation of two current Strike Fighter squadrons from the East Coast to the West Coast is required. In developing alternatives for this requirement, the Navy considered operational cost, risk, and synergy factors. Previous NEPA documents for the homebasing of Navy FA-18C/D Hornet and FA-18E/F Super Hornet aircraft considered alternative homebasing locations for those aircraft. However, the Records of Decision for those actions established NAS Lemoore as the West Coast homebase location for those aircraft, which concentrated operational functions and related infrastructure at NAS Lemoore. Consistent with previous analysis and decisions, consideration of any other bases to receive the two East Coast Strike Fighter Squadrons would require significant infrastructure development costs to provide hangar, parking, and maintenance facilities for the specialized Strike Fighter aircraft. Further, the timeline for development of such facilities increases operational risk associated with potential delays in relocation activities. Finally, collocating the FA-18 squadrons at NAS Lemoore would rely on the existing FA-18E/F support infrastructure and operational synergies at NAS Lemoore, as opposed to any split-basing alternative. The Navy considered split-basing the FA-18E/F squadrons at multiple locations on the West Coast; however, this alternative would require duplication of FA-18E/F support services and facilities which would increase manpower, equipment, construction, and operating costs. Relocating the FA-18E/F Strike Fighter Squadrons to NAS Lemoore provides the necessary support without duplication of existing homebase support or Command and Control functions. Therefore, no additional alternatives were considered for analysis in the EA.

2.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, two East Coast Strike Fighter squadrons would not relocate to NAS Lemoore, and the in-place transition of up to five existing FA-18C squadrons to FA-18E/F squadrons would not occur. East Coast Strike Fighter squadrons would continue to support the Pacific mission from the East Coast. Related personnel changes and modifications to Hangars 1, 2, and 4 also would not occur.

Additionally, the No Action Alternative would not provide mitigation of the pending shortfall of Strike Fighter aircraft due to the age of FA-18C aircraft. The No Action Alternative does not meet the purpose and need described above with regard to meeting West Coast carrier air wing deployment demands; however, it represents a change from baseline conditions and is carried forward for analysis in the EA.

As previously discussed, regardless of whether the Proposed Action is undertaken, the Navy plans to reduce the FRS at NAS Lemoore to eliminate the FA-18C/D aircraft from the FRS. This independent action reduces the number of FRS aircraft at NAS Lemoore by 30 in the 2012-2013 timeframe and reduces personnel by a total of 319 (184 enlisted, 55 officers, and 80 contractors). Also as a result of the FRS reduction, aircraft operations would decrease to 153,752, or a 27% reduction compared to baseline (2011) conditions. Table 2.3-1 shows NAS Lemoore aircraft and personnel loading in the end state year of 2015 under the No Action Alternative, and Table 2.3-2 shows airfield operations in the end state year of 2015 under the No Action Alternative.

2.4 COMPARISON OF ALTERNATIVES

A summary of environmental consequences, both beneficial and adverse, are shown in Table 2.4-1 for the Proposed Action and the No Action Alternative. To illustrate the differences between the Proposed Action and the No Action alternatives, the environmental consequences are discussed relative to 2011 baseline conditions, as described in Chapter 3 of this EA.

The Proposed Action would realign the Strike Fighter assets at NAS Lemoore and would relocate two Fleet FA-18E/F squadrons from the East Coast and transition up to five existing FA-18C squadrons to FA-18E/F, resulting in an additional 26 aircraft, 420 enlisted personnel, and 81 officers at NAS Lemoore. During the same timeframe as the Proposed Action, the Navy also plans to reduce the FRS at NAS Lemoore to eliminate the FA-18C/D aircraft from the FRS, which would eliminate 30 aircraft, 184 enlisted, 55 officers, and 80 contractors. The net result in the 2015 end state would be a net reduction of 4 aircraft, a net increase of approximately 182 personnel (+236 enlisted, +26 officers, -80 contractors), and a net decrease of aircraft operations of approximately 24%, compared to 2011 baseline conditions. Hangars 1, 2, and 4 would be modified.

Under the No Action Alternative, neither the relocation of two squadrons nor the transition of five squadrons would occur. The planned FRS reduction would still occur, however, eliminating 30 FRS aircraft compared to the baseline conditions. The net result in the 2015 end state would be a reduction of 30 aircraft, decrease of approximately 319 personnel (-184 enlisted, -55 officers, -80 contractors) and a decrease of aircraft operations of approximately 27%, compared to baseline conditions. Hangars 1, 2, and 4 would not be modified.

Table 2.3-1. No Action End State (2015) Aircraft and Personnel Loading at NAS Lemoore

Squadron[1]	T/M/S[2]	# of Aircraft	Enlisted	Officers	Contractors
Fleet Squadrons					
VFA-T1	FA-18C	10	195	22	0
VFA-T2	FA-18C	10	195	22	0
VFA-T3	FA-18C	10	195	22	0
VFA-T4	FA-18C	10	204	22	0
VFA-T5	FA-18C	10	195	22	0
VFA-C1	FA-18C	10	195	22	0
VFA-C2	FA-18C	10	195	22	0
	Total "Cs"	**70**	**1,374**	**154**	**0**
VFA-E1	FA-18E	10	191	22	0
VFA-E2	FA-18E	12	204	23	0
VFA-E3	FA-18E	12	204	23	0
VFA-E4	FA-18E	12	204	23	0
	Total "Es"	**46**	**803**	**91**	**0**
VFA-F1	FA-18F	12	218	40	0
VFA-F2	FA-18F	12	218	40	0
VFA-F3	FA-18F	12	218	40	0
VFA-F4	FA-18F	12	218	40	0
	Total "Fs"	**48**	**872**	**160**	**0**
TOTAL FLEET		**164**	**3,049**	**405**	**0**
Fleet Replacement Squadron (FRS)					
VFA-122/125[3]	FA-18E	13	NA[4]	NA[4]	NA[4]
	FA-18F	31	NA[4]	NA[4]	NA[4]
TOTAL FRS		**44**	**400**	**60**	**111**
No Action Total					
		208	**3,479**	**465**	**111**

Notes:
[1] Actual Squadron designations are not used in this EA because actual squadrons have not yet been identified for transitions in place or for relocation. The squadron naming convention is as follows: T1 through T5 designate existing FA-18C squadrons that would transition in place, once identified, under the Proposed Action. C1 and C2 are two FA-18C squadrons that would remain at NAS Lemoore under the Proposed Action. E1 through E4 are four existing FA-18E squadrons that would remain at NAS Lemoore under the Proposed Action. F1 through F4 are four existing FA-18F squadrons that would remain at NAS Lemoore under the Proposed Action.
[2] T/M/S is type/model/series [3] VFA-122/125 designates the end state FRS at NAS Lemoore, which is a combined squadron that would consist of FA-18E/F aircraft. [4] Personnel supporting the FRS are consolidated into an FRS total.

Table 2.3-2. Total Annual NAS Lemoore Airfield Operations for the No Action Alternative

No Action (2015)				
Operation Type	**Day 7 AM - 7 PM**	**Evening 7 PM - 10 PM**	**Night 10 PM - 7 AM**	**Total**
Departure	28,318	5,803	417	**34,538**
Straight-In Arrival	5,065	967	562	**6,594**
Overhead Break Arrival	20,544	4,107	2,791	**27,442**
TGO*	13,689	2,346	1,404	**17,439**
FCLP*	32,336	19,935	10,619	**62,890**
GCA Box*	3,677	716	458	**4,851**
Total	**103,629**	**33,874**	**16,251**	**153,754**

Source: Wyle 2011.
Notes: *Pattern counted as two operations . Refer to Appendix C, Air Quality, for aircraft operations for the 2012-2014 timeframe. General Aviation (non-military) operations were not included in the air quality analysis. Also, 172 GCA Box pattern operations for transient C-40A Clipper aircraft was not included in the air quality analysis as this pattern is not included in emission profiles for this aircraft.
Operation: An operation represents a single movement or individual segment of a flight in the base airfield or airspace environment, such as one take-off or one landing, or a closed pattern.

Table 2.4-1. Comparison of Alternatives

Resource Section	Proposed Action	No Action Alternative
Airfields and Airspace	• Annual airfield operations decrease 24% over baseline • No modification of current airspace or procedures	• Annual airfield operations decrease 27% over baseline • No modification of current airspace or procedures
Noise	• Net decrease of 1,445 acres exposed to 65 dB CNEL or greater. • Net increase of 10 people exposed to 65 dB CNEL or greater. • Population exposed to Potential Hearing Loss (PHL) levels above 80 dB CNEL remains the same as baseline. • Decrease of one event per hour for speech interfering events at five representative locations near NAS Lemoore with windows open. No change for windows closed. • One additional school may exceed classroom disturbance criteria with windows open compared to baseline. No change for windows closed. • Negligible decrease from baseline for potential indoor sleep disturbance.	• Net decrease of 5,875 acres exposed to 65 dB CNEL or greater. • Net decrease of 166 people exposed to 65 dB CNEL or greater. • Population exposed to PHL levels above 80 dB CNEL remains the same as baseline. • Decrease of one event per hour for speech interfering events at five representative locations near NAS Lemoore with windows open. No change for windows closed. • No additional schools exceed classroom disturbance criteria with windows open compared to baseline. No change for windows closed. • Negligible decrease from baseline for potential indoor sleep disturbance.
Air Quality	• Construction emissions would be below regulatory thresholds for all air pollutants. • Airfield operations for 2012-2015 show a reduction in all air pollutant emissions compared to the baseline (2011) with the exception of carbon monoxide (CO), which would increase in 2014 and 2015. • The Conformity Applicability Analysis indicates that emissions from the Proposed Action would not exceed *de minimis* thresholds and no further evaluation of conformity is required.	• No construction would occur. • Airfield operations for 2012-2015 show a reduction in all air pollutant emissions compared to the baseline (2011).
Safety	• There would be a net decrease in airfield operations; no increased safety risks or aircraft incidents are anticipated.	• There would be a net decrease in airfield operations; no increased safety risks or aircraft incidents are anticipated.
Land Use	• No change to on-base land use from hangar modifications. • On-base land uses affected by elevated aircraft noise levels (65 dB CNEL and greater) would decrease by 8 ac. • Off-base land uses affected by elevated noise (65 dB CNEL and greater) would decrease by 1,468 ac.	• No construction activities would occur. • On-base land uses affected by elevated aircraft noise levels (65 dB CNEL and greater) would decrease by 160 ac. • Off-base land uses affected by elevated noise (65 dB CNEL and greater) would decrease by 5,831 ac.
Infrastructure and Utilities	• Net increase in potable water demand of 108,809 gallons (gal) per day. • Net increase in wastewater generated of 57,892 gal per day. • Increase in electricity demand of 11.5 Megawatts per hour. • Increase of 637 tons per year (tpy) of solid waste.	• Net decrease in demand for potable water, wastewater generated, electricity demand, and solid waste generated.
Socioeconomics	• Net increase of 262 military personnel would represent 4% of base military workforce. • Net decrease of 80 contractors would be about 5% of base contractor workforce. • Less than 1% increase in Region of Influence (ROI) population.	• Net decrease of 239 military personnel would represent 4% of base military workforce. • Net decrease of 80 contractors would be about 5% of base contractor workforce. • Less than 1% decrease in ROI population. • Net decrease in personnel would result in

Table 2.4-1. Comparison of Alternatives

Resource Section	Proposed Action	No Action Alternative
	• Net increase in personnel would result in $9.1 million increase in annual payroll income. • Expenditures of $10 million for hangar renovations. • No disproportionate impacts to low-income populations, minority populations, or children under the age of 18 from airfield noise.	decrease of $17.9 million in annual payroll income. • No construction expenditures would occur. • No disproportionate impacts to low-income populations, minority populations, or children under the age of 18 from airfield noise.
Community Services	• Net gain of 262 military personnel and 341 family members. • Decrease of 80 contractors and 177 family members. • Approximately 4% increase in demand for on-base community services. • Less than 1% increase in demand for community services in ROI. • Increase of 142 school-aged children in ROI.	• Net decrease of 239 military personnel and 311 family members. • Decrease of 80 contractors and 177 family members. • Decrease in demand for on-base community services. • Decrease in demand for community services in ROI. • Decrease of 160 school-aged children in ROI.
Transportation	• Average daily trips would increase by a net maximum of 364.	• Average daily trips would decrease by 638.
Biological Resources	• Construction would occur within an existing paved area along the flightline. • Changes in aircraft operations would not substantially change the noise environment for wildlife. • No adverse effect to migratory birds or threatened and endangered species. • No change to Bird/Wildlife Aircraft Strike Hazard (BASH) conditions.	• No construction activities would occur. • Changes in aircraft operations would not substantially change the noise environment for wildlife. • No adverse effect to migratory birds or threatened and endangered species. • No change to BASH conditions.
Water Resources	• Construction activities are not anticipated to impact surface water or stormwater due to location of construction (existing paved area) and use of standard best management practices (BMPs).	• No impacts to surface water or stormwater because no construction would occur.
Cultural Resources	• All three hangars proposed for modification have been determined not eligible for nomination to the National Register of Historic Places (NRHP) (SHPO concurrence has been received and is provided in Appendix A), therefore no impact to cultural resources.	• No impacts to cultural resources.
Hazardous Materials and Waste	• Hangar renovations may generate small quantities of asbestos containing material (ACM) or lead based paint (LBP). • No active Installation Restoration (IR) sites are located within 1,000 ft of hangar renovations.	• No impact associated with hazardous materials and waste.

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CHAPTER 3 AFFECTED ENVIRONMENT

This chapter provides a description of the existing environment that could be affected by the Proposed Action at NAS Lemoore. As directed by NEPA, Council on Environmental Quality (CEQ) regulations included in 32 Code of Federal Regulations (CFR) Part 775, and DoN environmental instructions, the description of the affected environment focuses on those resource areas potentially subject to impacts. Therefore, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. As discussed in Section 1.4.2.1, five resource areas (vegetation, wetlands, topography and soils, archaeological resources, and visual resources) have been eliminated from consideration in this EA because ground-disturbing activities associated with modifications to Hangars 1,2, and 4 would be limited to a small portion of existing pavement along the flight line under the Proposed Action. No or minimal disturbance to vegetation, wetlands, topography and soils, archaeological, and visual resources is expected. There would also be changes to aircraft operations and minor changes in personnel levels. Therefore, the affected environment analyses include airfields and airspace, noise, air quality, safety, land use, infrastructure and utilities, socioeconomics, community services, transportation, biological resources (wildlife and sensitive species), water resources, cultural resources, and hazardous materials and waste.

3.1 AIRFIELDS AND AIRSPACE

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the U.S. and its territories. "Navigable airspace" is considered to be airspace above the minimum altitudes of flight prescribed by regulations under United States Code (USC) Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the takeoff and landing of aircraft (49 USC § 40102). Congress has charged the Federal Aviation Administration (FAA) with responsibility for developing plans and policy for the use of the navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and its efficient use (49 USC § 40103(b); FAA Order 7400.2 2004). The FAA considers multiple and sometimes competing demands for airspace in relation to civil, commercial, and military aviation. Specific rules and regulations concerning airspace designation and management are listed in FAA Order 7400.2.

There are two categories of airspace, regulatory and non-regulatory. Within these two categories, there are four types of airspace, Controlled, Special Use, Other, and Uncontrolled airspace. Controlled airspace is airspace of defined dimensions within which air traffic control service is provided to instrument flight rules flights and to VFR flights in accordance with the airspace classification (FAA 2004). Controlled airspace is categorized into five separate classes: Classes A through E. These classes identify airspace that is controlled, airspace supporting airport operations, and designated airways affording en route transit from place-to-place. The classes also dictate pilot qualification requirements, rules of flight that must be followed, and the type of equipment necessary to operate within that airspace. Uncontrolled airspace is designated Class G airspace. Class F is not used in the U.S.

Use of airspace is governed by two types of flight rules: Instrument Flight Rules and VFR. Instrument Flight Rules flight requires an advanced level of pilot training and certification. Pilots must adhere to air traffic control clearances containing specific flight route and altitude directions. VFR flight is restricted to altitudes less than 18,000 ft (5,486 m) msl and does not require flight clearances from an air traffic controller. In order to fly on VFR flight plans, certain weather requirements must be met, including visibility of at least 3 mi (5 km) and the pilot must be able to remain clear of clouds by at least 500 ft (152 m).

Special use airspace identified for military and other governmental activities is charted and published by the National Aeronautical Charting Office in accordance with FAA Order 7400.2 and other applicable regulations and orders. Management of this resource considers how airspace is designated, used, and administered to best accommodate the individual and common needs of military, commercial, and general aviation. Special use airspace is airspace of defined dimensions wherein activities must be confined because of their nature, or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. The types of Special use airspace areas are Prohibited Areas, Restricted Areas, Military Operations Areas, Warning Areas, Alert Areas, Controlled Firing Areas, and National Security Areas.

Air Traffic Control Assigned Airspace are classified as other airspace that includes advisory areas, areas that have specific flight limitations or designated prohibitions, areas designated for parachute jump operations and other Military Training Routes, and Aerial Refueling Tracks. When not required for other needs, an Air Traffic Control Assigned Airspace can extend the vertical boundary of training airspace as authorized for military use by the controlling Air Route Traffic Control Center.

The focus of training range management is on ensuring safe, effective, and efficient operation of military ranges, while balancing the military's need to accomplish realistic testing and training with the need to minimize potential impacts of such activities on the environment and surrounding communities.

This section describes the existing airfield operations at NAS Lemoore that the FA-18E/F would use in the Proposed Action (Section 2.1.2). This section does not address the training airspace that NAS Lemoore aircraft utilize as those activities would not change as a result of the Proposed Action. The study area for airspace is the NAS Lemoore airfield and airspace surrounding the base.

The airfield at NAS Lemoore is comprised of two parallel runways, 14L/32R and 14R/32L, both over 13,000 ft (3,962 m) in length. Runways 32L and 32R are the preferred runways due to prevailing wind conditions, approach procedures, facilities, and airport design.

NAS Lemoore maintains a Radar Air Traffic Control Facility that controls aircraft traversing the NAS Lemoore airspace. As shown in Figure 3.1-1, the NAS Lemoore airspace is divided into two areas: Alpha and Bravo. Radar Air Traffic Control Facilities control extends from the ground surface to 15,000 ft (4,572 m) msl in the Alpha area and from the ground surface to 10,000 ft (3,048 m) msl in the Bravo area. The southern border of the NAS Lemoore Radar Air Traffic Control Facility is also the border between the Oakland Air Route Traffic Control Center and Los Angeles Air Route Traffic Control Center. NAS Lemoore coordinates air traffic with the Oakland and Los Angeles Air Route Traffic Control Centers and neighboring air traffic control facilities. Neighboring Radar Air Traffic Control Facilities include the Fresno Yosemite International Airport to the northeast and the Meadows Field Airport in Bakersfield to the southeast. Air traffic from these local commercial and general aviation airports may receive air traffic control services from NAS Lemoore upon request. The Air Traffic Control Division of the Air Operations Department at NAS Lemoore provides air traffic control and is responsible for coordinating airspace matters with other agencies.

Historical aircraft operations at NAS Lemoore have been dynamic and have fluctuated over the decades of use, generally due to DoN mission changes. Total current number of operations used for analysis in this EA number just over 209,000 as shown in Table 2.1-4.

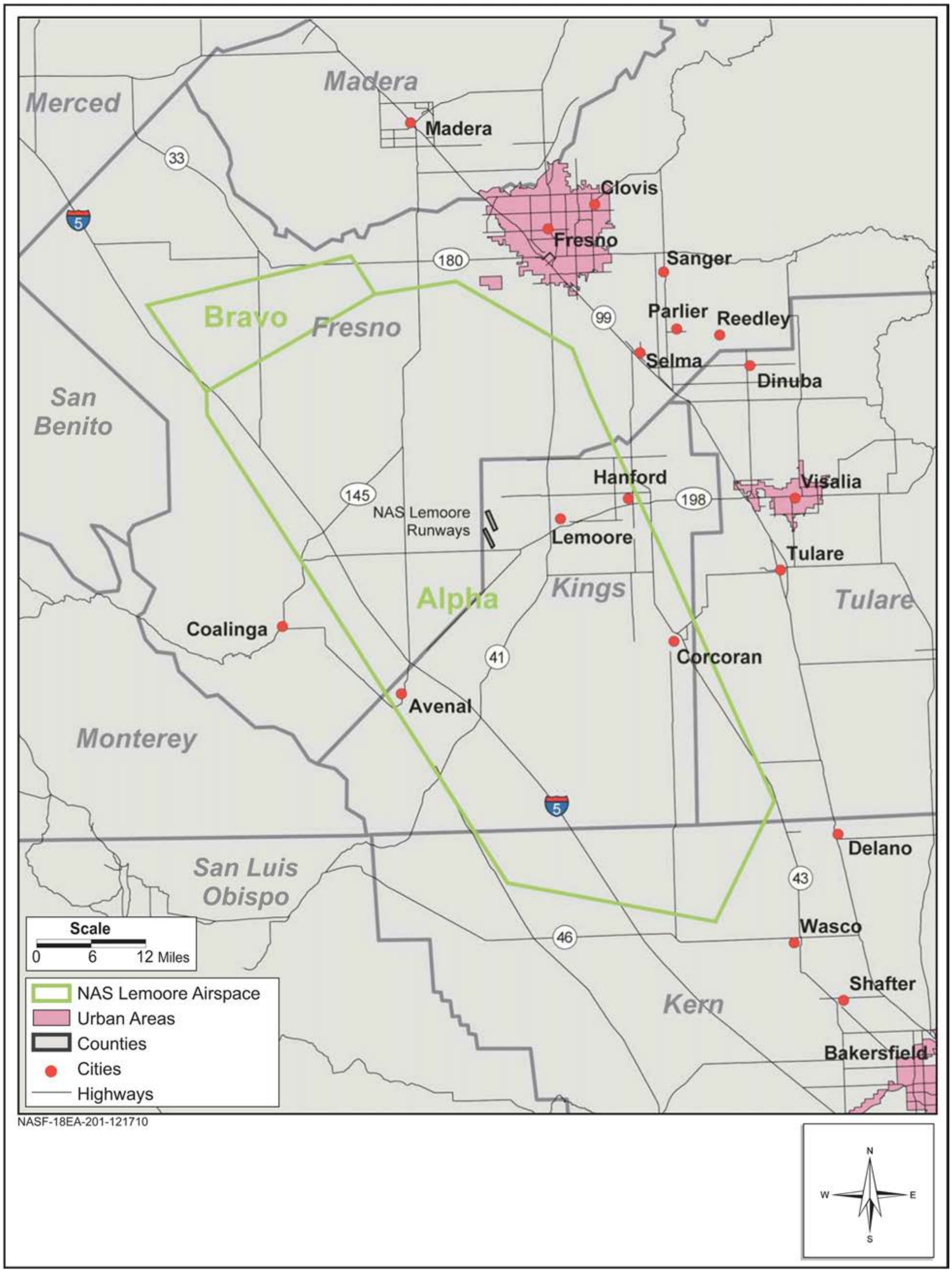


Figure 3.1-1. NAS Lemoore Airspace

Homebased and transient military flight operations by fixed wing aircraft at or using NAS Lemoore include the Hornet (FA-18), C-40A Clipper (modified Boeing 737-700C), and C-2 (Greyhound)/E-2 (Hawkeye) aircraft. In addition to departures and arrivals from the airfield, pilots also perform closed pattern work including TGO and GCA to ensure proficiency in these areas. Private and commercial air traffic is active in the airspace near NAS Lemoore (DoN 1994). Commercial jet corridors connecting northwestern and southern California are some of the busiest flight corridors in the country (DoN 1998a). Commercial and general aviation aircraft routinely pass through the NAS Lemoore Radar Air Traffic Control Facility airspace to land at one of the several private or commercial airports in the airfield area, including Bakersfield and Fresno.

3.2 NOISE

Noise can be defined as any unwanted sound. Sound is all around us and becomes noise when it interferes with normal activities such as sleep and conversation. The principal human response to noise is annoyance. Human response to noise can vary according to the type and source of the noise, the distance between the source and the human receptor, the perceived importance of the noise, its appropriateness in the setting, and the sensitivity of the person receiving the noise (receptor).

The measurement and human perception of sound involves three basic physical characteristics—intensity, frequency, and duration. Intensity is a measure of the acoustic energy of the sound vibrations and is expressed in terms of sound pressure. As sound pressure increases, the energy carried by the sound increases, and the perception of loudness of that sound increases as well. Frequency is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while sirens or screeches typify high frequency sounds. Duration is the length of time the sound can be detected.

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. Because of this vast range, using a linear scale to represent the intensity of sound becomes very unwieldy. As a result, a logarithmic unit known as the dB is used to represent the intensity of a sound. Such a representation is called a sound level. A sound level of zero (0) dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB and a garbage disposal has a sound level of about 80 dB; sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall 1995). Because of the logarithmic nature of the dB unit, sound levels cannot be arithmetically added or subtracted and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level (Berglund and Lindvall 1995). For example:

60 dB + 60 dB = 63 dB, and

80 dB + 80 dB = 83 dB.

Second, the total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB.

The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness, and this relation holds true for loud and quiet sounds. A decrease in sound level of 10 dB actually represents a 90% decrease in sound intensity but only a 50% decrease in perceived loudness because of the nonlinear response of the human ear (similar to most human senses) (Berglund and Lindvall 1995).

Noise measurements assessed relative to human exposure are usually expressed using an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the letter "A" to the unit of measurement (dBA) in order to identify that the measurement has been made with this filtering process. Human hearing ranges from approximately 20 dBA (the threshold of hearing) to between 130 and 140 dBA (the threshold of pain).

3.2.1 Noise Modeling

Analysis of aircraft noise exposure around Department of Defense (DoD) facilities is normally accomplished using a group of computer-based programs, collectively called NOISEMAP (Czech and Plotkin 1998; Wasmer and Maunsell 2006a, 2006b). The NOISEMAP suite of computer programs was primarily developed by the Air Force, which serves as the lead DoD agency for aircraft noise modeling for land use planning purposes (Ecology and Environment 2010). Some of the factors considered in the noise model include:

- Type of operation (e.g., arrival, departure, pattern).
- Number of operations per day of aircraft types.
- Time of operation.
- Flight tracks.
- Aircraft power settings, speeds, and altitudes.
- Number, duration, power setting, and heading of maintenance run-ups.
- Environmental data (temperature and humidity).
- Topographical features of the area.
- Surface hardness.

Noise environments around airports and airfields are typically defined by the Day-Night Average Sound Level (DNL) or the CNEL. In California, the CNEL is the standard for airports and is used in the noise studies conducted for DoN facilities in California, including NAS Lemoore. The DoN also utilizes noise studies in the preparation of AICUZ plans. AICUZ plans and noise zones from the most recent AICUZ at NAS Lemoore are discussed in Section 3.5, Land Use. DNL and CNEL are measures of cumulative noise exposure over a 24-hour period, with adjustments to reflect the added intrusiveness of noise during certain times of the day. DNL includes a single adjustment period; each aircraft noise event at night (defined as 10PM to 7AM) is counted 10 times. CNEL adds a second adjustment period; in addition to the night adjustment, each aircraft noise event in the evening (defined as 7PM to 10PM) is counted three times. The night adjustment is equivalent to increasing the noise levels during that time interval by 10 dB. The evening adjustment is equivalent to increasing the noise levels by approximately 5 dB (Ecology and Environment 2010).

Noise levels of the loudest aircraft operations significantly influence the 24-hour average. For example, if one daytime aircraft overflight measuring 100 dBA for 30 seconds occurs within a 24-hour period in a 50-dBA noise environment, the CNEL will be 65.5 dB. If 10 such 30-second aircraft overflights occur during daytime hours in the 24-hour period, the CNEL would be 75.4 dB. Therefore, a few maximum sound events occurring during a 24-hour period would have a strong influence on the 24-hour CNEL even though lower sound levels from other aircraft between these flights could account for the majority of the flight activity.

3.2.2 Potential Hearing Loss

The 1982 U.S. Environmental Protection Agency (USEPA) Guidelines report specifically addresses the criteria and procedures for assessing the noise-induced hearing loss in terms of the Noise-Induced Permanent Threshold Shift (NIPTS), a quantity that defines the permanent change in hearing level, or threshold, caused by exposure to noise (USEPA 1982). Numerically, the NIPTS is the change in threshold averaged over the frequencies 0.5, 1, 2, and 4 kilo Hertz that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with the exposure beginning at an age of 20 years. A grand average of the NIPTS over time (40 years) and hearing sensitivity (10^{th} to 90^{th} percentiles of the exposed population) is termed the Average NIPTS. With regard to military airbases, a 2009 DoD policy directive requires that hearing loss risk be estimated for the at risk population, defined as the population exposed to DNL greater than or equal to 80 dB (DoD 2009). Specifically, DoD components are directed to "use the 80 DNL noise contour to identify populations at the most risk of PHL". The Average NIPTS that can be expected for noise exposure as measured by the DNL metric is given in Table 3.2-1.

Table 3.2-1. Average NIPTS and 10^{th} Percentile NIPTS as a Function of DNL

DNL	Average NIPTS dB*	10th Percentile NIPTS dB*
80-81	3.0	7.0
81-82	3.5	8.0
82-83	4.0	9.0
83-84	4.5	10.0
84-85	5.5	11.0
85-86	6.0	12.0
86-87	7.0	13.5
87-88	7.5	15.0
88-89	8.5	16.5
89-90	9.5	18.0

Notes: *Rounded to the nearest 0.5 dB

For example, for a noise exposure of 80 dB DNL, the expected lifetime average NIPTS is 3.0 dB, or 7.0 dB for the 10^{th} percentile (10% most sensitive population). Since hearing loss is a function of the actual sound levels rather than annoyance levels, characterizing the noise exposure in terms of DNL will usually overestimate the assessment of hearing loss risk because DNL includes a 10 dB weighting factor for aircraft operations occurring between 10PM and 7AM. Since DoN uses CNEL to present noise zones for bases in California, for simplicity sake, it is also used for calculating PHL in this EA. Using CNEL provides a more conservative estimate on hearing loss than DNL since it adds an additional penalty for evening operations. Furthermore, the night and evening operations account for more than 5% of the total 24 hour operations. Consequently, using CNEL overestimates the exposure by approximately 3 dB. The exposure of workers inside the base boundary area is considered occupational and evaluated using the appropriate DoD component regulations for occupational noise exposure.

3.2.3 Speech Interference and Classroom Criteria

Speech interference associated with aircraft noise is a primary cause of annoyance to individuals on the ground. The disruption of routine activities in the home, such as radio or television listening, telephone use, or family conversation, gives rise to frustration and irritation. The quality of speech communication is also important in classrooms, offices, and industrial settings and can cause fatigue and vocal strain in those who attempt to communicate over the noise. A special case of speech interference deals with classroom interference at schools. The metric used for the speech interference and classroom criterion is the equivalent sound level (L_{eq}), which is expressed in dB. L_{eq} is an equivalent noise level averaged over the period on time analyzed (i.e., 15 hours [7:00 AM to 10:00 PM] for speech interference and 8 hours [8:00 AM to 4:00 PM) for classroom criteria].

3.2.4 Sleep Disturbance

Sleep Disturbance uses Sound Exposure Level (SEL) as the root noise metric and calculates the probability of awakening of single aircraft overflights. SELs are also equivalent noise levels but are typically used for single aircraft overflights and take the overall noise level from the event and compress the noise level into a one second interval. These data are based upon the particular type of aircraft, flight profile, power setting, speed and altitude relative to the receptor. The results are then presented as a probability of awakening in percent.

3.2.4.1 Existing Noise Environment

Data used for baseline noise conditions were derived from the recently completed AICUZ and the Naval Aviation Simulation Model. Both the AICUZ and Naval Aviation Simulation Model models investigate all of the various operations occurring on NAS Lemoore, the primary difference is that the AICUZ looked at average operations over a several year period of time while the NAS Lemoore Naval Aviation Simulation Model considered only FY 08 for the study. The baseline for this EA uses the proportion of operation types from the Naval Aviation Simulation Model, but scaled to match the average number of operations in the AICUZ. This approach was used because runway repair projects were occurring during part of FY 08 and the total number of operations was reduced during that year. Under normal years, the number of operations would be more consistent with the AICUZ. Under baseline conditions, 209,421 airfield operations were flown annually at NAS Lemoore (Table 3.2-2). This total includes 198,917 operations generated by the based fleet and FRS squadron aircraft and an additional 10,504 operations conducted by transient military as well as very few civilian and commercial aircraft. Under baseline conditions, 67% of the based and transient aircraft operations during daytime hours (7:00 AM and 7:00 PM); 22% of the operations were generated during evening (between 7:00 PM to 10:00 PM); and 11% during night (between 10:00 PM and 7:00 AM). Operations occurring during evening and night hours are assessed a 5 and 10-dB penalty applied for each operation respectively. The Aircraft Noise Study for this EA is provided in Appendix D.

Table 3.2-2. Baseline Day, Evening, and Night Operations by All Aircraft Including Transients

Day (7 AM-7 PM)	Evening (7 PM-10 PM)	Night (10 PM-7 AM)	Total
141,225 (67%)	46,344 (22%)	21,852 (11%)	209,421

The majority of overflights at NAS Lemoore are comprised of FA-18C/D and the FA-18E/F aircraft. Noise levels associated with a single overflight of these aircraft are presented in Table 3.2-3. The maximum noise level (L_{max}) is the peak noise level heard during the overflight. As described earlier, SEL is the overall noise levels averaged into a one second interval.

Table 3.2-3. L_{max} and SEL for FA-18C/D and FA-18E/F Aircraft

Operation Type	FA-18-C/D					FA-18-E/F				
	Altitude (AGL)	Power Setting(2)	Speed (knots)	L_{max}	SEL	Altitude (AGL)	Power Setting(2)	Speed (knots)	L_{max}	SEL
Departures	1,000	97	250	109	117	1,000	97	250	114	118
Arrivals	1,000	85	135	92	99	1,000	85	135	101	110
Pattern(3)	600	88	135	109	113	600	85	135	113	118

Notes:
Typical altitudes, speeds and power settings for each operation type
Power Setting (%NC) is the percent revolutions per minute at the Compressor Stage of the engine
Pattern includes TGOs, FCLP, and GCA box operations

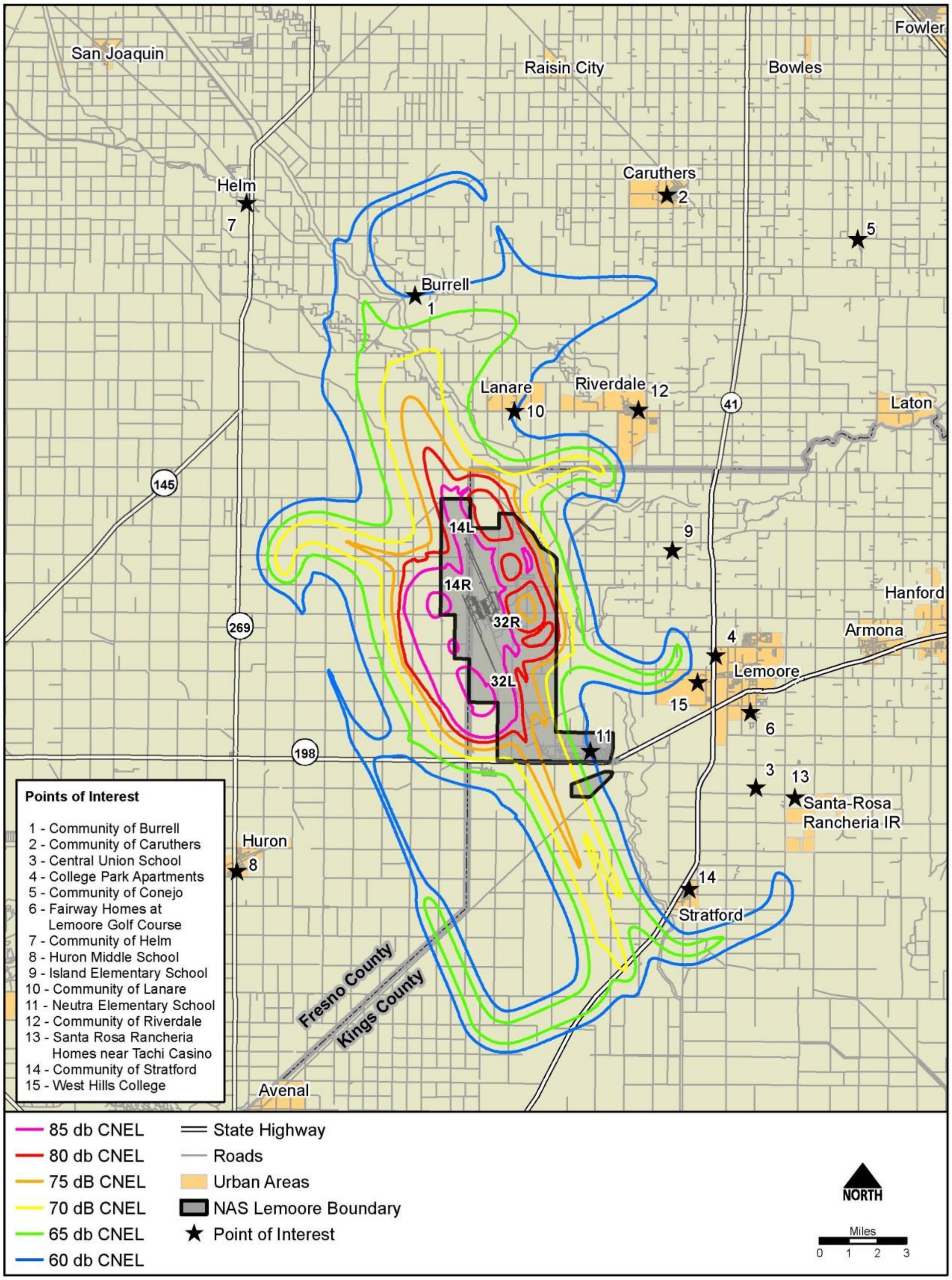
Figure 3.2-1 shows the 60-85 dB CNEL Noise Zones, in 5-dB increments, for NAS Lemoore baseline conditions. Navy noise criteria, along with most other federal agency noise criteria, consider all land uses compatible with noise levels below DNL 65 dB. However, noise contours beginning at DNL 60 dB are presented for informational purposes because that is the noise level at which the State of California standards for community noise (i.e., CNEL) begin. According to the AICUZ on-base housing lies within an area that periodically experiences 60-64 CNEL and a small portion that experiences 65-70 CNEL. Single family residences on NAS Lemoore have been designed with sound attenuation, including double-paned windows, to minimize increases in noise during flight operations. None of the points of interest shown in Figure 3.2-1 are within the 65-70 dB CNEL noise zone, although the Community of Burrell, the Community of Lanare, and Neutra Elementary School are approximately within the 60-65 dB CNEL noise zone.

Table 3.2-4 presents noise exposure within the 65-85 dB CNEL Noise Zones for total acreage and population. According to the U.S. Census Bureau (USCB), households are defined as a house, an apartment, a mobile home, a group of rooms, or a single room occupied (or if vacant, intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live separately from any other people in the building and that have direct access from the outside of the building or through a common hall. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated people sharing living quarters (USCB 2010a). The USCB also determines the average number of persons per household for each census block. This multiplier was used to calculate the population shown in Table 3.2-4.

Table 3.2-4. Noise Exposure within Baseline Noise Zones at NAS Lemoore

Noise Zone (dB CNEL)[1]	Acreage	Population[2]
65 - 70	29,633	544
70 - 75	17,979	122
75 - 80	9,847	52
80 - 85	8,749	20
85+	10,751	0
Total	**76,959**	**728**

Source: Wyle 2011; USCB 2010a.
Notes: [1]Exclusive of upper bound for all bands.
[2]Based on actual house counts and USCB persons per household data.
House counts are based on 2008 aerials provided by Google Earth.



Source: Wyle 2011

Figure 3.2-1. NAS Lemoore Baseline Noise Contours

3.2.4.2 Potential Hearing Loss

PHL applies to people living in high noise environments where they can experience long-term (40 years) hearing effects under noise levels greater than 80 dB CNEL. Three homes and a bunkhouse on farms to the north of NAS Lemoore occur within the 80 dB CNEL or greater noise zones. Approximately 20 people are estimated to live in the 80 dB CNEL zone or higher (Table 3.2-5). In the assessment of PHL, the use of CNEL to characterize noise exposure provides a conservative assessment of hearing loss risk by adding the evening (5 dB) and night (10 dB) noise penalties. For example, 9 people are currently affected by the 81-82 dB CNEL noise levels would fall in the category of the 3.5 dB Average NIPTS and 8.0 dB NIPTS for the most sensitive 10% of the population.

Table 3.2-5. Average NIPTS and 10th Percentile NIPTS as a Function of CNEL

CNEL	Average NIPTS dB*	10th Percentile NIPTS dB*	Population
80-81	3.0	7.0	0
81-82	3.5	8.0	9
82-83	4.0	9.0	7
83-84	4.5	10.0	0
84-85	5.0	11.0	4

Notes: *Rounded to the nearest 0.5 dB
1. Average NIPTS over entire affected population
2. NIPTS for the 10% most sensitive population affected

3.2.4.3 Speech Interference and Classroom Criteria

Speech interference comprises another indicator of noise effects. Such interference is measured by the numbers of average daily indoor day/evening (7:00 AM to 10:00 PM) events per hour subject to indoor maximum sound levels of at least 50 dB at representative locations. This measure also accounts for a 15 dB and 25 dB noise attenuation provided by buildings with windows open or closed respectively. Therefore, maximum outdoor noise levels should be 75 dB with windows closed and 65 dB with windows open and are represented as NA75L_{max} (windows closed) and NA65L_{max} (windows open). NA75L_{max} denotes the number of events above an L_{max} of 75dB. Table 3.2-6 presents indoor speech interference under baseline conditions at representative locations.

Table 3.2-6. Baseline Indoor Speech Interference at Representative Locations Near NAS Lemoore

Receptor	Average Daily Indoor Events per Hour Day/Evening (7 AM to 10 PM)	
	Windows Closed (NA75L_{max})	Windows Open (NA65L_{max})
Community of Burrell	3	7
Community of Caruthers	-	5
College Park Apartments	-	1
Community of Conejo	2	5
Fairway Homes at Lemoore Golf Course	-	1
Community of Helm	-	1
Community of Lanare	3	8
Community of Riverdale	-	3
Santa Rosa Rancheria homes near Tachi Casino	-	2
Community of Stratford	-	1

For schools, two additional classroom criteria have to be applied. When considering intermittent noise caused by aircraft overflights, guidelines indicate that an appropriate criteria is a comparative threshold on indoor background noise levels of 35-40 dB L_{eq} and a limit on single events of 50 dB L_{max}. These limits translate to an L_{eq} of 60 dB continuous level to obtain the 35-40 dB L_{eq} requirement and an outdoor L_{max} of 65 and 75 dB. The impacts are stated as number of events above a certain level, in this case, 65 and 75 dB L_{max} and are presented as $NA65L_{max}$ and $NA75L_{max}$. The time period for classroom events are during normal school hours from 8:00 AM to 4:00 PM rather than the 7:00 AM to 10:00 PM for normal conversation. Table 3.2-7 presents the schools in the vicinity of NAS Lemoore and the baseline classroom criteria levels for the school receptors. Burrell Elementary School, Conejo School, and Neutra Elementary School only exceed the windows open dB level criteria of 40 dB $L_{eq(8hr)}$.

Table 3.2-7. Baseline Classroom Criteria for Schools Near NAS Lemoore

Receptor	***Outdoor Equivalent Noise Level [$L_{eq(8hr)}$]***	***Number of Events Above a Maximum Outdoor Noise Level of 75 dB ($NA75L_{max}$)***			
		Windows Closed		***Windows Open***	
		dB[$L_{eq(8hr)}$]	**Events per hour**	***dB[$L_{eq(8hr)}$]***	**Events per hour**
Burrell Elementary School*	60	35	3	45*	8
Caruthers High School	54	29	-	39	6
Central Union School	51	26	-	36	-
Conejo School*	58	33	2	43*	5
Helm Elementary School	48	23	-	33	1
Huron Middle School	37	12	-	22	-
Island Elementary School	50	25	-	35	1
Neutra Elementary School*	59	34	2	44*	4
Riverdale High School	50	25	-	35	3
Stratford Elementary School	47	22	-	32	1
West Hills College	54	29	-	39	1

* Exceeds classroom criteria

3.2.4.4 Sleep Disturbance

Sleep disturbance also serves as a measure of noise conditions. Table 3.2-8 lists the probabilities of awakening from average daily night (10:00 PM to 7:00 AM) events for the same representative residential locations with probability of awakening ranges between 1% and 10%. Indoor awakening is used to distinguish average night sleeping from awakenings during the day or outdoor activities (i.e., naps in a hammock or tent camping).

Table 3.2-8. Baseline Indoor Sleep Disturbance at Representative Locations Near NAS Lemoore

Receptor	Average Nightly (10 PM - 7 AM) Probability of Awakening (%)	
	Windows Closed	Windows Open
Community of Burrell	3%	6%
Community of Caruthers	-	1%
College Park Apartments	1%	2%
Community of Conejo	-	1%
Fairway Homes at Lemoore Golf Course	1%	2%
Community of Helm	1%	3%
Community of Lanare	5%	10%
Community of Riverdale	1%	2%
Santa Rosa Rancheria homes near Tachi Casino	3%	7%
Community of Stratford	2%	7%

3.2.4.5 Occupational Noise

While on-base noise exposure occurs, existing DoN occupational noise exposure prevention procedures, such as hearing protection and monitoring, are undertaken in compliance with all applicable Occupational Safety and Health Administration and DoN occupational noise exposure regulations.

3.2.4.6 Other Noise Sources

Other sources of noise, such as general vehicle traffic, and other maintenance and landscaping activities, are a common on-going occurrence at the base. While these sources may contribute to the overall noise environment, they are relatively minor compared to the dominant aircraft-generated noise at and adjacent to the base. For this reason, these other noise sources were not considered under baseline nor are they analyzed under the Proposed Action.

3.3 AIR QUALITY

3.3.1 Definition of Resource

Air quality is defined by ambient air concentrations of specific pollutants determined by the USEPA to be of concern related to the health and welfare of the general public and the environment and are widespread across the U.S. The primary pollutants of concern, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone, suspended particulate matter less than or equal to 10 microns in diameter (PM_{10}), fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead. Under the Clean Air Act (CAA), the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for these pollutants. Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as non-attainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. The NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare. Short-term standards (1- 3-, 8-, and 24-hour periods) are established for pollutants contributing to chronic health effects.

In addition to the ambient air quality standards for criteria pollutants, national standards exist for hazardous air pollutants (HAPs) which are regulated under Section 112(b) of the 1990 CAA

Amendments. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from stationary sources (40 CFR Part 61).

HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs). MSATs are compounds emitted from highway vehicles and nonroad equipment which are known or suspected to cause cancer or other serious health and environmental effects. In 2001, EPA issued its first MSATs Rule, which identified 21 compounds as being HAPs that required regulation. A subset of six of these MSAT compounds were identified as having the greatest influence on health and included benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. More recently, EPA issued a second MSAT Rule in February 2007, which generally supported the findings in the first rule and provided additional recommendations of compounds having the greatest impact on health. The rule also identified several engine emission certification standards that must be implemented (40 CFR parts 59, 80, 85, and 86; FR 72 No. 37, pp. 8427-8570, 2007).

Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for these pollutants for mobile sources involves reducing their content in fuel and altering the engine operating characteristics to reduce the volume of pollutant generated during combustion. Because of the low levels of aircraft emissions of these pollutants in the ambient air below the mixing height (3,000 feet above ground level), HAPs are not further evaluated in this EA.

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. Pollutant emissions typically refer to the amount of pollutants or pollutant precursors introduced into the atmosphere by a source or group of sources. Pollutant emissions contribute to the ambient air concentrations of criteria pollutants, either by directly affecting the pollutant concentrations measured in the ambient air or by interacting in the atmosphere to form criteria pollutants. Primary pollutants, such as CO, SO_2, lead, and some particulates, are emitted directly into the atmosphere from emission sources. Secondary pollutants, such as ozone, NO_2, and some particulates are formed through atmospheric chemical reactions that are influenced by meteorology, ultraviolet light, and other atmospheric processes. Airborne emissions of lead are not addressed in this EA because there are no known lead emission sources associated with the proposed action.

3.3.1.1 General Conformity

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year) vary from pollutant to pollutant and also depend on the severity of the nonattainment status.

A conformity applicability analysis is the first step of a conformity evaluation and assesses if a federal action must be supported by a conformity determination. This is typically done by quantifying applicable direct and indirect emissions that are projected to result due to implementation of the federal action. Indirect emissions are those emissions caused by the federal action and originating in the region of interest, but which may occur at a later time and/or in a different location from the action itself and are reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity evaluation is performed. The location of such emissions is known and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency. If the results of the applicability analysis indicate that the total emissions would not exceed the *de minimis* emission thresholds, then the conformity evaluation process is completed.

3.3.1.2 Greenhouse Gases

Greenhouse Gases (GHGs) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

USEPA issued the Final *Mandatory Reporting of Greenhouse Gases Rule* on September 22, 2009. GHGs covered under the Final *Mandatory Reporting of Greenhouse Gases Rule* are carbon dioxide (CO_2), methane, and nitrous oxide, and hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Each GHG is assigned a global warming potential (GWP). The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, CH_4 has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. The equivalent CO_2 rate is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions as CO_2 equivalent (CO_2e) are required to submit annual reports to USEPA.

On a national scale, federal agencies are addressing emissions of GHGs by reductions mandated in federal laws and Executive Orders. Most recently, Executive Order 13423 *Strengthening Federal Environmental, Energy, and Transportation Management,* and Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance,* were enacted to address GHGs, including GHG emissions inventory, reduction, and reporting.

The California Global Warming Solutions Act of 2006, also known as AB 32, directs the state of California to reduce statewide GHG emissions to 1990 levels by the year 2020. The Climate Change Scoping Plan is California's strategy to reach the GHG reduction goals required in AB 32. This plan calls for reductions in California's carbon footprint; on a per-capita basis, reducing annual emissions of 14 tons of carbon dioxide for every man, woman and child in California down to about 10 tons per person by 2020.

In an effort to reduce energy consumption, reduce GHGs, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by Executive Order 13123 (subsequently replaced by Executive Order 13423) and the Energy Policy Act of 2005, the DoN has implemented a number of renewable energy projects (DoN 2006a). The types of projects currently in operation within the Naval Facilities Engineering Command (NAVFAC) Southwest region include thermal and photovoltaic solar systems, geothermal power plants, and wind generators. The DoN continues to promote and install new renewable energy projects within the NAVFAC Southwest region.

GHG emissions occur locally, but GHG impacts are both global in scale and cumulative over time. Therefore, GHG emissions for the baseline and the proposed action have been calculated and are presented and assessed in Chapter 5, Cumulative Impacts.

3.3.2 Existing Conditions

The ROI for the air quality analysis is the San Joaquin Valley Intrastate Air Quality Control Region, which is also identified as the SJVAPCD. This area includes all of Fresno County, Kings County, Madera County, Merced County, San Joaquin County, Stanislaus County, Tulare County and the San Joaquin Valley Air Basin portion of Kern County, which is that portion of the county that straddles the Sierra Nevada and Tehachapi mountains (40 CFR 81.165). The SJVAPCD is currently designated as nonattainment for the following NAAQS: 8-hour ozone (extreme), 24-hour $PM_{2.5}$, and annual $PM_{2.5}$ (40 CFR 81.305). Additionally, the SJVAPCD has achieved attainment for PM_{10}, and is therefore a PM_{10} Maintenance Area. The entire SJVAPCD is designated as unclassifiable, attainment, or better than national standards for the federal SO_2, and CO standards. There are two small regions within the SJVAPCD that are classified as maintenance areas for CO. These regions are specifically termed the "Fresno Urbanized Area" and the "Stockton Urbanized Area" in the California State Implementation Plan for CO (California Air Resources Board 2004). These maintenance areas are located 40 miles and 132 miles, respectively, from NAS Lemoore, which is located in portions of Kings County and Fresno County. Therefore, NAS Lemoore is not located in a CO maintenance area but is within 40 miles of the closest one. The applicable General Conformity Rule *de minimis* levels for the SJVAPCD are listed in Table 3.3-1.

Table 3.3-1. Applicable General Conformity [1]de minimis Levels (tons/year)

VOCs[2]	NO_x[2]	CO	SO_2	PM_{10}[3]	$PM_{2.5}$[4]
10	10	[5]NA	NA	100	100

Notes:
[1]40 CFR 93.153.
[2] SJVAPCD is an extreme nonattainment area for the 8-hour federal ozone standard; VOCs and NO_2 are precursors to the formation of ozone. NO_x = nitrous oxides, VOC = volatile organic compound.
[3] SJVAPCD is considered a maintenance area for the federal PM_{10} standard.
[4] SJVAPCD is in nonattainment of the federal $PM_{2.5}$ standard.
[5]NA = not applicable since none of SJVAPCD has ever been classified nonattainment of the federal SO_2, and all but the Urbanized Fresno Area and Urbanized Stockton Area have never been classified nonattainment of the federal CO standard.

Mobile source emissions are the primary air quality issue associated with the Proposed Action. Airfield operations and commuting personnel for 2011 represent the baseline, with a total of 238 aircraft. The baseline aircraft operations at NAS Lemoore are comprised of operations associated with permanently-assigned aircraft and transient aircraft. The permanently-assigned aircraft include 82 FA-18 C/Ds equipped with F404-GE-400 engines, 18 FA-18 C/Ds equipped with F404-GE-402 engines, and 138 FA-18 E/Fs equipped with F414-GE-400 engines, for a total of 238 aircraft. Emissions are based on an average of 198,917 operations annually for the permanently-assigned aircraft. Additionally, an average of 10,503 flight operations are performed at NAS Lemoore annually by transient aircraft, which include a 50/50 mix of FA-18 C/Ds and E/Fs, the C-40A Clipper (modified Boeing 737-700C), and C-2 (Greyhound) aircraft. In addition to baseline flight operations, the baseline for air emissions captures Ground Support Equipment operations, government-owned vehicles assigned to the squadrons, and commute emissions associated with military personnel assigned to NAS Lemoore with the aircraft. Table 3.3-2 presents baseline operation emissions for the current aircraft.

Table 3.3-2. Annual Emissions from Baseline Aircraft Operations at NAS Lemoore

Activity	Air Pollutant Emissions (tons)					
	VOCs	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
[1]FA-18C/D	308.46	893.19	263.72	10.69	144.18	139.85
Maintenance Runups	40.58	99.43	5.06	0.50	13.29	12.89
[2]FA-18C/D	66.90	197.92	66.69	2.63	34.14	33.12
Maintenance Runups	9.06	22.31	1.25	0.12	3.09	3.00
FA-18E/F	518.82	3,356.16	681.11	16.91	226.97	220.16
Maintenance Runups	95.28	221.81	96.85	2.17	37.20	36.08
Transient Aircraft	16.68	84.48	32.36	0.92	10.57	10.25
Subtotal Aircraft	*1,055.77*	*4,875. 31*	*1,147. 04*	*33. 93*	*469.43*	*455.34*
Ground Support Equipment	1.51	6.50	17.49	ND	1.30	1.26
Subtotal Aircraft Operations	**1,057.28**	**4,881.81**	**1,164.53**	**33.93**	**470.72**	**456.60**
Fleet Vehicles	0.02	0.12	0.13	0.00	0.01	0.01
Commuters	9.50	85.85	9.54	0.11	0.90	0.57
Subtotal Highway Vehicles	*9.51*	*85.97*	*9.67*	*0.11*	*0.92*	*0.58*
Total Baseline Air Emissions	**1,066.80**	**4,967.78**	**1,174.20**	**34.05**	**471.64**	**457.18**

Notes:
[1] Estimates for aircraft operations prepared from data provided by installation personnel and sources cited in Appendix C.
[2] Calculated values listed in this table are from Table A-3 in Appendix C.

3.4 SAFETY

The DoN practices Operational Risk Management as outlined in Office of the Chief of Naval Operations Instruction 3500.39 A. Requirements outlined in this document provide a process to maintain readiness in peacetime and achieve success in combat while safeguarding people and resources. The safety and environmental health analysis contained in the following sections addresses issues related to the health and wellbeing of military personnel and civilians living on or in the vicinity of NAS Lemoore. The primary safety issue identified for the project is flight safety, including BASH.

3.4.1 Flight Safety

The FAA is responsible for ensuring safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. To fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. The primary concern with regard to military training flights is the potential for aircraft mishaps (i.e., crashes) to occur, which could be caused by mid-air collisions with other aircraft or objects, weather difficulties, mechanical failures, pilot error, or bird/wildlife-aircraft strikes.

Aircraft mishaps are classified as A, B, or C, with Class A mishaps being the most severe, with total property damage of $2 million or more, total aircraft loss, or a fatality and/or permanent total disability (DoD 2000). Combat losses are excluded from these mishap statistics.

NAS Lemoore maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to major mishaps, whether on- or off-base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The initial response element usually consists of the Fire Chief, who would normally be the first on-scene Commander, fire-fighting and crash-rescue personnel, medical personnel, security police, and crash-recovery personnel. The second phase is the mishap investigation, which is comprised of an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoD 2000).

To complement flight training, all DoN pilots use state-of-the-art simulators extensively. Simulator training includes all facets of flight operations and comprehensive emergency procedures, which minimizes risk associated with mishaps due to pilot error. Additionally, highly trained maintenance crews perform routine inspections on each aircraft in accordance with Navy regulations, and maintenance activities are monitored by senior technicians to ensure the aircraft are equipped to withstand the rigors of operational and training events safely.

3.4.2 Bird/Wildlife Aircraft Strike Hazard Incidents

Safety is a priority for the DoN, and NAS Lemoore has developed a BASH management plan (NAS Lemoore 2007) to support that goal. To identify potential areas of concern and to establish procedures for minimizing the threat of aircraft striking birds and other animals, NAS Lemoore has implemented the BASH program. The management strategies covered in this plan include bird avoidance and control through harassment, grounds maintenance, habitat modification, and depredation. The key to this program is to track BASH incidents through reporting and to collect and analyze the bird remains. This plan is reviewed and updated annually by the NAS Lemoore Safety Officer. This plan review and update is necessary to ensure adaptive management that protects pilot safety and minimizes impacts on bird and other wildlife communities on NAS Lemoore.

3.5 LAND USE

Land use designations encompass undeveloped and developed land at NAS Lemoore and in the surrounding counties. Undeveloped land commonly is classified as open space, while developed land uses range from residential and commercial to recreational and agricultural. Land use on military-owned land is not regulated by regional and local plans and policies, but rather military plans and policies that identify the type and extent of uses allowed in specific areas. However, regional and local plans and policies on lands surrounding military installations can affect those installations.

The study area for land use includes NAS Lemoore and those portions of the City of Lemoore, Kings County, and Fresno County which may be affected by activities associated with the Proposed Action, particularly noise.

Given the potential for military aircraft-related noise to affect off-base land uses and for encroaching off-base development to affect NAS Lemoore military operations, various recent studies have thoroughly addressed existing land use conditions and challenges, and identified recommendations. These include: *Final AICUZ Report*, *NAS Lemoore* (Ecology and Environment 2010) and *Final Activity Overview Plan, NAS Lemoore* (DoN 2005a).

Further, a JLUS was a collaborative effort initiated in 2009 among Office of Economic Adjustment (DoD), the City of Lemoore, Kings County, and Fresno County to develop a comprehensive compatible development plan for the Region. The decision was made to conduct a JLUS to respond to the rapid population growth in California's Central Valley region and the potential for conflicts among regional stakeholders that might arise from this growth. While not a Navy action, as a stakeholder, NAS Lemoore participated in this study to achieve the following goals: 1) identify land use issues in the region that might impact the operational utility of NAS Lemoore; 2) identify actions the City of Lemoore, Kings County, and Fresno County can pursue to ensure that incompatible development does not impact the operational utility of NAS Lemoore; and 3) create an action plan to guide future planning from which all involved parties will benefit (Kings County Association of Governments 2011).

3.5.1 NAS Lemoore

NAS Lemoore is located in the central portion of the San Joaquin Valley, approximately 80 mi (129 km) east of the Pacific Ocean in Fresno and Kings Counties. The closest urban center is Fresno, 35 mi (56 km) north in Fresno County. Other nearby cities in Kings County include Lemoore, 7 mi (11 km) to the east; Hanford, 17 mi (27 km) to the east; and Stratford, 6 mi (9 km) to the southeast (DoN 2006b).

Approximately 15,744 ac (6,372 ha) of DoN-owned land are within Kings County, and 3,040 ac (1,230 ha) are within Fresno County. Fresno and Kings counties administer and regulate land uses within their respective boundaries. As a federal property, NAS Lemoore is not within the jurisdiction of either of these counties. The highest ground elevation within existing airspace boundaries is 1,397 ft (426 m) msl near the western edge of the airspace (DoN 2006b).

Land use at NAS Lemoore includes developed and undeveloped areas. Developed areas are used primarily for air operations, administration, and housing. The air operations area occupies approximately 4,100 ac (1,660 ha) in the central part of the base and primarily contains functions that directly support air operations, including training/operations, public works, maintenance, administration, and supply facilities. The administration and housing areas each occupy approximately 600 ac (243 ha) at the southeastern end of NAS Lemoore. Housing, personnel support facilities, and recreational facilities are the largest components of these areas, with a limited number of training, operations, and administration facilities. The administration and housing areas are bordered by agricultural outlease lands to the north and west and off-base agricultural lands along the south and east (DoN 2006b).

Undeveloped areas are used primarily for agricultural production, natural resources management, and outdoor recreation. Most of the land area of NAS Lemoore, approximately 13,715 ac (5,555 ha), is undeveloped and is leased to local farmers for agriculture. Agricultural lands leased pursuant to Public Law (PL) 97-321 permit the Secretary of the DoN to retain the lease rental receipts to cover the expenses of leasing and to finance multiple land use management programs (e.g., natural resources projects). Agricultural outlease lands are used primarily for producing cotton, wheat, and sugar beets, although other crops, including alfalfa, barley, corn, garlic, lettuce, melons, onions, safflower, and tomatoes, also are periodically produced. Five resource management areas are in the northern and northeastern areas of NAS Lemoore. These five areas have been and continue to be managed for the benefit of wildlife and native plant communities. Outdoor recreational uses on-base are those that depend on or are integrated with the natural environment. Outdoor recreational uses at NAS Lemoore are divided into concentrated activities, dispersed activities, and special interest activities. Concentrated activities are those in which people assemble at a specific location, such as a picnic area. Dispersed activities are those in which people are spread out over a larger area, such as hiking. Special interest activities are those associated with a particular resource value, such as wildlife viewing (DoN 2006b).

Land use on NAS Lemoore is documented and planned in the *AICUZ Report, NAS Lemoore, California* (Ecology and Environment 2010). The 2010 AICUZ is a planning document that helps identify land use compatibility issues within noise zones. It made some aircraft assumptions that do not correlate specifically with the baseline aircraft mix evaluated in this EA. The AICUZ program is designed to prevent incompatible development in areas of high noise, in areas that would expose the public to potential health and safety hazards associated with aircraft operations, and in areas that would jeopardize pilot safety and the operational capability of the base. The AICUZ establishes guidelines and provides recommendations for land use planning and policies that affect military installations and surrounding communities. The AICUZ program identifies land uses that would be compatible with certain noise levels, accident potential, and flight clearance requirements associated with military airfield operations. A goal of the AICUZ program is that the information will be incorporated into local, county, and regional planning (DoN 2006b).

A Military Influence Area is an official geographic planning or regulatory area where military operations impact local communities, and conversely, where local activities may affect the military's ability to carry out its mission. A Military Influence Area is designated to accomplish the following purposes:

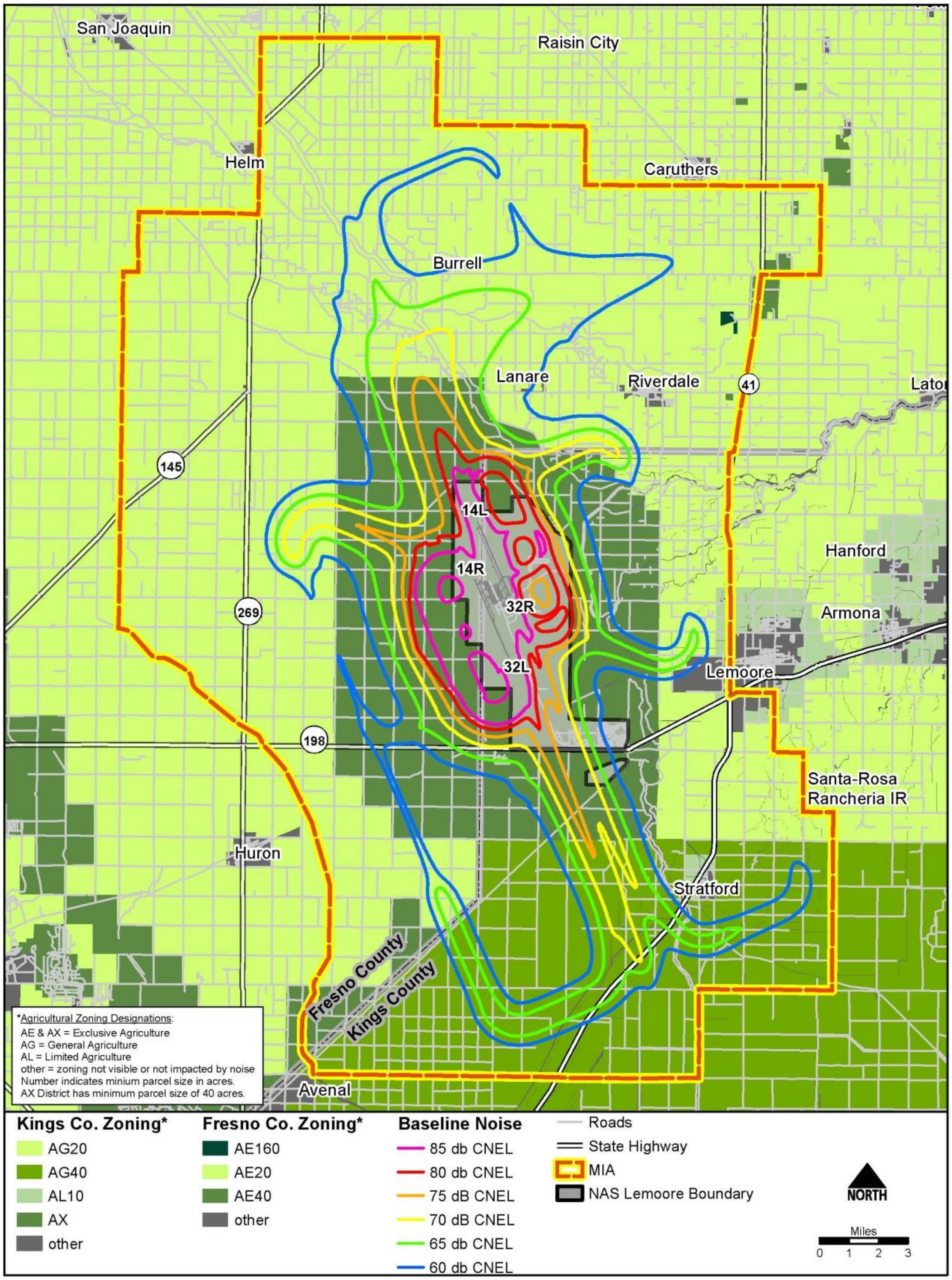
- Promote an orderly transition between community and military land uses so that land uses remain compatible.
- Protect public health, safety, and welfare.
- Maintain operational capabilities of military installations and areas.
- Promote the awareness of the size and scope of military training areas to protect areas separate from the actual military installation (for example, critical air and sea space) used for training purposes.
- Establish compatibility requirements within the designation area, such as requirements for sound attenuation, real estate disclosure, and aviation easements.

Figure 3.5-1 shows land uses that are currently affected by existing noise levels above 60 dB CNEL, and the Military Influence Area of NAS Lemoore. The noise zones depicted represent the current mix of aircraft at NAS Lemoore (2011 baseline) being evaluated in this EA.

3.5.2 Off-base

The General Plans of the City of Lemoore, Kings County, and Fresno County govern decisions regarding land use and growth surrounding the base. Each General Plan's Land Use Element and maps identify the NAS Lemoore Military Influence Area and AICUZ (City of Lemoore 2008; Kings County Board of Supervisors 2010; Fresno County 2011).

The primary land use surrounding the base is agriculture, with common crops being cotton, safflower, tomatoes, and various types of hay. Off-base land within approximately 4 mi (6 km) of the base airfield is zoned by both Fresno and Kings counties as agriculture, for farms with a minimum of 40 ac (16 ha). Off-base land between 4 and 10 mi (6 and 16 km) of the base airfield is zoned by both counties for agriculture, for farms with a minimum of 20 ac (8 ha). Agricultural zoning helps, in part, to prevent encroachment of residential development and other land uses that could pose a conflict to NAS Lemoore's mission. In addition, the DoN holds flight easements over 11,020 ac (4,460 ha) of land in Kings and Fresno Counties (DoN 2006b).



Source: Wyle 2011.

Figure 3.5-1. Baseline Land Uses Affected by Existing Noise Levels above 60 dB CNEL

Land use activities most sensitive to noise typically include residential and commercial areas, public services, and areas associated with cultural and recreational uses. Noise levels related to aircraft operations that define the area of noise impact are expressed in terms of CNEL (refer to section 3.2). According to these criteria, noise levels equal to or less than 65 dB CNEL are compatible with land uses such as residences, transient lodging, and medical facilities. Kings County's General Plan and Fresno County's General Plan do not allow for new residential construction in areas situated under a greater than 60 dB noise zone; however, the City of Lemoore allows such residential construction.

3.6 INFRASTRUCTURE AND UTILITIES

Infrastructure refers to the system of public works that provide the underlying framework for a community or installation. Infrastructure components and utilities discussed in the section include the water supply system, wastewater system, stormwater drainage system, electrical supply facilities, solid waste management facilities, and natural gas.

3.6.1 Water Supply

NAS Lemoore purchases its water supply from the Westlands Water District, which in turn receives water from the U.S. Bureau of Reclamation's Central Valley Project. NAS Lemoore entered into a Supplemental Water Allocation Agreement with Westlands Water District on 19 May 2003 to ensure an adequate water supply for the agricultural outleases. The Supplemental Water Allocation Agreement provides NAS Lemoore with an entitlement to 10,000 acre feet (3.26 billion gal) for its agricultural outleases and 5,000 acre feet per year (afy) (1.63 billion gal) for its potable water supply (Rugen 2005; Stewart 2000). The potable water is treated at the base's plant and stored in six tanks throughout the base. Water for agricultural purposes is made available to the lessees of agricultural lands on NAS Lemoore because the base is located within the Westlands Water District. Irrigation water is diverted into delivery pipelines that extend into the agricultural outlease lands.

Water is transported to the NAS Lemoore Water Treatment Plant, located in the southwest portion of the administration area, through a 30 inch (in) (76.2 centimeter [cm]) and a 28 in (71.1 cm) lateral line. The water treatment plant has a maximum operating capacity of 8.0 million gallons per day (mgpd) and consists of headworks, a clarifier, filtration units, clear wells, chemical injection units, pumping stations, and storage reservoirs. The average annual demand for water at NAS Lemoore is approximately 888,468,000 gal, or approximately 2.4 mgpd (DoN 2001a). This is approximately 31% of the capacity of the water treatment plant.

There are approximately 335,000 ft (102,108 m) of water distribution lines serving the housing, administration and operations areas at NAS Lemoore. NAS Lemoore has a storage capacity of approximately 5.6 million gallons of water (DoN 2006c). Two pumping stations exist at NAS Lemoore that contain water pumps, backup generators, and associated fire control and protection equipment (DoN 2001a).

3.6.2 Wastewater and Treatment Facilities

Like the water system, the wastewater and sewage treatment systems at NAS Lemoore are operated by the Public Works Department. All sanitary sewers are directed to the disposal ponds where treatment and ultimate disposal occurs. Since no treated or untreated sewer flows off-site, this system is classified as zero discharge. The sanitary sewer systems consists of approximately 35 mi (56.3 km) of laterals and gravity sewers that are made of vitrified clay and polyvinyl chloride pipe and range in diameter from 4 in (10.2 cm) to 21 in (53.3 cm). Additionally, there is approximately 8 mi (12.9 km) of steel and polyvinyl chloride force mains, from 4 in (10.2 cm) to 16 in (40.6 cm) in diameter.

The treatment and disposal of sanitary sewage at NAS Lemoore occurs at the main sewage plant, located near the southeast corner of the installation. The wastewater first enters one of two oxidation ponds where biological agents degrade the organic components. The treatment is assisted by a pump that recirculates the water within the ponds. The treated sanitary waste is then transferred to one of three evaporation basins that cover approximately 300 ac (121.4 ha). The abundant sunlight and low humidity in the area create the ideal situation for the evaporation of the treated water (DoN 2001a). The maximum operating capacity of the sanitary sewage system at NAS Lemoore is approximately 2.12 mgpd (773.8 million gallons per year [mgy]) with normal operations at 75% of the maximum capacity (DoN 2006c). Based on these estimates, the plant processes about 580,350,000 gallons of wastewater annually.

3.6.3 Stormwater Drainage

NAS Lemoore maintains a stormwater drainage system that conveys rainwater and infiltrated groundwater to the Main Storm Water Pumping Station through a series of underground pipes (in the housing area) and open ditches (in undeveloped areas). Water that is not evaporated is transferred to the oxidation and disposal ponds for treatment and evaporation. During high flow events (e.g., heavy rainfall), large pumps may become activated to route stormwater runoff into a stormwater ditch that diverts the flow to the Kings River (DoN 2001a).

3.6.4 Electrical Supply

The electrical distribution system operated at NAS Lemoore receives power through Pacific Gas & Electric transmission at the main substation. The power is provided from the Western Area Power Administration. Energy is delivered through a 70 kilovolt (kV) line to the highside bus at the main substation. The main substation is equipped with two power transformers and is designed so that both transformers are not required to serve the required power load. NAS Lemoore has two 70-7.2/12.5 kV substations. The main substation is located in the Administration Area, and the other substation is located in the Operations Area. Power is transferred throughout the installation through overhead and underground lines. There are 4.6 mi (7.4 km) of 70 kV transmission and 19.8 pole mi (31.9 km) of 7.2/12.5 kV distributions lines in service. Other components of the electrical system include 21.2 mi (34.1 km) of concrete encased ductline. There is 31.6 mi (50.9 km) of 15 kV line installed in the ductline (DoN 2001a).

Electrical usage on the installation is approximately 94,152 megawatt hours (MWh) annually, or 258 MWh daily (Washington State University 2004).

3.6.5 Solid Waste Management

Solid waste at NAS Lemoore is transported off-base to the Avenal municipal landfill, approximately 21 mi (33 km) southwest of NAS Lemoore (Rasmussen 2011a). A 40 ac (16.2 ha) landfill was located on-base but was recently closed when it reached capacity. The retired landfill is now used for the stockpiling of clean fill for use in other projects. In FY 10, a total of 2,600 tons was sent to the Avenal landfill, or approximately 7.1 tons per day. NAS Lemoore has instituted a recycling program and currently diverts approximately 44% of generated waste to recycling centers. Hazardous waste generated on-base is collected and stored at the Public Works Hazardous Waste Storage Area at building 45 located in the

Operations Area of NAS Lemoore. The hazardous wastes are then trucked by a commercial contractor to a USEPA permitted disposal area (DoN 2006b).

3.6.6 Natural Gas

Natural gas is provided to NAS Lemoore from the Southern California Gas Company through a series of 4 in (10.2 cm), high pressure gas lines entering at the housing area and main gate. From there, the natural gas is sent to one of three regulator/purchase stations; one in the Administrations Area, one in the Operations Area, and one in the Housing Area. These stations reduce the pressure of the natural gas to 25 pounds per square inch and divide the natural gas into a 2 or 6 in (5 or 15 cm) pipeline distribution system. There is a total of approximately 99,575 ft (30,350 m) of ¾-6 in (2-15 cm) natural gas distribution pipe comprised of steel, polyvinyl chloride, and polyethylene within the natural gas system (DoN 2001a). Annual usage of natural gas is approximately 180,000 million British thermal units (MBTU), or approximately 493 MBTUs daily (DoN 2006b).

3.7 SOCIOECONOMICS

The study area for socioeconomic resources includes NAS Lemoore and Kings and Fresno counties, the counties with the strongest economic ties to activities at NAS Lemoore. This section addresses population, employment, income, and housing characteristics of the study area. This section also assesses environmental justice.

3.7.1 Population

The 2010 estimated population in the study area was approximately 1,110,050 (see Table 3.7-1). The City of Lemoore grew by approximately 29% from 2000 to 2010. Kings and Fresno counties grew by approximately 21% and 19%, respectively, over the same time period. Rapid population growth is expected to continue, with Kings and Fresno Counties projected to grow by approximately 32% and 26%, respectively, from 2010 to 2020. Population in the study area grew faster than in the state as a whole, and is projected to continue to grow at a faster rate (California Department of Finance 2007, 2010).

Table 3.7-1. Study Area Population Trends

Jurisdiction	2000	2010	Growth Rate 2000-2010	2020 Projection	Growth Rate 2010-2020
City of Lemoore	19,712	25,461	29.1%	NA	-
Kings County	129,461	156,289	20.7%	205,707	31.6%
Fresno County	799,407	953,761	19.3%	1,201,792	26.0%
California	33,871,648	38,648,090	14.1%	44,135,923	14.2%

Source*:* USCB 2010b; California Department of Finance 2007, 2010.

The population associated with NAS Lemoore includes 7,600 total personnel (6,123 military, 1,477 civilian), 4,100 military family members, and 8,713 retirees (5,671 of who live in Kings and Fresno counties). In addition, approximately 23,456 transient personnel per year participate in training programs at NAS Lemoore (DoN 2009b; Ecology and Environment 2010).

3.7.2 Employment and Income

Employment by industry in Kings and Fresno counties for 2010 is shown in Table 3.7-2. The industries that employ the greatest number of people in Kings County included government (34.5%); agriculture (15.5%); trade, transportation, and utilities (12.3%); educational and health services (11.1%); and manufacturing (10.2%). In Fresno County, the industries that employ the most people are government

(20.2%); trade, transportation, and utilities (17.3%); agriculture (13.8%); educational and health services (12.5%); and leisure and hospitality (7.8%) (California Employment Development Department 2010a, 2010b).

***Table 3.7-2. Study Area Employment, 2010*[a]**

Industry	Kings County	Fresno County
Agriculture	6,700	45,000
Mining and Logging	1,200	300
Construction	NA[b]	12,000
Manufacturing	4,400	25,000
Trade, Transportation, and Utilities	5,300	56,500
Information	200	4,200
Financial Activities	1,100	13,700
Professional and Business Services	1,300	27,500
Educational and Health Services	4,800	41,000
Leisure and Hospitality	2,700	25,500
Other Services	500	10,300
Government	14,900	66,000
Total	**43,100**	**327,000**

Source: California Employment Development Department 2010b.
Notes: [a]Not seasonally adjusted. November 2010, preliminary.
[b]Included with Mining and Logging.

Total personal income in the study area increased by 17% in Kings County from 2005 to 2008, and by approximately 16% in Fresno County, over the same period (Table 3.7-3). Per capita income also increased from 2005 to 2008 by about 13% in Kings County and by approximately 12% in Fresno County. Total personal income grew faster in the study area than for the state as a whole, while per capita income increased more at the state level than in the study area (U.S. Department of Commerce 2010).

Table 3.7-3. Study Area Personal and Per Capita Income

Jurisdiction	2005 Personal Income[a] (000)	2008 Personal Income[a] (000)	Increase 2005-2008	2005 Per Capita Income[a]	2008 Per Capita Income[a]	Increase[a] 2005-2008
Kings County	$3,398,364	$3,976,623	17.0%	$23,735	$26,734	12.6%
Fresno County	$24,078,160	$27,994,357	16.3%	$27,758	$30,997	11.7%
California	$1,387,682,421	$1,604,112,764	15.6%	$38,767	$43,852	13.1%

Source: U.S. Department of Commerce 2010.
Notes: [a]Not adjusted for inflation.

Unemployment rates in the study area have increased dramatically over the last few years as shown in Table 3.7-4, almost doubling from 2007 to 2010. The comparable 2010 unadjusted unemployment rate for California was 12.4% and 9.3% for the nation (California Employment Development Department 2010b).

***Table 3.7-4. Study Area Unemployment Rates*[a]**

Jurisdiction	2007	2008	2009	2010[b]	Increase 2007-2010
City of Lemoore	7.5	9.1	12.8	14.4	92%
Kings County	8.7	10.5	14.6	16.4	89%
Fresno County	8.5	10.5	15.1	16.9	99%
California	5.3	7.2	11.4	12.4	134%

Source: California Employment Development Department 2010b.
Notes: [a]Not seasonally adjusted.
[b]November 2010, preliminary.

According to the most recent data available, NAS Lemoore employs 6,123 military and 1,477 civilian personnel. Military and civilian payrolls were approximately $557 million (DoN 2009b). Approximately

23,400 transient military and civilian personnel trained at NAS Lemoore in 2008, spending an average of 21 days. An economic impact assessment determined that payrolls, procurement contracts, base expenditures, and military retirement and disability benefits resulted in an additional 4,542 jobs with labor income of approximately $161 million in Fresno and Kings counties in FY 2008. Tax revenues generated from the economic activity at NAS Lemoore provided approximately $51.6 million to federal government entities and $51.7 million to state and local government entities in 2008 (DoN 2009b).

3.7.3 Housing

As reported in the USCB 2005-2009 American Community Survey, there were approximately 345,000 housing units in Kings and Fresno counties (Table 3.7-5). The vacancy rate was 5.5% in Kings County and 8.1% in Fresno County, compared to 8.2% for California.

Table 3.7-5. Study Area Housing Units, 2009

Jurisdiction	Housing Units	Percent Vacant	Occupied Housing Units		
			Total	Percent Owner	Percent Renter
City of Lemoore	7,982	6.5	7,464	57.8	42.2
Kings County	42,547	5.5	39,263	55.4	44.6
Fresno County	302,935	8.1	278,525	55.6	44.4
California	13,268,682	8.2	12,187,191	57.9	42.1

Source: USCB 2010c.

Similar to the rest of the state and nation, the local housing market has been hit hard by the recession. Home construction has slowed considerably. Residential building permits declined in Kings County by 81% from 2005 to 2009, and in Fresno County by 61% for the time period 2009-2014 (USCB 2011a).

In 2009 NAS Lemoore prepared an update of the 2006-2011 Housing Requirements and Market Analysis. The 2011 Housing Requirements and Market Analysis assessed the housing market within an approximately 30-mi (48 km) radius of NAS Lemoore, a smaller geographic area than the two-county study area. The 2011 Housing Requirements and Market Analysis rental market reflects the down turn in the local economy. There were approximately 15,573 rental housing units in 2009, of which approximately 12,688 units (82.5%) were considered suitable for military families in terms of physical conditions and health and safety concerns. The rental housing vacancy rate in 2009 was 5.8%, slightly lower than the long-term average vacancy rate of 5.9%. The rental supply grew at an average of 1.8% per year from 2006 with rental prices increasing 1.8% annually over the same time period.

Based on historic data, the 2011 Housing Requirements and Market Analysis assumes that the rental housing supply will grow at an annual rate of 0.3% to approximately 15,828 units by 2014. The newly added 255 rental units are assumed to be suitable for military families. The vacancy rate is assumed to be approximately 5.9% from 2009 to 2014.

NAS Lemoore recently completed construction or renovation of 1,640 single and multifamily residential homes. Family housing at NAS Lemoore averages 97% occupancy. In support of its bachelor population, NAS Lemoore has 16 barracks that can accommodate more than 2,000 personnel (Ecology and Environment 2010). The occupancy rate averages 89% for the junior enlisted personnel and 50% for officers/senior enlisted personnel (Rasmussen 2011b). Several projects are currently underway that will convert bachelor housing from two to one person per room. These conversions will continue through FY 17 and will result in a total of 1,382 bachelor spaces (Rasmussen 2011b).

3.7.4 Minority and Low Income

On February 11, 1994, President Clinton signed EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. It requires federal agencies to identify and avoid disproportionate impacts on minority populations, including Native Americans, or low-income communities. This section identifies minority or low-income communities that could be affected by the proposed project. California serves as the community of comparison since it is the next largest geographic area that encompasses the study area.

USCB data on the racial and ethnic composition of the study area in 2009 are summarized in Table 3.7-6. Overall, the majority of the study area is white. The City of Lemoore has a lower percentage of minority populations than Kings and Fresno counties and California. The City of Lemoore's Hispanic population makes up a slightly larger percentage than that for the state as a whole, but is less than both Kings and Fresno counties. Kings and Fresno counties have a lower percentage of minority populations and a higher percentage of Hispanic populations than the state.

Table 3.7-6. Percent Race and Ethnicity, 2009[a]

Jurisdiction	White	Black/African American	American Indian/Alaska Native	Asian	Native Hawaiian/Other Pacific Islander	Hispanic or Latino Origin[b]
City of Lemoore	70.5	7.5	0.5	6.4	0.3	36.6
Kings County	69.5	7.7	1.5	3.3	0.1	48.4
Fresno County	62.1	5.1	1.0	8.8	0.1	48.1
California	61.3	6.2	0.8	12.3	0.4	36.1

Source: USCB 2010c.

Notes: [a]One race. Data presented reflects most reported race and ethnicity categories; percentages may not add to 100% due to rounding.
[b]Hispanic origin may be of any race.

Table 3.7-7 presents data on low-income families and individuals in the study area. The percentage of low-income families in the City of Lemoore with incomes below poverty level (based on family size and composition) is the same as for the state, but lower than both Kings and Fresno counties. The percentage of individuals with incomes below the poverty level in the City of Lemoore was lower than both Kings and Fresno counties and California. Both Kings and Fresno counties have a greater percentage of low-income families and individuals than the state.

Table 3.7-7. Percent Low Income, 2009

Jurisdiction	Families Below Poverty Level	Individuals Below Poverty Level
City of Lemoore	9.8	12.7
Kings County	15.1	19.1
Fresno County	16.3	20.9
California	9.8	13.2

Source: USCB 2010c.

Table 3.7-8 presents baseline total, minority, and low-income populations underlying NAS Lemoore noise zones that are affected by noise levels above 65 dB CNEL. The affected population under these areas was determined using USCB 2000 data to calculate the total affected area in each Block Group, and then used to obtain the percentage of minority and low-income population for that area. The percentage was then used to achieve population estimates under each noise zones. The USCB 2000 data represent the best available data at this time that can be analyzed to determine potential impacts to minority and low-income populations using geographic information systems (see Section 3.7.2).

Table 3.7-8. Baseline Minority and Low-Income Populations Underlying NAS Lemoore Aircraft Noise Zones

Noise Zone (dB CNEL)	Total Population	Total Minority Population	Percent Minority	Total Low-Income Population	Percent Low-Income
65-70	544	331	61%	90	17%
70-75	112	81	72%	20	18%
75-80	52	36	69%	11	21%
80-85	20	17	85%	3	16%
>85	0	0	0%	0	0%
Total	**728**	**465**	**64%**	**124**	**17%**

Source: Wyle 2011; USCB 2011a,2010c

3.7.5 Protection of Children

In April 1997, President Clinton signed EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO requires federal agencies to identify, assess, and address disproportionate environmental health and safety risks to children from federal actions. This section identifies populations under the age of 18 that could be affected by the proposed project. California serves as the community of comparison since it is the next largest geographic area that encompasses the study area. As shown in Table 3.7-9, the study area has a greater percentage of children under the age of 18 than the state.

Table 3.7-9. Percent Under the Age of 18, 2009

Jurisdiction	< Age 18
City of Lemoore	30.2
Kings County	27.6
Fresno County	30.5
California	26.0

Source: USCB 2010c.

The NAS Lemoore housing area is the closest location to the Proposed Action where children are present on a regular basis. This area contains Akers Elementary School and RJ Neutra Elementary School, which have a combined student capacity of 1,600. This area also contains single and multi-family homes, a youth center, restaurants, a hospital, a gymnasium, an equestrian center, and other community support facilities (Ecology and Environment 2010).

Currently, Akers Elementary School, located on NAS Lemoore, is exposed to aircraft noise levels of about 65 dB CNEL. No other schools are exposed to noise levels of 65 dB CNEL or above in the vicinity of NAS Lemoore.

Table 3.7-10 presents baseline total and under the age of 18 populations underlying NAS Lemoore noise zones that are affected by noise levels above 65 dB CNEL.

Table 3.7-10. Under the Age of 18 Populations Underlying Baseline NAS Lemoore Aircraft Noise Zones

Noise Zone (dB CNEL)	Total Population	Total < Age 18 Population	Percent < Age 18
65-70	544	10	2%
70-75	112	4	4%
75-80	52	2	4%
80-85	20	1	5%
>85	0	0	0%
Total	**728**	**17**	**2%**

Source: Wyle 2011.

3.8 COMMUNITY SERVICES

Community services are those basic services that are provided by public and private entities for the purposes of enhancing the quality of life. The community services discussed for NAS Lemoore include schools, police and fire protection, health services, and recreational facilities. These community services support the military assigned to NAS Lemoore and their families. Currently, there is a total on-base population of 11,700 people (6,123 military personnel, 4,100 family members, and 1,477 civilians and contractors) (Ecology and Environment 2010). Approximately 56% of the military personnel reside on-base, and 44% reside off-base. All of the civilians and contractors reside off-base.

3.8.1 Schools

There are two schools serving kindergarten through eighth grade located on NAS Lemoore, both within the Central Union School District in King's County. Akers Elementary serves kindergarten through eighth grade and had a total enrollment of 685 students in 2009-2010, with an average of 632 students over the past 13 years (California Department of Education 2010). R.J. Neutra School serves kindergarten through fifth grade and had a total enrollment of 557 students in 2009-2010, with an average of 592 students over the past 13 years (California Department of Education 2010). The two schools on-base can accommodate approximately 1,600 total students (Ecology and Environment 2010). Based on the 2009-2010 data, there are 358 student openings available at the two schools. High school students living on base are bused off-base to Lemoore High School, located 7 mi (11.3 km) away in the city of Lemoore. Enrollment data for area high schools are provided in Table 3.8-1 below. Area high schools are under capacity or at capacity (i.e., Reef-Sunset High).

Table 3.8-1. High School Enrollment Capacities

High School	Facility Capacity	Enrollment Number	Available Capacity
Lemoore High School	2,150	1,915	+235
Lemoore Union High School	1,100	890	+210
Reef-Sunset Unified High School[1]	570-610	N/A	N/A
Hanford High School	1,700	1,558	+142
Hanford West High School	1,700	1,444	+256
Sierra Pacific High School	800	426	+374

[1] Reef-Sunset Unified High School is current operating at about capacity and modular facilities would be needed to accommodate growth.

There are numerous other schools located in the surrounding communities that serve NAS Lemoore family members living off-base, depending on which community they live in.

3.8.2 Police Protection

NAS Lemoore security provides police services within the boundaries of the base. Security for the base consists of drive-by patrols and response to service calls. Two to four patrols are on duty at all times. On-base security currently consists of 108 military and 36 civilian personnel. There is also a 139-person Augmentation Security Force (Rasmussen 2011a). A newly constructed police station on-base includes an armory, dispatch center, traffic court and conference room.

Off-base, police services consist of the Kings County Sheriff's department and local community police departments. The Sheriff's department is located in the City of Hanford, approximately 20 mi (32.2 km) east of NAS Lemoore with five satellite substations within the county (Kings County Board of Supervisors 2010). The Sheriff's department can supply a Special Weapons and Tactics team and mobile command center to NAS Lemoore, if needed. The nearest municipal police services are located in the City of Lemoore. The Lemoore police force consists of 25 officers and several support personnel (NAS Lemoore 2011).

3.8.3 Fire Protection

Fire protection services at NAS Lemoore are provided through two on-base fire stations. Fire Station 1 is located near the flight line in the operations area and is responsible for aircraft and related operational fires. Hazardous materials operations are conducted out of this station. Fire Station 2 is located in the southeastern portion of NAS Lemoore and is responsible for fires in the administration and housing areas. Currently, there are 52 firefighters at NAS Lemoore. Any time when the airfield is in use, a minimum of 17 firefighters are on duty, 11 personnel at the operations stations, and 6 at the administration station (Rasmussen 2011a). Fire protection services on NAS Lemoore utilize three aircraft rescue and firefighting vehicles, located at Station 1. Three "structural" vehicles used to respond to building fires are located between the two stations. There are also numerous support vehicles used between the two stations. In addition to operational and housing fires, fire protection services also responds to wildland fires that may occur within NAS Lemoore (NAS Lemoore Federal Fire Fighters 2010).

Fire protection services off-base include the Kings County Fire Department and municipal fire departments. The Kings County Fire Department serves the unincorporated areas of the County and the four unincorporated communities of Home Garden, Kettleman City, Armona, and Stratford. The Kings County Fire Department provides assistance to the NAS Lemoore Fire Department, and is staffed with 61 professional firefighters as well as 100 volunteer firefighters (Kings County Board of Supervisors 2010). The nearest municipal fire protection services is located at the City of Lemoore. The Lemoore Volunteer Fire Departments is staffed with 27 personnel and has a Mutual Aid Agreement with NAS Lemoore.

3.8.4 Health Services

The full-service hospital located at NAS Lemoore provides a full range of services to all military families and their children, including access to emergency care and after-hours services. The hospital was constructed in 1997 and is a 150,000 ft^2 (13,939.5 m^2) facility with 16 inpatient beds and is staffed with 294 military and 247 civilian personnel. The NAS Lemoore Hospital sees approximately 17,250 patients annually (Knapp 2009). The hospital has the capability to serve 32,000 patients annually (DoN 2006b).

Off-base, the surrounding cities and towns in Kings and Fresno counties have hospitals supporting the populations that live near those areas. The largest hospital is the Hanford Community Medical Center with 121 inpatient beds and 542 full time staff. It is located approximately 13 mi (20.9 km) east of NAS Lemoore (Kings County Board of Supervisors 2010).

3.8.5 Recreational Facilities

Recreational facilities at NAS Lemoore are primarily based at the fitness complex. Facilities include two full-size basketball courts, three racquetball courts, 1.5 and 2.5 mi (2.4 and 4.0 km) running courses, softball fields and tennis courts. Intramural and open league sports such as football, bowling, golf, and softball are also organized on-base. Three swimming pools which support military members and their family members are located at NAS Lemoore. A 985-seat movie theatre is also located on-base. The Outdoor Adventure Center rents out a variety of recreational equipment including camping gear, ski boats, and picnic equipment. Two picnic areas are also located on NAS Lemoore.

Off-base recreation includes regional, county, state, and national parks, located within a 100-mi (160.9 km) radius of NAS Lemoore. Nearby communities also have numerous recreational facilities that support the local population.

3.9 TRANSPORTATION

This section describes ground vehicle transportation and circulation in the vicinity of NAS Lemoore, including the existing road network and associated traffic levels. Transportation and circulation refer to road and street systems, the movement of vehicles, and mass transit.

Regional access to NAS Lemoore is provided by State Route (SR) 198 and SR 41, as well as many other local access routes (see Figure 3.9-1). Local access to NAS Lemoore is provided by SR198 which accesses the Main Gate via a signalized intersection; Grangeville Boulevard, which accesses the Operations Gate; Avenal Cutoff Road, which accesses the Housing Gate; and Jackson Avenue, which accesses the Housing Gate (DoN 1998b). Each of the primary roadways in the vicinity of NAS Lemoore is described below, and traffic counts for segments of SR 198 and SR 41 in the vicinity of NAS Lemoore are provided in Table 3.9-1. Traffic data are presented in terms of annual average daily traffic, which is the total volume of daily traffic for the year at a given location divided by 365. Peak hour traffic is the 1-hour period when traffic levels are highest during a 24-hour period (Caltrans 2009). Peak hour traffic typically occurs during commuter traffic periods in the morning or early evening.

The two state highways (SR 41 and SR 198) in the vicinity of NAS Lemoore are important components of the regional transportation system. Highway traffic in the area primarily includes farm-to-market, commuter, and business trips. Local roads are also important for farm-to-market transportation. Due to increased urbanization occurring in Kings County and the surrounding region, commuter and business trips are becoming a larger percentage of traffic on area roadways (Kings County Association of Governments 2008).

SR 198 is predominantly a four-lane, east-west oriented highway located immediately south of NAS Lemoore. It connects Interstate 5 to the southwest and Highway 99 to the northeast and provides access from Lemoore, Hanford, and other local communities. SR 198 is four lanes from the NAS Lemoore Main Gate to SR 41, and two lanes to the west of the Main Gate (DoN 1998b).

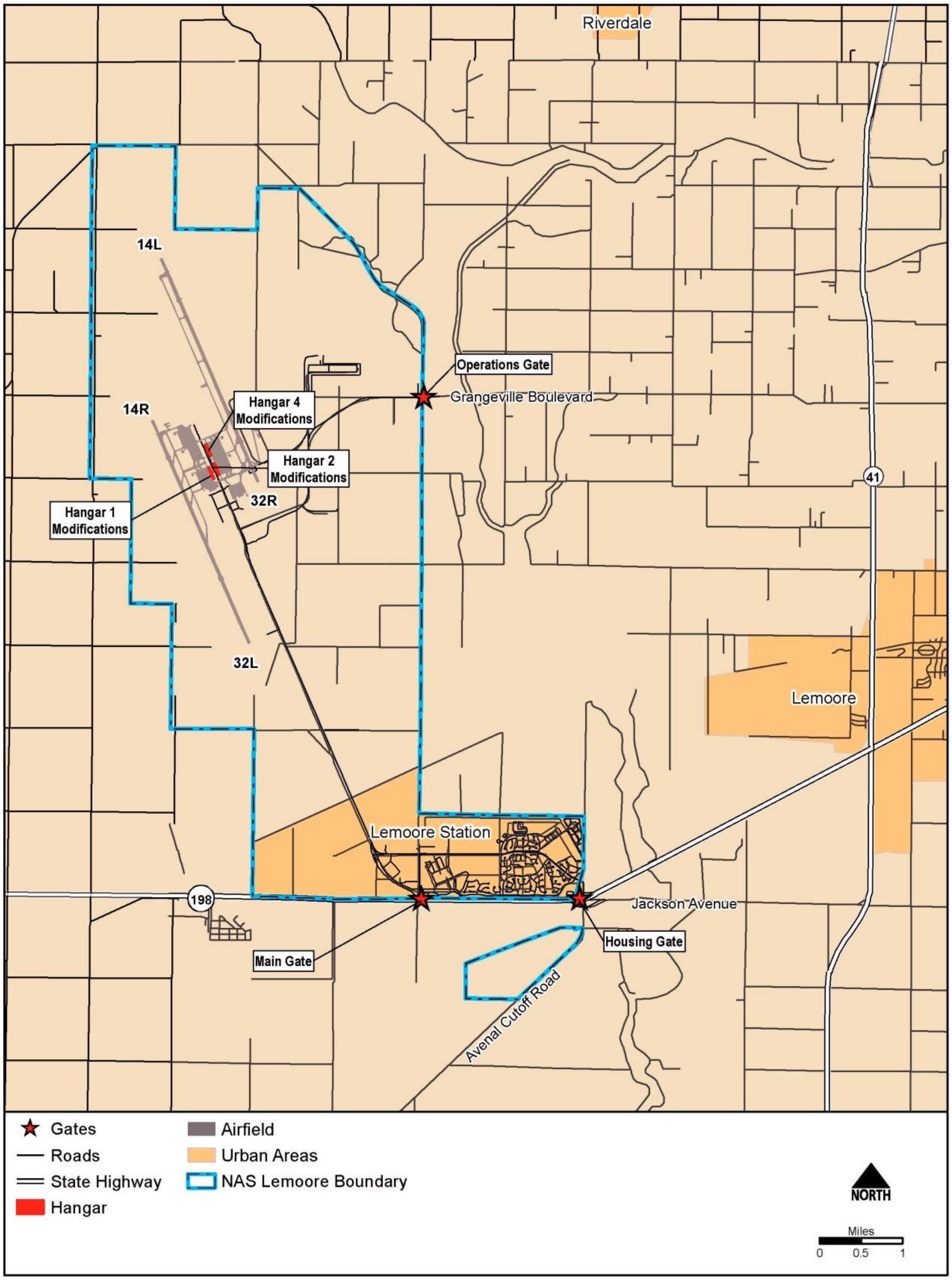


Figure 3.9-1. Transportation Network in the Vicinity of NAS Lemoore

SR 41 is predominantly a four-lane, north-south oriented expressway that provides access between the City of Lemoore and Fresno to the north. It is located about 3 mi (5 km) east of NAS Lemoore, and intersects SR 198 and Grangeville Boulevard. (DoN 1998b)

Grangeville Boulevard is a two-lane, east west arterial roadway with a signalized intersection at SR 41. Avenal Cutoff Road is a two-lane, north-south arterial roadway with an interchange at SR 198. Jackson Street is an two-lane, east-west major collector roadway providing access between SR 41 and SR 198. (DoN 1998b)

Table 3.9-1. Traffic Volumes for SR 198 and SR 41

Roadway Description	Peak Hour Traffic	AADT
SR 198/NAS Lemoore Main Gate (westbound)	320	2,350
SR 198/NAS Lemoore Main Gate (eastbound)	2,100	17,500
SR 198/Avenal Cutoff Road (westbound)	2,100	17,500
SR 198/Avenal Cutoff Road (eastbound)	2,050	18,000
SR 198/Jct. SR 41 (westbound)	2,050	18,000
SR 198/Jct. SR 41 (eastbound)	1,750	18,500
SR 41/Jackson Ave. (southbound)	960	7,500
SR 41/Jackson Ave. (northbound)	990	7,700
SR 41/Jct. SR 198 (southbound)	990	7,700
SR 41/Jct. SR 198 (northbound)	1,300	14,100
SR 41/Grangeville Blvd (southbound)	1,800	19,700
SR 41/Grangeville Blvd (northbound)	1,400	15,700

Source: Caltrans 2009.
Notes: AADT - average annual daily traffic.

3.10 BIOLOGICAL RESOURCES

NAS Lemoore and properties underlying the training airspace comprise the study area for biological resources. Due to the nature of the Proposed Action, the focus of the impact analysis for biological resources is limited to resources on-base near the flightline, as renovations and alterations of Hangars 1, 2, and 4 are the only "disturbance" activities being proposed. The following discussion describes base wide biological resources for context.

This section on the affected environment of biological resources presents wildlife in Section 3.10.1, migratory birds in Section 3.10.2, and threatened and endangered species in Section 3.10.3. Threatened and endangered migratory birds are discussed in Section 3.10.3.

3.10.1 Wildlife

Wildlife species diversity and abundance on NAS Lemoore is somewhat limited by the extensive existing development and constrained area of natural habitats present. Habitats on and near NAS Lemoore are typical of what one would expect for a small, somewhat isolated urbanized area in the arid regions of the southern San Joaquin Valley. Species observed in the developed/landscaped portions of the installation that have already adapted to human activity and may even be considered pest species include: house mouse (*Mus musculus*), black rat (*Rattus rattus*), western pocket gopher (*Thomomys mazama*), California ground squirrel (*Spermophilus beecheyi*), killdeer (*Charadrius voviferus*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), California scrub jay (*Aphelocoma californica*), American crow (*Corvus branchyrrhynchos*), house finch (*Carpodacus mexicanus*), American robin (*Turdus migratorius*), Brewer's blackbird (*Euphagus cyanocephalus*), house sparrow (*Passer domesticus*), raccoon (*Procyon lotor*), desert cottontail (*Sylvilagus audubonii*), and domestic cats and dogs (DoN 2001b).

Agricultural lands, both active and fallow, occur extensively throughout the base. Crop lands represent foraging habitat for many wildlife species and, when irrigated or flooded, can provide habitat for shorebirds and waterfowl. Areas not currently farmed that are left fallow for several years may become weedy (or "*ruderal"*) fields resembling disturbed grasslands. At NAS Lemoore, some 46 species of waterbirds and shorebirds have been observed in agricultural areas, including herons, egrets, ducks, geese, plovers, sandpipers, and gulls (DoN 2001b). Wildlife diversity is highest in the spring in these fields (when crop plants are immature, or when flood irrigation is more prevalent), and during the winter when food elsewhere is more scarce. Thirteen species of raptors have been observed at NAS Lemoore using the agricultural fields, including burrowing owls (*Athene cunicularia*) that nest in ground squirrel burrows along levees and farm roads.

There are two types of annual grasslands at NAS Lemoore: mowed and un-mowed. Grasslands close to the Air Operations Area are generally mowed to reduce wildlife use and the potential for BASH incidents (see section 3.7.4). Species diversity in the un-mowed fields tends to be higher, including species adapted to grasslands and human disturbance, such as: black-tailed jack rabbit (*Lepus califonicus*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), and a number of both common and special status rodent species, such as California ground squirrel, Fresno kangaroo rat (*Dipodomys nitratoides exilis*), and Tipton's kangaroo rat (*Dipodomys n. nitratoides*) (DoN 2001b). Common reptiles found in grasslands on the base include western whiptail (*Cnemidophorous tigris*), western fence lizard (*Sceloporous occidentalis*), side-blotched lizard (*Uta stansburiana*), and gopher snake (*Pituophis melanoleucus*) (DoN 2001b). Common grassland bird species onsite include loggerhead shrike (*Lanius ludovicianus*), burrowing owl, and American kestrel (*Falco sparverius*) (DoN 2001b).

Most of the wetlands on the base are in what the NAS Lemoore refers to in its 2001 Integrated Natural Resources Management Plan (INRMP) as Resource Management Areas 1, 2, and 3, including the ditches and canals that intersect the base that function at times as wetlands. Area 1 is 86 ac (35 ha) and consists of grasslands supporting scattered cottonwoods (*Populus fremontii*), willows (*Salix spp.*), and salt bush (*Atriplex* spp.), with much of the area being seasonally inundated. Area 2 includes Sunset Lake, is about 100 ac (40 ha) in size, and is now connected to Area 1 by a corridor that contains a meandering watercourse, and a grove of eucalyptus trees. Area 3 contains an old irrigation reservoir and is seasonally inundated; western spadefoot toads (*Scaphiopus hammondii*) are frequently found in this area.

Birds commonly using these wetland areas include great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), American coot (*Fulica Americana*), redwinged (*Agelaius phoenecius*) and tricolored blackbird (*A. tricolor*), and marsh wren (*Cistothorus palustris*) (DoN 2001b). Common reptile and amphibian species found in wetlands on the installation include California tree frog (*Hyla californica*), bullfrog (*Rana catesbiana*), western garter snake (*Thamnophis couchii*), and common kingsnake (*Lampropeltis getulus*) (DoN 2001b).

Although these are man-made features on the installation's landscape, windbreaks provide some cover and roosting habitat for a variety of wildlife species. Windbreaks are most notably used by raptors for nesting and roosting, as well as hummingbirds, warblers, and finches.

3.10.2 Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918 is the primary legislation in the U.S. established to conserve migratory birds. The MBTA prohibits taking, killing, or possessing migratory birds unless permitted by regulation. For military readiness activities, DoD installations are exempt from incidental taking of migratory birds, pursuant to a final 2007 rulemaking in accordance with Section 315 of the National Defense Authorization Act for FY 03 (PL 107-314, 116 Stat. 2458). Congress defined military readiness activities as all training and operations of the U.S. Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. However, if any of the Armed Forces determine that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of a migratory bird species, then they must confer and cooperate with the U.S. Fish and Wildlife Service (USFWS) to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem

The installation's INRMP describes 150 species of birds as being observed onsite during surveys performed in the late 1990s and, of these, all but three are on the USFWS list of MBTA-protected species. There are a number of sensitive migratory bird species protected by the MBTA that are known to occur on NAS Lemoore property. Bird species known to occur onsite that have some special status under the Federal Endangered Species Act (ESA), and are doubly protected under the MBTA, include: California least tern (*Sterna antillarum brownii*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), and tricolored blackbird (*Agelaius tricolor*). California least tern is federally listed as endangered, and the other three species are considered federal "species of concern." Although listed as a species of concern by USFWS and California Department of Fish and Game, burrowing owls present potential conflicts as they occur along the installation's runways and represent a potential BASH concern. A burrowing owl management plan was prepared for NAS Lemoore in 1998, and included surveys for this species throughout the base (Rosenberg et al. 1998). A total of 54 active burrowing owl nests were found, including many along the active runways, and within the runway buffer strips, plus some found in the wildlife management areas, the capped landfill site, and the receiver station site (Rosenberg et al. 1998). The INRMP describes loggerhead shrikes occurring in grasslands at the installation, and tricolored blackbirds foraging in agricultural fields onsite (DoN 2001b).

3.10.3 Threatened and Endangered Species

The ESA of 1973 and subsequent amendments provide for conservation of threatened and endangered species of animals and plants and the habitats in which they are found. The DoN ensures that consultations are conducted as required under Section 7 of the ESA for any action that "may affect" a federally listed threatened or endangered species. Although protection of species that are listed at the state level as threatened or endangered is not legally mandated for federal agencies, the DoN encourages cooperation with states to protect such species where such protection is consistent with an installation's mission.

The California Natural Diversity Data Base and the INRMP for NAS Lemoore were reviewed to obtain prior and current records of special status species occurrences on the installation. Federally listed threatened and endangered species previously documented as occurring within the installation's boundaries or in the immediate vicinity of NAS Lemoore include California least tern, Fresno kangaroo rat (*Dipodomys nitratoides exilis*), Tipton's kangaroo rat (*Dipodomys n. nitratoides*), and San Joaquin kit fox (*Vulpes macrotis mutica*). California least terns occur on-base in and near wetland areas, as described in the base's INRMP (DoN 2001b). See Appendix B for a summary of the listing status and preferred habitats used by all special status species known to occur either on the installation or in the region, including the four federally listed threatened and endangered species.

Federal and state endangered, threatened, and sensitive species confirmed present on NAS Lemoore include the Fresno and Tipton kangaroo rat, western burrowing owl, Swainson's hawk, California least tern, white-faced ibis, western spadefoot toad, and greater western mastiff bat. These species are distributed in various habitats throughout the Air Station. Since the early 1980s, NAS Lemoore has been managing for endangered kangaroo rats known to occur on the installation, as well as burrowing owls and spadefoot toads. Tipton and Fresno kangaroo rats have been observed only in Tumbleweed Park, and the western spadefoot toad has been observed within the vicinities of Resource Management Areas1, 2, and 3. Burrowing owls have been observed in virtually all annual grassland areas on the Air Station. Other confirmed special status species, such as California least tern and white-faced ibis, inhabit predominantly wetland habitats. Swainson's hawks and greater western mastiff bats may forage in virtually all the habitats at NAS Lemoore. Although not confirmed as present on the Air Station, habitat conditions and location are suitable for San Joaquin kit fox, blunt-nosed leopard lizard, western snowy plover, and valley longhorn elderberry beetle.

Some of the management measures being implemented at Tumbleweed Park for Tipton and Fresno kangaroo rats include prescribed burning to manage vegetation condition, monitoring of irrigation flows by lessees, and contracting with a species specialist to study and monitor these species (DoN 2001b). Other stewardship strategies being implemented to conserve and enhance kangaroo rat populations at Tumbleweed Park include trash removal, fencing the perimeter to prevent unauthorized access, reducing raptor predation by removing raptor perch sites, cleaning up access roads and preventing their disking, and identifying and managing habitat corridors and linkages from the Park to other suitable habitat areas on the installation. Tumbleweed Park is not in the vicinity of any construction or renovation activities being proposed for the hangars and flightline area of the Air Station.

NAS Lemoore also actively manages its burrowing owl populations scattered throughout the installation's grassland habitats. While mowed grasslands occupied by burrowing owls do exist near the flightline, there are none present near the hangars that would be renovated or rebuilt under the Proposed Action. Some stewardship strategies described in the installation's INRMP that are being implemented for the benefit of burrowing owls include population monitoring, installing artificial burrows in selected areas to encourage owl use, and vegetation management at select areas. Prescribed fire, mechanical mowing, and livestock grazing are being used to manage burrowing owls as follows:

- Area A (South Airfield) - fire and mowing (12in [30.5 cm]).
- Area B and Safety Zone (North Airfield) - fire and mowing (12in [30.5 cm]).
- Area C (Wildlife area) - fire and mowing (12 in [30.5 cm]).
- Area D (Receiver station) - mowing (12 in [30.5 cm]) and grazing.
- Area E (Transmitter Station) - mowing (12 in [30.5 cm]) and grazing.
- Resource Management Area 5 (Tumbleweed Park) - fire and research.

Management actions being undertaken at the installation for spadefoot toad are aimed at better understanding the species. NAS Lemoore staff and contracted scientists routinely conduct surveys for spadefoot toad to document its presence, and to identify its preferred habitat conditions that may be replicated elsewhere for the species' benefit. Although not yet confirmed as being present on the installation, staff and consultants continue to conduct surveys for federally listed San Joaquin kit fox, blunt-nosed leopard lizard, western snowy plover, and valley longhorn elderberry beetle.

3.10.4 Bird/Wildlife-Aircraft Strike Hazard

The presence of resident and migratory birds and other wildlife creates a BASH risk at NAS Lemoore. The airfield's proximity to expanses of grass adjacent to the airfields, and the proximity to agricultural fields and natural habitats on the installation worsen the BASH risk. NAS Lemoore is in the process of updating its BASH plan. The draft BASH plan prescribes an ongoing process to reduce the potential for collisions between aircraft and birds or other animals; this is accomplished by the distribution of information and active and passive measures to control how birds use critical areas around the airfields. Methods outlined in the plan to reduce BASH risk at the airfield include:

- An immediate exchange of information between ground crews and aircrews concerning the existence and location of birds that could pose a hazard to air operations.
- Setting Bird Hazard Conditions (low, moderate, or severe risk), and notifying pilots and air crews.
- If the Bird Hazard Condition is set to severe (red), a Bird Detection & Dispersal Team is deployed to implement either non-lethal (horns, bio-acoustic distress calls, pyrotechnics, propane-fueled sound cannons) or lethal (shooting, poisoning) control techniques.
- Entering wildlife strike and control data promptly into the Navy's online Web Enabled Safety System, so that trends can be tracked.

Implementing habitat management and modification techniques to reduce or eliminate wildlife attractants near runways and taxiways is a standard practice for reducing BASH incidents. As part of its BASH-oriented wildlife management program, NAS Lemoore implements the following wildlife control measures: removal of food sources, mowing tall grasses, cutting back shrubs, relocating perching and nesting structures, and preventing standing water in areas near the flightline.

Implementing habitat management and modification techniques to reduce or eliminate wildlife attractants near runways and taxiways includes the removal of food sources, mowing tall grasses, cutting back shrubs, relocating perching and nesting structures, and preventing standing water in areas near the flightline.

3.11 WATER RESOURCES

The Federal Water Pollution Control Act, as amended by the Clean Water Act (CWA), is intended to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The CWA regulates the discharge of pollutants from point sources into waters of the U.S. The CWA, as amended in 1987, requires each state to establish water quality standards for its surface waters derived from the amount of pollutants that can be assimilated by a body of water without deterioration of a designated use.

The CWA prohibits spills, leaks, or other discharges of oil or hazardous substances into the waters of the U.S. in quantities that may be harmful. The CWA limits any discharge of pollutants to a level sufficient to ensure compliance with the state water quality standards. Direct discharges of effluents are regulated under numerical limitations contained in National Pollutant Discharge Elimination System (NPDES) permits issued by the USEPA or under state NPDES programs approved by USEPA.

The study area for water resources for this EA is defined as surface water and groundwater sources associated with the San Joaquin Valley and NAS Lemoore.

3.11.1 Surface Water

Except for the northeast corner of the base near the Kings River, NAS Lemoore lies within the Kings and Tulare Lake Basins of the Tulare Lake Hydrologic Region (Planert and Williams 1995). Primary streams in the Tulare Drainage Basin originate in the Sierra Nevada and flow to the Kings, Kaweah, and Tule rivers. NAS Lemoore is near the divergence of the north and south forks of the Kings River on its alluvial fan. NAS Lemoore lies just west of the Kings River at the point where the river branches to the north and south. The North fork flows north into the San Joaquin River drainage basin; the south fork runs south near the eastern boundary of NAS Lemoore to Tulare Lake, which has no outlets.

Drainage within NAS Lemoore is poor in some areas, occasionally resulting in ponding. Wetlands in the northeast part of NAS Lemoore that lie along the North Fork of the Kings River are fed in part by stormwater runoff from the base and agricultural drainage (see Figure 3.12-1). Surface water on the base includes approximately 400 ac (162 ha) of sewage treatment ponds (consisting of two waste treatment ponds and three evaporation ponds) in the southeastern corner of the base, south of SR 198. The main sewage treatment plant treats domestic wastewater, treated industrial wastewater, and dry weather storm drain flow. Industrial waste (solvent, grease, oil, etc.) are pre-treated to remove volatile organic chemicals, hydrocarbons, and heavy metals at a site in the southern portion of the Operations Area. The maximum capacity of the sewage treatment ponds is 2.12 mgpd with normal operations recorded at 75% of maximum capacity (DoN 1992). The storm sewer network at NAS Lemoore occurs primarily underground in the developed areas of the base. In the less developed areas, the network consists primarily of swales and open ditches, where storm water normally dissipates through evaporation and percolation, but runoff from extremely heavy rains often reaches the Kings River (DoN 2001b).

Average precipitation within the Tulare Lake Hydrologic Region ranges from about 6 to 11 in (15 to 28 cm) per year (Department of Water Resources 2009). However, in the vicinity of NAS Lemoore, the average annual rainfall is only 6 to 8 in (15 to 20 cm). Water supplied by natural sources is not sufficient to meet the needs of the area. Therefore, much of the water used for irrigation and potable uses is obtained from northern California and transported via canal (DoN 2001b; Department of Water Resources 2009).

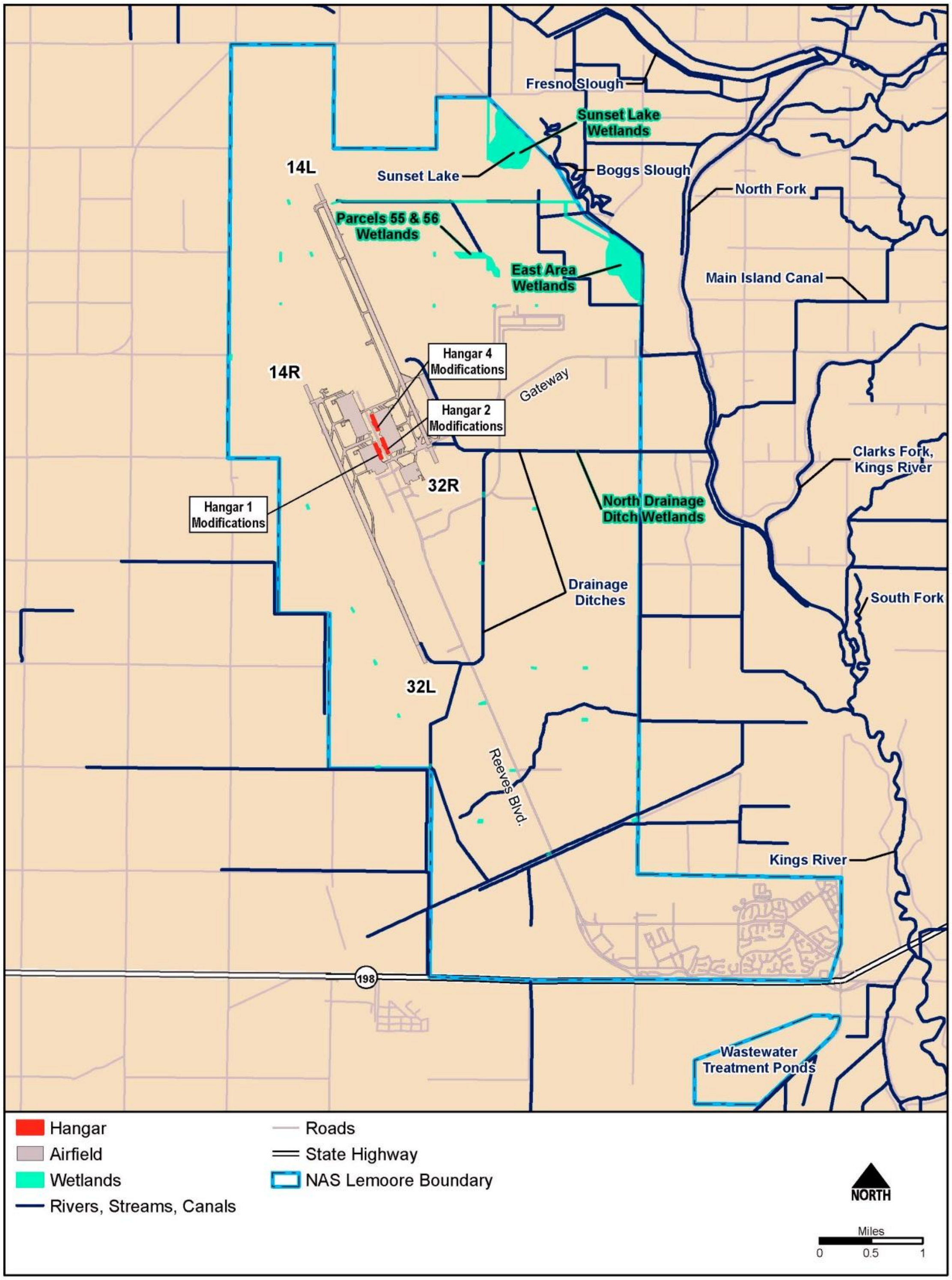


Figure 3.12-1. Surface Water Features and Wetlands Associated with NAS Lemoore

3.11.2 Groundwater

The Tulare Lake basin is underlain by a thick sequence of clay sediments deposited in the large lakes that have covered the region in recent geologic time. The clay deposits overlie and confine several freshwater aquifers at relatively great depths. Groundwater depth in the region is inconsistent with respect to both location and season. Groundwater is generally contained in two aquifers. One is very shallow, coming to within 2-3 ft (0.6 - 0.9 m) of the ground surface in some areas of the base and the other aquifer lies 150 - 200 ft (46 - 61 m) below ground surface. The thick, extensive, shallow clay sediments underlying the region limit local recharge to the deeper aquifers. Instead, water used for crop irrigation (primarily cotton) contributes to the shallow perched water table. Drainage sumps and canals are needed to prevent flood irrigation recharge from saturated shallow soils and to keep the water table below the root zone of crops (Department of Water Resources 2009).

The confined groundwater has been highly exploited for agriculture, resulting in overdraft conditions, where net groundwater withdrawal exceeds recharge. Groundwater overdrafts resulted in 4 - 12 ft (1 - 4 m) of land subsidence by the 1960s in the immediate vicinity of NAS Lemoore. Subsidence of more than 20 ft (6 m) occurred farther to the west (Poland and Evenson 1966). Imported surface water from the state and federal water projects has significantly reduced dependence on groundwater, except during droughts. The introduction of deep well turbines resulted in a considerable rise in groundwater use in the early 1990s, resulting in decreasing groundwater levels and land subsidence. Surface water storage and conveyance systems built to reduce the overuse of groundwater provided an impounded supply of water that could be used during years with deficient surface water. This resulted in a regional reliance on conjunctive water use in the development of the local water economy (Department of Water Resources 2009). NAS Lemoore currently does not use any groundwater, but there are wells on-base for agricultural use on outlease land.

3.11.3 Water Quality

Groundwater and local surface water are not a primary source of potable water for NAS Lemoore or the surrounding communities. Domestic and agricultural water is supplied by the Westlands Water District through the California Aqueduct. In the western valley area of the Tulare Lake Hydrologic Region, groundwater quality is often poor, and availability is highly variable. In portions of Kings County, elevated concentrations of boron, arsenic, and selenium have historically occurred in groundwater, affecting drinking water supplies (DoN 1990, 2001b).

3.12 CULTURAL RESOURCES

Cultural resources are remnants of past human activity that as a general rule are greater than 50 years of age. Cultural resources can be present within landscapes as districts, sites (including both archaeological sites and historic properties), or isolated finds. Districts are groups of buildings, structures, and sites that are linked historically by function, theme, or physical development (Little et al., 2000). Sites are the locations of a significant event, or of historical human occupation or activity (Little et al., 2000). They are identified by the presence of artifacts and/or features within a given space; sites may have the capacity to yield important information about aspects of human history and cultures. Isolated finds are characterized by solitary artifacts or sparse, insignificant groupings of artifacts within a given space; isolated finds lack the capacity to yield information important to human history and cultures.

Cultural resources also include Traditional Cultural Properties (TCPs), locations with enduring significance to the beliefs, customs, and/or practices of living communities. In particular, a TCP is a place defined by its historical association with the beliefs, customs, and/or practices of an existing community and its continuing, contemporary importance in maintaining that community's cultural identity. TCPs are generally considered to be eligible for nomination to the NRHP if they are associated with cultural practices or beliefs of a living community that are (a) rooted in the community's history and (b) important in maintaining the continuing cultural identity of the community (Parker and King 1990). Culturally sensitive locations called Areas of Native American Concern which may not be considered eligible for nomination to the NRHP may still be protected under the American Indian Religious Freedom Act.

The DoN has responsibility under NEPA and associated legislation for taking into consideration impacts to cultural resources from the Proposed Action and Alternatives.

A Class I file and literature review was conducted by Soil and Water Conservation Assistance Environmental Consultants in 2009 in association with the production of the 2010-2015 NAS Lemoore Draft Integrated Cultural Resources Management Plan. The Class I file and literature review included a search of the cultural resources records on file at NAS Lemoore as well as at the Southern San Joaquin Valley Information Center of the California Resource Information System at California State University, Bakersfield.

Based on the results of the 2009 Integrated Cultural Resources Management Plan file and literature search, 18 cultural resources studies have been documented within the boundaries of NAS Lemoore. These investigations consist of Class I, II, and III archaeological and historic structures inventories, many conducted for resource management purposes related to development and expansion of infrastructure, including demolition and construction of new housing areas, development of recreational facilities, construction of cell towers, right-of-ways for pipeline and railroad routes, reclamation projects, and a base realignment and closure III program. Other cultural resources projects completed at NAS Lemoore include the development of two Historic and Archaeological Resources Protection Plans, a geomorphologic analysis and reassessment of archaeological sensitivity zones within installation boundaries, and the informal documentation, mitigation, and re-interment of human remains inadvertently discovered during a remediation of contaminated soils (SWCA Environmental Consultants 2009).

3.12.1 Historic Structures

Seven groups of extant historic buildings (P16-000219 - P16-000224), including 51 individual structures, have been previously recorded within the Family Housing Area at NAS Lemoore. All of the previously recorded extant historic structures within the Family Housing Area are recommended not eligible for the NRHP (SWCA Environmental Consultants 2009). Other previously recorded historic structures which comprised the Capehart Housing complex were found not eligible for the NRHP and subsequently demolished to make way for new construction between 2000 and 2006 (SWCA 2009 Environmental Consultants).

Other historic structures of note at NAS Lemoore include the Neutra Elementary School complex, which was constructed from 1960-1961. The Neutra Elementary School complex has not been formally inventoried or evaluated for the NRHP to date, but is likely a significant historic property due to its design, as well as its association with the architect Richard Neutra (SWCA Environmental Consultants 2009).

An evaluation of the built environment of NAS Lemoore with regard to Cold War significance was completed in the 1997 Historic and Archaeological Resources Protection Plan under NRHP Criterion G, which applies to structures less than 50 years old and evaluates those structures as to "exceptional significance." At that time none of the structures at NAS Lemoore were recommended eligible for the NRHP under Criterion G with regard to Cold War-era significance. However, the recommendation of non-eligibility with regard to Cold War significance of NAS Lemoore's built environment was not supported by a formal inventory, and the California SHPO was not consulted with regard to the recommendation of non-eligibility, so no concurrence was received (SWCA Environmental Consultants 2009).

3.12.2 Traditional Cultural Properties

No TCPs have been identified within the boundaries of the installation based on correspondence with Native American groups with interests in the area (as identified by the California Native American Heritage Commission) in 1994 and 2005 (SWCA 2009:56).

3.13 HAZARDOUS MATERIALS AND WASTE

This section describes hazardous materials and waste at NAS Lemoore. Hazardous materials management, hazardous waste management, IR Program sites, asbestos, polychlorinated biphenyls (PCBs), storage tanks and oil/water separators, pesticides, lead, ordnance, and radon are discussed.

The Navy has implemented a strict Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program for all activities. These programs are governed Navy wide by applicable Chief of Naval Operations Instructions and at NAS Lemoore by specific instructions issued by the commander. The Navy continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes.

3.13.1 Hazardous Materials Management

Hazardous materials are used in various operations throughout NAS Lemoore and are managed in accordance with NAS Lemoore Instruction 5090.4C (DoN 2005b). NAS Lemoore has submitted a list of chemicals and emergency planning information in compliance with the Emergency Planning and Community Right-to-Know Act (40 CFR § 301-311).

Hazardous materials used on the base include lubricants, degreasers, cleaners, paint strippers, solvents, acids, and pesticides (DoN 2005b). Most of the hazardous materials are used for airfield operations and industrial support. These materials are used at the following locations:

- Construction Battalion Maintenance Unit 303, Building #792.
- Quality of Life, Auto Hobby, Building #954.
- Center for Naval Aviation Technical Training Unit, Building #730.
- DoN Exchange Service Station, Building #829.
- Naval Hospital, Building #937.
- Facilities Management Transportation, Building #765.
- Security, Building #705.
- Aircraft Intermediate Maintenance Department, Buildings #170 and #179.
- Air Operations / Crash Fire, Building #190.
- Air Operations / Field Support, Building #315.

- Fleet Aviation Specialized Operations, Building #16.
- Fleet Imaging Facility, Pacific (Photo Lab), Building #1.
- DoN Aviation Depot (Mod Team), Building #180.
- Operations Maintenance Department, Building #180.
- VFA Weapons School, Pacific, Building #4.
- Fuels, Building #90.
- Weapons, Building #440.
- Magazine Area, Building #421.
- Boeing, DoN Aviation Depot (Mod Team), and VFA-125, Hangar #1.
- VFA-22, VFA-25, VFA-94, VFA-97, and VFA-113, Hangar #2.
- VFA-115, VFA-137, VFA-146, VFA-147, and VFA-151, Hangar #3.
- VFA-2, VFA-14, VFA-41, VFA-102, and VFA-154, Hangar #4.
- VFA-122, Hangar #5.

Small quantities of hazardous materials are used for cleaning and other maintenance operations throughout the base, to be collected at Satellite Accumulation Points at the above locations.

3.13.2 Hazardous Waste Management

NAS Lemoore possesses an active USEPA generator number. Hazardous wastes are generated from aircraft-related and building maintenance-related activities and commonly consist of adhesives and sealant, aerosol cans, aircraft cleaning compound containers (empty), alodine, antifreeze, asbestos, batteries, blasting residue (sand grit, glass bead), canopy polish containers (empty), cathode ray tubes, ceiling tile, composite waste, contaminated soil, coolanol or RLCS oil, corrosive wastes, cutting fluid and PC-444, floor tile, fluorescent ballast, fluorescent light tubes, fuel filters from the fuel farm, empty containers, janitorial supplies, methylene chloride, office supplies (including photo-copier dry ink cartridges), oil filters, oily rags, paint booth filters, paint buckets, empty paint cans, paint cans containing solidified pain, paint chips, paint debris, paint enamel, paint latex, paint paper, paint stripper, paint waste, empty petroleum/oil/lubricant cans, photographic waste, refrigerant, respirator cartridges, solvent rags, spill residue, and spill residue disposal (DoN 2005b).

Hazardous wastes are collected, packaged, and transferred from user areas to the Public Works Hazardous Waste Storage area at Building 45 and then trucked by commercial contractor to an USEPA permitted disposal facility. Waste oil is transported to the waste-oil tank in the fuel farm area (DoN 2005a).

3.13.3 Asbestos

Asbestos surveys were conducted in two phases in the early 1990s; the initial phase was conducted from October through December 1992 and the second phase was conducted from September through November 1993. Friable or damaged ACM identified in this survey were abated. Although ACM remained in buildings on the base as recently as 1997, the remaining asbestos was nonfriable and does not represent a threat to persons working in these areas (Mora 1997). As buildings are renovated, ACM is abated if it presents a potential health and safety concern.

3.13.4 Polychlorinated Biphenyls

There are three transformers on-base containing PCB concentrations less than 5 parts per million. Transformers that were determined to contain PCB concentrations above 5 parts per million have had the dielectric fluid replaced with non-PCB fluid (Smith 1997). There is no record of any PCB equipment or

PCB-contaminated equipment at NAS Lemoore. There have been no known releases of dielectric fluid or transformer explosions at the proposed project location (DoN 2001b).

3.13.5 Storage Tanks and Oil/Water Separators

NAS Lemoore has implemented a base Spill Prevention Control and Countermeasures Plan (NAS Lemoore Instruction 5090). Spill response equipment is stored at each fuel storage area, and the fire department responds to any spills on soil or water and those over five gal on pavement.

There are three active oil/water separators at NAS Lemoore. One is at Facilities Management and Support Transportation, one is at the base car wash, and one is at the auto hobby shop. Water collected in the units is discharged to the sanitary sewer. There are no oil/water separators at Hangars 1, 2, or 4 (DoN 2005b).

3.13.6 Pesticides

Pesticides are applied at the base by certified base or contracted personnel. NAS Lemoore implements a pest management plan that specifies the area to be treated, the type of pest, the frequency of application, the pesticide product name and USEPA registration number, the mixing concentration, and any special precautions or remarks (DoN 2001b, 2005b).

3.13.7 Lead Based Paint

NAS Lemoore has not conducted an LBP survey of the residential buildings on the base. DoD regulations do not require surveying nonresidential structures for LBP, but LBP is likely to be present in buildings constructed before 1978 (DoN 2001b, 2005b).

3.13.8 Ordnance

Ordnance is loaded aboard aircraft at the outboard areas of the aircraft parking aprons in the combat aircraft ordnance area. This practice requires parked aircraft to be towed out of the ordnance area and portions of maintenance hangars to be evacuated during loading procedures. No known ordnance manufacture, storage, or disposal has been conducted at Hangars 1, 2, or 4 (DoN 2001b, 2005b).

3.13.9 Radon

The DoN conducted a radon facility screening survey of all buildings and housing at the installation in November 1989. No radon concentrations above the action level of 4 Picocuries Per Liter was detected at base facilities or housing units, and no further action is planned based on these results (DoN 2001b, 2005b).

3.13.10 Installation Restoration Program

The Navy environmental cleanup program is known as the IR Program. The purpose of the IR Program is to identify, assess, characterize, and clean up or control contamination caused by past hazardous waste disposal practices and hazardous material spills at Navy facilities. Past hazardous material use and methods of disposal, although acceptable at the time, resulted in unexpected and long-term environmental problems because pollutants were released into soil and groundwater. The Navy has taken an aggressive and proactive approach to cleaning up its hazardous waste sites through the IR Program (DoN 2005a).

In 1984, NAS Lemoore completed an Initial Assessment Study, which identifies disposal sites and contaminated areas caused by past hazardous substance storage, handling, or disposal practices. The IR Program (at the initiation of the Remedial Investigation phase) established that NAS Lemoore had 16 IR

Program sites, for which remedial investigations were completed between 1991 and 1996. The general base-wide remedial investigation report was completed in May 1996; this report concluded that 10 of the sites (Sites 3, 6, 7, 8, 10, 11, 12, 13, 15, and 16) required no further action (DoN 2005a). Sites that were determined to require further actions are described below in more detail.

Site 1, a landfill that operated from 1961-1991, contains hazardous materials covered under a protective soil cap and has final closure certification under the IR long-term monitoring program. Site 2, located in the Administration Area, was a former pesticide rinse area. Site 4, located in the Operations Area, was a former firefighter training area. While investigation results show these two sites do not pose a significant threat to human health or the environment, NAS Lemoore will not construct residential housing at either of these sites in the future. Sites 1, 2, and 4 have Institutional Controls (Land Use Restrictions) implemented as part of the site closure process to protect human health and the environment (DoN 2005a).

Site 4 is the old fire training area located at the northern end of the Operations Area. It is unpaved, measuring approximately 40 by 60 ft (12 by 18 m), and is directly west of the concrete calibration pad for taxiway 32-L and 600 ft (183 m) west of runway 32-L. Site 4 was used from 1961 to 1965 to train fire-fighting personnel stationed at NAS Lemoore. During fire training exercises, waste fuel was ignited on the ground or spread over an old airplane fuselage to simulate a crash fire. Records indicate that approximately 24,000 gal of fuel were used for the fire training exercises. Site 4 currently consists of a grassy area next to a guided missile unloading area (DoN 1998c).

Site 5, the former Fire-fighting Training Area, and Site 9, the industrial wastewater treatment plant sludge ponds, were combined for the remedial investigation and the Naval Exchange gas station was later added to this investigation. Several phases of investigation occurred from 1991 through 2003. A revised remedial investigation report and risk assessment are in progress and the Navy and regulatory agencies are working toward a remedial action and closure (DoN 2006c).

Site 14 consists primarily of a complex plume of chlorinated solvents that originates from multiple source areas in the operations area of NAS Lemoore (DoN 1999). Potential source areas initially identified during the remedial investigation that occurred from 1991 through 2001 include former underground storage tanks, industrial wastewater lines, wash racks, and surficial spills. In 2005, during the Triad investigation, new potential source areas were identified and include storm drains emanating from Buildings 170 and 180. The most recent investigation conducted in 2009 (for the remedial investigation addendum) further refined potential source areas and plume boundaries (DoN 2011a).

Site 17 is a jet fuel spill resulting from a leaking pipeline between the active aircraft taxiways in the Operations Area. Approximately 200,000 gal of fuel were removed by excavations and direct vacuum skimming in open excavations (1988) and a steam injection/vapor extraction demonstration system (1994). Approximately 28,000 gal of fuel were recovered from the subsurface by a multi-phase extraction system used to extract liquids and vapors until May 2005. Between 2005 and 2010 bioventing, hand bailing, and absorbent socks removed approximately 1,100 gal of fuel during monitoring events (DoN 2010). In 2011, the multi-phase extraction system was restarted and extracted and additional 1,600 gal. The system was subsequently shut down because no further product could be extracted (DoN 2011b). Per the Corrective Action Plan (DoN 2011c), the maximum extent practicable was achieved. Quarterly product thickness and groundwater level measurements are occurring to evaluate potential product rebound.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential environmental consequences to the resources described in Chapter 3. As discussed in Section 1.4.2.1, five resource areas (vegetation, wetlands, topography and soils, archaeological, and visual resources) have been eliminated from detailed consideration in this EA because ground-disturbing activities would be limited to a small portion of existing pavement along the flight line under the Proposed Action; therefore, no impacts or negligible impacts to these resources is anticipated. There would be minor impacts from changes in the number of aircraft operations, three facilities modifications, and additional military personnel (and their families) assigned to NAS Lemoore with the aircraft. Therefore, other environmental consequences analyses include socioeconomics, community services, safety, infrastructure and utilities, traffic, biological resources (wildlife and sensitive species), water resources, cultural resources, and hazardous materials and waste.

For the analysis of personnel increases (and associated family members), except where otherwise stated, two scenarios are assessed: 1) all military personnel and family members live on-base; and 2) all personnel and family members live off-base. This type of analysis was performed to present the maximum scenario (in either case) because it is not currently known what proportion of new personnel and family members would be housed on- or off-base. The maximum scenario for off-base personnel and family members maximizes the impact to the city and local population, including transportation and infrastructure impacts. The maximum scenario for on-base personnel and family members maximizes the on-base impacts to community resources such as schools, police services, and fire protection services.

Significance was determined according to Section 1508.27 of the Environmental Quality Improvement Act of 1970, as amended [43 FR 56003, Nov. 29, 1978]. The primary factors considered for each resource area in determining significance requires considerations of both context and intensity.

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
2) The degree to which the proposed action affects public health or safety.
3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP or may cause loss or destruction of significant scientific, cultural, or historical resources.
9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA.
10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

4.1 AIRFIELDS AND AIRSPACE

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any changes within the airspace and aircraft operations that could occur. This assessment of airspace use and management examines how the Proposed Action and No Action alternatives would affect air traffic within the local NAS Lemoore area.

4.1.1 Proposed Action

Since no modifications or additions are proposed to the current airspace in support of the Proposed Action, the impact analysis focuses on changes in airspace use that would result from changes in the number of aircraft operations. Strike Fighter relocation and in-place transition would add 26 aircraft and an associated 5,105 operations at NAS Lemoore. However, during this timeframe the FRS reduction would result in a decrease of 30 aircraft and an associated reduction of over 50,000 annual airfield operations, decreasing operations at the end state (2015) by approximately 24% compared to the baseline condition (2011). The change in operations within the associated airspace at the conclusion of the aircraft transitions is shown in Table 2.1-4.

Combined aircraft related actions would reduce the use of Class D airspace surrounding NAS Lemoore due to the net decrease in aircraft operations by the 2015 end state. The proposed aircraft transition would not require any modification to the current airspace or operational procedures, or any changes to the departure and arrival route structures. These routes were established on the basis of terrain and obstacle clearance, civil air traffic routes and available airspace, and navigational aid coverage, as well as current aircraft operational characteristics of the FA-18E/F.

The Proposed Action would have no impact on local Fresno area civil and commercial aviation airspace use since the FA-18E/F would be operating within the same flight parameters currently used for NAS Lemoore airspace, and as described above, overall aircraft related actions would result in a decrease from baseline operations by 24% (over 50,000 fewer operations annually). As such, no impacts to airfields and airspace would occur under the Proposed Action.

4.1.2 No Action Alternative

Under the No Action Alternative, reduction of the FRS would reduce aircraft operations by 27% (55,669 fewer operations) as compared to the baseline. This would reduce the use and management of Class D airspace surrounding NAS Lemoore due to the decrease in aircraft operations. The No Action Alternative would not require any modification to the current airspace or operational procedures, or any changes to the departure and arrival route structures. As such, no impacts to airfields and airspace would occur under the No Action Alternative.

4.2 NOISE

The potential effects of proposed aircraft realignment at NAS Lemoore were assessed by considering CNEL, which is the approved standard measure of noise exposure in California. CNEL measures cumulative noise exposure over a 24-hour period, with adjustments to reflect the added intrusiveness of noise during certain times of the day. Because noise intrudes to varying degrees on many human activities, supplemental metrics are included in the analysis to improve public understanding of noise. This assessment of noise examines how the Proposed Action and No Action alternatives compare to current baseline conditions at NAS Lemoore and nearby communities.

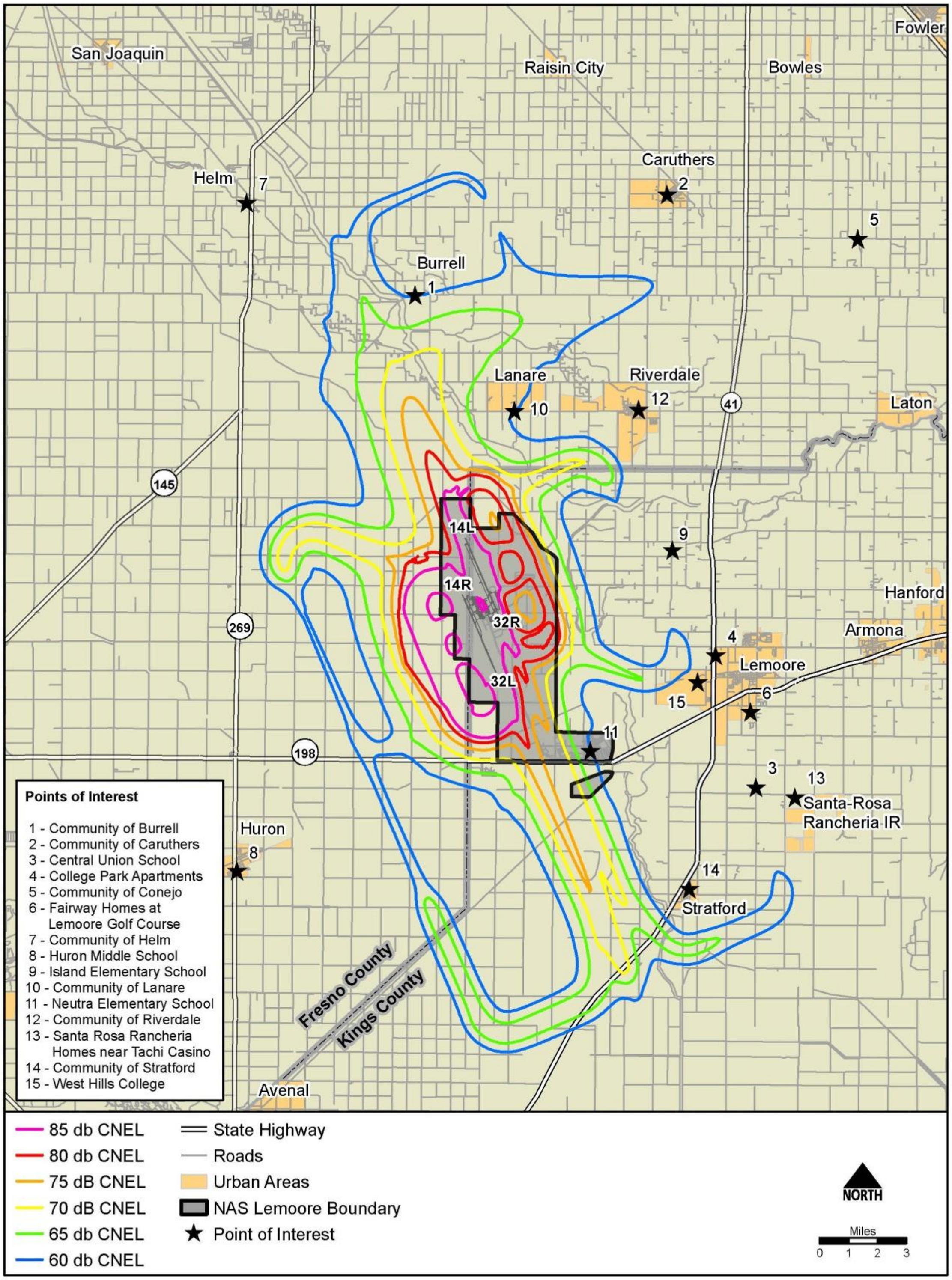
4.2.1 Proposed Action

4.2.1.1 Noise Exposure

Under the Proposed Action, two additional FA-18E/F squadrons would be relocated to NAS and five legacy fleet squadrons would transition from FA-18C to FA-18E/F squadrons. At the same time, the FRS reduction (eliminating 30 FA-18C/D aircraft) would decrease the existing inventory overall by four aircraft. Since the FRS would be reduced, operations related to FRS training activities would be reduced. FA-18C/E/F operations would total 158,858 annually with the same proportion of day, evening, and night operations as baseline operations (67% daytime, 22% evening, and 11% night) (Table 4.2-1). Although the overall number of operations would decrease, FA-18E/F aircraft operations would increase. In some flight profiles, the FA-18E/F is louder than FA-18C/D. Overall, the noise contours would remain approximately the same as current baseline conditions. Therefore, there is no significant impact associated with noise under the Proposed Action. Figure 4.2-1 depicts the noise contours under the Proposed Action.

Table 4.2-1. Proposed Day, Evening and Night Operations by All Aircraft Including Transients (Proposed Action)

Day (7AM-7PM)	Evening (7PM-10PM)	Night (10PM-7AM	Total
106,435 (67%)	34,949 (22%)	17,474 (11%)	158,858



Source: Wyle 2011.

Figure 4.2-1. Noise Contours Under the Proposed Action

Table 4.2-2 presents total noise exposure (on-base and off-base) in terms of estimated acreage and population. When compared to baseline conditions, the Proposed Action noise levels of 65 dB CNEL or greater would affect 1,445 ac (585 ha) less than the baseline. All of this area consists of open or agricultural lands; however, there are farmhouse dispersed under the noise zones. Table 4.2-3 also shows the baseline and Proposed Action population affected in the noise zones. Overall, a net of 10 additional people would be affected by the Proposed Action. Noise impacts under the Proposed Action would be less than significant.

Table 4.2-2. Noise Exposure within Baseline and Proposed Zones at NAS Lemoore

Noise Zone (dB CNEL)[1]	Acreage			Population[2]		
	Baseline	Proposed	Change	Baseline	Proposed	Change
65 - 70	29,670	28,722	-948	544	597	+53
70 - 75	17,978	17,693	-285	112	84	-28
75 - 80	9,849	10,097	+248	52	37	-15
80 - 85	8,674	8,781	+107	20	20	0
85+	10,745	10,178	-567	0	0	0
Total	**76,916**	**75,471**	**-1,445**	**728**	**738**	**+10**

Source: Wyle 2011.
Notes:
[1] Exclusive of upper bound for all bands.
[2] Based on actual house counts.
[3] House counts are based on 2008 aerials provided by Google Earth.

4.2.1.2 Potential Hearing Loss

The population exposed to noise levels greater than 80 dB CNEL would remain the same under the Proposed Action, although the noise levels they would be exposed to would decrease slightly from baseline levels. No other population would increase to levels greater than 80 dB CNEL. Therefore, the same population currently affected by PHL levels above 80 dB CNEL would be reduced by an average of one dB CNEL. As such, impacts associated with PHL would be less than significant.

Table 4.2-3. Baseline and Proposed Action Average NIPTS and 10th Percentile NIPTS as a Function of CNEL

CNEL	Average NIPTS dB*[1]	10th Percentile NIPTS dB*[2]	Population	
			Baseline	Proposed Action
80-81	3.0	7.0	0	9
81-82	3.5	8.0	9	4
82-83	4.0	9.0	7	3
83-84	4.5	10.0	0	4
84-85	5.0	11.0	4	0

Notes: *Rounded to the nearest 0.5 dB.
[1] Average NIPTS over entire affected population.
[2] NIPTS for the 10% most sensitive population affected.

4.2.1.3 Speech Interference and Classroom Criteria

In terms of speech interference, Table 4.2-4 enumerates the average daily indoor daytime (7:00 AM to 7:00 PM) events per hour for receptors that generally would experience indoor maximum sound levels of at least 50 dB with windows closed and open. Under the Proposed Action, the mean number of speech interfering events across all receptors would be 3.1 and 2.3 per hour for windows open and closed, respectively, with an average decrease of 3 or 2 less events per hour relative to baseline windows open and closed respectively. As such, no impacts with regard to speech interference would occur.

Table 4.2-4. Proposed Action Indoor Speech Interference at Representative Locations at NAS Lemoore

Receptor	Average Daily Indoor Events per Hour Daytime (7 AM to 7 PM)			
	Windows Closed	Windows Open	Change from Baseline	
			Windows Closed	Windows Open
Community of Burrell	3	6	0	-1
Community of Caruthers	0	4	0	-1
College Park Apartments	0	0	0	-1
Community of Conejo	2	4	0	-1
Fairway Homes at Lemoore Golf Course	0	1	0	0
Community of Helm	0	1	0	0
Community of Lanare	3	7	0	-1
Community of Riverdale	0	3	0	0
Santa Rosa Rancheria homes near Tachi Casino	0	2	0	0
Community of Stratford	0	1	0	0

Table 4.2-4 represents speech interference for normal conversation at the representative receptor locations; however. for schools, two additional classroom criteria have to be applied such that classroom learning would not be inhibited. Table 4.2-5 presents the classroom criteria levels for the school receptors under the Proposed Action. Under this alternative, noise levels and number of events per hour increase slightly and one additional school (West Hills College) would exceed the classroom criteria with windows open, but there would only be an average of one event per hour. Therefore, impacts associated with classroom criteria would be less than significant.

Table 4.2-5. Proposed Action Classroom Criteria for Schools Near or On NAS Lemoore

Receptor	Outdoor Equivalent Noise Level [$L_{eq(8hr)}$]	Number of Events Above a Maximum Outdoor Noise Level of 75 dB ($NA75L_{max}$)			
		Windows Closed		Windows Open	
		dB[$L_{eq(8hr)}$]	Events per hour	dB[$L_{eq(8hr)}$]	Events per hour
Burrell Elementary School*	62	37	7	47*	10
Caruthers High School	55	30	1	40	7
Central Union School	54	29	-	39	1
Conejo School*	60	35	6	45*	7
Helm Elementary School	50	25	1	35	1
Huron Middle School	38	13	-	23	-
Island Elementary School	53	28	1	38	1
Neutra Elementary School*	61	36	3	46*	7
Riverdale High School	52	27	-	37	6
Stratford Elementary School	50	25	-	35	2
West Hills College*	57	32	-	42*	1

* Exceeds classroom criteria.

4.2.1.4 Sleep Disturbance

Sleep disturbance also serves as a measure of noise conditions. Table 4.2-6 lists the probabilities of indoor awakening from average daily night (10:00 PM to 7:00 AM) events under the Proposed Action for the same representative residential locations discussed for the baseline conditions. The probability of awakening would vary by location with Burrell, Lanare, and Stratford having the highest percentages. Overall the change from baseline is minor with changes ranging between a 1% decrease to a 1% increase among all representative locations. Therefore, impacts associated with sleep disturbance would be less than significant.

Table 4.2-6. Proposed Action Indoor Sleep Disturbance at Representative Locations Near NAS Lemoore

Receptor	Average Nightly (10 PM - 7 AM) Probability of Awakening (%)			
	Windows Closed		Windows Open	
	% probability of awakening	Change from baseline	% probability of awakening	Change from baseline
Community of Burrell	3%	0	6%	0
Community of Caruthers	-	0	1%	0
College Park Apartments	-	-1%	2%	0
Community of Conejo	1%	+1%	2%	+1%
Fairway Homes at Lemoore Golf Course	1%	0	2%	0
Community of Helm	1%	0	3%	0
Community of Lanare	5%	0	9%	-1%
Community of Riverdale	-	-1%	2%	0
Santa Rosa Rancheria homes near Tachi Casino	4%	+1%	7%	0
Community of Stratford	2%	0	8%	+1%

4.2.1.5 Occupational Noise

DoN occupational noise exposure prevention procedures such as hearing protection and monitoring would continue to be required at NAS Lemoore in compliance with all applicable OSHA and DoN occupational noise exposure regulations. As such, no impacts to occupational noise would occur.

4.2.1.6 Construction Noise

Construction noise would be generated by the three facilities modification projects (Hangars 1, 2, and 4) under the Proposed Action. These modifications would include construction of a second story, including new footings (Hangars 2 and 4); expansion of the building footprint (Hangar 2); and interior renovations (Hangars 1, 2, and 4). Noise associated with construction is typically dominated by grading/earth-moving equipment (e.g., graders, excavators, etc.) and impact devices (e.g., pile drivers, jackhammers, etc.). The interior and minor exterior building modifications such as those proposed would rarely use these types of equipment, although a jackhammer may be used to break up paved areas. Smaller equipment such as skid-steer loaders, concrete trucks, man-lifts, etc., would likely be the types of construction equipment used. These construction projects would occur on the flight line, between active runways, so that aircraft related noise would likely dominate construction noise. No residential areas or other sensitive receptors are located in the vicinity, and construction noise would be intermittent and short term (e.g., 12 months). As such, construction noise would be less than significant.

4.2.2 No Action Alternative

Under the No Action Alternative, reduction of the FRS would reduce aircraft operations by 27% (55,669 fewer operations) as compared to the baseline.

4.2.2.1 Noise Exposure

Under the No Action Alternative, the FA-18C/D aircraft in the FRS would be eliminated resulting in a net decrease of 30 aircraft to the existing inventory. Since the FA-18C/D aircraft would be eliminated, operations related to FRS training activities would be reduced. FA-18C/E/F operations would total 153,752 annually with the same proportion of day, evening, and night operations as baseline operations (67% daytime, 22% evening, and 11% night) (Table 4.2-7). Figure 4.2-2 depicts the noise contours under the No Action Alternative.

Table 4.2-7. Proposed Day, Evening and Night Operations by All Aircraft Including Transients

Day (7 AM-7 PM)	Evening (7 PM-10 PM)	Night (10 PM-7 AM	Total
103,627 (67%)	33,783 (22%)	16,251 (11%)	153,752

Table 4.2-8 presents total noise exposure (on-base and off-base) in terms of estimated acreage and population under the No Action Alternative. When compared to baseline conditions, the No Action noise levels of 65 dB CNEL or greater would affect 5,875 ac (2,378 ha) less than the baseline. All of this area consists of open or agricultural lands; however, there are farmhouses dispersed within the noise zones. Table 4.2-8 also shows the baseline and No Action population affected in the noise zones. Overall, 166 fewer people would be affected by the No Action Alternative. Therefore, noise impacts would not occur under the No Action Alternative.

Table 4.2-8. Noise Exposure within Baseline and No Action Zones at NAS Lemoore

Noise Zone (dB CNEL)[1]	Acreage			Population[2]		
	Baseline	No Action	Change	Baseline	No Action	Change
65 - 70	29,670	27,416	-2,254	544	433	-111
70 - 75	17,978	16,335	-1,643	112	75	-37
75 - 80	9,849	9,466	-383	52	34	-18
80 - 85	8,673	8,453	-220	20	20	0
85+	10,745	9,371	-1,374	0	0	0
Total	**76,916**	**71,041**	**-5,875**	**728**	**562**	**-166**

Source: Wyle 2011.
Notes:
[1]Exclusive of upper bound for all bands.
[2]Based on actual house counts.
House counts are based on 2008 aerials provided by Google Earth.

4.2.2.2 Potential Hearing Loss

The population exposed to noise levels greater than 80 dB CNEL would remain the same under the No Action Alternative, although the noise levels they would be exposed to would decrease slightly from baseline levels (Table 4.2-9). No other population would increase to levels greater than 80 dB CNEL. Therefore, the same population currently affected by PHL levels above 80 dB CNEL would be reduced by an average of one dB CNEL under the No Action Alternative. As such, no impacts associated with PHL would occur.

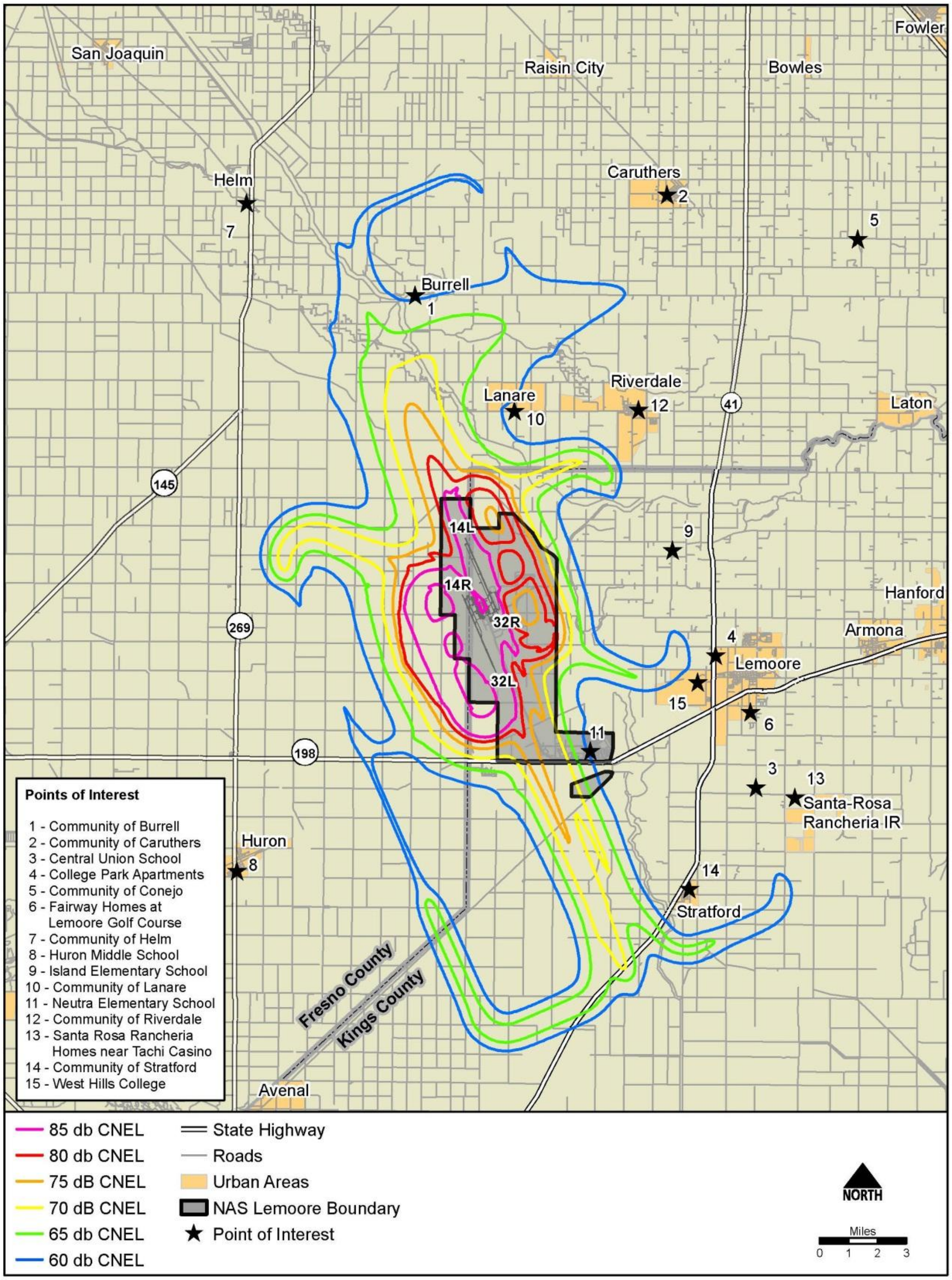


Figure 4.2-2. Noise Contours Under the No Action Alternative

Table 4.2-9. Baseline and No Action Average NIPTS and 10th Percentile NIPTS as a Function of CNEL

CNEL	Average NIPTS dB*[1]	10th Percentile NIPTS dB*[2]	Population	
			Baseline	No Action
80-81	3.0	7.0	0	9
81-82	3.5	8.0	9	4
82-83	4.0	9.0	7	3
83-84	4.5	10.0	0	4
84-85	5.0	11.0	4	0

Notes: *Rounded to the nearest 0.5 dB.
[1] Average NIPTS over entire affected population.
[2] NIPTS for the 10 percent most sensitive population affected.

4.2.2.3 Speech Interference and Classroom Criteria

In terms of speech interference, Table 4.2-10 enumerates the average daily indoor daytime (7:00 AM to 7:00 PM) events per hour for receptors that generally would experience indoor maximum sound levels of at least 50 dB with windows closed and open. Under the No Action Alternative, the number of speech interfering events across all receptors varies with location, but the greatest number of events would be in Burrell and Lanare. All locations either remain about the same or decrease by approximately 1 dB compared to the baseline conditions. Therefore, impacts associated with speech interference would not occur.

Table 4.2-10. No Action Indoor Speech Interference at Representative Locations at NAS Lemoore

Receptor	Average Daily Indoor Events per Hour Daytime (7:00 a.m. to 7:00 p.m.)			
	Windows Closed	Windows Open	Change from Baseline	
			Windows Closed	Windows Open
Community of Burrell	3	6	0	-1
Community of Caruthers	0	4	0	-1
College Park Apartments	0	0	0	-1
Community of Conejo	2	4	0	-1
Fairway Homes at Lemoore Golf Course	0	1	0	0
Community of Helm	0	1	0	0
Community of Lanare	3	7	0	-1
Community of Riverdale	0	3	0	0
Santa Rosa Rancheria homes near Tachi Casino	0	2	0	0
Community of Stratford	0	1	0	0

Table 4.2-10 represents speech interference for normal conversation at the representative receptor location; however, for schools, two additional classroom criteria have to be applied such that classroom learning would not be inhibited. Table 4.2-11 presents the classroom criteria levels for the school receptors under the No Action Alternative. Under this alternative, noise levels decrease slightly and no additional schools would exceed any of the classroom criteria. Therefore, no impacts associated with classroom criteria would occur.

Table 4.2-11. No Action Classroom Criteria for Schools Near or On NAS Lemoore

Receptor	Outdoor Equivalent Noise Level [$L_{eq(8hr)}$]	Number of Events Above a Maximum Outdoor Noise Level of 75 dB ($NA75L_{max}$)			
		Windows Closed		Windows Open	
		dB[$L_{eq(8hr)}$]	Events per hour	dB[$L_{eq(8hr)}$]	Events per hour
Burrell Elementary School*	60	35	3	45*	6
Caruthers High School	53	28	-	38	4
Central Union School	50	25	-	35	-
Conejo School*	58	33	2	43*	4
Helm Elementary School	47	22	-	32	1
Huron Middle School	36	11	-	21	-
Island Elementary School	49	24	-	34	-
Neutra Elementary School*	58	33	2	43*	4
Riverdale High School	49	24	-	34	3
Stratford Elementary	47	22	-	32	1
West Hills College	54	29	-	39	-

* Exceeds classroom criteria.

4.2.2.4 Sleep Disturbance

Sleep disturbance also serves as a measure of noise conditions. Table 4.2-12 lists the probabilities of indoor awakening from average daily night (10:00 PM to 7:00 AM) events under the No Action for the same representative residential locations discussed for the baseline conditions. Probability of awakening varies by location but remains the same or decreases 1- 2% among the representative locations. Therefore, no impacts associated with sleep disturbance would occur under the No Action Alternative.

Table 4.2-12. No Action Indoor Sleep Disturbance at Representative Locations Near NAS Lemoore

Receptor	Average Nightly (10 PM-7 AM) Probability of Awakening (%)			
	Windows Closed		Windows Open	
	% probability of awakening	Change from baseline	% probability of awakening	Change from baseline
Community of Burrell	2%	-1%	4%	-2%
Community of Caruthers	-	0	1%	0
College Park Apartments	-	-1%	2%	0
Community of Conejo	-	0	1%	0
Fairway Homes at Lemoore Golf Course	1%	0	2%	0
Community of Helm	1%	0	2%	-1%
Community of Lanare	4%	-1%	8%	-2%
Community of Riverdale	-	-1%	2%	0
Santa Rosa Rancheria homes near Tachi Casino	3%	0	6%	-1%
Community of Stratford	2%	0	6%	-1%

4.2.2.5 Occupational Noise

DoN occupational noise exposure prevention procedures such as hearing protection and monitoring would be implemented under this alternative. These procedures would comply with all applicable OSHA and DoN occupational noise exposure regulations. As such, no impacts to occupational noise would occur.

4.2.2.6 Construction Noise

No construction is proposed under the No Action Alternative; therefore, no noise impacts from construction noise would occur.

4.3 AIR QUALITY

To determine potential impacts to regional air quality, NAS Lemoore baseline conditions were compared to those projected for the proposed aircraft realignment and associated engine maintenance runup operations, as well as commute emissions associated with military personnel assigned to NAS Lemoore with the aircraft. Potential air quality impacts include: 1) increasing ambient air pollution concentrations above the NAAQS, 2) contributing to an existing violation of the NAAQS, 3) interfering with, or delaying timely attainment of the NAAQS, and 4) resulting in the potential for new stationary source(s) to be considered a major source of emissions as defined in 40 CFR Part 52.21 (total emissions of any pollutant subject to regulation under the CAA that is greater than 250 TPY for attainment areas).

Pollutants considered in this analysis include the criteria pollutants, excluding lead. Airborne emissions of lead are not included because there are no known significant lead emission sources in the region or associated with the Proposed Action.

In accordance with General Conformity requirements for maintenance and nonattainment areas, calculated emissions were evaluated against the *de minimis* thresholds for each applicable pollutant: VOCs, NO_x, $PM_{2.5}$, and PM_{10}.

4.3.1 Proposed Action

The transition of aircraft from FA-18C/Ds to FA-18E/Fs would begin in 2012. By 2015, all aircraft relocations and transitions associated with the Proposed Action would be complete, along with associated personnel changes required to support aircraft operations. There are no new stationary sources associated with the Proposed Action, nor would there be an increase in operations for any existing stationary sources at NAS Lemoore. Thus, stationary sources are removed from further evaluation in this EA.

4.3.1.1 Hangar Renovations

Hangars 1, 2, and 4 are slated for renovation, including second story additions to Hangars 2 and 4. The renovation of approximately 11,000 square feet of Hangar 1 is scheduled to occur in 2013 and would involve only interior modifications, therefore heavy construction equipment would not be required.

Renovation activities for Hangar 2 would reconfigure 2,500 square feet and construct an additional 2,500 square feet. Construction activities, which are scheduled to occur in 2014, are expected to be similar to those that would be conducted at Hangar 4.

Renovation activities for Hangar 4 would reconfigure 17,705 square feet of existing space, and construct a 6,685 square foot second story. Construction activities, which are scheduled to occur in 2013, are expected to be those associated with interior remodeling and new second story construction. The new construction would be expected to require some ground disturbance associated with footer reinforcement and concrete pad installation, as well as the use of crane equipment, two skid steer loaders, and a backhoe.

Emission factors for construction equipment calculations are from the California Air Resources Board Off-road 2007 model.

In accordance with SJVAPCD Rule 4102, *Nuisance,* and Rule 4601, *Architectural Coatings,* the emission of any air pollutants as a result of ground disturbance, use of equipment, coatings application or other construction activities will be controlled by incorporating BMPs, to include minimal idling of engines, watering of soils to be disturbed, use of low volatility coatings and other recognized controls.

Paving and other applications requiring the use of asphalt products are not anticipated for the hangar renovations; however, if small surface areas require asphalt coatings, these will be selected and applied in accordance with Rule 4641, *Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations*. Additionally, hangar renovation activities that are planned will be reviewed to ensure compliance with Rule 4002, which incorporates by reference the National Emission Standards for Hazardous Air Pollutants. No significant air emissions would result from the actual renovation activities (painting, for example, would utilize low VOC coatings). It is expected that if construction workers were not occupied at NAS Lemoore, they would be involved in similar work elsewhere in the region. Therefore the construction worker commute emissions are not evaluated in this EA. Emissions from construction workers driving onsite during the renovation of the hangars have been estimated based on 140 workers working onsite for 12 months in 2013 and 30 workers onsite for up to 12 months in 2014. Additional emission sources include construction equipment, although the work involving their use would be intermittent and short term. The emissions from construction workers and construction equipment were calculated in Appendix C and are provided in Tables 4.3-2 and 4.3-3.

4.3.1.2 Airfield Operations

Air quality impacts were assessed by comparing the net change in operational emissions associated with the retirement of legacy FA-18C/D aircraft and the transition and relocation of FA-18E/F aircraft. These emissions include:

- Aircraft operations within the airfield and surrounding airspace environs under the 3,000 ft above ground level mixing height.
- Ground Support Equipment operations.
- Fleet vehicles used for squadron operations and for on-base commuting from base housing.
- Personally owned vehicle use by commuting staff stationed at NAS Lemoore. The commuting staff includes on-base commuters and off-base commuters.

Data used to calculate emissions from aircraft operations were obtained from NAS Lemoore personnel, the Navy Aircraft Environmental Support Office (AESO), and subcontractors (Qinetiq 2011). Information on Ground Support Equipment was obtained from NAS Lemoore personnel (Bugay 2011) and emission factors for Ground Support Equipment were derived from Table A4 in Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition (EPA 2010), with the exception of SO2 factors, which were not included in the report's tabular data. Fleet and personally owned vehicle emissions were calculated using the South Coast Air Quality Management District's CEQA spreadsheets, onroadEF07_26.xls and onroadEFHHDT07_26.xls (SCAQMD 2009), which were developed from the California Air Resources Board's EMFAC 2007 model.

Each year of operational emissions is presented separately and in-depth emission calculations are provided in Appendix C, which contains the Conformity Applicability Analysis Report for the Proposed Action.

Airfield operations and commuting personnel for 2011 represent the baseline, with a total of 238 aircraft. Aircraft transition begins in 2012, with the initial drawdown of aircraft from the FA-18C/D FRS, which, while not a part of the Proposed Action, initiates the changes to operational mobile source emissions and so the analysis begins with this year for purposes of continuity.

2012 Airfield Operations and On-Road Vehicles.

Table 4.3-1 presents a summary of 2012 projected airfield operational emissions and government-personally owned vehicle emissions, and compares the results to the baseline. Additionally, the net change from the baseline is compared to the General Conformity Rule (40 CFR 93, Subpart B) *de minimis* thresholds for those pollutants for which the region is designated as nonattainment or maintenance.

Table 4.3-1. Projected Mobile Source Emissions for 2012

Activity	Air Pollutant Emissions (tons)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Airfield Operations	1,006.66	4,736.36	1,105.18	31.79	442.60	429.32
Highway Vehicles	8.18	77.37	8.13	0.11	0.90	0.57
Total 2012 Emissions	**1,014.84**	**4,813.73**	**1,113.31**	**31.90**	**443.50**	**429.90**
Baseline Air Emissions	1,066.80	4,967.78	1,174.20	34.05	471.64	457.18
Compared to Baseline	***-51.96***	***-154.05***	***-60.88***	***-2.15***	***-28.14***	***-27.28***
***de minimis* Thresholds**	**10**	**[1]NA**	**10**	**[2]NA**	**100**	**100**

Notes [1]: Calculated values listed in this table are from Tables A-2, A-3 and A-4 in Appendix C.
[1]The SJVAPCD is designated "unclassifiable/attainment for CO, so the threshold does not apply.
[2]The SJVAPCD is designated "unclassifiable/better than national standards for SO_2." However, SO_2 is a precursor for $PM_{2.5}$. For this Proposed Action, SO_2 is not considered a significant precursor, and so the SO_2 threshold does not apply.

Airfield operations in 2012 show a reduction in criteria pollutants from the baseline as a result of the retirement of 9 FA-18C/D FRS aircraft and a resulting reduction in flight operations. A total of 229 fixed wing aircraft would be based at NAS Lemoore.

2013 Airfield Operations and On-Road Vehicles.

Table 4.3-2 presents a summary of 2013 projected airfield operational emissions and government-owned vehicle and privately owned vehicle emissions, as well as construction activities for airfield hangars, and compares the results to the baseline. Additionally, the net change from the baseline is compared to the General Conformity Rule *de minimis* thresholds for those pollutants for which the region is designated as nonattainment or maintenance. During 2013, the remaining FA-18C/D aircraft associated with the FRS are removed from service, which is a separate action from the Strike Fighter realignment.

Table 4.3-2. Projected Mobile Source Emissions For 2013

Activity	Air Pollutant Emissions (tons)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Airfield Operations	917.50	4,792.80	1,053.45	28.06	391.44	379.69
Highway Vehicles	7.63	71.59	7.49	0.10	0.88	0.57
Construction Equipment	0.06	0.24	0.37	0.00	0.02	0.00
Total 2013 Emissions	**925.19**	**4,864.63**	**1,061.32**	**28.16**	**392.34**	**380.26**
Baseline Air Emissions	1,066.80	4,967.78	1,174.20	34.05	471.64	457.18
Compared to Baseline	**-141.60**	**-103.15**	**-112.88**	**-5.89**	**-79.30**	**-76.92**
***de minimis* Thresholds**	**10**	**[1]NA**	**10**	**[2]NA**	**100**	**100**

Note [1]: Calculated values listed in this table are from Tables A-1, A-2, A-3, and A-5in Appendix C.
[1]The SJVAPCD is designated "unclassifiable/attainment for CO, so the threshold does not apply.
[2]The SJVAPCD is designated "unclassifiable/better than national standards for SO_2." However, SO_2 is a precursor for $PM_{2.5}$. For this Proposed Action, SO_2 is not considered a significant precursor, and so the SO_2 threshold does not apply.

Airfield operations in 2013 show a reduction in criteria pollutants from the baseline as a result of the retirement/transition of 46 FA-18C/D aircraft and the addition of 30 FA-18 E/F aircraft. A total of 225 based fixed wing aircraft would be based at NAS Lemoore.

Renovation activities at Hangars 1 and 4 would contribute a small amount of pollutant emissions from construction workers driving personally owned vehicles onsite for an approximately 12-month period when renovations would occur and the limited use of construction equipment at Hangar 4. These emissions would have a minimal and temporary effect on regional air quality and, where possible, NAS Lemoore would encourage construction workers to carpool to limit onsite driving activity.

2014 Airfield Operations and On-Road Vehicles.

Table 4.3-3 presents a summary of 2014 projected airfield operational emissions and vehicle emissions, and compares the results to the baseline. Additionally, the net change from the baseline is compared to the General Conformity Rule *de minimis* thresholds for those pollutants for which the region is designated as nonattainment or maintenance. These operations include the arrival of both east coast FA-18E/F squadrons.

Airfield operations in 2014 show a reduction in all criteria pollutants from the baseline, with the exception of CO, as a result of the retirement/transition of 15 FA-18C/D fleet aircraft and the addition of 34 FA-18E/F aircraft. The increase in CO emissions is due to the larger FA-18E/F engine and the use of the afterburner setting during departures. A total of 232 fixed wing aircraft would be based at NAS Lemoore.

Renovation activities at Hangar 2 would contribute a small amount of pollutant emissions from construction workers driving personally owned vehicles onsite for an approximately 12-month period when renovations would occur and the limited use of construction equipment. These emissions would have a minimal and temporary effect on regional air quality and, as with prior year construction, NAS Lemoore would encourage construction workers to carpool to limit onsite driving activity.

Table 4.3-3. Projected Mobile Source Emissions For 2014

Activity	Air Pollutant Emissions (tons)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Airfield Operations	980.85	5,337.76	1,145.10	29.50	411.33	398.99
Highway Vehicles	8.09	75.32	7.80	0.12	1.00	0.64
Construction Equipment	0.02	0.09	0.13	0.00	0.01	0.00
Total 2014 Emissions	**988.97**	**5,413.17**	**1,153.03**	**29.61**	**412.33**	**399.64**
Baseline Air Emissions	1,066.80	4,967.78	1,174.20	34.05	471.64	457.18
Compared to Baseline	**-77.83**	**445.38**	**-21.17**	**-4.43**	**-59.30**	**-57.54**
***de minimis* Thresholds**	**10**	**[1]NA**	**10**	**[2]NA**	**100**	**100**

Note [1]: Calculated values listed in this table are from Tables A-1, A-2, A-3, and A-6, in Appendix C.
[1]The SJVAPCD is designated "unclassifiable/attainment for CO, so the threshold does not apply.
[2]The SJVAPCD is designated "unclassifiable/better than national standards for SO_2." However, SO_2 is a precursor for $PM_{2.5}$. For this Proposed Action, SO_2 is not considered a significant precursor, and so the SO_2 threshold does not apply.

2015 Airfield Operations and On-Road Vehicles.

Table 4.3-4 presents a summary of 2015 projected airfield operational emissions and vehicle emissions, and compares the results to the baseline. Additionally, the net change from the baseline is compared to the General Conformity Rule *de minimis* thresholds for those pollutants for which the region is designated as nonattainment or maintenance.

Table 4.3-4. Projected Mobile Source Emissions For 2015

Activity	Air Pollutant Emissions (tons)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Airfield Operations	984.76	5,463.21	1,138.83	29.51	410.42	398.11
Highway Vehicles	7.83	71.98	7.41	0.12	1.01	0.66
Total 2015 Emissions	**994.07**	**5,541.59**	**1,163.43**	**29.63**	**412.71**	**400.00**
Baseline Air Emissions	1,066.80	4,967.78	1,174.20	34.05	471.64	457.18
Compared to Baseline	**-72.72**	**573.80**	**-10.76**	**-4.42**	**-58.93**	**-57.18**
***de minimis* Thresholds**	**10**	**[1]NA**	**10**	**[2]NA**	**100**	**100**

Note [1]: Calculated values listed in this table are from Tables A-2, A-3, and A-7 in Appendix C.
[1]The SJVAPCD is designated "unclassifiable/attainment for CO, so the threshold does not apply.
[2]The SJVAPCD is designated "unclassifiable/better than national standards for SO_2." However, SO_2 is a precursor for $PM_{2.5}$. For this Proposed Action, SO_2 is not considered a significant precursor, and so the SO_2 threshold does not apply.

Airfield operations in 2015 show a reduction in all pollutant emissions, with the exception of CO. These emissions are a result of the retirement/transition of 10 FA-18 C fleet aircraft and the addition of 12 FA-18F aircraft. A total of 234 based fixed wing aircraft would be based at NAS Lemoore.

CO emissions would increase as a result of the Proposed Action based on the aircraft population and operations beginning in 2014 (445 tons of CO per year) and reaching the static population and operations in 2015 (574 tons of CO per year). Although the Proposed Action would result in an overall increase in

CO emissions, the local area meets CO attainment criteria by wide margins. While the increase in CO would produce a negative impact to the local ambient air quality, the increase in CO emissions would not be expected to alter the attainment status, and therefore would not be considered significant. In addition, the continued implementation of Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (October 2009), includes requirements for reductions in energy consumption of agency buildings, implementation of renewable energy projects on agency property, and reductions in the use of fossil fuels. To date, NAS Lemoore has obligated nearly $6 million towards upgrading facilities for energy efficiency and implementing onsite photovoltaic projects (NASL 2009). These efforts help to reduce the CO emissions that result from the Navy's operations, and therefore help mitigate the increase in CO that would result from FA-18E/F operations in the area.

The Conformity Applicability Analysis (Appendix C) indicates that emissions from the Proposed Action would not exceed *de minimis* thresholds. It can therefore be concluded, based on that analysis, that the criteria pollutant emissions associated with the Proposed Action would be exempt from the requirements for conformity, and no further evaluation of conformity would be required.

4.3.2 No Action Alternative

Under the No Action Alternative, drawdown of the FA-18C/D aircraft from the FRS would still occur as this is an independent action, as would the basing of two MH-60 helicopters. This drawdown would reduce the total number of fixed wing aircraft to 208 and result in a reduction of 319 personnel. These changes would occur in the 2012-2013 period. Compared to the baseline, all pollutant emissions would decline under the No Action Alternative.

Table 4.3-5. Projected Mobile Source Emissions For No Action Alternative

Activity	Air Pollutant Emissions (tons)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Airfield Operations	886.54	4,387.12	962.49	27.02	378.29	366.94
Highway Vehicles	6.97	64.11	6.60	0.10	0.90	0.58
Total 2015 Emissions	**894.84**	**4,456.91**	**984.37**	**27.12**	**380.32**	**368.62**
Baseline Air Emissions	1,066.80	4,967.78	1,174.20	34.05	471.64	457.18
Compared to Baseline	**-171.96**	**-510.87**	**-189.82**	**-6.92**	**-91.32**	**-88.56**
***de minimis* Thresholds**	**10**	**[1]NA**	**10**	**[2]NA**	**100**	**100**

Note [1]: Values listed in this table are from Tables A-2, A-3, and A-8 in Appendix C.
[1]There are no *de minimis* thresholds as the area is categorized as attainment/unclassifiable for these pollutants.

4.4 SAFETY

There is no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these measures are implemented, risks are minimized, even though they can never be eliminated.

Analysis of flight risks correlates Class A mishap rates and BASH with projected airfield utilization.

4.4.1 Proposed Action

4.4.1.1 Flight Safety

Implementation of the Proposed Action would not measurably affect airfield safety at NAS Lemoore.

Strike Fighter relocation and in-place transition associated with the Proposed Action would add 26 aircraft and an associated 5,105 operations at NAS Lemoore. However, during this timeframe the FRS reduction would result in a decrease of 30 aircraft and an associated reduction of over 50,000 annual airfield operations, decreasing operations at the end state (2015) by approximately 24% compared to the baseline condition (2011).

The 24% decrease in airfield flight operations would reduce the potential for aircraft incidents. In addition, current airspace safety procedures, maintenance, training, and inspections discussed previously would continue to be implemented and additional airfield flight operations would adhere to established safety procedures. No changes to established clear zones, accident potential zones, or other established airfield safety features would be required. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

The Proposed Action would not change the potential for public health or safety impacts, including those related to aviation safety. The relocation of and transition to FA-18E/F aircraft would not introduce a new activity within the NAS Lemoore airfield. All current training regulations and procedures would continue to reflect FA-18E/F specific rules and pilots would continue to adhere to training policies. Since the FA-18E/F is an existing airframe at the base, it would not require an update to response plans specific to the FA-18E/F and associated equipment, including the emergency and mishap response plans. As such, the NAS Lemoore airfield safety conditions would be similar to existing conditions. No significant safety impacts from the FA-18E/F operational training actions would be expected for NAS Lemoore airfield airspace.

4.4.1.2 Bird/Wildlife Aircraft Strike Hazard Incidents

Under the Proposed Action, FA-18E/F aircraft would continue to operate in the same airfield environment. With slightly decreased operations resulting from the FRS reduction, the overall potential for bird-aircraft or wildlife aircraft strikes would not be significantly different under the Proposed Action. FA-18E/F aircrews operating in NAS Lemoore airspace would be required to follow applicable procedures outlined in the NAS Lemoore BASH Management Plan (NAS Lemoore 2007). NAS Lemoore has developed aggressive procedures designed to minimize the occurrence of bird/wildlife-aircraft strikes, and has documented detailed procedures to monitor and react to heightened risk of bird strikes (NAS Lemoore 2007). When risk increases, limits are placed on low altitude flight and some types of training (e.g., multiple approaches, closed pattern work) in the airport environment. Special briefings are provided to pilots whenever the potential exists for greater bird-strike sightings within the airspace. FA-18E/F pilots would continue to be subject to these procedures. Therefore, no significant BASH related impacts would occur.

4.4.2 No Action Alternative

Under the No Action Alternative, reduction of the FRS would reduce aircraft operations by 27% (55,669 fewer operations) as compared to the baseline. As such, the decrease in airfield operations would reduce the potential for public health or safety impacts, including those related to aviation safety, and thus no adverse impacts to safety would be expected. NAS Lemoore would continue to conduct flight training in the local airfield environment and annual operations would continue to operate according to existing safety protocols. Therefore, no significant safety impacts from the FA-18E/F operational training actions would be expected for NAS Lemoore airfield airspace.

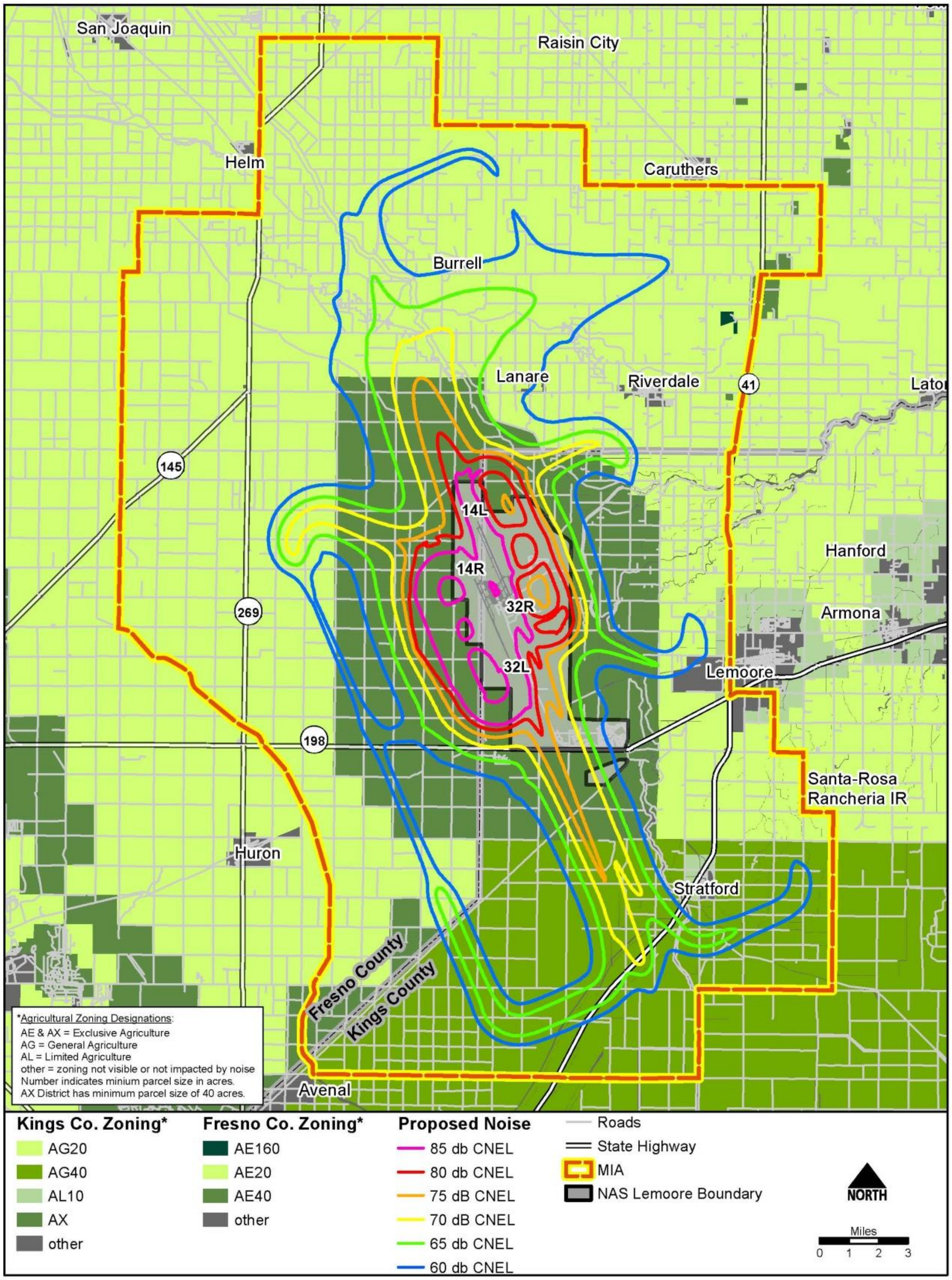
4.5 LAND USE

The study area for land use includes NAS Lemoore and those portions of the City of Lemoore, Kings County, and Fresno County that may be affected by activities associated with the Proposed Action and No Action alternatives, particularly noise. The land-use analysis compares the proposed noise zones to baseline noise zones by land-use type, acreage, and population density.

4.5.1 Proposed Action

The Proposed Action would include modifications to Hangars 1, 2, and 4. No additional facilities construction or modification projects are proposed. There would be no impacts to on- or off-base land use due to hangar modifications. Therefore, changes in noise conditions on- and off-base represent the focus of this impact analysis. Section 4.2, Noise, contains noise zone maps and detailed tables identifying project-related impacts. Figure 4.5-1 shows land uses that are affected by noise levels above 65 dB CNEL.

The land use impact analysis compares the proposed noise zones to existing baseline zones. The comparison shows potential changes in noise conditions. Table 4.5-1 shows land use area measurements within the existing and proposed noise zones for on-base land uses. On-base, the Proposed Action would result in an overall decrease in the areas affected by noise greater than or equal to 65 dB CNEL by 8 ac (3.2 ha) (less than 1%). However, the shape of the zones would change such that some land uses would experience reduced exposure and others, greater. Areas used for bachelor quarters would have 3 ac (1.2 ha) (12%) less exposed to 65-70 dB CNEL and 4 ac (1.6 ha) (7%) more exposed to 70-75 dB CNEL. Military family residential areas within the 65-70 dB CNEL zone would increase by 3 ac (1.2 ha) (11%). On-base community land uses (restaurants, shops) would experience an increase of 39 ac (15.7 ha) (45%) exposed to noise levels 65 dB CNEL and greater.



Source: Wyle 2011.

Figure 4.5-1. Land Uses Affected by Noise Levels Above 60 dB CNEL Under the Proposed Action

Table 4.5-1. On-Base Land Uses Affected by Noise Levels 65 dB CNEL and Greater

Land Use Category	65-70 dB CNEL			70-75 dB CNEL			75-80 dB CNEL			80-85 dB CNEL			85+ dB CNEL			Totals		
	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change
Administration	0	0	0	13	13	0	0	0		0	0	0	0	0	0	13	13	0
Bachelor Quarters	25	22	-3	58	62	4	0	0		0	0	0	0	0	0	83	84	1
Community	1	37	36	73	75	2	0	0	0	0	0	0	12	13	1	86	125	39
Easements	3	3	0	20	18	-2	36	36	0	80	11	-69	0	0	0	139	68	-71
Irrigated Land	297	280	-17	1,501	1,565	64	3,099	3,352	253	4,367	4,429	62	3,853	3,492	-361	13,117	13,118	1
Maint/Production	0	0	0	2	2	0	0	0	0	0	27	27	178	151	-27	180	180	0
Ops/Training	5	5	0	133	130	-3	79	81	2	52	77	25	1,560	1,536	-24	1,829	1,829	0
Ordnance	0	0	0	0	3	3	37	58	21	188	171	-17	6	0	-6	231	232	1
Public Safety	4	2	-2	72	75	3	1	1	0	0	0	0	3	3	0	80	81	1
Rec/Open Space	91	92	1	149	136	-13	367	383	16	0	2	2	1	1	0	608	614	6
Residential	28	31	3	0	0	0	0	0	0	0	0	0	0	0	0	28	31	3
Supply/Storage	0	0	0	8	8	0	0	0	0	0	0	0	44	44	0	52	52	0
Utilities	122	123	1	141	148	7	0	0	0	0	0	0	26	26	0	289	297	8
Vacant	88	110	22	55	34	-21	65	68	3	67	71	4	730	725	-5	1,005	1,008	3
Total	**664**	**705**	**41**	**2,225**	**2,269**	**44**	**3,684**	**3,979**	**295**	**4,754**	**4,788**	**34**	**6,413**	**5,991**	**-422**	**17,740**	**17,732**	**-8**

Table 4.5-2 shows land use area measurements within the existing and proposed noise zones for off-base uses. Only open space, agricultural, and unclassified lands are exposed to noise levels of 65 dB CNEL or greater. Six ac (2.4 ha) of industrial use land within the City of Lemoore would no longer be within the 65-70 dB CNEL noise zone. The Proposed Action would result in an overall decrease in land uses affected by noise greater than or equal to 65 dB CNEL by 1,468 ac (594 ha) (2.5%) (note that this total is somewhat higher than the decrease presented in section 4.2.1.1, due to differences between Geographic Information System data for land use which include individual polygons for each land use category). No areas zoned for residential, commercial, or industrial use occur within the areas affected by noise levels above 65 dB CNEL; therefore, there are no significant impacts to land use from the Proposed Action.

Table 4.5-2. Off-Base Land Uses Affected by Noise Levels 65 dB CNEL and Greater

Land Use Category	65-70 dB CNEL			70-75 dB CNEL			75-80 dB CNEL			80-85 dB CNEL			85+ dB CNEL			Totals		
	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change	Baseline	Proposed	Acres Change
City of Lemoore/ Industrial	6	0	-6	0	0	0	0	0	0	0	0	0	0	0	0	6	0	-6
Open/Agricultural	28,442	27,518	-924	15,552	15,220	-332	6,114	6,067	-47	3,972	3,976	4	4,338	4193	-145	58,418	5,6974	-1,444
Unclassified (roads/water)	521	497	-24	202	206	4	49	51	2	23	23	0	0	0	0	795	777	-18
Total	**28,969**	**28,015**	**-954**	**15,754**	**15,426**	**-328**	**6,163**	**6,118**	**-45**	**3,995**	**3,999**	**4**	**4,338**	**4,193**	**-145**	**59,219**	**57,751**	**-1,468**

4.5.2 No Action Alternative

Under the No Action Alternative, reduction of the FRS would reduce aircraft operations by 27% (55,669 fewer operations) as compared to the baseline. Table 4.5-3 shows land use area measurements within the existing and proposed noise zones for on-base land uses. On-base, the No Action Alternative would result in an overall decrease in the areas affected by noise greater than or equal to 65 dB CNEL by 160 ac (65 ha) (about 1%). However, the shape of the contours zones would change such that some land uses would experience reduced exposure and others, greater. Areas used for bachelor quarters would have 7 ac (2.8 ha) (28%) more exposed to 65-70 dB CNEL and 6 ac (2.4 ha) (93%) less exposed to 80-85 dB CNEL. Military family residential areas within the 65-70 dB CNEL zone would decrease by 6 ac (2.4 ha) (21%). On-base community land uses (restaurants, shops) would experience an increase of 31 ac (12.6 ha) (3,500%) exposed to noise levels 65 dB CNEL and greater.

Table 4.5-3. On-Base Land Uses Affected by Noise Levels 65 dB CNEL and Greater

Land Use Category	65-70 dB CNEL			70-75 dB CNEL			75-80 dB CNEL			80-85 dB CNEL			85+ dB CNEL			Totals		
	Baseline	**Proposed**	**Acres Change**	**Baseline**	**Proposed**	**Acres Change**	**Baseline**	**Proposed**	**Acres Change**	**Baseline**	**Proposed**	**Acres Change**	**Baseline**	**Proposed**	**Acres Change**	**Baseline**	**Proposed**	**Acres Change**
Administration	0	0	0	13	4	-9	0	0	0	0	0	0	0	0	0	13	4	-9
Bachelor Quarters	25	32	7	58	52	-6	0	0	0	0	0	0	0	0	0	83	84	1
Community	1	35	34	73	70	-3	0	0	0	0	0	0	12	12	0	86	117	31
Easements	3	4	1	20	24	4	36	33	-3	80	6	-74	0	0	0	139	67	-72
Irrigated Land	297	423	126	1,501	1,813	312	3,099	3,599	500	4,367	4,099	-268	3,853	3,181	-672	13,117	13,115	-2
Maint/Production	0	0	0	2	2	0	0	0	0	0	47	47	178	130	-48	180	179	-1
Ops/Training	5	4	-1	133	144	11	79	73	-6	52	83	31	1,560	1,524	-36	1,829	1,828	-1
Ordnance	0	0	0	0	6	6	37	69	32	188	156	-32	6	0	-6	231	231	0
Public Safety	4	6	2	72	71	-1	1	0	-1	0	0	0	3	2	-1	80	79	-1
Rec/Open Space	91	89	-2	149	170	21	367	273	-94	0	0	0	1	1	0	608	533	-75
Residential	28	22	-6	0	0	0	0	0	0	0	0	0	0	0	0	28	22	-6
Supply/Storage	0	0	0	8	8	0	0	0	0	0	0	0	44	44	0	52	52	0
Utilities	122	120	-2	141	128	-13	0	0	0	0	0	0	26	26	0	289	274	-15
Vacant	88	110	22	55	36	-19	65	63	-2	67	72	5	730	714	-16	1,005	995	-10
Total	**664**	**845**	**181**	**2,225**	**2,528**	**303**	**3,684**	**4,110**	**426**	**4,754**	**4,463**	**-291**	**6,413**	**5,634**	**-779**	**17,740**	**17,580**	**-160**

Table 4.5-4 shows land use area measurements within the existing and anticipated noise zones for off-base uses under the No Action Alternative. Only open space, agricultural, and unclassified lands are exposed to noise levels of 65 dB CNEL or greater. Similar to that under the Proposed Action, 6 ac (2.4 ha) of industrial use land within the City of Lemoore would no longer be affected by elevated noise levels under the No Action Alternative. The No Action Alternative would also result in an overall decrease in land uses affected by noise greater than or equal to 65 dB CNEL by 5,831 ac (2,360 ha) (10%). Therefore, no significant land use related impacts would occur under the No Action Alternative.

Table 4.5-4. Off-Base Land Uses Affected by Noise Levels 65 dB CNEL and Greater under the No Action Alternative

Land Use Category	65-70 dB CNEL			70-75 dB CNEL			75-80 dB CNEL			80-85 dB CNEL			85+ dB CNEL			Totals		
	Baseline	No Action	Acres Change	Baseline	No Action	Acres Change	Baseline	No Action	Acres Change	Baseline	No Action	Acres Change	Baseline	No Action	Acres Change	Baseline	No Action	Acres Change
City of Lemoore/ Industrial	6	0	-6	0	0	0	0	0	0	0	0	0	0	0	0	6	0	-6
Open/Agricultural	28,442	26,086	-2,356	15,552	13,632	-1,920	6,114	5,244	-870	3,972	3,975	3	4,338	3,739	-599	58,418	52,676	-5,742
Unclassified (roads/water)	521	482	-39	202	164	-38	49	46	-3	23	20	-3	0	0	0	795	712	-83
Total	**28,969**	**26,568**	**-2,401**	**15,754**	**13,796**	**-1,958**	**6,163**	**5,290**	**-873**	**3,995**	**3,995**	**0**	**4,338**	**3,739**	**-599**	**59,219**	**53,388**	**-5,831**

4.6 INFRASTRUCTURE AND UTILITIES

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any changes to infrastructure and utilities that may occur. This assessment of infrastructure and utilities examines how the Proposed Action and No Action alternatives would affect on-base and off-base level of service for water, wastewater treatment, storm water management, electrical supply, solid waste management, and natural gas service.

4.6.1 Proposed Action

The Proposed Action would add 501 military personnel and an estimated 651 family members to NAS Lemoore and the region). However, the FRS reduction would remove 239 military personnel, 80 contractors, and 488 associated family members from NAS Lemoore and possibly the region. Resulting impacts to infrastructure and utilities at the end state scenario would potentially occur from the net increase of 262 military personnel (+236 enlisted, +26 officers) and 341 family members on-base, or approximately a 4% increase in the on-base population (assuming all new Navy personnel and their family members reside on-base). Of this net increase, however, approximately 56% of the personnel and their families would live on-base, while 44% would live in surrounding communities according to current housing availability data for NAS Lemoore. This would disperse the overall impacts to infrastructure and utilities among NAS Lemoore and in the surrounding communities (see Section 3.7.2.1 for a more detailed discussion of personnel and family members). However, for the purposes of this analysis, on-base impacts are analyzed assuming all personnel live on-base, while off-base impacts are analyzed assuming all personnel live off-base. Additionally, the Proposed Action would take place over a period of four years. Between 2012 and 2015, personnel totals would vary as squadrons transition aircraft, but would generally remain below the total that would result at the end of the realignment. Therefore, the impacts discussed below are based on the final net increase of personnel and their family members. No impacts are anticipated to occur from the transition of the type of aircraft stationed at NAS Lemoore, the decrease of four total aircraft at NAS Lemoore, or the 24% decrease in flight operations.

There also would be a decrease of approximately 80 contractors and 177 of their family members. As the contractors and their families live off-base, there would likely be a small decrease in demand for infrastructure and utilities on-base due to those contractors no longer working at NAS Lemoore. It is assumed that these contractors and their family members would remain in the area. As such, it is assumed there would be no change to off-base utilities or infrastructure use due to the elimination of the 80 contractor positions.

4.6.1.1 Water Supply

The end state (2015) scenario would result in a 4% increase in demand for potable water at NAS Lemoore from the end state increase of 262 military personnel and 341 family members. This increase in personnel would result in an increased usage of approximately 108,809 potable gal daily, or 39,715,280 potable gal annually. As the current water treatment plant operates at approximately 31% of its 8.0 mgpd capacity, the 4% increase in personnel stationed at NAS Lemoore would result in an anticipated daily usage of 2.5 mgpd, which would be within the existing capabilities of the water plant. The transition of aircraft under the Proposed Action would not result in an increased demand for water at NAS Lemoore. The modifications to Hangars 1, 2, and 4 are not anticipated to result in impacts to the water supply.

The Proposed Action would result in less than significant impacts to surface water and groundwater availability. The increased population and operations at NAS Lemoore in the 2015 end state would increase the demand for potable water by approximately 39.7 mgy (122 afy), a 4% increase over the current usage of 888.5 mgy(2,727 afy). The base's total water demand of approximately 928 mgy (2,849 afy), would not exceed its contract with the Westlands Water District for 977 mgy (3,000 afy). Therefore, no impacts to water supply would occur.

Water used for either agricultural purposes or municipal and industrial requirements is regulated differently by the Bureau of Reclamation. California Aqueduct surface water is allocated by Westlands Water District under separate contracts for agricultural or municipal and industrial uses and these allocations are not interchangeable. If future municipal and industrial requirements increase, NAS Lemoore contract rates with Westlands Water District would be renegotiated.

Assuming that all 262 military personnel and their families lived off-base, the increase in population of Kings and Fresno counties would result in a less than 1% increase in water demand. It is anticipated that this increase would be a less than significant impact to area water supply.

4.6.1.2 Wastewater and Treatment Facilities

The increased wastewater generated under the Proposed Action would not significantly affect the existing wastewater infrastructure at NAS Lemoore. The increase of 262 military personnel and 341 family members would represent a small increase (approximately 4%) in the overall population at NAS Lemoore, assuming all would live on the installation. Accordingly, there would be an increase of 57,892 gal produced daily, or 21,130,692 gal annually. As the wastewater plant currently operates at 1.59 mgpd, 75% of its 2.12 mgpd capacity, this increase to 1.65 mgpd would not exceed the operating capacity. The modifications to Hangars 1, 2, and 4 are not anticipated to result in impacts to wastewater and treatment facilities.

Assuming that all 262 military personnel and their families lived off-base, the increase in population of Kings and Fresno counties would be less than 1%. This would be anticipated to represent a less than significant impact to those communities' wastewater treatment facilities.

4.6.1.3 Stormwater Drainage

To accommodate the Proposed Action, modifications to Hangars 1, 2, and 4 ground disturbance would be limited to existing paved areas. As such, under the Proposed Action, no new construction would occur. Therefore, there would be no change to the stormwater drainage that occurs at NAS Lemoore or in the communities surrounding the Project Area. The net increase in the population at NAS Lemoore would have no impact on stormwater drainage.

4.6.1.4 Electrical Supply

To accommodate the Proposed Action, interior modifications to Hangars 1, 2, and 4 would occur. Hangars 2 and 4 would also undergo exterior modifications to include a second story. These additions would likely require additional electrical connections, and may result in an increase in electricity demand. The additional electrical demand would be offset somewhat by the installation of more modern, energy efficient electrical systems.

However, a portion of the 262 military personnel and their families would live at NAS Lemoore in existing housing. This would result in a maximum increase of approximately 4% in on-base electrical consumption. The additional daily demand would increase by approximately 11.5 MWh to a total of 269.5 MWh, or annually by 4,209 MWh to a total of 98,361 MWh. It is anticipated that existing infrastructure would be able to support the additional demand.

Assuming that all 262 military personnel and their families lived off-base, the increase in population of Kings and Fresno counties would be less than 1%. It is anticipated that this would not result in a significant increase to those communities' electrical demands or capabilities.

4.6.1.5 Solid Waste Management

Under the Proposed Action, there would be a 4% increase in the amount of solid waste generated at NAS Lemoore from a maximum increase of 262 military personnel and 341 family members. There would be approximately 637 pounds of solid waste generated daily or 116 tpy, from the additional people living on-base. This would be a 4% increase over existing levels of generated waste, resulting in total solid waste of approximately 7.42 tons of solid waste generated daily or 2,716 tpy. Waste would continue to be disposed of at the Avenal Landfill, which would be able to absorb the additional waste without needing to expand their facilities. No additional waste would be generated from the changes in aircraft operations since there would not be any change to flight operations. Modifications to Hangars 1, 2, and 4 would result in less than significant impacts to solid waste management due to the anticipated generation of small amounts of construction and demolition debris.

Assuming that all 262 military personnel and their families lived off-base, the increase in population of Kings and Fresno counties would be less than 1%. This would not result in a significant increase to those communities' solid waste management demands or capabilities.

4.6.1.6 Natural Gas

Under the Proposed Action, there would be a 4% increase in natural gas usage from the increase of military personnel and their family members. The Proposed Action would result in an increased gas usage of approximately 22.0 MBTU daily, or 8,046 MBTU annually to a total usage of approximately 515.2 MBTU daily, or 188,046 MBTU annually. This increased demand would be able to be met through the existing infrastructure that exists on-base. The additions to Hangars 2 and 4 would likely result in a slight increase in natural gas usage.

Assuming that all 262 military personnel and their families lived off-base, the increase in population of Kings and Fresno counties would be less than 1%. This would not result in a significant increase to those communities' natural gas demands or capabilities.

4.6.2 No Action Alternative

Under the No Action Alternative, FRS reduction would result in a decrease of 184 enlisted personnel, 55 officers, and 80 contractors at NAS Lemoore. This would result in a small net decrease in the use of and demand for electricity, potable water, wastewater treatment, electricity, solid waste management, and natural gas at NAS Lemoore and the region. As such, impacts to infrastructure and utilities would be less than significant.

4.7 SOCIOECONOMICS

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any changes to socioeconomic conditions. This assessment of socioeconomics examines how the Proposed Action and No Action alternatives would affect population, employment, income, housing characteristics, and environmental justice, for the study area populations.

4.7.1 Proposed Action

Under the Proposed Action, 420 enlisted personnel and 81 officers, and an estimated 651 family members, would be added to NAS Lemoore and the region. However, the FRS reduction would remove 239 military personnel and 311 associated family members at NAS Lemoore. Overall, there would be a net increase of 262 military personnel (236 enlisted and 26 officers) and their 341 family members. In addition, the FRS reduction would remove 80 contractor positions at NAS Lemoore, but for the purposes of this analysis it is assumed that the contractors and their estimated 177 family members would remain in the region. Based on the evaluation of population, employment and income, housing, minority populations, low income populations, and protection of children presented below, there is no significant impact to socioeconomics from the Proposed Action.

4.7.1.1 Population

The end state (2015) scenario would result in an increase of 236 enlisted personnel, 26 officer positions, and 341 family members. Under a conservative scenario, all new personnel associated with these positions would either move to or relocate from outside the study area. The study area would experience a net gain of approximately 346 people. This would represent less than 1% of the study area population. Therefore, there is no significant impact to short- or long-term regional population trends from the Proposed Action.

4.7.1.2 Employment and Income

The net increase of 262 military positions during the Proposed Action would represent approximately 4% of existing military positions, while the loss of 80 civilian contractors would represent 5% of existing contractor positions at NAS Lemoore. The net change in military and contractor employment would be less than 1% of study area employment.

Military payrolls would increase by approximately $13.4 million annually (Defense Financing Accounting Service 2011). Civilian contractor payrolls would decrease by approximately $4.3 million annually (U.S. Office of Personnel Management 2011). The net increase of approximately $9.1 million in salaries would represent less than 1% of total study area personal income.

Any increases in secondary employment as a result of the net increase in military personnel and salaries would represent less than 1% of study area employment and would be expected to be met by the local labor force. Therefore, there would be no significant impact to short- or long-term regional employment and income trends from the Proposed Action.

Based on available data, the expenditures for proposed modifications to Hangars 1, 2, and 4 would be approximately $10 million (refer to Section 2.1.4 for more information). The increase in construction spending would generate construction and secondary jobs. Given the total dollar amount and the size of the local economy, however, the regional labor force would be expected to absorb the increased supply of construction jobs, as well as any associated secondary jobs. No in-migration to the area would occur as a result of construction spending.

Additional taxes would accrue to federal, state, and local governments as a result of the increase in personnel and construction activities. These impacts would be beneficial.

4.7.1.3 Housing

In addition to the changes in personnel during the Proposed Action, 80 civilian contractor positions would be lost due to FRS reduction. Under a conservative scenario, all personnel associated with these positions would live off-base and would either seek to rent, purchase, or sell homes at the same time. The 262 new military positions would represent less than 1% of the available (vacant) units in the housing market area. The potential sale of 80 contractor homes (under the maximum scenario since it is possible that most would be able to find work in the region) would represent less than 1% of the study area owner-occupied housing units. The Proposed Action would occur over four years, further reducing potential impacts to the local housing market. Therefore, there would be no significant impact to short- or long-term trends in the regional housing market from the Proposed Action.

4.7.1.4 Minority and Low Income

Noise levels of 65 dB CNEL or greater were identified for the Proposed Action (see Section 3.2, Noise). The affected population under these areas was determined by inspecting aerial photographs and counting houses to estimate the total number of households and multiplied by a factor to determine population under each noise zone. The estimated population was scaled using USCB Block data to calculate low-income and minority population. Tables 4.7-1 and 4.7-2 present the minority and low income populations that would be affected by noise levels 65 dB CNEL or greater under the Proposed Action.

As shown in Tables 4.7-1 and 4.7-2, the total population, minority population, and low-income population underlying 65 dB CNEL noise zones and greater would increase compared to the baseline condition. However, the proportion of minority population and low-income population exposed to aircraft noise would remain proportional relative to the total population. For all populations, the vast majority of the increased noise exposure would be in the 65-70 dB CNEL noise zone. In fact, there would be a decrease or no change of population affected within the 70- 85+ dB CNEL noise zone compared to baseline. Therefore, impacts to minority populations and low income populations would be less than significant.

Table 4.7-1. Projected Minority Populations Underlying NAS Lemoore Aircraft Noise Zones (Proposed Action)

Noise Zone (dB CNEL)	Baseline			End-State		
	Total Population	**Total Minority Population**	**Percent Minority**	**Total Population**	**Total Minority Population**	**Percent Minority**
65-70	544	331	61%	597	360	60%
70-75	112	81	72%	84	66	79%
75-80	52	36	69%	37	26	70%
80-85	20	17	85%	20	17	85%
>85	0	0	0%	0	0	0%
Total	**728**	**465**	**64%**	**738**	**469**	**64%**
Net Change from Baseline	**--**	**--**	**--**	**10**	**4**	**0%**

Source: Wyle 2011; USCB 2011b, 2010b.
Note: [1]The percentage of low-income persons is calculated as a percentage of all persons for whom the USCB determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.

Table 4.7-2. Projected Low-Income Population Underlying NAS Lemoore Aircraft Noise Zones (Proposed Action)

Noise Zone (dB CNEL)	Baseline			End-State		
	Total Population	**Total Low-Income Population**	**Percent Low-Income**	**Total Population**	**Total Low-Income Population**	**Percent Low-Income[1]**
65-70	544	90	17%	597	94	16%
70-75	112	20	18%	84	16	19%
75-80	52	11	21%	37	8	22%
80-85	20	3	16%	20	3	16%
>85	0	0	0%	0	0	0%
Total	**728**	**124**	**17%**	**738**	**121**	**16%**
Net Change from Baseline	**--**	**--**	**--**	**10**	**-3**	**-1%**

Source: Wyle 2011; USCB 2011b, 2010b.
Note: [1]The percentage of low-income persons is calculated as a percentage of all persons for whom the USCB determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.

4.7.1.5 Protection of Children

Table 4.7-3 presents the population under the age of 18 that would be affected by noise levels 65 dB CNEL or greater under the Proposed Action. The data indicate that although there would be an increase in the total population exposed to noise levels of 65 dB CNEL and higher, the proportion of population under the age of 18 exposed to noise levels would remain similar to that under baseline conditions. As such, impacts with regard to protection of children would be less than significant.

Table 4.7-3. Under the Age of 18 Populations Underlying Proposed NAS Lemoore Aircraft Noise Zones (Proposed Action)

Noise Contour (dB CNEL)	Baseline			End-State		
	Total Population	Total < Age 18 Population	Percent < Age 18	Total Population	Total < Age 18 Population	Percent < Age 18
65-70	544	10	2%	597	20	3%
70-75	112	4	4%	84	3	4%
75-80	52	2	4%	37	1	3%
80-85	20	1	5%	20	1	5%
>85	0	0	0%	0	0	0%
Total	**728**	**17**	**2%**	**738**	**25**	**3%**
Net Change from Baseline	**--**	**--**	**--**	**10**	**8**	**1%**

Source: Wyle 2011; USCB 2011b,2010b.

4.7.2 No Action Alternative

Under the No Action Alternative, FRS reduction would result in a decrease of 184 enlisted personnel, 55 officers, and 80 contractors, as well as an estimated 488 family member at NAS Lemoore and the region. This would result in a loss of 239 military jobs associated with NAS Lemoore (about 4% of the NAS Lemoore military workforce) and a corresponding loss of approximately $13.6 million in payroll (U.S. Office of Personnel Management 2011). Civilian contractor payrolls would decrease by approximately $4.3 million annually (U.S. Office of Personnel Management 2011). The net decrease of approximately $17.9 million in salaries would represent less than 1% of total study area personal income. Additionally, approximately $10 million expenditures for renovation of Hangars 1, 2, and 4, as well as associated construction jobs and any secondary jobs that would be generated, would not occur under the No Action Alternative. It is likely that many military personnel whose jobs would be removed under the FRS reduction would be reassigned outside of the region. This would increase housing availability but would be less than significant on a regional scale. It is not anticipated that this change would impact local housing prices. The reduction would occur over a two-year period, further diluting the effects on regional housing.

4.7.2.1 Minority and Low Income

As shown in Table 4.7-4 and Table 4.7-5, the total population, minority population, and low-income population underlying 65 dB CNEL noise levels and greater under the No Action Alternative would decrease compared to the baseline condition. The proportion of minority population exposed to aircraft noise would increase by 1% relative to the total population, while low-income population would remain the same as the baseline condition; therefore, impacts would be less than significant.

Table 4.7-4. No Action Alternative Minority Populations Underlying NAS Lemoore Aircraft Noise Contours

Noise Contour (dB CNEL)	Baseline			End-State		
	Total Population	Total Minority Population	Percent Minority	Total Population	Total Minority Population	Percent Minority
65-70	544	331	61%	433	267	62%
70-75	112	81	72%	75	56	75%
75-80	52	36	69%	34	24	71%
80-85	20	17	85%	20	17	85%
>85	0	0	0%	0	0	0%
Total	**728**	**465**	**64%**	**562**	**364**	**65%**
Net Change from Baseline	**--**	**--**	**--**	**-166**	**-103**	**1%**

Source: Wyle 2011; USCB 2011b, 2010b.
Note: [1]The percentage of low-income persons is calculated as a percentage of all persons for whom the USCB determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.

Table 4.7-5. No Action Alternative Low-Income Population Underlying NAS Lemoore Aircraft Noise Contours

Noise Contour (dB CNEL)	Baseline			End-State		
	Total Population	Total Low-Income Population	Percent Low-Income	Total Population	Total Low-Income Population	Percent Low-Income[1]
65-70	544	90	17%	433	72	17%
70-75	112	20	18%	75	14	19%
75-80	52	11	21%	34	7	21%
80-85	20	3	16%	20	3	15%
>85	0	0	0%	0	0	0%
Total	**728**	**124**	**17%**	**562**	**96**	**17%**
Net Change from Baseline	**--**	**--**	**--**	**-166**	**-28**	**0%**

Source: Wyle 2011; USCB 2011b, 2010b.
Note: [1]The percentage of low-income persons is calculated as a percentage of all persons for whom the USCB determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.

4.7.2.2 Protection of Children

Table 4.7-6 presents the population under the age of 18 that would be affected by noise levels 65 dB CNEL or greater under the No Action Alternative. The data indicate that there would be a decrease in the total population exposed to noise levels 65 dB CNEL and higher, while the proportion of population under the age of 18 exposed to noise levels would remain similar to that under baseline conditions; therefore, impacts would be less than significant.

Table 4.7-6. No Action Alternative Under the Age of 18 Populations Underlying Baseline NAS Lemoore Aircraft Bands Noise Contours

Noise Contour (dB CNEL)	Baseline			End-State		
	Total Population	Total < Age 18 Population	Percent < Age 18	Total Population	Total < Age 18 Population	Percent < Age 18
65-70	544	10	2%	433	14	3%
70-75	112	4	4%	75	3	4%
75-80	52	2	4%	34	1	3%
80-85	20	1	5%	20	1	5%
>85	0	0	0%	0	0	0%
Total	**728**	**17**	**2%**	**562**	**19**	**3%**
Net Change from Baseline	**--**	**--**	**--**	**-166**	**2**	**1%**

Source: Wyle 2011; USCB 2011b, 2010b.

4.8 COMMUNITY SERVICES

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any changes to community services that may occur. This assessment of community services examines how the Proposed Action and No Action alternatives would affect schools, police and fire protection, health services, and recreational facilities both on- and off-base.

4.8.1 Proposed Action

Potential impacts to community services under the end state scenario at NAS Lemoore would occur from the total net increase of 262 military personnel and 341 family members, or approximately 4% in the on-base personnel. Of this net increase, approximately 56% of the personnel and their families would be expected to live on-base, while 44% would live in the surrounding communities. This would disperse the overall impacts to the community service among NAS Lemoore and in the surrounding communities (see Section 3.7.2.1 for a more detailed discussion of personnel and family members). However, for the purposes of analysis of on-base impacts, it is assumed that all personnel would live on-base. Similarly, while analyzing off-base impacts, it is assumed that all personnel would live off-base. Because the Proposed Action would take place over a period of 4 years, between 2011 and 2015 personnel totals would vary as squadrons transition aircraft, but would generally remain below the total that would result at the end of realignment. Therefore, the impacts discussed below are based on the final net increase of personnel and their family members. No impacts are anticipated to occur from the transition in the type of aircraft stationed at NAS Lemoore or the decrease by four aircraft stationed at NAS Lemoore under the end state scenario. Therefore, there are no significant impacts to community services from the Proposed Action.

There would also be a decrease of approximately 80 contractors and 177 their family members due to the FRS reduction. As these contractors and their families live off-base, and would potentially move out of the area, this partially could offset impacts to community services off-base. However, for the purposes of off-base analysis, it is assumed that these contractors and their family members would remain in the area.

4.8.1.1 Schools

It is anticipated that there would be an estimated increase of 142 school-aged family members associated with the projected increase of 262 military personnel under the Proposed Action. These students would be enrolled at area schools both on- and off-base. Assuming an approximately even age distribution of these students, on-base schools would be able to accommodate kindergarten through eighth grade students based on existing enrollment capacities. However, all high school students would attend off-base high schools since there are no on-base high schools. Area high schools currently have available capacity (refer to Table 3.8-1). Assuming an even age distribution, approximately 47 new high school students would need to be accommodated by area high schools.

4.8.1.2 Police Protection

The net increase of 262 military personnel and 341 family members would have a less than significant impact on police services at NAS Lemoore. As there would be a slight increase (approximately 4%) to the total population at NAS Lemoore, there would likely be a correspondingly slight increase in the number of calls that base police respond to. As no new housing or other facilities would be constructed under the Proposed Action, there would not be an increase in the area requiring patrol.

Personnel residing off-base would likely be distributed among the surrounding communities and would increase the regional population by less than 1%. Therefore, impacts associated with police protection would be less than significant.

4.8.1.3 Fire Protection

Under the Proposed Action, a portion of the estimated increase of 262 military personnel and 341 family members would reside on-base in existing housing, or an approximately 4% increase in the on-base population. As there would be no new housing or facilities under the Proposed Action, there would be no additional areas for fire protection services to respond to. Additionally, under the Proposed Action, there would be a decrease of four aircraft stationed as NAS Lemoore and a decrease of 24% of flight operations. As such, there would be no impacts to the level of fire protection services located within the operations area. Current staffing levels, facilities, and equipment would be able to accommodate the increased personnel and maintain the current level of service.

The personnel and their family members that would reside off-base would likely be dispersed into the surrounding communities and would increase the regional population by less than 1%. Therefore, impacts associated with fire protection would be less than significant.

4.8.1.4 Health Services

Currently, the base hospital operates at approximately 54% capacity, thus an increase of approximately 4% to the on-base population would not adversely impact the ability of the hospital to provide services. There would be a net reduction in aircraft operations at NAS Lemoore at the 2015 end state, thus it is unlikely that there would be an increase in the number of accidents requiring medical services from the Proposed Action.

The personnel and their family members that would reside off-base would likely be dispersed into the surrounding communities and would not impact health services in those areas. Further, assuming all personnel and their families live off-base, this would result in an increase of less than 1% to the regional community. Therefore, impacts to health services would be less than significant.

4.8.1.5 Recreational Facilities

The existing recreational facilities would successfully accommodate the 4% increase in personnel and their family members associated with the Proposed Action. Therefore, there would be no impacts. Off-base recreation would not be impacted as the increase of people assigned to NAS Lemoore would represent an insignificant increase to the County.

4.8.2 No Action Alternative

Under the No Action Alternative, FRS reduction would result in a decrease of 184 enlisted personnel, 55 officers, and 80 contractors, as well as an estimated 488 family members at NAS Lemoore and the region. This would result in a decrease in the demand for community services at NAS Lemoore and in the region. This would include an estimated decrease in 160 school-aged children. As such, impacts to community services would be less than significant under the No Action Alternative.

4.9 TRANSPORTATION

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any changes to transportation and circulation in the vicinity of NAS Lemoore. This assessment of transportation examines how the Proposed Action and No Action alternatives would affect the road network and traffic levels that provide access to NAS Lemoore.

4.9.1 Proposed Action

Impacts to transportation at the end state scenario would occur from the net increase of 182 personnel at NAS Lemoore (+236 enlisted, +26 officers, -80 contractors) and 341 family members.

To provide a conservative analysis of potential traffic impacts, this analysis assumes that all personnel would reside off-base and commute to and from NAS Lemoore on a daily basis. As such, a total of 182 daily round trips (or 364 total trips) would be added to the local transportation system based on the addition of 262 personnel and subtraction of 80 contractor personnel, since all contractors live off-base and would have commuted to NAS Lemoore (family members are not included since they would not likely be accessing the base and their trips would be dispersed throughout the area). This would represent a 2.4% increase compared to total base population levels (182 net proposed base personnel compared to approximately 7,600 existing base personnel).

As described above, NAS Lemoore is accessed via three primary gates: the Main Gate via a signalized intersection off SR 198; the Operations Gate via Grangeville Boulevard; and the Housing Gate via Avenal Cutoff Road or off Jackson Avenue. Most of the additional 364 total daily trips generated by the Proposed Action would likely utilize SR 191 or SR 41, or both highways to some extent, although access to the base would likely be dispersed across the three gates. In addition, military operations usually begin earlier and end earlier in the day than typical peak hour commute times. As such, it is anticipated that the Proposed Action would have no significant impact on traffic and level of service of area roads.

4.9.2 No Action Alternative

Under the No Action Alternative, FRS reduction would result in a decrease of 184 enlisted personnel, 55 officers, and 80 contractors (as well as an estimated 488 family members at NAS Lemoore and the region). This would result in a decrease in the number of total trips for NAS Lemoore personnel traveling between surrounding communities and the base. As such, impacts to transportation would be less than significant under the No Action Alternative.

4.10 BIOLOGICAL RESOURCES

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any effects on biological resources that may occur. This assessment of examines how the Proposed Action and No Action alternatives would affect wildlife, migratory birds, and threatened and endangered species (including threatened and endangered migratory birds).

4.10.1 Proposed Action

4.10.1.1 Wildlife

There would be no impacts to wildlife species as a result of the Proposed Action. No wildlife habitat would be directly disturbed from the hangar renovation activities, and construction noise is anticipated to be less than the noise associated with aircraft operations. Also, based on noise modeling results, noise levels associated with aircraft operations under the Proposed Action are not expected to be noticeably different from baseline conditions (see Section 4.2). Therefore, indirect impacts from aircraft noise would not substantially affect wildlife located on and in the vicinity of NAS Lemoore. No significant impacts to wildlife would occur from the Proposed Action.

4.10.1.2 Migratory Birds

As with wildlife species, migratory birds would not be affected by the Proposed Action. Construction would be limited to renovations of existing hangars and ground disturbance would occur on existing paved areas, so no important habitat for migratory bird species would be impacted. Operational and airfield training noise would be generally similar to existing conditions. Burrowing owls, a USFWS and California Department of Fish and Game species of concern, are known to occur in some NAS Lemoore air operations areas; however, it is well documented that this species is often found in open, grassy areas near active airport runways, and is therefore not perturbed by aircraft takeoff, landing, and overflight noise. No impacts to nearby burrowing owls are anticipated during the construction or operational phases of the Proposed Action.

Under the Proposed Action, FA-18E/F aircraft would continue to operate in the same airfield environment. With slightly decreased operations resulting from the FRS reduction, the overall potential for bird-aircraft or wildlife aircraft strikes would not be significantly different under the Proposed Action. FA-18E/F aircrews operating in NAS Lemoore airspace would be required to follow applicable procedures outlined in the NAS Lemoore BASH Management Plan (NAS Lemoore 2007). NAS Lemoore has developed aggressive procedures designed to minimize the occurrence of bird/aircraft strikes, and has documented detailed procedures to monitor and react to heightened risk of bird strikes (NAS Lemoore 2007). When risk increases, limits are placed on low altitude flight and some types of training (e.g., multiple approaches, closed pattern work) in the airport environment. Special briefings are provided to pilots whenever the potential exists for greater bird-strike sightings within the airspace. FA-18E/F pilots would continue to be subject to these procedures. Therefore, no significant impacts to migratory birds would occur from the Proposed Action.

4.10.1.3 Threatened and Endangered Species

Threatened and endangered species, or other special status species, on the installation would not be directly affected by the Proposed Action as no loss of habitat is anticipated. Any ground disturbance necessary to implement the Proposed Action would be minor and would occur on existing paved areas along the flightline. The only special status species known to occur in the immediately vicinity of the flightline and runways (areas that are already barren or vegetated with non-native grasses) is the burrowing owl, a USFWS and California Department of Fish and Game species of concern. Burrowing owls are well-known to be an adaptable species that often occupy open space areas at airfields, apparently unperturbed by aircraft noise or human presence. Burrowing owls are therefore also a problem species as with regard to BASH; NAS Lemoore, like many military airfields with a stable burrowing owl population, actively manages this species' numbers by mowing open space areas near the flightline to maintain very short grass conditions. It is unlikely that burrowing owls would be disturbed by either short-term construction noise or noise associated with aircraft operations as the noise environment would not change substantially.

Other special status species known to occur on-base are far enough away from any proposed construction activity to not be affected by any additional noise, ground disturbance, or human presence that would occur with implementation of the Proposed Action. Swainson's hawks may periodically fly over the flight line areas in search of small rodent prey, but their primary habitats are riparian areas and agricultural fields in areas more remote from the flight line. Similarly, wetland and grassland habitats that support Tipton and Fresno kangaroo rats, California least tern, white-faced ibis, western spadefoot toad, and greater mastiff bat are not located near the flightline and hangar areas, so these species would be unaffected by construction-related or ground disturbance activities. Indirect impacts to all of these listed or special status species caused by possible changes in the noise environment from increased aircraft overflights were considered, but modeling demonstrates that noise levels would not be noticeably different from baseline conditions. As a result, the Proposed Action would not adversely affect any threatened or endangered species. In addition, installation personnel would continue to manage habitats pursuant to the INRMP, which is designed to protect and benefit threatened and endangered species. Therefore, impacts to threatened and endangered species would be less than significant.

4.10.1.4 Bird/Wildlife-Aircraft Strike Hazard

Because the number of air ops is not expected to increase, there should be no additional impacts from bird/wildlife-aircraft strikes. The Super Hornet aircraft is already based at NAS Lemoore and is not substantially different in design or silhouette from the FA-18C aircraft it would replace to cause an increase in bird-aircraft strike incidents above current baseline levels. During and after implementation of the Proposed Action, installation personnel will continue to implement the base's BASH Management Plan in order to control this hazard.

4.10.2 No Action Alternative

4.10.2.1 Wildlife

Under the No Action Alternative, wildlife habitats on the installation would continue to be managed for the benefit of native wildlife species pursuant to the INRMP, and no new loss of wildlife habitat would occur.

4.10.2.2 Migratory Birds

Under the No Action Alternative, the migratory bird resource on the installation would continue to be managed and protected pursuant to the INRMP, and no deleterious effects to migratory bird species would occur.

4.10.2.3 Threatened and Endangered Species

Impacts to threatened and endangered species would be similar to those described under section 4.10.1.3, although no construction is proposed under the No Action Alternative. In addition, installation personnel would continue to manage habitats pursuant to the INRMP which is designed to protect and benefit threatened and endangered species. Therefore, impacts to threatened and endangered species under the No Action Alternative would be less than significant.

4.10.2.4 Bird/Wildlife-Aircraft Strike Hazard

Under the No Action Alternative, the numbers of birds being struck on the runways or in training airspace would not change, and the installation personnel would continue to implement the base's BASH Management Plan in order to control this hazard.

4.11 WATER RESOURCES

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any effects on water resources that may occur. This assessment examines how the Proposed Action and No Action alternatives would affect on-base and off-base surface water and groundwater quantity, as well as water quality.

4.11.1 Proposed Action

The Proposed Action may result in a slight increase in the amount of water used for industrial and domestic purposes, but would have no direct impacts on surface or groundwater quality. See section 4.6 for a discussion of water use.

Although the Proposed Action would add 5,105 more aircraft operations, there would be a 24% net reduction in aircraft operations by the 2015 end state (compared to the baseline) due to the FRS reduction. This would likely reduce any releases of hazardous substances, decreasing the potential for surface water contamination. NAS Lemoore would continue to comply with established BMPs and programs for the management of hazardous substances and spill response at NAS Lemoore. Possible oil or other material spills from the aircraft would be minimized by appropriate management techniques such as requiring all equipment to be in good condition and to be properly maintained to avoid the potential for spills and leaks.

To accommodate the Proposed Action, modifications to Hangars 1, 2, and 4 would include interior renovations and ground disturbance on existing paved areas to accommodate the addition to Hangar 2 and new footings for Hangars 2 and 4. No additional runways or taxiways are proposed. Because the construction would result in limited ground disturbance on existing paved areas, the construction would comply with established BMPs and programs for the management of sedimentation and erosion

Because BMPs would be implemented during any ground-disturbing construction for the Proposed Action there would be no significant impact to surface or groundwater resources.

4.11.2 No Action Alternative

Because no construction or any other ground disturbance is included under the No Action Alternative, no impacts to water resources or water quality would occur.

4.12 CULTURAL RESOURCES

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any changes to cultural resources located at NAS Lemoore. This assessment includes a determination of the eligibility of potentially eligible structures, and the potential for impacts to these structures or any TCPs.

4.12.1 Proposed Action

4.12.1.1 Historic Structures

Three structures, Hangars 1, 2, and 4, constructed in 1959, would be directly impacted by interior and exterior modifications including reconfiguration, modernization, new construction, and expansion under the Proposed Action. All three hangars have been determined not eligible for nomination to the NRHP, thus no historic properties would be affected and no further steps would be required. Therefore, there is no significant impact to historic structures from the Proposed Action. Other impacts to historic structures from the Proposed Action are expected to be indirect and less than significant. The change in noise associated with the end state would be small compared to existing conditions, and the small decrease in noise would not impact the physical and NRHP integrity of historic structures at NAS Lemoore.

4.12.1.2 Traditional Cultural Properties

As no TCPs have been identified within the boundaries of NAS Lemoore, there are no significant impacts to this resource type as a result of the Proposed Action, as discussed below.

4.12.1.3 Consultation and State Historic Preservation Office Concurrence

The DoN consulted with interested parties (Appendix A) regarding the proposed undertaking per 36 CFR 800.4. No concerns were identified by interested parties in the course of consultation. A letter of consultation was sent by the DoN to the California SHPO on June 23, 2011 requesting concurrence with the finding of no historic properties affected from the Proposed Action. A letter of concurrence on this finding was received from the California State Historic Preservation Officer and is provided in Appendix A.

4.12.2 No Action Alternative

Under the No Action Alternative, reduction of the FRS would occur but this would not include any ground disturbance or building modifications. As such the No Action Alternative would have no effect on cultural resources.

4.13 HAZARDOUS MATERIALS AND WASTE

The potential effects of the proposed aircraft realignment at NAS Lemoore were assessed by considering any effects associated with hazardous materials and waste. This assessment examines how the Proposed Action and No Action alternatives would affect, or be affected by, hazardous waste management, asbestos, PCBs, storage tanks and oil/water separators, pesticides, LBP, ordnance, radon, and IR sites on-base and off-base.

4.13.1 Proposed Action

There would be a reduction in overall aircraft operations associated with the Proposed Action. Use of certain hazardous materials such as fuel, oils, and lubricants would continue at levels similar to baseline. The Proposed Action would not result in significant impacts with regard to the handling, use, storage, or disposal of such materials at NAS Lemoore. NAS Lemoore would continue to comply with established BMPs and programs for the management of hazardous substances and spill response at NAS Lemoore. Possible oil or other material spills from the aircraft would be minimized by appropriate management techniques such as requiring all equipment to be in good condition and to be properly maintained to avoid the potential for spills and leaks.

Given the age of the hangars proposed for modification and/or expansion, which were built in 1959 (DoN 2005a), the renovations may require disposal of small quantities of ACM or LBP, which would be removed and disposed of in accordance with applicable federal, state and local regulations, as outlined in the Hazardous Waste Management Plan (DoN 2005b).

Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous waste at NAS Lemoore, and implementation of the Proposed Action would not result in significant hazardous materials related impacts.

Since none of the non-No Further Action IR sites is located within 1,000 ft (304.8 m) of Hangars 1, 2, or 4, no impacts associated with IR sites would occur.

With incorporation of the appropriate procedures for handling of hazardous materials during renovation of Hangars 1, 2, and 4, and the application of BMPs for the management of hazardous substances and spill response at NAS Lemoore, the Proposed Action alternative would have no significant impacts related to hazardous materials.

4.13.2 No Action Alternative

Under the No Action Alternative, decreases in aircraft operations associated with the FRS reduction would result in a decrease in the use of hazardous materials and generation of hazardous waste. These impacts would be similar in nature, though somewhat smaller in magnitude, to those described for the Proposed Action. No building modifications would occur, so no impacts associated with disposal of ACM or LBP would occur. As such, impacts would be less than significant.

CHAPTER 5 CUMULATIVE IMPACTS

5.1 INTRODUCTION

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Recent CEQ guidance in considering cumulative effects involves defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographical and temporal overlaps among the Proposed Action and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergy exists between the Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated.

To identify cumulative effects, three fundamental questions need to be addressed:

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the timeframe in which the effects could be expected to occur. It is possible that analysis of cumulative impacts may go beyond the scope of the project-specific direct and indirect impacts to include expanded geographic and time boundaries and a focus on broad resource sustainability. This "big picture" approach is becoming increasingly important as growing evidence suggest that the most significant impacts result not from the direct impact of a particular action, but from the combination of individual, often minor, impacts of multiple actions over time. The underlying issue is whether or not a resource can adequately recover from the impact of an action before the environment is exposed to a subsequent action or actions.

The Proposed Action analyzed in this EA would not make radical changes to the operations, facilities, or population in and around NAS Lemoore, California. Rather the Proposed Action would result in small-scale changes to the type and number of aircraft operating at NAS Lemoore. Day-to-day operations of those aircraft would be similar to those operations occurring in the recent past and currently under baseline conditions (2011), thus few resources areas would be impacted. As such, there is limited potential for the affected resources of the Proposed Action to interact with the affected resources of past, present, or reasonably foreseeable actions. As discussed in Chapter 4 of this EA, environmental impacts of the Proposed Action result from the change in composition of the aircraft at NAS Lemoore that result in changes to the noise environment, differences in air emissions from those aircraft, facilities modifications, and the minor change to population associated with those aircraft. Potential interactions with other past, present, or reasonably foreseeable actions would generally be those actions that also may have effects on the noise environment, air quality, and population levels of NAS Lemoore.

5.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Various types of past, present, and reasonably foreseeable actions not related to the Proposed Action have the potential to affect the resources identified in Chapter 3 of the EA. The overview of these actions in this section emphasizes components of the activities that are relevant to the impact analysis in Chapter 4. Geographic distribution, intensity, duration, and historical effects of similar activities are considered when determining whether a particular activity may contribute cumulatively and significantly to the impacts of the Proposed Action on the resource areas identified in Chapter 3.

Based on a review of past, present, and reasonably foreseeable actions at NAS Lemoore and the region (Fresno and Kings Counties), it was determined that several actions be considered when analyzing the potential cumulative impacts of the actions. The projects listed in this section are those that have the greatest potential to cumulatively impact the resources assessed in this EA. These projects include Relocation of VFA-86, potential Navy F-35C Homebasing at NAS Lemoore, establishment of SAR at NAS Lemoore, potential basing of F-15 aircraft at the Fresno-Yosemite Airport, several construction and master plan projects occurring at NAS Lemoore, and three non-Navy projects, the California High-Speed Rail Line, the SR 198/19th Avenue Interchange, and the Avenal power plant project (Figure 5.1.1). These projects are described below, and the impacts of these projects, in combination with the impacts of the Proposed Action, are described in Section 5.3.

5.2.1 Federal Actions

Relocation of VFA-86 to NAS Lemoore, California

A Categorical Exclusion was prepared for the relocation of VFA-86 (a squadron of FA-18s) from Marine Corps Air Station Beaufort, South Carolina to NAS Lemoore, California in 2010. Relocation of VFA-86 was proposed to provide better geographic alignment of Strike Fighter assets in support of aircraft carrier wing deployment demands of Global Force Management. This action provided one 10-plane Strike Fighter squadron for the sixth west coast aircraft carrier wing and relocated 22 officers and 196 enlisted (218 personnel billets) assigned to VFA-86 and their family members to NAS Lemoore. The squadron transitioned from a 10-plane FA-18C Hornet squadron to a 10-plane FA-18E Super Hornet squadron in 2011 while conducting the same mission and same training as other Strike Fighter squadrons homebased at NAS Lemoore. This action has the potential to interact with impacts from the Proposed Action because this additional squadron added aircraft operations in and around the NAS Lemoore airfield and the transition from the older FA-18C to the newer FA-18E contributed to changes in the noise environment and air emissions from the aircraft operations. VFA-86 continues to train at the same detached locations. No additional facilities or functions were required to support the relocation and transition of VFA-86 to NAS Lemoore. Because of the timing of the relocation to NAS Lemoore, the FA-18E squadron is included in the baseline of this EA, and the cumulative impacts of this action were assessed in Chapter 4.

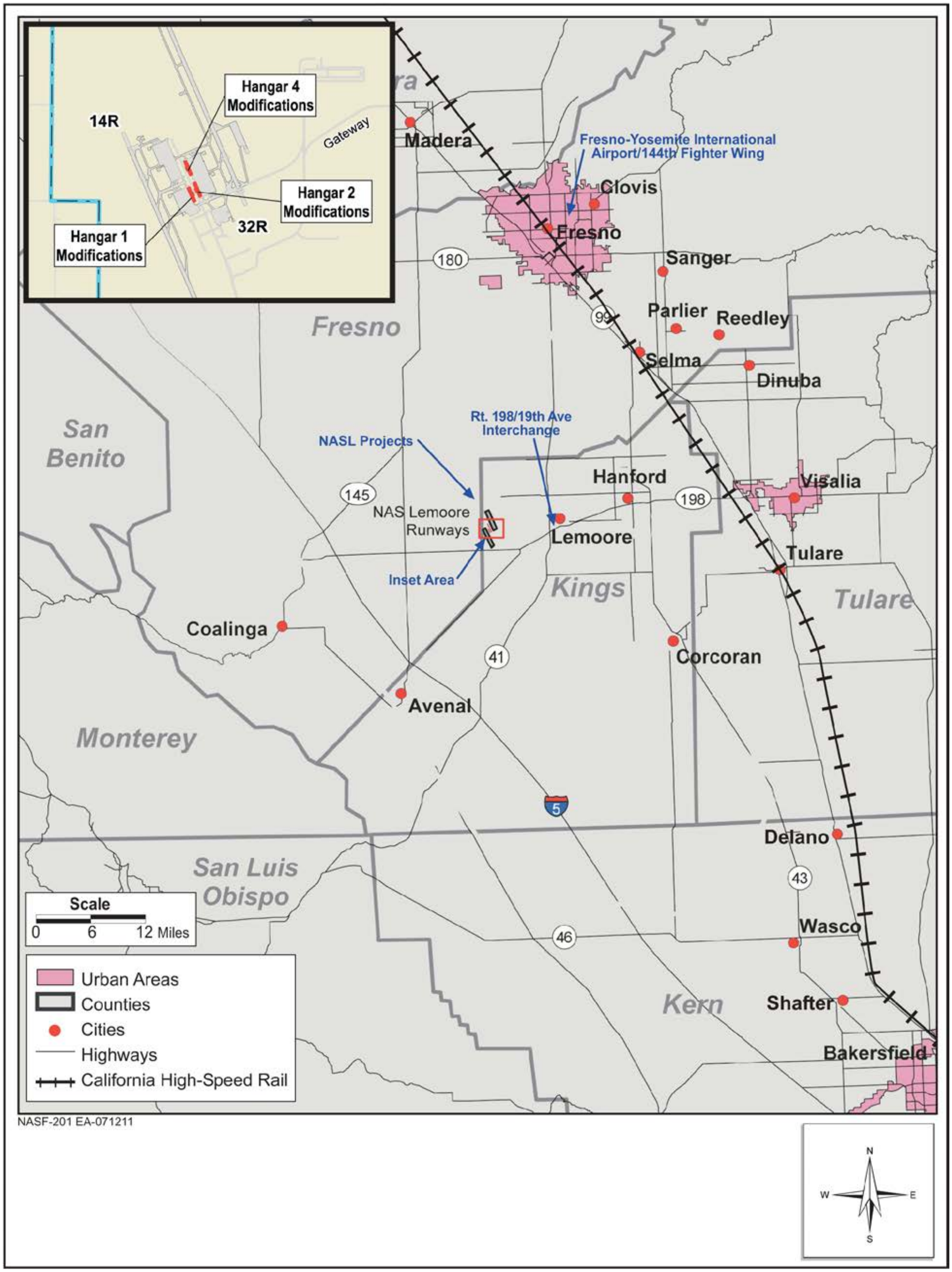


Figure 5.1-1. Cumulative Projects

U.S. Navy F-35C West Coast Homebasing

An EIS is being prepared to identify and evaluate the potential environmental consequences associated with providing facilities and functions to homebase the F-35C JSF aircraft on the West Coast of the U.S. NAS Lemoore is one of the locations being considered for homebasing of the F-35C. On January 28, 2011, the Navy published a Notice of Intent in the Federal Register to prepare this EIS and announced public scoping meetings. The 45-day scoping period for the project began on January 28, 2011 and ended on March 14, 2011. The Draft EIS is currently being prepared. Public and agency comments received during the scoping period are being addressed in the EIS.

A total of seven Fleet FA-18 aircraft squadrons would progressively transition from FA-18 aircraft to the more advanced F-35C JSF beginning in 2015. An F-35C FRS also would be established at the homebase location. This transition is expected to be completed by 2025. The Navy will evaluate two homebasing options (plus a No Action Alternative) to efficiently and economically transition the F-35C aircraft into the fleet. The action would provide facilities and functions to support homebasing of 100 F-35C aircraft (seven squadrons of 10 aircraft each, plus up to 30 aircraft in the FRS) at the selected West Coast homebasing location. By 2025, when the program is complete, if NAS Lemoore were selected for the F-35C JSF, 100 F-35C aircraft would replace all existing FA-18C and some existing FA-18E/F aircraft currently homebased at NAS Lemoore and create a new 30-plane F-35C FRS at NAS Lemoore. This F-35C FRS would be in addition to the existing FA-18 FRS currently operating at NAS Lemoore. The selected homebase installation may require some construction, facility renovations, and utility upgrades in order to accommodate the new aircraft. Facility construction and modification would occur prior to and continue throughout arrival of F-35C aircraft. The F-35C would operate within existing airspace and within existing training ranges.

To maximize efficiency of support facilities, simulation devices, and on-site support personnel, the Navy intends to base all its West Coast F-35C aircraft at one location. Accordingly, initial action alternatives to be considered are basing seven F-35C fleet squadrons and one F-35C FRS at either NAS Lemoore or Naval Air Facility El Centro. The proposed F-35C West Coast Homebasing is independent of and separate from this current Strike Fighter Realignment EA. The F-35C EIS is in the early data collection phase, and will not be complete before the Strike Fighter Realignment EA Proposed Action would be well underway. Specific requirements associated with quantity and quality of flight operations, manpower, equipment, and facilities are still in development for the F-35C proposal and data is not available in time to support detailed analysis of cumulative impacts in this EA.

The proposed F-35C action has potential to interact with impacts from the Proposed Action for a variety of reasons: (1) it would result in a different composition of aircraft at NAS Lemoore that use different engines with different noise signatures and air emissions; (2) it may result in changes to the population of NAS Lemoore; and (3) it would add an F-35C FRS that would increase aircraft operations beyond those identified in the Proposed Action of this EA. Homebasing of the F-35C at NAS Lemoore is in the early planning stages and project details have yet to be developed. Basing of the F-35C aircraft would occur after implementation of the Proposed Action, and the 2015 end state aircraft operations analyzed in Chapter 4 of this EA would serve as the baseline for the F-35C EIS. The F-35C Homebasing EIS will include an in-depth analysis of potential cumulative impacts.

Establishment of Search and Rescue Mission at NAS Lemoore

The Navy is proposing to homebase two MH-60 helicopters to perform SAR Operations from NAS Lemoore. This proposal would provide better response times for SAR operations in the vicinity of NAS Lemoore in support of its current Strike Fighter assets. This project would involve the construction of a 6,000 ft^2 (557.4 m^2) addition at the northern end of an existing hangar (Building 180) and would include space for helicopter hangar maintenance and administrative services, including the addition of two MH-60 helicopters at NAS Lemoore. There is currently a shortfall of hangar space. This situation is exacerbated by the proposed relocation of two additional east coast FA-18E/F squadrons to NAS Lemoore (part of the Proposed Action in this EA for NAS Lemoore Strike Fighter Realignment). If additional hangar space is not constructed, the 42 person contract maintenance unit scheduled to arrive at NAS Lemoore in FY 13 would have no facilities to maintain and repair SAR helicopter assets. Structural features for the addition would include a concrete slab, spread footings on engineered compacted fill material, structural concrete wall and steel frame with insulated metal siding, and a steel truss system supporting a membrane roof system supported on metal roof decking with rigid insulation. Interior features include fire alarm/suppression system, state-of-the-art energy efficient lighting, epoxy floor finishes, telecommunications, 400 hertz power, compressed air, and connections to industrial wastewater collection system. The addition would match the exterior elevations of the existing hangar.

The proposed SAR Mission action has the potential to interact with impacts from the Proposed Action because it would add two rotary wing aircraft at NAS Lemoore that use different engines with different noise signatures and air emissions and it may result in changes to the population of NAS Lemoore.

California Air National Guard F-15 Aircraft Basing at Fresno-Yosemite International Airport

The National Guard Bureau is conducting preliminary environmental analysis in order to prepare an EIS to evaluate the potential environmental consequences for basing 18 to 24 F-15C fighter aircraft for the 144th Fighter Wing at the Fresno-Yosemite International Airport. The purpose of this action is to recapitalize the 144th Fighter Wing's existing F-16C aircraft in Calendar Year 2012 to maintain an Air Sovereignty Alert mission and capability at the 144th Fighter Wing. The 144th Fighter Wing's current squadrons of F-16 fighter aircraft are scheduled to transfer to the 162d Fighter Wing in Tucson, Arizona when the 162d Fighter Wing's F-16s are retired from the Air Force inventory in 2012. The Air Force has designated the F-15C as the primary aircraft for Homeland Defense and it is currently programmed through FY 25. Since this action is still evolving, the Air National Guard is still developing specific requirements associated with the quantity and quality of the flight operations, manpower, and facilities. Therefore, data is not available at this time to support detailed analysis of cumulative impacts in relation to the Navy's Proposed Action.

The proposed F-15 basing action has potential to interact with impacts from the Proposed Action due to potential changes to regional airspace usage and air quality.

Proposed Construction and Master Plan Projects at NAS Lemoore

There are numerous other known projects proposed at NAS Lemoore that might interact directly or indirectly with the Proposed Action because of geographic proximity to the Proposed Action. These projects consist of military construction projects or other ongoing projects identified in the Master Plan. These include the following:

Aircraft Ready Jet Fuel Storage and Distribution System

Construction of an above ground jet fuel storage and distribution system at NAS Lemoore would increase jet fuel inventory by 32% to 4.4 million gal, providing NAS Lemoore with a fuel storage and distribution system that would support existing tactical air forces and potential future requirements. Construction would eliminate environmental concerns that are typically associated with underground storage tank systems and would provide the installation reliable fuel distribution for the future. All supply and return JP-5 fuel pipeline (33,380 linear feet [10,174 m]) would be replaced. Existing pipeline would be abandoned in-place in compliance with federal, state, and county regulations. All underground structures would be properly removed. Replacement tanks would use a concrete pit configuration. Construction would include replacement of six existing fuel farms, 2,500-13,500 barrel (105,000-567,000 gal) underground storage tanks (105, 106, 110, 111, 112, and 113), with three new 30,000 barrel (1,260,000 gal) vertical, above-ground storage tanks, and replacement of the five existing 2,500 barrel (105,000 gal) operating day tanks (215, 245, 275, 305, and 335) with new horizontal vaulted storage tank(s) in concrete pit. Each concrete pit would comprise one or more day tank(s) with a capacity of 3,000 barrels (126,000 gal). This project also would include replacement fuel distribution pipeline (transfer lines), valves, filter/separators, cathodic protection, grounding, leak detection, and other miscellaneous items associated to the fuel distribution system.

Recreational Facilities, Golf Course

This project would involve construction of a new 18-hole championship golf course to include a club house, starter hut, golf cart storage, and maintenance buildings.

Religious Education Facility

This project would provide a new 16,146 ft^2 (1,500 m^2) religious education facility.

Bachelor Enlisted Quarters

Each project would include construction of a 59,675 ft^2 (5,545 m^2) two-story apartment Bachelor Enlisted Quarters to meet Chief of Naval Operations 1+1 module criteria. This project would provide billeting for 118 enlisted personnel per project for a total of approximately 708 billets if all Quarters were constructed.

Missile Support Facility

This project would involve construction of a missile maintenance/assembly facility, approximately 19,117 ft^2 (1,776 m^2). Building 472 (approximately 8,784 ft^2 [816 m^2]) would be demolished.

Additional Potential Projects

Other potential projects at NAS Lemoore are immature and are too speculative for analysis at this time and descriptions for these potential projects are not yet available. However, a list of other potential projects is included below:

- Operations Access Road;
- Bachelor Housing;
- Consolidate Base Operation Functions;
- Retractable Lap Pool Enclosure;
- Commuter Bikeway;
- New Potable Water Well;
- Water Wells;

- Fire Department Training Facility;
- Purple Pipe Irrigation System;
- Waste Water Treatment Plants;
- Expand Security Building;
- Communication Infrastructure;
- Solar Thermal and photovoltaic Carports;
- Photovoltaic Carports at Enterprise;
- Solar Thermal Hot Water for Bachelor Officers' Quarters;
- Aviation Survival Training Center Replacement;
- Energy Renovation Repair; and
- Thermal Solar and Photovoltaic System.

All of these proposed Construction and Master Plan projects have somewhat limited potential to substantially interact with impacts from the Proposed Action because the impacts of the Proposed Action result from primarily from noise and air emissions changes associated with newer aircraft engines or with changes in population at NAS Lemoore. None of the Construction and Master Plan projects would have such impacts. Several of the Construction and Master Plan projects have potential to interact with impacts of Proposed Action in a positive manner by providing additional base support infrastructure and by implementing sustainable design features, such as solar thermal technologies. Most of the potential projects, however, are too speculative for detailed analysis in this EA.

5.2.2 Non-Federal Actions

The following projects are in the vicinity of NAS Lemoore but are not related to military actions. Representatives of Fresno County and Kings County were contacted to determine what development is occurring or is proposed in the vicinity of NAS Lemoore. Few projects are planned near NAS Lemoore boundaries due to the three exclusive agriculture land buffers that surround the base. This designated agricultural land was established by Kings County in 1963 to limit urban development to prevent issues with aircraft noise and population build-up adjacent to NAS Lemoore. This land designation was last updated in 1993 and has been carried forward in the 2035 Kings County General Plan.

California High-Speed-Rail Line

The California High-Speed-Rail Authority is proposing high-speed train route that would eventually connect the San Francisco Bay Area to Los Angeles, with numerous stations in between. The train would travel up to 220 mi per hour and allow travel between the two cities in under three hours. This project is made up of several different sections, each receiving separate environmental analysis. The 113-mi (182 km) Fresno to Bakersfield section would pass through the Central Valley and the town of Hanford, approximately 15 mi (24 km) east of the project area of NAS Lemoore. This section of the rail line is anticipated to serve approximately 4,500 riders boarding daily in Fresno and 5,100 in Bakersfield. This section of the project is currently at the Draft EIS stage (planned Draft EIS release is Summer 2011) with the Final EIS anticipated to be completed at the end of 2011.

The proposed Fresno-Bakersfield high-speed rail action has potential to interact with impacts from the Proposed Action because the rail may reduce certain air emissions in the region.

<u>State Route 198/19th Avenue Interchange</u>

SR 198 is a major travel corridor and the main commuter route providing access to NAS Lemoore. A construction project is proposed to create an interchange where SR 198 and 19th Avenue meet in the City of Lemoore, approximately 4.5 mi (7.2 km) east of NAS Lemoore. It is anticipated that this interchange would spur industrial development in the City and facilitate the closure of two uncontrolled crossings of SR 198 that have high accident rates. Planning for this project has been completed and construction is slated to begin in 2011.

The proposed SR 198 interchange action has potential to interact with impacts from the Proposed Action because the interchange may affect how the Navy population accesses NAS Lemoore.

<u>Avenal Power Plant Project</u>

The Avenal power plant is a 600-megawatt, natural gas-fired power plant that would provide electricity for up to 450,000 homes in the San Joaquin Valley. This power plant would be located in the northeast corner of the City of Avenal, approximately 24 mi (39 km) southwest of NAS Lemoore. The California Energy Commission approved this project in December 2009 and the USEPA recently approved the license in May 2011. Construction is slated to begin in 2011 and the plant is expected to be fully operational in 2013.

5.3 Potential Cumulative Impacts

The following analysis examines the impact on the environment that would result from the incremental impact of the Proposed Action in addition to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. This analysis assesses the potential for an overlap of impacts with respect to project schedules and/or affected areas. Specific information on all of the projects listed in Section 5.2 is not available, so the cumulative impacts of these actions cannot yet be quantified. Therefore, this section presents a qualitative analysis of the cumulative impacts, based on significant activities anticipated for each project (e.g., ground-disturbing activities). A quantitative analysis of the cumulative impacts between the Navy F-35C West Coast homebasing, scheduled to begin in 2015, and the Strike Fighter Realignment proposed in this EA, will be evaluated in detail in the F-35C West Coast Homebasing EIS.

Five resource areas (vegetation, wetlands, topography and soils, archaeological resources, and visual resources) have been eliminated from consideration in this EA because any ground-disturbing activities under the Proposed Action would be limited to existing facilities and/or associated paved areas; therefore, no disturbance to any of these resources is anticipated, and the cumulative impacts of these resources is not considered in this section.

To determine the significance of each of the cumulative impacts of the Proposed Action and other actions, significance was determined according to Section 1508.27 of the Environmental Quality Improvement Act of 1970, as amended [43 CFR 56003, Nov. 29, 1978]. The primary factors considered for each resource area in determining significance as used in NEPA requires considerations of both context and intensity.

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
2) The degree to which the proposed action affects public health or safety.
3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.
5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP or may cause loss or destruction of significant scientific, cultural, or historical resources.
9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA of 1973.
10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Based on the assessment of ongoing and reasonably foreseeable actions at NAS Lemoore, the Proposed Action would result in some less than significant cumulative impacts as a result of the various construction projects that would not be considered significant, as described below.

5.3.1 Airfields and Airspace

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact airfields and airspace include those projects that would add aircraft to NAS Lemoore or to the Fresno-Yosemite airport. A summary of relevant impacts of each action is described below.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action and is included in the baseline for this EA and therefore is part of the existing detailed analysis. The addition of the 10-plane FA-18E squadron did not require any changes to the airfield or airspace.

U.S. Navy F-35C West Coast Homebasing

Homebasing of the F-35C at NAS Lemoore is in the early planning stages and aircraft operations details have yet to be developed. Basing of the F-35C aircraft would occur after implementation of the Proposed Action, and the 2015 end state aircraft operations analyzed in Chapter 4 of this EA would serve as the baseline for the F-35C EIS. Preliminary indications are that F-35C airfield flight profiles would be similar enough to FA-18 profiles that no major changes to airfield airspace or operations would be required and F-35 C would follow similar procedures as other aircraft currently using the airfield. Additionally, the F-35C is projected to use the same training ranges as FA-18C/D and FA-18E/F aircraft.

If NAS Lemoore were selected as the F-35C homebase, 100 F-35C aircraft would replace all of the remaining FA-18C and a portion of the FA-18E/F aircraft between 2015 and 2025, resulting in a mixture of FA-18 E/F squadrons and F-35C squadrons in 2025. It is expected that the level of aircraft operations at the NAS Lemoore airfield would be similar to the current (2011) baseline level of operations evaluated in this EA. The F-35C Homebasing EIS will include an in-depth analysis of the potential impacts on airfields and airspace.

Establishment of Search and Rescue Mission at NAS Lemoore

The addition of two MH-60 helicopters to provide a SAR Mission at NAS Lemoore would not substantially add to the number of aircraft operations or require any modification to the current airfield airspace structure or operational procedures at NAS Lemoore. The pilots would perform basic flight proficiency training in the vicinity of NAS Lemoore and contribute to regional emergency SAR operations.

California Air National Guard F-15 Aircraft Basing at Fresno-Yosemite Airport

The potential basing of 18 to 24 F-15C fighter aircraft for the 144th Fighter Wing at the Fresno-Yosemite International Airport may occur in 2012. This action generally would replace F-16 aircraft that would be transferred from Fresno, California to Tucson, Arizona. There would be no change to local or regional airspace required.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The Proposed Action and the planned FRS reduction, which would occur during the same timeframe as the Proposed Action, would result in a 24% reduction of aircraft operations at NAS Lemoore in 2015 compared to the current 2011 baseline. In large part, the decrease in operations is a result of the reduction of the existing FA-18 FRS to eliminate all FA-18C/D aircraft from the FRS which will occur in 2012-2013 timeframe. The Proposed Action would not require any modification to the current airfield airspace or operational procedures, or any changes to the departure and arrival route structures. Nor would there be any impact to local civil and commercial airspace since the FA-18E/F would continue to operate within the same flight parameters currently used for NAS Lemoore airfield airspace.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Considering the timeline of the implementation of the potential F-35C homebasing (2015-2025), it is expected that the total number of aircraft operations at NAS Lemoore by 2025 would be higher than the number of operations occurring in the 2015 end state of the Proposed Action but similar to the number of operations occurring in the 2011 baseline. The difference in the number of operations in 2025 is attributable to the addition of a new F-35C FRS as part of the potential F-35C homebasing action. Likewise, the potential Air National Guard basing of F-15C at the Fresno-Yosemite Airport would replace a similar current mission based at the airport and would require no change to local or regional airspace. None of these actions, either individually or in combination, would require significant changes to airfield operations or airspace. Therefore, based upon available information, it is expected that implementation of the Proposed Action would result in less than significant impacts to airfields and airspace, although the F-35C EIS will provide more detailed analysis.

5.3.2 Noise

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact noise include those projects that would change aircraft operations at NAS Lemoore or require on-base construction. The three non-federal actions would occur at a distance from NAS Lemoore such that they would not overlap with the current or future noise contour zones. A summary of relevant impacts of each action is described below.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action and is included in the baseline for this EA and therefore is part of the existing detailed analysis. Airfield operations of the 10-plane FA-18E squadron contribute to the baseline noise contours presented in Chapter 3 of this EA.

U.S. Navy F-35C West Coast Homebasing

This action is in the early planning stages and the noise contours have yet to be developed. The basing of F-35C aircraft would occur after implementation of the Proposed Action, and the Proposed Action noise contours (2015) would serve as the baseline for the Navy F-35C West Coast Homebasing EIS. Noise measurements show that F-35A (i.e., the U.S. Air Force version of the F-35 for which most testing has occurred already) noise levels are generally similar to those of the FA-18C (there is no available noise modeling for the F-35C). However, updating the noise contours for transition from FA-18 aircraft to F-35C aircraft at NAS Lemoore will occur in the F-35C West Coast Homebasing EIS, and it is likely that the noise contours will change to some extent. As previously discussed, if NAS Lemoore were selected as the F-35C homebase, 100 F-35C aircraft would replace all of the remaining FA-18C and a portion of the FA-18E/F aircraft between 2015 and 2025, resulting in a mixture of FA-18E/F squadrons and F-35C squadrons in 2025. The current FA-18 FRS (44 aircraft in 2015) would remain and a new F-35C FRS (30 aircraft) would be established at NAS Lemoore between 2015 and 2025. As a result, it is expected that the level of aircraft operations at the NAS Lemoore airfield would be higher than 2015 levels but similar to the current (2011) baseline level of operations evaluated in detail in this EA. However, a quantitative analysis of the noise impacts of the proposed Navy F-35C West Coast homebasing, as well as comprehensive cumulative noise impacts, will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

Establishment of Search and Rescue Mission at NAS Lemoore

Proposed SAR operations at NAS Lemoore would include the addition of two MH-60 helicopters. Noise from the MH-60 helicopters would be dominated by noise from jet operations and would not affect the NAS Lemoore noise contours. Additionally, the two helicopters would be used for basic pilot proficiency training and during SAR operations so the noise generated by their operations would be minimal compared to noise from the 15 squadrons of FA-18 aircraft currently based at NAS Lemoore.

Proposed Construction and Master Plan Projects at NAS Lemoore

The numerous Navy construction projects planned within the reasonably foreseeable future are discussed as a single group because there is a common potential for their construction noise to interact with noise impacts associated with the Proposed Action. Construction of each of the Master Plan projects would result in short-term, localized increases in noise levels. The noise impacts from this construction would be minor as construction would generally occur during daylight hours, and occur in a location already dominated by loud noises (i.e., the flight line for SAR hangar space and jet fuel storage/distribution system) or in an area generally away from residences or sensitive noise receptors. The BEQ construction would occur in an area with other military quarters, which would cause minor short-term impacts. In each case, there would be no long-term increases to noise levels from construction or operation of the various facilities. These impacts would not extend to residential areas on or off-base.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The end state (2015) analyzed in this EA would result in a 24% reduction of aircraft operations at NAS Lemoore in 2015 compared to the 2011 baseline. In large part, the decrease in operations is a result of the planned reduction of the existing FA-18 FRS to eliminate all FA-18C/D aircraft from the FRS in 2012-2013 timeframe (an action separate from the Proposed Action). However, the newer FA-18E/F aircraft generate slightly larger noise contours than the existing FA-18C aircraft they are replacing. Therefore, the noise contours in 2015 would remain approximately the same as current 2011 baseline conditions, despite the reduction by approximately 50,000 annual flight operations previously flown by the eliminated FA-18C/D FRS. Overall, the Proposed Action would result in approximately 1,445 fewer ac (585 ha) being impacted by noise levels greater than 65 dB CNEL. However, due to the revised noise contours, approximately 10 more people would be affected by noise levels greater than 65 dB CNEL. The PHL impacts (areas over 80 dB) would remain the same or be slightly reduced compared to baseline conditions.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

When taken together, the past, present, and reasonably foreseeable future actions are expected to result in a less than significant increase in noise levels in the vicinity of NAS Lemoore. When examined for both the context and the intensity as described in Section 5.3, no cumulatively significant impacts to noise are anticipated.

Considering the timeline of the implementation of the potential F-35C homebasing (2015-2025), it is expected that the total number of aircraft operations at NAS Lemoore by 2025 would be similar to the number of operations occurring in the 2011 baseline, but higher than the number of operations occurring in the 2015 end state of the Proposed Action. The difference in the number of operations is attributable to the addition of a new F-35C FRS as part of the potential F-35C homebasing action. It is expected that the 2025 noise contours will differ from the Proposed Action (2015) contours at NAS Lemoore primarily because the 2015 noise contours include only the operations of a single FRS (44 FA-18E/F), and the 2025 contours will include additional operations associated with the new F-35 FRS. Detailed noise modeling to be included in the Navy F-35C West Coast Homebasing EIS will present projected changes in noise contours compared to the 2015 contours. The F-35C generally operates in the same manner as the FA-18 in and around the airfield, and noise measurements have shown that F-35A (i.e., the U.S. Air Force version of the F-35 for which most testing has occurred already) noise levels are similar to FA-18C aircraft. Lands surrounding NAS Lemoore are predominantly agricultural, thus changes to noise contours off-base are less likely to affect large populations than areas of more intense development.

When taken together, the other federal and non-federal past, present, and reasonably foreseeable actions would not result in significant cumulative noise impacts because the non-federal actions would occur at a distance from NAS Lemoore such as they would be unlikely to overlap with federal actions at NAS Lemoore. It is expected that the F-35C would operate in the same manner as the FA-18s it would replace, although there is no available noise modeling for the F-35C (F-35A noise modeling indicates that the noise level is similar to FA-18s). Therefore, based upon available information it is expected that implementation of the Proposed Action would result in less than significant noise impacts, although the F-35C West Coast Homebasing EIS will provide more detailed noise analysis, including cumulative noise impacts.

5.3.3 Air Quality

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact air quality primarily include projects that would add aircraft to NAS Lemoore or change the number of aircraft operations. Actions that require new construction would also contribute incrementally to air quality impacts.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action and is included in the baseline for this EA and therefore is part of the existing detailed analysis. Airfield operations of the 10-plane FA-18E squadron contribute to the baseline aircraft emissions presented in Chapter 3 of this EA.

U.S. Navy F-35C West Coast Homebasing

Homebasing of the F-35C at NAS Lemoore is in the early planning stages and aircraft operations and associated air emission details have yet to be developed. Homebasing of the F-35C aircraft would occur after implementation of the Proposed Action and the 2015 end state aircraft operations analyzed in Chapter 4 of this EA would serve as the baseline for the F-35C EIS. Because the F-35C would be a new aircraft at NAS Lemoore, detailed calculations of air emissions will be required once the projected type and volume of operations are known. The F-35C uses a different engine at different power settings than existing FA-18 aircraft, so there is potential for certain air emissions to change (increase or decrease) as a result of transitioning the F-35C into squadrons based at NAS Lemoore. Furthermore, the addition of the F-35C FRS would result in increased levels of aircraft operations compared to 2015 levels (although similar to 2011 levels), which may also result in increased air emissions. Construction, personnel commuting to NAS Lemoore, and ground support activities would also contribute to air emissions. The pending U.S. Navy F-35C West Coast Homebasing EIS will analyze in detail potential impacts on air quality associated with F-35C operations at NAS Lemoore.

Establishment of Search and Rescue Mission at NAS Lemoore

The addition of two MH-60 helicopters at NAS Lemoore for SAR operations would have minor impacts on air quality. Aircraft operations would include basic proficiency training and SAR operations as required within the region. Minor construction would be required for the maintenance hangar and would contribute to air emissions of the project.

Proposed Construction and Master Plan Projects at NAS Lemoore

Most of the Navy construction projects planned within the reasonably foreseeable future are likely to contribute to air emissions from construction activities. No new stationary sources of emissions are anticipated. The amount of construction related emissions depends on the amount of ground disturbance, duration of construction activities, types of vehicles performing the work, and other factors. Design has not been completed to date for all potential construction and Master Plan projects thus emissions cannot be quantified at this time.

California High-Speed Rail Line

The California High-Speed Rail Line project would connect San Francisco and Los Angeles with multiple stops in between, including Fresno and Bakersfield. There would be short-term impacts from construction activities and long-term emissions from train operations. This project is expected to reduce automobile traffic on regional highways, particularly on Interstate 5, and could result in the reduction of certain criteria pollutant emissions in the region. Detailed analysis of potential impacts on air quality will be included in the pending California High-Speed Rail EIS. This section of the project is currently at the Draft EIS stage (planned Draft EIS release is summer 2011) with the Final EIS anticipated to be completed at the end of 2011.

State Route 198/19th Avenue Interchange

Construction of the SR 198/19th Avenue interchange project would contribute to air emissions from construction activities. It is expected that these emissions would be relatively minor.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The Proposed Action generally would result in decreased air emissions at NAS Lemoore. In the end state year of 2015, projected airfield operations show a reduction in all criteria pollutant emissions, except CO. Although the Proposed Action would result in an overall increase in CO emissions, the local area meets CO attainment criteria by wide margins. The increase in CO emissions would not be enough to alter the attainment status, and therefore the increase would not be considered significant. The Conformity Applicability Analysis for the Proposed Action indicates that emission from the Proposed Action would not exceed *de minimis* thresholds, and that criteria pollutant emissions associated with the Proposed Action would be exempt from the General Conformity Rule requirements for conformity, and no further evaluation of conformity is required.

Greenhouse Gases

GHGs are not analyzed in detail in Chapter 4 of this EA. The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, an appreciable impact on global climate change would only occur when proposed GHG emissions combine with GHG emissions from other man-made activities on a global scale.

Currently, there are no formally adopted or published NEPA thresholds of significance for GHG emissions stemming from proposed actions. Formulating such thresholds is problematic, as it is difficult to determine what level of proposed emissions would substantially contribute to global climate change. Therefore, in the absence of an adopted or science-based NEPA significance threshold for GHGs, this EIS compares GHG emissions that would occur due to implementation of the Proposed Action to the permitting threshold identified in the Greenhouse Gas Mandatory Reporting Rule (40 CFR Part 98)

Table 5.1-1 compares the annual GHG emissions for NAS Lemoore for 2015, after the proposed realignment is completed, with the baseline GHG emissions. The result is a net decrease in emissions, estimated as a nearly 30,000 metric tpy reduction.

Table 5.1-1. Comparison of Baseline and Proposed Action GHG Emissions at NAS Lemoore in Metric tpy

	CO_{2e}
NAS Lemoore Baseline GHGs	242,489
2015 with Proposed Action Implemented	212,498
Net Change	**-29,991**

Note: Calculated values listed in this table are from Tables A-2 in Appendix C.

Table 5.1-2 compares the annual GHG emissions for NAS Lemoore for 2015 for the No Action Alternative. The result is a net decrease in emissions, estimated as a more than 49,000 metric tpy reduction.

Table 5.1-2. Comparison of Baseline and No Action Alternative GHG Emissions at NAS Lemoore in Metric tpy

	CO_{2e}
NAS Lemoore Baseline GHGs	242,489
No Action Alternative	192,676
Net Change	**-49,812**

Note: Calculated values listed in this table are from Tables A-2 in Appendix C.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

As stated above, the air quality impacts associated with Homebasing of the F-35C at NAS Lemoore cannot be quantified at this time, as the specific number of F-35C aircraft operations has not yet been determined. However, it is expected that the total number of aircraft operations at NAS Lemoore by 2025 would be higher than the number of operations occurring in the 2015 end state of the Proposed Action but similar to the number of operations occurring in the 2011 baseline. Mobile air emissions, particularly emissions from aircraft operations, would dominate the air emissions associated with the F-35C homebasing action. Based upon available information it is expected that implementation of the Proposed Action would result in less than significant air quality impacts, although the F-35C West Coast Homebasing EIS will provide more detailed air quality analysis, including cumulative air quality impacts.

The addition of two MH-60 helicopters would also contribute to cumulative aircraft emissions. A quantitative analysis of the cumulative air quality impacts of the Navy F-35C West Coast homebasing and other activities will be evaluated in detail in the pending F-35C West Coast Homebasing EIS. Off-base projects, i.e., the high-speed rail line and SR 98/19th Avenue interchange, would contribute temporary construction air emissions and long-term air quality impacts from train operations and automobile traffic, respectively. Detailed analysis of potential impacts on regional air quality will be included in the pending California High-Speed Rail EIS. This section of the project is currently at the Draft EIS stage (planned Draft EIS release is summer 2011) with the Final EIS anticipated to be completed at the end of 2011.

When taken together, the past, present, and reasonably foreseeable future actions (with the exception of F-35C homebasing) are expected to result in less than significant cumulative impacts on air quality.

5.3.4 Safety

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact safety include those projects proposing changes to flight operations, addition of two MH-60 SAR helicopters, and SR 198/19th Avenue Interchange construction.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action and is included in the baseline for this EA and therefore is part of the existing detailed analysis. Airfield operations of the 10-plane FA-18E squadron contribute to the baseline safety conditions presented in Chapter 3 of this EA.

U.S. Navy F-35C West Coast Homebasing

Potential homebasing of the F-35C at NAS Lemoore is in the early planning stages and will be analyzed in detail in the pending EIS. It is anticipated that flight operations involving the F-35C would follow the same procedures as those involving other aircraft currently using the NAS Lemoore airfield and associated airspace. The addition of the F-35C to NAS Lemoore would not require changes to the airfield's safety plans, such as accident potential zones, clear zones, or BASH plan.

Establishment of Search and Rescue Mission at NAS Lemoore

The enhanced SAR operations at NAS Lemoore would include the addition of two MH-60 helicopters. These helicopters would be used to enhance SAR capabilities at NAS Lemoore and would participate in SAR operations throughout the region, as appropriate, which would result in beneficial impacts to the community.

State Route 198/19th Avenue Interchange

The proposed interchange in the City of Lemoore would result in the closure of two uncontrolled crossing that have high accident rates. While this project is located several miles from NAS Lemoore, this project would result in beneficial impacts to NAS Lemoore personnel and locals that travel through this area.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

Largely due to the overall decrease in FA-18 FRS operations, aircraft operations at NAS Lemoore would decrease by 24% in the 2015 end state. Aircraft operations would follow the same procedures as those involving other aircraft currently using the NAS Lemoore airfield and associated airspace and would require no changes to current airfield safety plans, such as accident potential zones, clear zones, or BASH plan.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

When all past, present, and reasonably foreseeable future actions are combined, safety would generally improve at NAS Lemoore and in the surrounding communities. When examined for both the context and intensity of these actions as described in Section 5.3, no cumulatively significant impacts to safety are anticipated. The Proposed Action would reduce the total number of aircraft operations by 2015 compared to the 2011 baseline. However, the potential F-35C homebasing at NAS Lemoore between 2015 and 2025 would likely increase the number of aircraft operations to levels more similar to current 2011 levels as a result of adding a new F-35C FRS at NAS Lemoore. Safety concerns associated with F-35C operations are expected to be generally similar to those of current FA-18 operations. The pending U.S. Navy F-35C West Coast Homebasing EIS will analyze in detail potential safety impacts associated with F-35C operations at NAS Lemoore, including cumulative impacts.

5.3.5 Land Use

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact land use include projects that would add aircraft to NAS Lemoore and those that may require new construction. Projects that would add aircraft include the VFA-86 relocation, the F-35C homebasing, and the addition of two MH-60 helicopters associated with the SAR mission. Projects with the potential for ground disturbance include, but are not limited to, the SAR Maintenance Hangar and several base construction projects. The off-base construction projects would not interact with on-base land use, but may impact off-base land use in the region.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action included in the baseline for this EA and therefore is part of the existing detailed analysis. Airfield operations of the 10-plane FA-18E squadron contribute to the baseline noise-related impacts on land use presented in Chapter 3 of this EA.

U.S. Navy F-35C West Coast Homebasing

As previously discussed for cumulative noise impacts, it is expected that the overall noise contours in 2025 would be expected to be generally similar to 2011 baseline noise contours. However, the 2025 contours would differ from the Proposed Action (2015) contours at NAS Lemoore primarily because the 2015 noise contours include only the operations of a single FRS (44 FA-18E/F) and the 2025 contours would include additional operations associated with the new F-35 FRS. As such, it is expected that some off-base land use categories could be exposed to higher levels of noise than projected in the 2015 contours and there could be changes affecting various sensitive noise receptors. The land uses surrounding NAS Lemoore are predominantly agricultural, thus changes to noise contours off-base are less likely to affect large populations than areas of more intense development. The pending U.S. Navy F-35C West Coast Homebasing EIS will analyze in detail potential noise impacts on on- and off-base land use associated with F-35C operations at NAS Lemoore.

Establishment of Search and Rescue Mission at NAS Lemoore

The addition of two MH-60 helicopters at NAS Lemoore for SAR operations would have minimal noise impacts on land use, as noise from helicopter basic pilot proficiency training and during SAR operations would be minimal compared to the noise from the 15 squadrons of FA-18 aircraft currently based there. Noise contours are not expected to change noticeably, thus noise impacts on land use are not expected to change. The construction of the new hangar for these two helicopters would occur along the flight line and would be consistent with current Navy land use planning and would require no land use changes.

Proposed Construction and Master Plan Projects at NAS Lemoore

The numerous Navy construction projects planned within the reasonably foreseeable future are discussed as a single group because there is a common potential for the siting of the projects to interact with the land uses associated with the Proposed Action. NAS Lemoore maintains a Master Plan of necessary development projects for the successful support of the base mission. The base conducts planning activities to prevent incompatible land uses and maximize the preservation of sensitive habitats on base. It is anticipated that all of the anticipated Master Plan projects would be planned according to sound planning principles which separate incompatible land uses and minimize on-base land use conflicts.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The Proposed Action would result in minor impacts on land use surrounding NAS Lemoore as a result of changes in noise contours. Generally there would be slightly less off-base noise impacts on land use, as the higher noise contours are concentrated more within the boundaries of NAS Lemoore. The Proposed Action, in combination with the FA-18 FRS reduction and the VFA-86 relocation, would result in an overall increase in the on-base areas affected by noise greater than or equal to 65 dB CNEL by 8 ac (less than 1%). Off-base areas would experience a decrease of 1,468 ac (594 ha) (2.5%) of lands exposed to noise levels of 65 dB CNEL or greater. The modifications to Hangars 1, 2, and 4 would occur in previously disturbed areas and would therefore not impact on-base land use.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

All of the Master Plan projects at NAS Lemoore would occur in accordance with existing land use plans and are not likely to conflict with current on-base land uses. Any impacts from these projects would be localized and would not extend off NAS Lemoore. Known potential off-base development projects are far enough away as to not interact with NAS Lemoore land use. The potential homebasing of F-35C at NAS Lemoore is the primary action that may affect cumulative impacts on land use. It is expected that the total number of aircraft operations at NAS Lemoore by 2025 would be higher than the number of operations occurring in the 2015 end state of the Proposed Action but similar to the number of operations occurring in the 2011 baseline. Additionally, the F-35C generally operates in the same manner as the FA-18 in and around the airfield, and noise measurements have shown that F-35A noise levels are similar to FA-18C aircraft. In addition, the land uses surrounding NAS Lemoore are predominantly agricultural, thus changes to noise contours off-base are less likely to affect large populations than areas of more intense development. As such, no significant cumulative impacts on land use are expected. The pending U.S. Navy F-35C West Coast Homebasing EIS will analyze in detail potential noise impacts on on- and off-base land use associated with F-35C operations at NAS Lemoore, including potential cumulative impacts.

When taken together, the other federal and non-federal past, present, and reasonably foreseeable actions (with the exception of F-35C homebasing) would not result in significant cumulative land use impacts because the non-federal actions would occur at a distance from NAS Lemoore such as they would be unlikely to overlap with federal actions at NAS Lemoore. It is expected that the F-35C would operate in the same manner as the FA-18s it would replace and would likely be of a similar noise level (although there is no available noise modeling for the F-35C, F-35A noise modeling indicates that the noise level is similar to FA-18s). It is also expected that the total number of aircraft operations at NAS Lemoore by 2025 would be higher than the number of operations occurring in the 2015 end state of the Proposed Action but similar to the number of operations occurring in the 2011 baseline. Based upon available information it is expected that implementation of the Proposed Action would result in less than significant land use impacts, although the F-35C West Coast Homebasing EIS will provide more detailed analysis, including cumulative land use impacts.

5.3.6 Infrastructure and Utilities

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact infrastructure and utilities include those that would add personnel to NAS Lemoore, such as VFA-86 relocation and F-35C homebasing. Other projects that may increase the need for additional or upgrades to infrastructure and utilities include the several facilities construction projects, and F-35C homebasing, which would include new facilities as well as new personnel. The Avenal Power Plant action is a non-federal project with the potential to impact infrastructure and utilities at NAS Lemoore and the region.

<u>Relocation of VFA-86 to NAS Lemoore, California</u>

Relocation of VFA-86 to NAS Lemoore is a recent action included in the baseline for this EA and therefore is part of the existing detailed analysis. The VFA-86 relocation included an increase of 218 officers and enlisted personnel and their families which contributed to the demand on infrastructure and utilities presented in Chapter 3 of this EA.

<u>U.S. Navy F-35C West Coast Homebasing</u>

This potential action would transition existing FA-18 squadrons into F-35C squadrons and add a new 30-plane F-35C FRS to NAS Lemoore in the 2015-2025 timeframe. Personnel loading associated with active duty fleet F-35C squadrons would be very similar to requirements of FA-18 squadrons, so it is not expected that there would be substantial changes to overall personnel levels at NAS Lemoore for the active duty squadron transitions. The new F-35C FRS, however, likely would add approximately 300 more military personnel plus contractors compared to the 2015 personnel loading projections. This increase would contribute additional usage of utilities and existing infrastructure. However, considering implementation of the planned infrastructure and site improvement projects listed above, and given sufficient advance planning and preparation to accommodate the influx of personnel, no significant impacts are anticipated. The pending U.S. Navy F-35C West Coast Homebasing EIS will analyze in detail potential impacts on utilities and infrastructure associated with F-35C operations at NAS Lemoore.

<u>Establishment of Search and Rescue Mission at NAS Lemoore</u>

The new hangar space for the two MH-60 SAR helicopters would require connections to the water supply, wastewater, electrical supply, and natural gas. There would also be an increase of 42 personnel associated with the enhanced SAR operations. It is anticipated that the current infrastructure and utilities would be able to meet the additional demands from this project. A more detailed analysis of the utility requirements would be made during the project planning phase.

<u>Proposed Construction and Master Plan Projects at NAS Lemoore</u>

The numerous Navy construction projects planned within the reasonably foreseeable future have potential to interact with utilities and infrastructure usage. All of the projects address infrastructure requirements identified in the Master Plan, either though replacement or new construction. For example, the construction and operation of the jet fuel storage and distribution system would modernize and increase capabilities to more effectively distribute jet fuel. The Missile Support Facility, Aviation Survival Training Center, Fire Department Training Facility, and Communication Infrastructure projects all address tenant mission and base infrastructure needs. The Bachelor Enlisted Quarters construction would provide more modern bachelor living conditions consistent with Navy criteria. The new Religious Education Facility, commuter bikeway, and golf course all address personnel support needs.

Construction of each of the projects would have a short-term, relatively minor impact on utilities usage, and most projects do not involve personnel increases that would result in substantial longer-term increases in utilities usage; thus generally, adverse impacts on utilities usage is not expected.

Water used for either agricultural purposes or municipal and industrial requirements is regulated differently by the Bureau of Reclamation. California Aqueduct surface water is allocated by Westlands Water District under separate contracts for agricultural or municipal and industrial uses and these allocations are not interchangeable. If future municipal and industrial requirements increase, NAS Lemoore contract rates with Westlands Water District would be renegotiated. The new golf course planned at NAS Lemoore would likely result in increased water usage for irrigation; however, other planned projects involving solar and photovoltaic systems generally would reduce certain utilities usage once implemented. Overall, it is anticipated that the existing infrastructure and utilities would be able to support each of these projects, although a more detailed, quantitative analysis may be performed during the project planning and design phases.

<u>Avenal Power Plant</u>

The Avenal power plant is planned to support the growing demand for electricity in the San Joaquin Valley as well as replace the aging transmission lines in the Valley. This project would help ensure that electrical outages are kept to a minimum at NAS Lemoore and would therefore have a beneficial impact to operations at NAS Lemoore and the surrounding community.

<u>Proposed Action (Strike Fighter Realignment at NAS Lemoore)</u>

The Proposed Action would involve modifications to three hangars at NAS Lemoore as well as an increase of 262 military personnel and their families. Since the current infrastructure and utilities at NAS Lemoore are operating below their capacities, it was determined that there would be no significant impacts from the Proposed Action. The change in aircraft and operations under the Proposed Action would not have any impacts on infrastructure and utilities at NAS Lemoore.

<u>Combined Impacts from Past, Present, and Reasonably Foreseeable Actions</u>

Past, present, and reasonably foreseeable projects at NAS Lemoore would add approximately 600 new personnel as well as family members at the base and within the surrounding community. It is likely that these additional personnel and their families would reside in both on-base housing and off base in nearby communities. Although these personnel may result in greater demand for utilities, it is anticipated that this increase can be accommodated by existing utilities both on and off base. As such, cumulative impacts to infrastructure and utilities would be less than significant. During the individual, site specific review of each project, utilities would be examined to ensure that the capabilities of the existing infrastructure would be able to support the projects. Therefore, when examined for both the context and intensity of these actions as described in Section 5.3, no cumulatively significant impacts to infrastructure and utilities are anticipated.

5.3.7 Socioeconomics and Environmental Justice

The study area for socioeconomic analysis includes communities adjacent to NAS Lemoore. Impacts are based on changes or relocation of personnel and/or construction spending in support of improvements at the installation, as well as those projects that have an impact on flight operations. The past, present, or reasonably foreseeable actions that have a potential to interact with the proposed action and cumulatively impact socioeconomics and environmental justice include the VFA-86 relocation, F-35C Homebasing, and various construction projects at NAS Lemoore. The off-base projects would not likely interact with actions at NAS Lemoore.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action included in the baseline for this EA and therefore is part of the existing detailed analysis. The VFA-86 relocation included an increase of 218 officers and enlisted personnel and their families that contribute a minor beneficial impact by increasing employment and income in the area.

U.S. Navy F-35C West Coast Homebasing

Personnel loading associated with active duty fleet F-35C squadrons would be very similar to requirements of FA-18 squadrons, so it is not expected that there would be substantial changes to overall personnel levels at NAS Lemoore for the active duty squadron transitions. The new F-35C FRS, however, likely would add approximately 300 additional military personnel plus contractors compared to the 2015 personnel loading projections. The addition of these personnel and their families would result in increased spending in the local community. Demand for on-base and off-base housing would also increase. The addition of the F-35C FRS would increase aircraft operations compared to projected 2015 levels and it is likely that noise contours would change as a result. Detailed noise modeling is required to predict how this specifically may impact low-income and minority populations surrounding the airfield, however, given the relatively low overall population surrounding NAS Lemoore and the predominance of agricultural lands, it is not expected that impacts would be disproportionate to the community. At NAS Lemoore, many of the facilities necessary to support the Strike Fighter mission already exist or require only renovation/modifications. New construction in support of the action would be relatively limited. As military construction projects in support of F-35C homebasing at NAS Lemoore are awarded to general/prime contractors from urban centers in neighboring counties, construction generally would have a positive effect on employment and income. A quantitative analysis of the socioeconomics and environmental justice impacts of the Navy F-35C West Coast homebasing will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

Establishment of Search and Rescue Mission at NAS Lemoore

The construction and operation of a new SAR hangar would include the addition of 42 personnel to NAS Lemoore. The increase in personnel would have a beneficial impact by increasing employment and income in the area. Because military construction projects at NAS Lemoore are awarded to general/prime contractors from urban centers in the region, construction of the new hangar and facilities would generally have a positive effect on employment and income. No adverse impacts to socioeconomics are anticipated from this action.

Proposed Construction and Master Plan Projects at NAS Lemoore

Construction of the various Master Plan projects likely would use general/prime contractors from urban centers in the region, and would therefore have a positive effect on employment and income in the vicinity. One Master Plan project would provide additional on-base housing for bachelors which would add capacity for 118 to 708 bachelors, depending on how many units are built, which would help address current and future bachelor housing demand. Overall, the proposed construction and Master Plan projects would provide minor beneficial impacts on the local and regional economy.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The limited construction associated with the Proposed Action would result in negligible beneficial impacts due to net job creation and construction expenditures. The Proposed Action would involve a net increase of 262 military and 341 family members, or a 4% increase in the number of military and civilian personnel at NAS Lemoore and a net change of less than 1% in Kings and Fresno counties. This increase in personnel would contribute incrementally, along with other potential personnel increases, to the effects on local and regional socioeconomics (e.g., housing demand). The total population, minority population, and low-income population underlying 65 dB CNEL noise contours and greater would increase compared to the baseline condition. However, the proportion of minority population and low-income population exposed to aircraft noise would remain proportional relative to the total population. For all populations, the vast majority of the increased noise exposure would be in the 65-70 dB CNEL noise contour. In fact, there would be a decrease or no change of population affected within the 70-85+ dB CNEL noise contours compared to baseline.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

When all past, present, and reasonably foreseeable actions are taken together and examined for their context and intensity as described in Section 5.3, there would be minor beneficial cumulative impacts to socioeconomics and environmental justice at NAS Lemoore and the surrounding area. Increases of personnel and various construction projects would result in increased employment and income levels in the local and regional economies. It is expected that the F-35C would operate in the same manner as the FA-18s it would replace (although there is no available noise modeling for the F-35C, F-35A noise modeling indicates that the noise level is similar to FA-18s). Therefore, no significant cumulative impacts are expected , although the F-35C West Coast Homebasing EIS will provide more detailed noise analysis, including cumulative noise impacts on low income, minority, or child populations. A quantitative analysis of the cumulative socioeconomics and environmental justice impacts of the Navy F-35C West Coast homebasing and other activities will be evaluated in detail in the F-35C West Coast Homebasing EIS.

5.3.8 Community Services

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact community services (schools, police/fire protection, health services, and recreational services) are those that would result in changes to personnel numbers at NAS Lemoore or result in construction of new facilities. Projects that involve the replacement of existing facilities would generally result in no net change and therefore would not cumulative impact community services. The non-federal actions off-base would also not result in any cumulative impacts at NAS Lemoore or the surrounding community.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action included in the baseline for this EA and therefore is part of the existing detailed analysis. The VFA-86 relocation included an increase of 218 officers and enlisted personnel and their families that contribute to demand on community services.

U.S. Navy F-35C West Coast Homebasing

The F-35C Homebasing likely would result in an increase of personnel and facilities at NAS Lemoore and therefore may result in a greater demand on existing community facilities and services. Potential base loading in 2025 likely would be greater than 2011 or projected 2015 levels primarily due to the potential addition of approximately 300 military personnel plus contractors associated with the F-35C FRS in the 2015-2025 timeframe. As some of the families may include high-school age children or otherwise live off-base, the demand for community services may extend into the surrounding communities. The potential F-35C homebasing would occur over a 10-year period, thus any additional demands on community services would change gradually, allowing NAS Lemoore and the local community to respond to needs over time. At NAS Lemoore, many of the facilities necessary to support the Strike Fighter mission already exist or require only renovation/modifications. New construction in support of the action would be relatively limited. A quantitative analysis of the impacts of the Navy F-35C West Coast homebasing will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

Establishment of Search and Rescue Mission at NAS Lemoore

The SAR operations and hangar would result in an increase of 42 personnel and their families moving to NAS Lemoore. This increase would be a small percentage of the existing population and a correspondingly small increase to the demand for community services. As some of the families may include high-school age children or otherwise live off-base, the demand for community services may extend into the surrounding communities. The new maintenance hangar facility that would be constructed would also result in a small increase in the number of buildings on-base requiring police and fire protection.

Proposed Construction and Master Plan Projects at NAS Lemoore

The construction and Master Plan projects would result in a minor increase in the number of facilities potentially requiring police and fire protection on base. Two projects would enhance such capabilities, however, as NAS Lemoore would expand its Security Building and construct a new Fire Department training facility. Furthermore, some of the projects would increase the number of recreational and community opportunities on-base (golf course, commuter bikeway, Religious Education Facility) thereby having a beneficial impact at NAS Lemoore.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

As a result of the personnel increase associated with the Proposed Action, community services needs would increase by up to 4% at NAS Lemoore and less than 1% within the study area. It is anticipated that there would be an increase of 142 school-aged children under the Proposed Action. Overall, the minor increase in NAS Lemoore population would not be expected to impact the capability of these services or exceed operational capacity. The modifications to the three hangars would not result in increased areas required police or fire protection.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

When all past, present, and reasonably foreseeable future actions are examined together, there would be a net increase in the demands for community services at NAS Lemoore, and to a lesser extent, the surrounding communities. These actions would therefore contribute incrementally to the cumulative impacts on community services. Estimated overall population growth from the Proposed Action, potential F-35C homebasing, and establishment of a SAR mission at NAS Lemoore would be approximately 600 military personnel compared to the 2011 baseline. The potential population growth at NAS Lemoore would be less than significant (approximately 600 personnel and associated family members), and occur over a long timeframe (2011 through 2025), allowing NAS Lemoore and the local community to respond to needs over time. Several currently anticipated construction and Master Plan projects are already being planned to address current and future needs for community services. The cumulative impacts would not be significant based on the context and intensity criteria listed in Section 5.3. A quantitative analysis of the cumulative community service impacts of the Navy F-35C West Coast homebasing and other activities will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

5.3.9 Transportation

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact transportation are limited to those projects that would add personnel and increase traffic in the vicinity of NAS Lemoore. These include the VFA-86 relocation, F-35C homebasing, and new SAR mission. In addition, several identified cumulative projects would potentially improve transportation, including the SR 198 interchange and the California High-Speed Rail Line.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action included in the baseline for this EA and therefore is part of the existing detailed analysis. The VFA-86 relocation included an increase of 218 officers and enlisted personnel and their families that contribute to traffic in the vicinity of NAS Lemoore.

U.S. Navy F-35C West Coast Homebasing

The F-35C homebasing at NAS Lemoore would likely include an increase in the number of personnel and their families stationed there. This would result in an increase in the traffic levels in and around NAS Lemoore. Most additional trips would likely utilize SR 191 and/or SR 41, resulting in minor increases to area traffic. A quantitative analysis of the traffic impacts of the Navy F-35C West Coast homebasing will be evaluated in detail in the F-35C West Coast Homebasing EIS.

Establishment of Search and Rescue Mission at NAS Lemoore

The addition of two SAR helicopters and associated facilities would also include an increase of approximately 42 military personnel and their families to the region. This increase of personnel would result in a slight impact in the level of traffic at NAS Lemoore and the vicinity. Most additional trips would likely utilize SR 191 and/or SR 41, resulting in minor increases to area traffic.

California High-Speed Rail Line

The California High-Speed Rail Line project would connect San Francisco and Los Angeles with multiple stops in between, including Fresno and Bakersfield. This project would improve regional traffic conditions, particularly travel on Interstate 5, but likely would not have a noticeable effect on local traffic in the NAS Lemoore area, as the nearest station would be located in Fresno.

State Route 198/19th Avenue Interchange

The SR 198/19th Avenue interchange project would seek to improve traffic conditions in the City of Lemoore. Many of the personnel stationed at NAS Lemoore travel through this interchange so traffic conditions near NAS Lemoore would improve.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The Proposed Action would result in increase of approximately 364 total trips daily to and from NAS Lemoore. It is likely that these trips would be dispersed somewhat with regards to accessing NAS Lemoore gates. Most additional trips likely would utilize SR 191 and/or SR 41, resulting in minor increases to area traffic. In addition, military operations usually begin and end earlier in the day than typical City of Lemoore peak hour commute times which would further reduce impacts to transportation.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

When all past, present, and reasonably foreseeable future actions are examined together, there would be an overall increase in traffic accessing NAS Lemoore, and to a lesser extent, the surrounding communities. The potential population growth at NAS Lemoore would be less than significant (approximately 600 personnel and associated family members), and would occur over a long period of time from 2011 through 2025, allowing NAS Lemoore and the local community to respond to cumulative traffic impacts over time. Therefore, using the context and intensity criteria listed in Section 5.3, the cumulative impacts to transportation are not expected to be significant. A quantitative analysis of the cumulative transportation impacts of the Navy F-35C West Coast homebasing and other activities will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

5.3.10 Biological Resources

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact biological resources are limited to those projects that may break ground at NAS Lemoore or surrounding community or may increase noise levels. Projects with the potential for ground disturbance actions or increases in noise levels include, but are not limited to VFA-86 relocation, F-35C West Coast Homebasing, the SAR Maintenance Hangar, several construction projects, the California High-Speed Rail Line, and the SR 198 Interchange.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action included in the baseline for this EA and therefore is part of the existing detailed analysis. Airfield operations of the 10-plane FA-18E squadron contribute to the baseline noise contours presented in Chapter 3 of this EA. No ground disturbing activities occurred as part of this relocation.

U.S. Navy F-35C West Coast Homebasing

The F-35C homebasing would likely include ground disturbing activities for new facilities that are required as part of this project. If any of the construction takes place in previously undisturbed areas, impacts to biological resources could occur. Additionally the noise from construction and from potential changes to flight operations could impact wildlife species in the vicinity of the action. F-35C airfield operations would be substantially similar to those operations already occurring by FA-18 aircraft at NAS Lemoore, thus it is not expected that flight operations or aircraft noise would have significant impacts on wildlife species, migratory birds, or threatened and endangered species. A quantitative analysis of biological impacts of the Navy F-35C West Coast homebasing will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

Establishment of Search and Rescue Mission at NAS Lemoore

The proposed construction of an additional hangar for two SAR helicopters could have potential to impact biological resources if it were constructed in a previously undisturbed area. It is expected that the hangar would be constructed and attached to an existing hangar in a previously disturbed area near the flight line and would be consistent with current Navy land use planning. Noise from the construction could have minimal impact on any wildlife at the project site; however, this would be short-term and localized.

Proposed Construction and Master Plan Projects at NAS Lemoore

The numerous Navy construction projects planned within the reasonably foreseeable future are discussed as a single group because there is a common potential for the siting of the projects to interact with the Proposed Action and potentially impact biological resources. While the designs of all potential construction and Master Plan projects have not yet been completed, the base conducts planning activities to prevent incompatible land uses and maximize the preservation of sensitive habitats on-base. Appropriate NEPA documentation would occur for projects that have potential to adversely impact biological resources. It is anticipated that all of the planned construction and Master Plan projects would be planned according to sound planning principles and consistent with the NAS Lemoore INRMP. Any impacts from construction noise would be short-term and localized. As such, it is not expected that the proposed construction and Master Plan projects would have significant impacts on biological resources.

California High-Speed Rail Line

The section of the line closest to NAS Lemoore is the Fresno to Bakersfield section which would run through Hanford. The proposed construction of the California high-speed rail line would have the potential to impact biological resources from the loss of habitat. The noise from construction could also impact wildlife; however this would be short-term and localized. Operation of the rail line would likely result in a long-term increase of noise levels which could also impact wildlife species. Detailed analysis of potential impacts on biological resources and threatened and endangered species will be included in the pending California High-Speed Rail EIS. This section of the project is currently at the Draft EIS stage (planned Draft EIS release is summer 2011) with the Final EIS anticipated to be completed at the end of 2011.

State Route 198/19th Avenue Interchange

The proposed construction of the SR 198/19th Avenue interchange would have the potential to impact biological resources if it constructed in a previously undisturbed area. The noise from the construction would also impact wildlife; however, this would be short-term and localized.

Avenal Power Plant

The proposed construction of the Avenal Power Plant would have the potential to impact biological resources if it constructed in a previously undisturbed area. The noise from the construction would also impact wildlife; however this would be short-term and localized. The operation of this power plant would also potentially result in noise that impacts wildlife species.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The Proposed Action is not anticipated to have any substantial effect on biological resources since no disturbance to any previously undisturbed areas is proposed, the total number of aircraft operations would decrease, and noise levels would remain similar to existing conditions, or decrease. Proposed construction under the Proposed Action would be limited to modifications and expansions to existing hangars in in flight line areas which are currently developed. The Proposed Action would not affect threatened or endangered species or migratory birds.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Several of the cumulative actions described include ground disturbing activities for construction of new or modification of existing facilities at NAS Lemoore that would result in surface disturbance. Such additive disturbance could affect biological resources, including direct (e.g., mortality) and indirect (e.g., habitat loss) impacts to wildlife and vegetation. It is anticipated that all of the planned construction and Master Plan projects would be planned according to sound planning principles and be consistent with the NAS Lemoore INRMP, thus such impacts would be expected to be less than significant. While construction would be ongoing for the various potential projects, the known construction would not interact synergistically with elements of the Strike Fighter Realignment under the Proposed Action, since the Proposed Action would result in minimal ground disturbance in locations that have been previously disturbed. Any construction noise impacts would be short-term and localized.

The cumulative noise from potential increases in the number of aircraft operations could impact wildlife species in the vicinity of the airfield. However, while the noise contours may change over time, it is expected that the F-35C would operate in the same manner as the FA-18s it would replace (although there is no available noise modeling for the F-35C, F-35A noise modeling indicates that the noise level is similar to FA-18s). It is also expected that the total number of aircraft operations at NAS Lemoore by 2025 would be higher than the number of operations occurring in the 2015 end state of the Proposed Action but similar to the number of operations occurring in the 2011 baseline. Therefore, no significant impacts to biological resources are expected although the F-35C West Coast Homebasing EIS will provide more detailed noise analysis, including cumulative noise impacts on wildlife, migratory birds, and threatened and endangered species. A quantitative analysis of biological impacts of the Navy F-35C West Coast homebasing will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

Detailed analysis of potential impacts of the high-speed rail project on biological resources and threatened and endangered species will be included in the pending California High-Speed Rail EIS. This section of the project is currently at the Draft EIS stage (planned Draft EIS release is Summer 2011) with the Final EIS anticipated to be completed at the end of 2011. Generally, it is expected that any impacts on biological resources of that action would not interact with any impacts at NAS Lemoore.

When taken together, the other federal and non-federal past, present, and reasonably foreseeable actions would not result in significant cumulative impacts to biological resources because the non-federal actions would occur at a distance from NAS Lemoore such as they would be unlikely to overlap with federal actions at NAS Lemoore. Considering the context and intensity criteria described in Section 5.3, it is expected that any cumulative impacts on biological resources would be less than significant.

5.3.11 Water Resources

The past, present, and reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact water resources are limited to those projects that may break ground at NAS Lemoore or the surrounding community, or those that may increase water demand in the region. Projects with the potential for ground disturbance actions include, but are not limited to VFA-86 relocation, F-35C West Coast Homebasing, construction of the SAR maintenance hangar associated with the search and rescue mission, several construction projects, the California High-Speed Rail Line, the SR 198 Interchange, and the Avenal Power Plant.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action included in the baseline for this EA and therefore is part of the existing detailed analysis. The VFA-86 relocation included an increase of 218 officers and enlisted personnel and their families that contribute to increased water usage at NAS Lemoore. No ground-disturbing activities occurred as part of this relocation.

U.S. Navy F-35C West Coast Homebasing

The F-35C Homebasing would likely result in an increase of personnel and facilities at NAS Lemoore and therefore may result in an increased demand for water usage and impacts to water from construction. Potential base loading in 2025 would likely be greater than 2011 or projected 2015 levels primarily due to the potential addition of approximately 300 military personnel plus contractors associated with the F-35C FRS in the 2015-2025 timeframe. The additional personnel associated with the action would result in a greater demand for water. At NAS Lemoore, many of the facilities necessary to support the strike fighter mission already exist or require only renovation/modification. Any new construction would require some water usage. If this construction takes place in previously undisturbed areas, there would be an increase in water runoff which may impact surface water resources. A quantitative analysis of the impacts of the Navy F-35C West Coast homebasing will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

Establishment of Search and Rescue Mission at NAS Lemoore

The construction of a new hangar for two SAR helicopters would not impact water resources since it would occur on an existing paved area (i.e., the flight line). The additional 42 personnel and their families associated with this action would potentially result in an increased water demand. This increase would be a small percentage of the existing population and a correspondingly small increase to the demand for water resources.

Proposed Construction and Master Plan Projects at NAS Lemoore

The numerous Navy construction projects planned within the reasonable foreseeable future are discussed as a single group because there is a common potential for the siting of the projects to interact with the water resources at NAS Lemoore. While the designs of all potential construction and Master Plan projects have not yet been completed, the base conducts construction activities to minimize impacts to water resources. It is anticipated that all new construction would require some amount of water during construction and in their operation. During construction, there would be a potential for increased erosion and sedimentation which may impact surface water. All construction would implement BMPs to minimize these impacts. As such, it is not expected that the proposed construction and Master Plan projects would have significant impacts on water resources.

California High-Speed Rail Line

The California high-speed rail line is a large-scale project that would require water for construction. Its construction and operation would also impact surface water resources by potentially altering overland flow. Due to the distance from NAS Lemoore, it is unlikely that this project would impact waters at NAS Lemoore. Detailed analysis of the potential impacts on water resources will be included in the pending California High-Speed Rail EIS. This section of the project is currently at the Draft EIS stage (planned Draft EIS release is summer 2011) with the Final EIS anticipated to be available at the end of 2011.

State Route 198/19th Avenue Interchange

The SR 198/19th Avenue interchange project would potentially require construction in previously undisturbed areas. This would potentially result in increased surface water runoff, erosion, and sedimentation of nearby water sources. Additionally, water would be required for construction.

Avenal Power Plant

The Avenal power plant project would impact water resources if it is constructed in previously undisturbed areas. Additionally, operation of the power plant would require 12.4 gal of water per minute, or approximately 18,000 gal a day. Water for the power plant operation would come from the City of Avenal.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The Proposed Action is not anticipated to have any substantial effect on water resources, as no new impervious area would be created and ground disturbance would be limited to existing paved areas. The Proposed Action would result in less than significant impacts to surface water and groundwater availability. The increased population and operations at NAS Lemoore would result in a 4% increase in water demand over the current usage.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

When all past, present, and reasonably foreseeable future actions are examined together, there would be a net increase in the demands for water at NAS Lemoore as well as an increase in construction. The potential increase in population and construction at NAS Lemoore would be moderate and occur over a long timeframe (2011 through 2025), allowing NAS Lemoore to respond to increased water demand. Therefore, under the context and intensity criteria listed in Section 5.3, the Proposed Action would not significantly add to the cumulative impacts to water resources. A quantitative analysis of the cumulative water resource impacts of the Navy F-35C West Coast homebasing and other activities will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

5.3.12 Cultural Resources

The past, present, and reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact cultural resources are those that would result in ground disturbance, demolition/modifications of buildings, or aircraft operations (i.e., noise). Projects with the potential for ground disturbance and demolition/modifications include, but are not limited to, the F-35C West Coast Homebasing, the SAR Maintenance Hangar, base construction projects, the California High-Speed Rail

Line, and the SR 198 Interchange, and the Avenal Power Plant. Those projects that may increase aircraft operations at NAS Lemoore, include VFA-86 relocation and the F-35C homebasing.

Relocation of VFA-86 to NAS Lemoore, California

Relocation of VFA-86 to NAS Lemoore is a recent action included in the baseline for this EA and therefore is part of the existing detailed analysis. Airfield operations of the 10-plane FA-18E squadron contribute to the baseline noise presented in Chapter 3 of this EA. No new construction was required for this project.

U.S. Navy F-35C West Coast Homebasing

The F-35C homebasing would likely include ground disturbing activities for new facilities required as part of the project. If any of the construction takes places in previously undisturbed areas, impacts to cultural resources could occur. Also, any demolition of existing facilities would have the potential to impact historic structures. Prior to any construction or demolition, the area would be surveyed for cultural resources and existing buildings would be evaluated for eligibility for inclusion under the NRHP. F-35C airfield operations would be similar to those operations already occurring by FA-18 aircraft at NAS Lemoore, thus it is not expected that flight operations or aircraft noise would have adverse impacts on cultural resources. Noise from construction projects would be localized and short-term and would therefore not be expected to impact cultural resources. A quantitative analysis of cultural resource impacts of the Navy F-35C West Coast homebasing will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

Establishment of Search and Rescue Mission at NAS Lemoore

The addition of two SAR helicopters at NAS Lemoore would have the potential to increase noise impacts on cultural resources. Noise from the MH-60 helicopters would be dominated by the noise from jet operations and would not affect the NAS Lemoore noise zones. The additional hangar space for the two helicopters would be attached to Building 180. This building would be evaluated to determine if it is eligible for nomination to the NRHP prior to construction.

Proposed Construction and Master Plan Projects at NAS Lemoore

The numerous Navy construction projected planned within the reasonably foreseeable future are discussed as a single group because there is a common potential for their effects to interact and impact cultural resources. Prior to any initiation of these projects, the areas would be surveyed to determine if any cultural resources are present in the project area. If any cultural resources are present, they would be mitigated for, usually through avoidance. Should any of the projects require the demolition or modification of existing structures, the structure(s) would be evaluated to determine eligibility for inclusion to the NRHP. Noise from the projects would be limited to construction and no long-term increases in noise levels are anticipated.

California High-Speed Rail Line

The California high-speed rail line is a large-scale project that would have the potential to impact cultural resources. Prior to its construction, the proposed route would be surveyed to determine if any cultural resources are present. Detailed analysis of the potential impacts on cultural resources will be included in the pending California High-Speed Rail EIS. This section of the project is currently at the Draft EIS stage (planned Draft EIS release is Summer 2011) with the Final EIS anticipated to be completed at the end of

2011. However, due to the distance of this project from NAS Lemoore, it is not likely that it would interact synergistically with the Proposed Action with regard to impacts to cultural resources.

State Route 198/19th Avenue Interchange

Construction of the SR 198/19th Avenue interchange would have the potential to impact cultural resources if cultural resources are present within the construction area. However, due to the distance of this project from NAS Lemoore, it is not likely that it would interact synergistically with the Proposed Action with regard to impacts to cultural resources.

Avenal Power Plant

The construction of the Avenal power plant would have the potential to impact cultural resources if any occur in the vicinity of the project area. Prior to construction, the area would be surveyed and any impacts to cultural resources would be mitigated. However, due to the distance of this project from NAS Lemoore, it is not likely that it would interact synergistically with the Proposed Action with regard to impacts to cultural resources.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

Three buildings, Hangars 1, 2, and 4, which date to 1959 and are therefore potentially eligible for the NRHP, would be directly impacted by interior and exterior modifications and renovations under the Proposed Action. However, all three hangars have been evaluated and determined not eligible for nomination to the NRHP, and a letter of concurrence on this finding was received from the California SHPO and is provided in Appendix A. As such, it is anticipated that no historic properties would be affected, and no other impacts to cultural resources would result from the Proposed Action. The noise zones under the Proposed Action would be similar to baseline conditions; therefore, there would be no impacts on cultural resources from project-related noise.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

When taken together, the past, present, and reasonably foreseeable future actions have the potential to impact cultural resources. On-base and off-base construction projects that include ground disturbance, demolition/modifications of buildings, or aircraft operations (i.e., noise) associated with other cumulative projects could impact prehistoric archaeological resources, historic archaeological resources, or historic structures. Prior to the initiation of any modifications, renovations, or other physical changes, structures would need to be surveyed and evaluated for NRHP significance under Criteria A-D. Additional inventory of these structures would identify eligible resources and these impacts would be resolved through the Section 106 process. Federal projects with potential for significant impacts on cultural resources would undergo Section 106 review under the National Historic Preservation Act (NHPA) and any potentially significant impacts would be mitigated, usually through avoidance when possible. Considering the context and intensity criteria described in Section 5.3, it is expected that any cumulative impacts on cultural resources would be less than significant.

5.3.13 Hazardous Materials and Waste

The past, present, and reasonably foreseeable future actions that have a potential to use hazardous materials or generate hazardous waste include those projects that require building demolition/modification that may require disposal of small quantities of ACM or LBP. Projects with the potential for ground disturbance and demolition/modification include, but are not limited to, the F-35C

West Coast Homebasing, the SAR Maintenance Hangar, several base construction projects, the California High-Speed Rail Line, SR 198 Interchange, and the Avenal Power Plant.

U.S. Navy F-35C West Coast Homebasing

Homebasing of the F-35C at NAS Lemoore is in the early planning stages and associated facility construction, modification, or demolition projects are yet to be developed. However, it is likely that facilities construction, demolition and modifications would occur under this project, so there would hazardous materials or wastes are likely to be used or generated. Additionally, the F-35C aircraft would potentially require greater amounts of hazardous materials (e.g., oil, fuel, lubricants) than the aircraft they would be replacing. The potential F-35C homebasing would take place over a 10-year period, thus any increases in the use or generation of hazardous materials or wastes would change gradually. A quantitative analysis of the impacts of the Navy F-35C West Coast homebasing will be evaluated in detail in the pending F-35C West Coast Homebasing EIS.

Establishment of Search and Rescue Mission at NAS Lemoore

The addition of two MH-60 SAR helicopters at NAS Lemoore would slightly increase the amount of hazardous materials (e.g., fuel, lubricant, oil) required to be stored and used on-base. Additionally, the modifications to an existing hangar would potentially require the disposal of small amounts of hazardous materials generated during construction.

Proposed Construction and Master Plan Projects at NAS Lemoore

The numerous Navy construction projects planned within the reasonably foreseeable future are discussed as a single group because there is a common potential for these project to use hazardous materials or generate hazardous waste. Construction of these facilities would potentially require the use of some hazardous materials. The demolition of existing structures associated with these projects would have the potential to generate hazardous waste that would need to be disposed of properly. The new jet fuel storage and distribution system would replace an aging, underground system and would therefore reduce the potential for future hazardous material spills, thereby having a beneficial, long-term impact.

California High-Speed Rail Line

Construction of the California high-speed rail line through the San Joaquin Valley would potentially require the use of hazardous materials. In addition, some hazardous wastes may be generated for its operation. However, the trains would be electrically powered, and therefore would reduce the potential for fuel spills, as well as potentially from the reduction of motor vehicles traveling through the area.

State Route 198/19th Avenue Interchange

Construction of the SR 198/19th Avenue interchange would potentially require the use of small quantities of hazardous materials. No hazardous wastes are anticipated to be generated from its operation. Improving the safety at this interchange would reduce the potential for vehicle accidents, which would also reduce the potential for the release of hazardous materials from accidents.

Avenal Power Plant

The construction of the Avenal power plant would potentially require the use of hazardous materials. As this power plant would be natural gas powered, no hazardous wastes are anticipated to be generated from its operation.

Proposed Action (Strike Fighter Realignment at NAS Lemoore)

The Proposed Action would add aircraft and aircraft operations that would increase the use of hazardous materials (such as fuel, oils, and lubricants) and generation of hazardous waste. However, the FRS reduction would offset this increase and result in an overall decrease in aircraft and operations of approximately 24%, thereby reducing the use of hazardous materials and reducing the generation of hazardous wastes by a similar amount. Renovations to Hangars 1, 2, and 4 could generate small quantities of hazardous wastes, given their age of construction (1959) and the associated potential for the presence of ACM or LBP.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

When taken together, the past, present, and reasonably foreseeable future actions are expected to result in a small increase in the amount of hazardous materials use or hazardous wastes generated. The increase in hazardous materials and wastes would generally be limited to the construction period of these projects and would result in any long-term increase of hazardous materials. All of the project would occur in accordance with existing plans and regulations relating to hazardous materials. The Proposed Action would contribute incrementally to the generation of hazardous materials and wastes at NAS Lemoore as use these substances would likely increase due to construction/demolition, aircraft operations, etc., associated with cumulative projects including F-35C homebasing and other construction projects. Existing facilities and established procedures are in place for the safe handling and use of these materials, and any increase in hazardous waste generated at NAS Lemoore would be removed and disposed in accordance with applicable federal, state and local regulations, as outlined in the Hazardous Waste Management Plan (DoN 2005b). When examined for both the context and the intensity of these actions as described in Section 5.3, no cumulatively significant impacts from hazardous materials and wastes are anticipated.

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CHAPTER 6 OTHER CONSIDERATIONS REQUIRED BY NEPA

Activities associated with the Proposed Action at NAS Lemoore would comply with applicable federal, state, and local requirements with regard to the human environment. The federal acts, EOs, policies, and plans that apply include the following: NEPA; CAA and federal General Conformity Rule (§176(c)(1); CWA; ESA; MBTA and EO 13186; NHPA; USC Title 49; EO 12898, *Minority Populations and Low-Income Populations*; EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*; EO 12372, *Coordination with State and Regional Agencies*; Resource Conservation and Recovery Act; the NAS Lemoore Integrated Cultural Resources Management Plan, the NAS Lemoore INRMP, and the NAS Lemoore AICUZ report. Relevant state, local, and regional plans, policies, and controls include: City of Lemoore General Plan, Kings County General Plan, Fresno County General Plan, and SJVAPCD Rules and Regulations.

6.1 CONSISTENCY WITH OTHER FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS

The DoN adheres to all relevant laws and requirements applicable to its operations, maintenance, and new construction activities. Table 6.1-1 provides a comprehensive list, organized by environmental resource, of federal and state environmental statutes, regulations, and EOs relevant to environmental analysis of the Proposed Action and, to a lesser extent, to the supplemental analysis of environmental impacts. The table is followed by a more detailed description of the applicable laws and regulations.

6.1.1 Federal Acts, Executive Orders, Policies, and Plans

6.1.1.1 National Environmental Policy Act

The Navy has prepared this EA to assess the environmental effects associated with the proposed realignment of Strike Fighter community assets at NAS Lemoore to more efficiently support operational requirements in the Pacific. This EA was prepared in accordance with NEPA, 42 USC §§ 4321-4370d, as implemented by the CEQ regulations, 40 CFR Parts 1500-1508, and DoN regulations described in Office of the Chief of Naval Operations Instruction 5090.1C of 30 October 2007.

6.1.1.2 Clean Air Act and General Conformity Rule

The CAA of 1970 and subsequent amendments specify requirements for control of the nation's air quality. Federal and state ambient air standards have been established for each criteria pollutant. The 1990 amendments to the CAA require federal facility compliance with all requirements for air pollution control to a similar extent as non-governmental entities must comply. Emissions from the Proposed Action from the 2015 end state do not exceed *de minimis* thresholds. It can therefore be concluded, based on this analysis, that the criteria pollutant emissions associated with the Proposed Action meet the requirements for conformity, and no further evaluation of conformity is required.

Existing CAA permits will be modified or new permits obtained as necessary to maintain compliance with California Air Resources Board and SJVAPCD rules and regulations.

6.1.1.3 Executive Order 12898

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs all federal departments and agencies to incorporate environmental justice considerations in achieving their mission. Each federal department or agency must identify and address disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority populations and low-income populations.

The Proposed Action would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

6.1.1.4 Executive Order 13045

In 1997, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was issued. This EO requires each federal agency to "…make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and …ensure that its policies, programs, activities and standards address disproportionate risks to children…."

The Proposed Action would not result in environmental health risks and safety risks that may disproportionately affect children.

Table 6.1-1. Major Environmental Statutes, Regulations, and Executive Orders Relevant to the Proposed Action

Environmental Resources	Statute, Regulation, or Executive Order
Noise	• Noise Control Act of 1972 (PL 92-574) and Amendments of 1978 (PL 95-609) • USEPA, Subchapter G-Noise Abatement Programs (40 CFR 201-211)
Air Quality	• CAA of 1970 (PL 95-95), as amended in 1977 and 1990 (PL 91-604) • CAA General Conformity Rule (40 CFR Part 93) • USEPA, Subchapter C-Air Programs (40 CFR 52-99) • SJVAPCD Rules and Regulations
Safety	• OSHA regulations (29 CFR)
Geology, Topography, and Soils	• NPDES Construction Activity General Permit (40 CFR 122-124)
Utilities	• Safe Drinking Water Act of 1972 (PL 95-923) and Amendments of 1986 (PL 99-339) • USEPA, National Drinking Water Regulations and Underground Injection Control Program (40 CFR 141-149)
Socioeconomics	• Federal Actions to Address Environmental Justice in Minority Populations and Low- Income Populations (EO 12898) • Protection of Children from Environmental Health Risks and Safety Risks (EO 13045)
Biological Resources	• Fish and Wildlife Coordination Act of 1958 (PL 85-654) • Sikes Act of 1960 (PL 86-97) and Amendments of 1986 (PL 99-561) and 1997 (PL 105-85 Title XXIX) • ESA of 1973 (PL 93-205) and Amendments of 1988 (PL 100-478) • Fish and Wildlife Conservation Act of 1980 (PL 96-366) • Responsibilities of Federal Agencies to Protect Migratory Birds (EO 13186)
Wetlands and Floodplains	• Section 401 and 404 of the Federal Water Pollution Control Act of 1972 (PL 92-500) • USEPA, Subchapter D-Water Programs 40 CFR 100-149 (105 ref) • Floodplain Management-1977 (EO 11988) • Protection of Wetlands-1977 (EO 11990) • Emergency Wetlands Resources Act of 1986 (PL 99-645) • North American Wetlands Conservation Act of 1989 (PL 101-233)
Water Resources	• Federal Water Pollution Control Act of 1972 (PL 92-500) and Amendments • CWA of 1977 (PL 95-217) • NPDES Construction Activity General Permit (40 CFR 122-124)

Table 6.1-1. Major Environmental Statutes, Regulations, and Executive Orders Relevant to the Proposed Action

Environmental Resources	Statute, Regulation, or Executive Order
	• NPDES Industrial Permit and NPDES MS4 Permit • CWA 40 CFR 112 Spill Prevention Control and Countermeasures • USEPA, Subchapter D-Water Programs (40 CFR 100-145) • Water Quality Act of 1987 (PL 100-4) • USEPA, Subchapter N-Effluent Guidelines and Standards (40 CFR 401-471)
Cultural Resources	• NHPA (16 USC 470 et seq.) (PL 89-865) and Amendments of 1980 (PL 96-515) and 1992 (PL 102-575) • Protection and Enhancement of the Cultural Environment-1971 (EO 11593) • Archaeological Resources Protection Act of 1979 (PL 96-95) • Native American Graves Protection and Repatriation Act of 1990 (PL 101-601) • Protection of Historic Properties (36 CFR 800)
Hazardous and Toxic Substances and Waste	• Resource Conservation and Recovery Act of 1976 (PL 94-5800), as amended by PL 100-582; • USEPA, subchapter I-Solid Wastes (40 CFR 240-280) • Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 USC 9601) (PL 96-510) • Toxic Substances Control Act (PL 94-496) • USEPA, Subchapter R-Toxic Substances Control Act (40 CFR 702-799) • Federal Insecticide, Fungicide, and Rodenticide Control Act (40 CFR 162-180) • Emergency Planning and Community Right-to-Know Act (40 CFR 300-399) • Federal Compliance with Pollution Control Standards-1978 (EO 12088), Superfund Implementation (EO 12580) • Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition (EO 13101) • Greening the Government Through Efficient Energy Management (EO 13123) • Greening the Government Through Leadership in Environmental Management (EO 13148)

6.1.1.5 Endangered Species Act

The ESA of 1973, as amended, requires that any action authorized by a federal agency shall not jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. Section 7 of the ESA requires that the responsible federal agency consult with USFWS concerning endangered and threatened species under their jurisdiction that may be affected by a Proposed Action.

Federally listed threatened and endangered species previously documented as occurring within the installation's boundaries or in the immediate vicinity of NAS Lemoore include California least tern, Fresno kangaroo rat (*Dipodomys nitratoides exilis*), Tipton's kangaroo rat (*Dipodomys n. nitratoides*), and San Joaquin kit fox (*Vulpes macrotis mutica*). Renovations to Hangars 1, 2, and 4 and the decrease in aircraft operations that would occur under the Proposed Action would have no effect on species occupancy, energetics, or productivity. The Navy concluded that there would be no adverse effects to endangered and threatened species or habitat as a result of the Proposed Action.

6.1.1.6 Migratory Bird Treaty Act

All birds, with the exception of non-native species, that occur in the NAS Lemoore area are protected under the MBTA and EO 13186, which directs federal agencies to avoid or minimize negative effects on migratory birds, to protect their habitats, and to consider effects on migratory birds in NEPA documents. The Navy concluded that there would be no adverse effects on migratory birds as a result of the Proposed Action.

6.1.1.7 Sikes Act

The purpose of the INRMP is to help the DoN manage their resources in a manner that promotes sustainable management practices and to ensure continued support of military activities. The NAS Lemoore INRMP was developed in accordance with the Sikes Act Improvement Act of 1997 (16 USC 670a-670o, 74 Stat. 1052), as amended and in cooperation with the USFWS and California Department of Fish and Game. The Proposed Action would be consistent with INRMP goals of protecting the natural ecosystems of NAS Lemoore and would have no significant impact on natural resources.

6.1.1.8 Clean Water Act

The federal CWA was enacted as an amendment to the Federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the U.S. The CWA includes programs addressing both point source and nonpoint source pollution and empowers the states to set state-specific water quality standards and to issue permits containing effluent limitations for point source discharges. The analysis in this EA concludes that the Proposed Action would be in compliance with the CWA as no new impervious surface would be created and all other potential impacts would be managed to prevent discharges of pollutants to waters of the U.S. through implementation of existing plans and policies.

6.1.1.9 National Historic Preservation Act

The NHPA was passed in 1966 to provide for the protection, enhancement, and preservation of those properties that possess significant architectural, archaeological, historical, or cultural characteristics. Section 106 of the NHPA requires the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking, prior to the expenditure of any federal funds on the undertaking, to take into account the effect of the undertaking on any historic property.

Three structures, Hangars 1, 2, and 4, constructed in 1959, would be directly impacted by interior and exterior modifications including reconfiguration, modernization, new construction, and expansion under the Proposed Action. All three hangars have been determined not eligible for nomination to the NRHP, thus no historic properties would be affected and no further steps would be required. Therefore, there is no significant impact to historic structures from the Proposed Action.

Other impacts to historic structures from the Proposed Action are expected to be indirect and less than significant. The change in noise associated with the end state would be small compared to existing conditions, and the small decrease in noise would not impact the physical and NRHP integrity of historic structures at NAS Lemoore.

As no TCPs have been identified within the boundaries of NAS Lemoore, no impacts to this resource type are anticipated as a result of the Proposed Action.

The DoN consulted with interested parties (Appendix A) regarding the proposed undertaking per 36 CFR 800.4. No concerns were identified by interested parties in the course of consultation. A letter of consultation was sent by the DoN to the California SHPO on June 23, 2011 requesting concurrence with the finding of no effect to cultural resources from the Proposed Action. A letter of concurrence on this finding was received from the California SHPO and is provided in Appendix A. EO 12372, *Intergovernmental Review of Federal Programs*, was issued in 1982 in order to foster an intergovernmental partnership and a strengthened federalism by relying on state and local processes for the state and local government coordination and review of proposed federal financial assistance and direct federal development.

The DoN pursues close planning relations with local and regional agencies and planning commissions of adjacent cities, counties, and states. In preparing this EA, relevant data from state, regional, and local agencies were reviewed in order to determine regional and local conditions associated with the Proposed Action.

6.1.1.10 Other Plans Related to NAS Lemoore

NAS Lemoore Air Installation Compatible Use Zone Report

The purpose of the AICUZ is to provide guidance to a variety of planning efforts to provide smart growth opportunities in the San Joaquin Valley and avoid conflicts with current and future military operations at NAS Lemoore. The AICUZ Program recommends community land uses that are compatible with noise levels, accident potential, and flight clearance requirements associated with military airfield operations. A goal of the AICUZ program is that the information will be incorporated into local, county, and regional planning. The Proposed Action would be consistent with AICUZ goals and recommendations as the Proposed Action, in combination with other actions (i.e., FRS reduction) would reduce noise impacts compared to the baseline.

Joint Land Use Study

The JLUS was a collaborative effort initiated by the communities in the vicinity of NAS Lemoore. One of the purposes of the JLUS was to identify land use issues that might impact the operational utility of NAS Lemoore and to identify actions the City of Lemoore, Kings County, and Fresno County can pursue to ensure that incompatible development does not impact the operational utility of NAS Lemoore. It is an action plan to guide future planning that all involved parties will benefit from. The JLUS was prepared due to the rapid population growth in California's Central Valley region and the potential for conflicts between NAS Lemoore and the public that might arise from this growth. The Proposed Action would be consistent with JLUS goals and recommendations since the action, in combination with other actions (i.e., FRS reduction) would reduce noise impacts compared to the baseline and no changes in on-base or surrounding land use would occur.

6.1.2 State, Local, and Regional Plans, Policies, and Controls

6.1.2.1 California Endangered Species Act

The Proposed Action would not adversely affect state-listed blunt-nosed leopard lizard, California least tern, Swainson's hawk, bald eagle, American peregrine falcon, Fresno kangaroo rat, or burrowing owl.

6.1.2.2 San Joaquin Valley Air Pollution Control District Rules and Regulations

Air emissions would comply with all applicable SJVAPCD Rules and Regulations and permit requirements.

In accordance with SJVAPCD Rule 4102, Nuisance, and Rule 4601, Architectural Coatings, the emission of any air pollutants as a result of ground disturbance, use of equipment, coatings application or other construction activities will be controlled by incorporating BMPs, to include minimal idling of engines, watering of soils to be disturbed, use of low volatility coatings and other recognized controls.

Paving and other applications requiring the use of asphalt products are not anticipated for the hangar renovations; however, if small surface areas require asphalt coatings, these will be selected and applied in accordance with Rule 4641, *Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations*. Additionally, hangar renovation activities that are planned will be reviewed to ensure compliance with Rule 4002, which incorporates by reference the National Emission Standards for Hazardous Air Pollutants.

6.1.2.3 City of Lemoore, Kings County, and Fresno County General Plan

Implementation of the Proposed Action would result in open space, agricultural, and unclassified lands exposed to noise levels of 65 dB CNEL or greater. Four ac (1.6 ha) of industrial use land within the City of Lemoore would no longer be affected by noise under the Proposed Action. The Proposed Action would result in an overall decrease in the land uses affected by noise greater than or equal to 65 dB CNEL by 1,468 ac (690 ha) (3%). No areas zoned for residential, commercial, or industrial use occur within the areas affected by noise levels above 65 dB CNEL. Therefore, the Proposed Action would result in no incompatible land use off-base.

6.1.2.4 Water Quality Control Plan for the Tulare Lake Basin

The Proposed Action may result in a small increase in the amount of water used for industrial and domestic purposes, but would have no direct impacts on surface or groundwater quality as defined by the Water Quality Control Plan for the Tulare Lake Basin (Plan). The Plan consists of designated beneficial uses to be protected, water quality standards for groundwater and surface waters in California to protect those uses, and a program of implementation needed for achieving the objectives.

The increased population and base operations at NAS Lemoore in the 2015 end state would increase the demand for water by approximately 39.7 mgy (122 afy), a 4% increase over the current usage of 888.5 mgy (2,727 afy). California Aqueduct surface water is allocated by Westlands Water District under separate contracts for agricultural or municipal and industrial uses, and these allocations are not interchangeable. If future municipal and industrial requirements increase, NAS Lemoore contract rates with Westlands Water District would be renegotiated. However, the base's total water demand of approximately 928 mgy (2,849 afy) is not anticipated to exceed its contract with the Westlands Water District for 977 mgy (3,000 afy) as a result of the Proposed Action.

The net decrease in aircraft operations at NAS Lemoore between 2011 and 2015 would likely reduce any releases of hazardous substances, decreasing the potential for surface water contamination. NAS Lemoore would continue to comply with established BMPs and programs for the management of hazardous substances and spill response at NAS Lemoore.

Therefore, the Proposed Action would not result in incompatibilities with regard to water use or water allocation for agricultural purposes or municipal and industrial requirements by the Westlands Water District. In addition, the Proposed Action would result in no significant impact to surface or groundwater resources.

6.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA (42 USC § 4332 Section 102(2)(C)(v) as implemented by CEQ regulation 40 CFR 1502.16) requires an analysis of significant, irreversible effects resulting from implementation of a Proposed Action. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources such as metal, wood, fuel, paper, and other natural or cultural resources) also are irretrievable. Human labor is also considered an irretrievable resource. All such resources are irretrievable in that they are used for a project and, thus, become unavailable for other purposes. An impact that falls under the category of the irreversible or irretrievable commitment of resources is the destruction of natural resources that could limit the range of potential uses of that resource.

Implementation of the Proposed Action would result in a less than significant irreversible commitment of building materials; vehicles and equipment used during removal and installation activities; and human labor and other resources due to the modifications to Hangars 1, 2, and 4. Energy (electricity and natural gas), water and fuel consumption, as well as demand for services, would not increase significantly as a result of the implementation of the Proposed Action. The commitment of these resources would be undertaken in a regular and authorized manner and does not present significant impacts within this EA.

6.3 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts include the possibility that choosing one alternative could reduce future flexibility to pursue other alternatives, or that choosing a certain use could eliminate the possibility of other uses at the site.

Implementation of the Proposed Action would not result in any environmental impacts that would narrow the range of beneficial uses of the project site or vicinity. The location of Hangars 1, 2, and 4 proposed for modification is a developed military site within the industrial (flight line) area of the base. The Proposed Action would not represent a new short-term use and would not impact the productivity of the natural environment. In addition, biological productivity would not be affected as implementation of the Proposed Action would not result in significant direct, indirect, or cumulative impacts to any biological resources.

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CHAPTER 7 REFERENCES

Berglund, B. and Lindvall, T. 1995. Community Noise. Institute of Environmental Medicine, Center for Sensory Research.

California Air Resources Board. 2004. 2004 Revision to the California State Implementation Plan for Carbon Monoxide. July.

California Department of Education. 2010. California Department of Education Dataquest. Available: http://dq.cde.ca.gov/dataquest/ (Accessed: December16, 2010).

California Department of Finance. 2007. Population Projections for California and it's Counties 2000-2050, by Age, Gender and Race Ethnicity. Available: http://www.dof.ca.gov/research/demographic/reports/projections/p-3/ (Accessed: December 16, 2010).

_____. 2010. Table E-1: City/County Population Estimates with Annual Percentage Change January 1 2009 and 2010. Available: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2009-10/view.php. (Accessed: December 21, 2010).

California Employment Development Department. 2010a. Labor Market Information Division. Labor Force and Industry Employment Data for Counties. Available: http://www.calmis.ca.gov (Accessed: December 20, 2010).

_____. 2010b. Labor Market Information Division. Monthly Labor Force Data for Cities and Census Designated Places. Available: http://www.labormarketinfo.edd.ca.gov. (Accessed: December 20, 2010).

Caltrans. 2009. Traffic Volumes on the California State Highway System, Routes 198-220 and 34-43. Available: www.dot.ca.gov/hq/traffops/safeesr/trafdata/2009all/docs/ on (Accessed: February 15, 2011).

City of Lemoore. 2008. 2030 General Plan. Available: http://www.lemoore.com/planning/general_plan/htm (Accessed: January 24, 2011).

Czech, J. and Plotkin, K. 1998. Wyle Research Report WR 98-13, NMAP 7.0 User’s Manual. November.

Defense Finance and Accounting Service. 2011. 2011 Military Pay Table. http://www.dfas.mil/militarypay/militarypaytables/2011MilitaryPayTable1-4.pdf.(Accessed February 10, 2011).

Department of Defense (DoD). 2000. DoD Instruction 6055.07, Accident Investigation, Reporting, and Record Keeping. 1 October.

_____. 2009. Undersecretary of Defense for Acquisition Technology and Logistics Memorandum on Methodology for Assessing Hearing Loss Risk and Impacts in DoD Environmental Impact Analysis.

Department of Navy (DoN). 1990. NAS Lemoore Natural Resources Management Plan. Prepared by: California State University, Fresno.

_____. 1992. NAS Lemoore, California, Master Plan. Prepared by Wolf Planning, Inc. for the DoN, Western Division Naval Facilities Engineering Command, San Bruno, California.

_____. 1994. Final EIS for Base Realignment of NAS Lemoore, California. Volume 1 of 3. November 1994.

_____. 1998a. Final EIS for Realignment of E-2 Squadrons from Marine Corps Air Station Miramar. Volume 1. March 1998.

_____. 1998b. Final EIS for Development of Facilities to Support Basing U.S. Pacific Fleet FA-18E/F Aircraft on the West Coast of the U.S. Volume I. May.

_____. 1998c. Final Site 4 Remedial Investigation Report. NAS Lemoore, Lemoore, California.

_____. 1999. Site 14 Remedial Investigation Final Report, NAS Lemoore, Lemoore, California.

_____. 2001a. Final Report for Utility Privatization at NAS Lemoore. October 2001.

_____. 2001b. U.S. Navy, Final INRMP and EA, NAS Lemoore, 2001-2005. Prepared for DoN Engineering Field Activity, West. June 2001.

_____. 2005a. Final Activity Overview Plan, NAS Lemoore. September.

_____. 2005b. Hazardous Waste Management Plan for NAS Lemoore, California. NAS Lemoore Instruction 5090.4C. Prepared by Environmental Site Office NAS Lemoore.

_____. 2006a. Renewable Energy and Distributed Generation Projects. NAVFAC Southwest. 2006.

_____. 2006b. Final EA for the NAS Lemoore Proposed Airspace, Lemoore, California. September.

_____. 2006c. Final NAS Lemoore Activity Overview Plan . September 2006.

_____. 2009a. 2009 Evaluation of the 2006 -- 2011 Housing Requirements and Market Analysis, 2009 - 2014 Lemoore, California.

_____. 2009b. NAS Lemoore Economic Impact, FY 08. October.

_____. 2010. Final Work Plan For Site 17 Multi-Phase Extraction System Repair And Operation And Maintenance NAS Lemoore, Lemoore, California

_____. 2011a. Work Plan Site 14 Source And Beneficial Use Characterization Lemoore, California.

_____. 2011b. Site 17 Multi-Phase Extraction System Repair and Operation and Maintenance Monthly Update: April 1 to June 30, 2011 NAS, Lemoore, California

_____. 2011c. Final Corrective Action Plan -- Site 17 NAS Lemoore, Lemoore, California.

Department of Water Resources. 2009. Tulare Lake Integrated Water Management. California Water Plan Update 2009, Volume 3. Bulletin 160-09.

Ecology and Environment. Final AICUZ Report, NAS Lemoore, California. May.

Federal Aviation Administration (FAA). 2004. Pilot/Controller Glossary. Addendum to Aeronautical Information Manual. FAA Order 7110.10, Flight Services, and FAA Order 7110.65, Air Traffic Control. Available: http://www.faa.gov/Atpubs/PCG.htm (Accessed: January 24, 2011).

Fresno County. 2011. Fresno County General Plan, Public Review Draft Policy Document, August 2010. http://www.co.fresno.ca.us/ (Accessed: January 24, 2011).

Kings County Association of Governments. 2008. 2008 Kings County Regional Transportation Improvement Program. Available: http://lemoorejlus.com/ (Accessed: January 2010).

_____. 2011. NAS Lemoore Joint Land Use Study Brochure. http://lemoorejlus.com/ (Accessed January2011).

Kings County Board of Supervisors 2010. 2035 Kings County General Plan. Prepared by the Kings County Community Development Agency. January 2010.

Knapp, Capt J. 2009. PowerPoint presentation: NAS Lemoore Update for Lemoore City Council. June 2, 2009.

Little, B., Siebert, E.M., Townsend, J.,. Sprinkle Jr., and Knoerl, J. 2000. Guidelines for Evaluating and Registering Archeological Properties. National Register Bulletin, U.S. Department of the Interior, National Park Service.

Mora, S. 1997. Solid Waste Specialist, Environmental Management Division, NAS Lemoore, written communication with Kris Kolassa, Tetra Tech, Inc. August 18 and October 1997.

Naval Air Station (NAS) Lemoore. 2007. BASH Management Plan.

_____. 2011. Final PRODUCTION REPORT 03 FEB 2011 Ground Support Equipment.xlsx. FRC-West, 900 Division. 2011.

Naval Air Station (NAS) Lemoore Federal Fire Fighters. 2009. Lemoore Federal Fire Fighters Website. Available: http://www.fedfire.org/ (Accessed: December 16, 2010).

Parker, P. and King, T. 1990. Guidelines for Evaluating and Documenting TCPs. National Register Bulletin 38, U. S. Department of Interior, Washington D.C. Available: http://www.nps.gov/history/NR/publications/bulletins/nrb38/ (Accessed: January 2011).

Planert, M., and Williams, J.S. 1995. Ground Water Atlas of the U.S. - Segment 1 California Nevada. Groundwater Atlas of the Unites States. Series Number 730-B. U.S. Geological Survey. Available: http://ca.water.usgs.gov/groundwater/gwatlas/valley/drainage.html (Accessed: December 20, 2010).

Poland, J. and Evenson, R. 1966. Hydrogeology and Land subsidence, Great Central Valley, California. *Geology of Northern California.* California Division of Mines and Geology, Bulletin 190.

Rasmussen, K. 2011a. Personal communication between K. Rasmussen (NAS Lemoore) and Neil Lynn (TEC Inc). January 11, 2011

Rasmussen, K. 2011b. Personal communication between K. Rasmussen (NAS Lemoore) and C. Jallo (TEC Inc). January 18, 2011

Rosenberg, D.J., Gervais, H., Ober, and DeSante, D. 1998. An Adaptive Management Plan for the Burrowing Owl Population at NAS Lemoore. Prepared for NAVFAC West. Report N68711-96LT-60008. 51p.

Rugen, D. 2005. Personal communication between D. Rugen, Manager (Natural Resource Management, IPT West) and Beth Defend (TEC Inc.) 2 May and 13 July.

Smith, A. 1997. Personal communication between A. Smith (Chief Operator, City of Brawley Public Works Department, Wastewater Treatment Plant) and E. Bondoc (Tetra Tech, Inc.) July 9 and October 1997.

Stewart, J. 2000. Personal communication between J. Stewart (Utilities Engineer, NAS Lemoore) and D. Amundson (Tetra Tech, Inc.) 8 February.

SWCA Environmental Consultants 2009. Advance Draft, Integrated Cultural Resources Management Plan for NAS Lemoore, Kings and Fresno Counties, California, 2010-2015. Prepared for DoN, NAVFAC southwest.

U.S. Census Bureau (USCB). 2010a. Terms and Definitions for Housing Unit Estimates. Available: http://www.census.gov/popest/topics/terms/housing_unit.html.

_____. 2010b. Census 2000 Demographic Profile Highlights. Available: http://factfinder.census.gov/ (Accessed: December 16, 2010).

_____. 2010c. 2005-2009 American Community Survey Five-Year Estimates. Available: http://factfinder.census.gov/ (Accessed: December 15, 2010).

_____. 2011a. 2009 Building Permits, Annual New Privately Owned Residential Building Permits, Kings and Fresno Counties. http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl. (Accessed: 4 January 4, 2011).

_____. 2011b. Census 2000 Summary File 1 100-Percent Data. Available: http://factfinder.census.gov/ (Accessed: February 16, 2011).

U.S. Department of Commerce. 2010. Bureau of Economic Analysis. Table CA1-3, Personal Income Summary. Available: http://www.bea.gov/regional/reis (Accessed: December 21, 2010).

U.S. Environmental Protection Agency (USEPA). 1982. Guidelines for Noise Impact Analysis. April.

U.S. Office of Personnel Management. 2011. General Schedule Locality Pay Table, Salary Table 2011-RUS. Available: http://www.opm.gov/oca/11tables/pdf/RUS.pdf (Accessed: February 10, 2011).

Washington State University. 2004. Resource Efficiency Management at NAS Lemoore, California. October.

Wasmer, F. and Maunsell, F. 2006a. BaseOps 7.3 User's Guide. Wasmer Consulting.

_____. 2006b. NMPlot 4.955 User's Guide. Wasmer Consulting.

Wyle 2011. Revised Final Aircraft Noise Study for Strike Fighter Realignment Environmental Assessment, Naval Air Station Lemoore, California. July 2011.

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APPENDIX A
CALIFORNIA SHPO FINDING

As part of the Environmental Assessment process for the proposed Strike Fighter Realignment at Naval Air Station Lemoore, California, the Navy consulted with applicable regulatory agencies. One agency, the California State Historic Preservation Office, was consulted with and a copy of the consultation letter is included in this appendix.

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DEPARTMENT OF THE NAVY
Environmental Management Division
750 Enterprise Ave.
Lemoore, CA 93246-5001

5090
Ser N45L/ 054
June 23, 2011

Milford Wayne Donaldson
State Historic Preservation Officer
Department of Parks and Recreation
1725 23rd Street, Suite 100
Sacramento, CA 95816

Dear Mr. Donaldson:

SUBJECT: USN110516A-MODIFICATIONS TO HANGAR 1 (BLDG 210), HANGAR 2 (BLDG 240), AND HANGAR 4 (BLDG 300), NAVAL AIR STATION LEMOORE, CA

This letter continues consultation on the subject undertaking with your office and local parties in accordance with 36 CFR 800, regulations implementing Section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 470S). This letter specifically reports on the results of the Navy's identification of potentially eligible historic properties in the Area of Potential Effect (APE) and the Navy's Determination of Eligibility for Hangar 1 (Bldg. 210), Hangar 2 (Bldg 240), and Hangar 4 (Bldg 300). In summary, the Navy is seeking your concurrence on its determination that the proposed under-taking qualifies for a finding of no historic properties affected, consistent with 36 CFR 800.4(d)(1).

Consultation History:

The Navy initiated consultation with your office on May 12, 2011. In that letter, the Navy proposed to make limited interior modifications to Hangar 1, in support of the relocation of two FA-18 E/F Super Hornet squadrons to Naval Air Station Lemoore (NASL) and the transition of up to five squadrons currently based at NASL from FA-18C Hornet aircraft to FA-18E/F Super Hornets. In a May 23, 2011 letter, you concurred that the Navy had properly identified and documented the project's APE pursuant to 36 CFR Parts 800.4(a)(1) and 800.16(d). Since your May 23rd letter, the undertaking has expanded to include Hangars 2 and 4 at NASL. This letter proposes an updated description of the undertaking and the Navy's Identification of Historic Properties and Determination of Eligibility for Hangars 1 and the Finding of Effect. Because the Identification of Historic Properties effort did not identify any properties inside the APE eligible for listing on the National Register of Historic Places (NRHP), the Navy is seeking your concurrence on a finding of no historic properties affected, consistent with 36 CFR 800.4(d)(1).

Undertaking:

In addition to the interior modifications to Hangar 1 (Bldg 210) specified in the initiation of consultation letter dated May 12, 2011, the Navy also proposes modifications to two additional structures inside a modified APE (See Enclosure 1). The Navy proposes to modify Hangar 2 (Bldg 240) by configuring approximately 2,500 square feet and constructing an additional 2,500 square foot second story to the building's elevation, to expand administrative capabilities for activities associated with the building's occupants. The Navy also proposes to modify Hangar 4 (Bldg 300) by reconfiguring approximately 17,650 square feet and constructing a 6,685 square foot second story upper elevation, to expand administrative capabilities for activities associated with the building's occupants and the larger Strike Fighter Realignment. The modified APE for the undertaking is limited to the footprints of Hangars 1, 2, and 4, including approximately 25 meters of hardscape parking/tarmac area around each structure. Any required laydown areas would be confined to this APE.

Identification of Historic Properties and Determination of Eligibility:

In compliance with 36 CFR 800.4(a) and (b), the Navy has identified and surveyed possible historic structures and buildings inside the APE in an effort to identify all historic properties present. Consistent with 36 CFR 800.4(c)(1), the Navy has evaluated the properties inside the APE and has determined that Hangars 1, 2, and 4 are not significant and are not eligible for listing on the NRHP. Based on existing cultural resources reports, know Cold War-era historic contexts for NASL, a recent photographic survey, and analysis of property records, the Navy has applied the NRHP criteria (36 CFR part 63) to the properties identified within the APE that have not been previously evaluated for NRHP eligibility. Navy has determined that Hangars 1, 2, and 4 do not possess historic significance sufficient to qualify them for eligibility for listing on the NRHP. The attached DPR 523 form details the Navy's evaluation.

Built in 1959 and commissioned in 1961, Hangars 1, 2, and 4 have only recently turned fifty years of age. Previous analyses, specifically the 1997 Historic and Archeological Resources Protection (HARP) Plan, did not identify any historic context(s) at NASL that could provide Hangars 1, 2, and 4 with "exceptional significance" necessary for eligibility under NRHP Criterion G for structures and buildings less than 50 years old. Nothing about the historic context has changed at NASL since Hangars 1, 2, and 4 turned fifty years old, and nothing researched for this evaluation of Hangars 1, 2, and 4 produced information that would demonstrate "exceptional significance" and lead to determination of eligibility under Cold War-era themes. The attached DPR 523 form (Enclosure 1) provides historic context, significance evaluation, and detailed determination of eligibility under NRHP Criteria A, B, C, and D. In summary, the Navy has determined that Hangars 1, 2, and 4 do not meet the criteria for eligibility required for listing on the NRHP.

5090
Ser N45L/ 054
June 23, 2011

Summary:

Based on the evaluation of Hangar 1, and the analyses of previous cultural resources reports, the Navy seeks your concurrence that the subject undertaking qualifies for a determination of "no historic properties affected" consistent with 36 CFR 800.4(d)(1). At this time, the Navy respectfully requests your comments and concurrence within 30 days, consistent with 36 CFR 800.4(d)(1).

The Navy respectfully requests written concurrence with the determination of eligibility and finding of effect described above. If you have comments or questions, please contact Dr. David Sproul, Naval Facilities Engineering Command, Southwest, at (619) 532-2819 or via email at david.sproul@navy.mil.

Sincerely,

SCOTT R. TARBOX
Installation Environmental Program Manager
Environmental Management Division

Enclosures: 1. Hangar 1 (Bldg 210), Hangar 2 (Bldg 240), Hangar 4 (Bldg 300) Strike Fighter Realignment Area of Potential Effects
2. Department of Parks and Recreation Primary Record (Form DPR 523A)

STATE OF CALIFORNIA – THE NATURAL RESOURCES AGENCY
EDMUND G. BROWN, JR., *Governor*

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August 16, 2011

Reply in Reference To: USN110516A

Scott R. Tarbox
Department of the Navy
Environmental Management Division
750 Enterprise Ave.
Lemoore, CA 93246-5001

RE: Modifications to Hangars 1, 2, and 4, Naval Air Station Lemoore, Lemoore, CA

Dear Mr. Tarbox:

Thank you for requesting my comments on the above-referenced undertaking. Pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act, the United States Navy (Navy) is requesting my concurrence with a Determination of Eligibility and a finding of No Historic Properties Affected.

The Navy intends to undertake a number of interior renovations at three hangars, including construction of demountable partitions, refinishing of interior surfaces, and upgrades to mechanical, plumbing, electrical, and communication systems. The structures were built between 1959 and 1961 to facilitate the maintenance and storage of fighter jets. In our previous round of consultation I concurred that that the Area of Potential Effects (APE) had been properly determined and documented pursuant to 36 CFR Parts 800.4 (a)(1).

Since this time the project description has changed; the Navy now wishes to renovate two additional hangars, identified as Hangars 2 and 4. In addition to a host of interior improvements, a second-story addition will be constructed atop Hangar 4. In addition to updating the APE to include Hangars 2 and 4 and approximately 25 meters of parking and tarmac areas around each structure, you have provided eligibility determinations for Hangars 1, 2, and 4.

Having reviewed your submittal, I concur with your Determinations of Eligibility and Finding of Effect. The Hangars did not play a significant role in the themes of the Cold War, nor do the structures appear to possess architectural significance. Please be advised that in the event of a change in project description or an inadvertent discovery, you may have additional responsibilities under 36 CFR Part 800.

Thank you for considering historic properties during project planning. If you have any questions or comments, please contact Tristan Tozer of my staff at (916) 445-7027 or by email at ttozer@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

APPENDIX B
FEDERALLY AND STATE-LISTED THREATENED AND ENDANGERED SPECIES, CANDIDATE SPECIES, AND SPECIES OF SPECIAL CONCERN AT NAS LEMOORE

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Table B-1. Federally and State-Listed Threatened and Endangered Species, Candidate Species, and Species of Special Concern Known to Occur, or that May Potentially Occur, at NAS Lemoore

Common Name	Scientific Name	Federal/State/CNPS[1] Listing Status	Presence[2] Confirmed	May[2,3] Occur	Optimal Habitat
Plants					
Crownscale	*Atriplex coronata* var. *coronata*	-- /-- / 4	Yes	--	Moist grasslands and wetlands.
Vernal barley	*Hordeum intercedens*	-- /-- / 3	Yes	--	Primarily vernal pools.
San Joaquin wooly threads	*Monolopia congdonii*	E / -- / 1B	No	Yes	Vernal pools.
Invertebrates					
Vernal pool fairy shrimp	*Branchinecta lynchi*	T / -- /--	No	Yes	Vernal pools.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphis*	T / -- / --	No	Yes	Mature elderberry shrubs.
Amphibians					
Western spadefoot toad	*Spea hammondi*	SC / SSC / --	Yes	--	Open areas with sandy or gravelly soils.
Reptiles					
Northwestern pond turtle	*Emys marmorata*	SC / SSC / --	No	Yes	Ponds and marshes.
Blunt-nosed leopard lizard	*Gambelia sila*	E / E / --	No	Yes	Semi-arid grasslands, alkali flats, and washes.
San Joaquin whipsnake	*Masticophis flagellum ruddocki*	-- / SSC / --	No	Yes	Dry, treeless areas, including grasslands and saltbush scrub.
Giant garter snake	*Thamnophis gigas*	T / T / --	No	Yes	Emergent marsh.
Birds					
Double-crested cormorant	*Phalacrocorax auritus*	-- / WL / --	Yes	--	Wetlands, and a colonial nester in dead trees.
California least tern	*Sterna antillarum browni*	E /E / --	Yes	--	Salt pannes, beaches, and dunes.
Black tern	*Chlidonias niger*	-- / SSC / --	Yes	--	Freshwater marshes and marshy lakes in summer; sandy coasts on migration and in winter.
California gull	*Larus californicus*	-- / WL / --	Yes	--	Isolated islands in rivers, reservoirs, and lakes; winters along Pacific coast.

Table B-1. Federally and State-Listed Threatened and Endangered Species, Candidate Species, and Species of Special Concern Known to Occur, or that May Potentially Occur, at NAS Lemoore

Common Name	Scientific Name	Federal/State/CNPS[1] Listing Status	Presence[2] Confirmed	May[2,3] Occur	Optimal Habitat
Long-billed curlew	*Numenius americanus*	-- / WL / --	Yes	--	Breeds in northern CA; winters along coastal estuaries, grasslands, and croplands.
White-faced ibis	*Plegadis chihi*	-- / WL / --	Yes	--	Emergent wetlands; mostly a wintering or transient species in CA.
Swainson's hawk	*Buteo swainsoni*	-- / T / --	Yes	--	Nests in tall trees and feeds in croplands, especially alfalfa.
Ferruginous hawk	*Buteo regalis*	-- / WL / --	No	Yes	Requires large, open tracts of grasslands, sparse shrubs, or desert habitats, with elevated structures for nesting.
White-tailed kite	*Elanus leucurus*	-- / FP / --	Yes	--	Nests in trees; forages in open grasslands, meadows, farmlands, and emergent wetlands.
Northern harrier	*Circus cyaneus*	-- / SSC / --	Yes	--	Nests on ground along wetland edges.
Sharp-shinned hawk	*Accipiter striatus*	-- / WL / --	Yes	--	Migrant and winter resident; eats mostly birds.
Cooper's hawk	*Accipiter cooperi*	-- / WL / --	Yes	--	Nests in deciduous trees and feeds on small birds and mammals.
Golden eagle	*Aquila chrysaetos*	BGEPA / FP, WL / --	No	Yes	Year-round resident; nests in tall trees or on cliffs, and feeds on rabbits and rodents.
Bald eagle	*Haliaeetus leucocephalus*	BGEPA / E / --	No	Yes	Nests in trees near reservoirs, lakes, and rivers; feeds on fish and waterfowl, and may eat carrion.
Merlin	*Falco columbarius*	-- / WL / --	No	Yes	Uncommon winter migrant; frequents numerous habitat types.
American peregrine falcon	*Falco peregrinus anatum*	S / FP / --	No	Yes	Uncommon breeding resident in northern CA; winters in the Central Valley.
Prairie falcon	*Falco mexicanus*	-- / WL / --	No	Yes	Uncommon year-round resident; frequents open habitats, savanna, and desert scrub.

Table B-1. Federally and State-Listed Threatened and Endangered Species, Candidate Species, and Species of Special Concern Known to Occur, or that May Potentially Occur, at NAS Lemoore

Common Name	Scientific Name	Federal/State/CNPS[1] Listing Status	Presence[2] Confirmed	May[2,3] Occur	Optimal Habitat
Western snowy plover	*Charadrius alexandrinus nivosus*	FT / SSC / --	No	Yes	Intertidal mudflats, beaches, dunes, salt flats
Mountain plover	*Charadrius montanus*	FPT /SSC / --	No	Yes	Uncommon winter resident in short grasslands and plowed fields.
Burrowing owl	*Athene cunicularia*	SC / SSC / --	Yes	--	Year-round resident, mostly in open, dry grasslands and desert habitats.
Long-eared owl	*Asio otus*	SC / CSC / --	No	Yes	Uncommon winter visitor in the Central Valley; prefers riparian woodlands.
Short-eared owl	*Asio flammeus*	-- / SSC / --	Yes	--	Widespread winter migrant, but may breed in the San Joaquin Valley; prefers open habitats, such as grasslands.
California horned lark	*Eremophila alpestris actia*	-- / WL / --	Yes	--	Uncommon sub-species found in grasslands, fallow fields, and pastures.
Loggerhead shrike	*Lanius ludovicianus*	-- / SSC / --	Yes	--	Common resident; prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.
Tricolored blackbird	*Agelaius tricolor*	SC / SSC / --	Yes	--	Colonial nesters in emergent wetlands; forages in grasslands and pastures.
Yellow warbler	*Dendroica petechia*	-- / SSC / --	Yes	--	Uncommon breeder in riparian woodlands; feeds on insects and spiders.
Mammals					
Nelson's antelope ground squirrel	*Ammospermophilus nelson*	-- / ST / --	No	Yes	Dry, flat, or slightly rolling terrain in areas of alluvial or sandy soils, such as grasslands and alkali scrub.
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	E / E / --	Yes	--	Grasslands and alkali dessert scrub, in the southern San Joaquin counties.
Short-nosed kangaroo rat	*Dipodomys nitratoides brevinasus*	SC / SSC / --	No	Yes	Arid grasslands and desert scrub with powdery soils; primarily in southern San Joaquin counties.

Table B-1. Federally and State-Listed Threatened and Endangered Species, Candidate Species, and Species of Special Concern Known to Occur, or that May Potentially Occur, at NAS Lemoore

Common Name	Scientific Name	Federal/State/CNPS[1] Listing Status	Presence[2] Confirmed	May[2,3] Occur	Optimal Habitat
Tipton kangaroo rat	*Dipodomys n. nitratoides*	E / E / --	Yes	--	Arid land with level terrain in the southern San Joaquin counties.
Western mastiff bat	*Eumops perotis californicus*	SC / SSC / --	Yes	--	Uncommon resident in southeastern San Joaquin Valley; roosts in crevices in cliff faces, high buildings, trees, and tunnels.
Yuma myotis bat	*Myotis yumanensis*	SC / -- / --	No	Yes	Prefers open forests and woodlands; roosts in buildings, mines, caves, or crevices.
Townsend's big-eared bat	*Corynorhinustownsendii*	SC / SSC / --	No	Yes	Uncommon species; requires caves, mines, tunnels, buildings, or other human-made structures for roosting.
Tulare grasshopper mouse	*Onychomys torridus tularensis*	SC / SSC / --	Yes	--	Arid habitats along the sloping margins of the San Joaquin Valley.
San Joaquin pocket mouse	*Perognathus inornatus*	SC / -- / --	Yes	--	Open grasslands or scrub areas with fine textured soils.
San Joaquin kit fox	*Vulpes macrotis mutica*	E / T / --	Yes	--	Uses dens in grasslands and farm-field edges in the San Joaquin Valley.

Notes: (1) FE = federally endangered, FT = federally threatened, FPT = federally proposed threatened, SC = federal species of concern (includes BLM and USFS "sensitive" species), SE = state endangered, ST = state threatened, SSC = California Species of Special Concern, FP = state fully-protected, WL = state "watch list," BGEPA = protected by the Bald and Golden Eagle Protection Act. For CNPS-listed plant species: 1B = rare throughout its range and most are endemic to California, 3 = a review list (need more information), and 4 = limited distribution or infrequent throughout a broader area in California.

Based on information provided in the installations INRMP (DoN 2001b), a search of the 2009 California Natural Diversity Data Base (2009), Appendix A (Halstead 2008) of the Kings County General Plan Update 2035 (Kings County Board of Supervisors 2010), and a recently updated "Special Animals" list downloaded from CDFG's website (CDFG 2011)

Sensitive species in the region whose presence is unconfirmed, and the last known record of occurrence or sighting is more than 20 years old, have been excluded from this table. Also excluded are species of unknown occurrence that did not show up in the 9-quad search of California Natural Diversity Data Base.

References: California Department of Fish and Game (CDFG). 2011. California Department of Fish and Game, Biogeographic Data Branch, California Natural Diversity Database, "Special Animals" (898 taxa), January 2011. 60p.

California Natural Diversity Base 2009. Search of nine USGS 7.5-minute topographic quadrangles, including: Vanguard, Calflax, Five Points, Burrell, Riverdale, Lemoore, Stratford, Westhaven, and Huron.

APPENDIX C
AIR QUALITY

1. Conformity Applicability Analysis
2. Appendix A to the Applicability Analysis - Air Quality Calculations
3. Record of Non-Applicability (RONA)

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AIR QUALITY CONFORMITY APPLICABILITY ANALYSIS
STRIKE FIGHTER REALIGNMENT AT
NAVAL AIR STATION LEMOORE

LEMOORE, CA

Prepared for:

Naval Facilities Engineering Command
Atlantic Division
Norfolk, VA

Prepared by:

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Executive Summary

Pursuant to the requirements of the Clean Air Act General Conformity Rule (GCR), this document was prepared to determine the applicability of the GCR to the proposed strikefighter realignment action to be located at Naval Air Station (NAS) Lemoore, located in Lemoore, California. The Proposed Action would realign Strike Fighter community assets at NAS Lemoore to more efficiently support operational requirements in the Pacific. NAS Lemoore is the West Coast Master Jet Base, hosting the Navy's entire U.S. West Coast Strike Fighter VFA community. The purpose of the Proposed Action is to provide Strike Fighter community assets needed to meet the changing operational demand in the Pacific and to mitigate shortfalls in Strike Fighter community assets due to the age of FA-18C/D aircraft. The Proposed Action would include in-place transition of up to five Strike Fighter squadrons currently based at NAS Lemoore from older, FA-18C/D Hornet aircraft to newer FA-18E/F Super Hornets and relocate two 12-plane, East Coast FA-18 E/F Super Hornet squadrons to NAS Lemoore. Under the Proposed Action, aircraft operations at NAS Lemoore would decrease by about 24% compared to baseline conditions, and aircraft loading would decrease by four aircraft. The Proposed Action would also include an increase of 182 personnel (+262 officers and enlisted, -80 contractors). Hangars 1, 2 and 4 would be reconfigured and modernized in order to accommodate Super Hornet squadrons; two of the hangars would require second story additions to be added. The Proposed Action is scheduled to occur from 2012 to 2015.

An analysis of criteria pollutant and ozone precursor emissions is required to determine if a formal Conformity Determination is required. Determination of applicability was made by comparing estimated emissions from the proposed action to the *de minimis* emission rates specified under the GCR (40 CFR 93.153). The SJVAPCD comprises all of Fresno County, Kings County, Madera County, Merced County, San Joaquin County, Stanislaus County, Tulare County and the San Joaquin Valley Air Basin portion of Kern County, which is that portion of the county that straddles the Sierra Nevada and Tehachapi mountains (40 CFR 81.165). The SJVAPCD is currently designated as nonattainment for the following NAAQS: 8-hour ozone (extreme), 24-hour $PM_{2.5}$, and annual $PM_{2.5}$ (40 CFR 81.305). Additionally, the SJVAPCD has achieved attainment for PM_{10}, and so is a PM_{10} Maintenance Area. The GCR specifies the *de minimis* levels for the ozone precursors nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in nonattainment areas, as well as for $PM_{2.5}$ and its precursors NO_x and SO_2. NO_x and SO_2 are not further evaluated as PM2.5 precursors because they are not considered significant $PM_{2.5}$ precursors in this region. Because the SJVAPCD is in extreme nonattainment for ozone the *de minimis* levels evaluated in this analysis are 10 tons per year for VOCs and NOx, respectively. The *de minimis* levels evaluated in this analysis for $PM_{2.5}$, and PM_{10} are 100 tons per year, respectively.

Potential emissions that could result from the proposed action were calculated for all applicable criteria pollutants emitted for every year during which the realignment transitions would occur; however, the conformity analysis focused on VOCs, NO_x, $PM_{2.5}$, and PM_{10}. The calculated emissions for the proposed strikefighter realignment are below the *de minimis* levels for these pollutants; therefore, a formal Conformity Determination is not required.

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LIST OF TABLES

Acronyms and Abbreviations

CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
EF	Emission Factor
EPA	Environmental Protection Agency
ft	feet
ft^2	square foot
g	grams
GCR	General Conformity Rule
GOV	Government-owned vehicle
hp	horsepower
hr	hour
LF	Load Factor
mmBtu	million British Thermal Units
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NO_x	nitrogen oxides
O_3	ozone
Pb	lead
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter not exceeding 2.5 microns
PM_{10}	Particulate matter with an aerodynamic diameter not exceeding 10 microns
POV	Privately-owned vehicle
ROG	Reactive Organic Gases
TOG	Total Organic Gases
SJVAPCD	San Joaquin Valley Air Pollution Control District
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
VOCs	volatile organic compounds

1.0 INTRODUCTION

1.1 Air Quality

Air quality is defined as the ambient air concentrations of specific criteria pollutants determined by the EPA to be of concern to the health and welfare of the general public. These criteria pollutants include ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. Two types of NAAQS have been established by the EPA for these criteria air pollutants. Primary ambient air quality standards are designed to protect public health with an adequate margin of safety. Secondary ambient air quality standards are designed to protect public welfare-related values including property, materials, and plant and animal life. The maximum primary and secondary standards (concentrations) of criteria pollutants are listed in the Code of Federal Regulations, Title 40, Part 50 (40 CFR 50) and apply throughout the United States, including California.

1.2 Criteria Air Pollutants

Criteria pollutants affecting air quality in a given region can be characterized as being emitted from either stationary or mobile sources. Stationary sources of emissions are typified by emissions from smokestacks, turbine engines, and refinery and chemical processing operations. Mobile sources of emissions include emissions from cars, airplanes, ships, and boats. Air quality within a region is a function of the stationary and mobile source types and amount of pollutants emitted, size and topography of the air basin, and prevailing meteorological conditions. PM, NO_2, CO, lead, and SO_2 are emitted directly from air pollution sources.

Areas that comply with NAAQS are designated as attainment areas. Areas that violate ambient air quality standards are designated as non-attainment areas. Areas that have improved air quality from non-attainment to attainment are designated as attainment/maintenance areas. Areas that lack monitoring data to demonstrate attainment or non-attainment status are designated as unclassified and are treated as attainment areas for regulatory purposes. Varying levels of non-attainment have been established for ozone, CO, PM_{10}, and $PM_{2.5}$ to indicate the severity of the air quality problem (i.e., the classifications run from moderate to serious for PM_{10} and from marginal to extreme for ozone).

Ozone, commonly known as smog, is a highly reactive gas that can damage lung tissue and affect respiratory function. While ozone in the lower atmosphere is considered a damaging air pollutant, ozone in the upper atmosphere is beneficial, as it protects the earth from harmful ultraviolet radiation. Ozone is formed as a result of complex photochemical reactions in the atmosphere between VOCs, NO_x, and oxygen. Therefore, ozone is controlled by strictly limiting emissions of VOCs and NO_x in areas where ozone is a problem.

On April 8, 2004, EPA's Regional Administrator signed a final rule re-designating the SJVAPCD to extreme under EPA's 1-hour ozone standard. On December 11, 2009, EPA issued final approval of the SJVAPCD 2004 *Extreme Ozone Attainment Demonstration Plan*, which shows that the area will have in place the controls necessary to meet the 1-hour ozone standard by the area's Clean Air Act (CAA) deadline of 2010.

The SJVAPCD Board adopted the *2007 Ozone Plan* on April 30, 2007. The CARB approved the plan on June 14, 2007. The plan was due to EPA by June 15, 2007. The SJVAPCD was re-designated from "serious" to "extreme" nonattainment under EPA's 8-hour ozone standard on April 15, 2010.

The SJVAPCD adopted the *2008 $PM_{2.5}$ Plan* following a public hearing on April 30, 2008. This plan sets forth the methods to implement so that the SJVAPCD will attain all the $PM_{2.5}$ standards - the 1997 federal standards, the 2006 federal standards, and the state standard - as soon as possible. The CARB submitted the 2008 $PM_{2.5}$ Plan to EPA June 30, 2008.

The CARB approved the SJVAPCD 2007 *PM_{10} Maintenance Plan and Request for Redesignation* on October 27, 2007. On November 12, 2008 EPA published final approval of the re-designation of SJVAPCD from PM_{10} nonattainment to attainment.

1.3 Federal Requirements

Section 176(c) of the CAA, as amended, requires federal agencies to ensure that actions undertaken in non-attainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The CAA places responsibility on individual states to achieve and maintain the NAAQS through EPA-approved SIPs.

Under the GCR (40 CFR 93, Subpart B), emissions of criteria pollutants and their precursors (the ozone precursors VOCs and NO_x, $PM_{2.5}$, the $PM_{2.5}$ precursor SO_2, and PM_{10}) that are associated with a proposed action that is in a non-attainment area for a given pollutant must be below *de minimis* emission rates for that pollutant to be exempt from a formal conformity determination. The *de minimis* emission rates for VOCs and NOx emissions are 10 tons/year, respectively, for proposed actions in an extreme non-attainment area. *De minimis* rates for the NAAQS pollutants of concern are listed in Table 1. Proposed actions that contribute less than these amounts and have no other conformity requirements are exempt from the GCR. Proposed actions that exceed the pollutant *de minimis* thresholds in any given year must undergo a detailed analysis and a formal conformity determination is required. Finally, mitigation would be required if the detailed analysis indicates an exceedance of the *de minimis* levels for any of the pollutants of concern.

Table 1 Criteria Pollutant General Conformity de minimis Emission Rates (tons/year)

	***de minimis* Thresholds in Tons/Year**	
	Criteria Pollutant	**Precursor**
VOCs		10
NOx		10
PM2.5	100	
PM10	100	

1.4 State Requirements

The CAA requires each state to develop, adopt, and implement a SIP to achieve, maintain, and enforce federal air quality standards throughout the state. SIPs are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated.

CARB is responsible for the preservation, protection, and improvement of the State's air resources. California law has established 35 local air pollution control districts in California. In general, these local districts are responsible for control of stationary sources of emissions. While mobile source emissions are mostly controlled by state and federal regulations, local districts do have authority to implement control measures which affect transportation sources, including automobiles. Local district activities are overseen by both the state and federal agencies.

2.0 SITE DESCRIPTION

NAS Lemoore is the West Coast Master Jet Base, hosting the United States Department of Navy entire West Coast Strike Fighter (VFA) community. NAS Lemoore is located in the central portion of the San Joaquin Valley, approximately 80 miles east of the Pacific Ocean, in Kings County and Fresno County, California (Figure 1.1-1). NAS Lemoore encompasses 18,784 acres of DoN-owned land of which 15,744 ac are within Kings County and 3,040 are within Fresno County.

NAS Lemoore hosts more than 40 tenants in aviation, including Commander Strike Fighter Wing, US Pacific Fleet, which comprises FA-18C/D squadrons and FA-18E/F squadrons, as well as an FA-18C/D FRS training squadron and an FA-18E/F FRS.

The FA-18 C/D Hornet is the older variant, twin-engine, multi mission fighter/attack aircraft that can operate from either aircraft carriers or land bases. The FA-18 E/F Super Hornet is the newer variant, twin-engine, multi mission fighter/attack aircraft that fulfills the same types of roles as the C/D models. The Super Hornet carries 33% more internal fuel, which effectively increases mission range by 41-50%.

Airfield operations and commuting personnel for 2011 represent the baseline, with a total of 238 aircraft. The aircraft operational baseline for the conformity applicability analysis is presented in Table 2.

Table 2. Baseline Aircraft Operations for NAS Lemoore, Based and Transient Aircraft

Aircraft Type	Fleet Squadrons	No. of Aircraft	[1]Annual Operations	FRS Squadrons	No. of Aircraft	[1]Annual Operations
[2]FA-18 C/D	7	57	32,475	1	25	46,391
[3]FA-18 C/D		13	7,406		5	9,278
FA-18 E/F	8	94	41,549	1	44	61,818
FA-18 C/D/E/F	[4]Transient	NA	3,630			
C-40A	Transient	NA	1,331			
C-2	Transient	NA	1,789			

[1]Wyle Labs (Dec 2010)
[2]Aircraft with F404-GE-400 engines
[3]Aircraft with F404-GE-402 engines
[4]Transient aircraft are identified by operations only.

Baseline Ground Support Equipment (GSE) information was obtained from NAS Lemoore staff (FRC West) and are presented in Table 3.

Table 3. Baseline Ground Support Equipment for NAS Lemoore

Designation	GSE Type	Total Items	Avg Fuel consumption in gal/month/unit	Brake Horsepower (BHP)
Towtractor	A/S32A-45	48	37.4	88
Towtractor	A/S32A-37	1	1.0	192
Turbine	MSU-200	5	0.6	396
Air Compressor	ACU-20M	2	0.5	58
Hydraulic Power Supply	HYD, Portable Test Stand	37	3.6	111
Air Conditioning Unit	A/M32C-17	8	1.0	210
MEPP	A/M32A-108	34	28.1	215
MEPP	NC-10	3	28.1	215
Flood Light Assembly	A/M42M-2A	14	3.1	19

Table 4 presents government-owned vehicles (GOVs) associated with the baseline, including squadron-assigned vehicles and buses that are used to transport squadron staff from base housing to the airfield. Data were obtained from NAS Lemoore personnel (Cardoza 2011) and segregated into mileage per year for each vehicle.

Table 4. Baseline GOV emissions

Vehicle	# Vehicles	Mi/Yr
7-passenger van	2	1,508
1/2-ton pickup truck	18	500
1/2-ton flatbed truck	2	1,508
Compact pickup trucks	4	1,508
44-passenger buses	4	1,530

Table 5 presents baseline commuter data, including military personnel who commute within the fenceline from base housing to the airfield as well as personnel, both military and contractor, who commute from the surrounding area to the installation. Data were obtained from NAS Lemoore personnel (Richard 2011) and segregated into mileage per day and number of days per year for each vehicle.

Table 5. Baseline Commuters - On Base and Off Base

Commuters On Base	# Vehicles	# Days	Mi/Day	Commuters Off Base	# Vehicles	# Days	Mi/Day
carpool	270	240	14	carpool	425	240	25
cars	647	240	14	cars	1388	240	25
SUV/pickups	324	240	14	SUV/pickups	692	240	25
8-cyl	108	240	14	8-cyl	232	240	25

3.0 PROPOSED ACTION DESCRIPTION

The Proposed Action involves realigning two 12-plane, East Coast FA-18 E/F squadrons to NAS Lemoore and transitioning in-place up to 54 FA-18C/D aircraft to FA-18 E/F aircraft at NAS Lemoore during the 2012 to 2015 timeframe. East Coast VFA squadrons would be identified based on operational availability to execute the relocation to NAS Lemoore tentatively planned for the timeline. The timing of the in-place transitions is dependent on FA-18E/F acquisition schedules and the availability of training resources. Additionally, two H-60 helicopters are expected to arrive as part of an independent action for enhanced search and rescue capabilities at NAS Lemoore beginning in 2012. The Proposed Action would include a net decrease of four fixed-wing aircraft, a net increase of two rotary-wing aircraft, a net increase of approximately 140 personnel, and Hangars 1, 2, and 4 are slated for renovation, including second story additions to Hangars 2 and 4. No additional facilities construction or modification, and no changes to aircraft operations, ranges, or airspace, are proposed.

4.0 METHODOLOGY

In accordance with 40 CFR 93, Subpart B and Appendix F of OPNAV 5090.1C, the incremental increase in emissions above the existing conditions has been considered and includes reasonable foreseeable direct and indirect emissions, and the total of direct and indirect emissions from the action have been evaluated against the GCR *de minimis* thresholds.

Emissions resulting from the proposed action were estimated based on the expected number, type, and duration of aircraft operations, GSE operations and personnel on an annual basis to complete the proposed action. According to preliminary estimates, the proposed action would require the aircraft, GSE, and motor vehicles identified in Appendix A.

The baseline and the years 2012-2015, during which realignment activities would be scheduled, were evaluated to assess estimated emissions.

5.0 PROCEDURE AND CALCULATIONS

5.1 Emissions Calculations

Operation emissions calculations performed for the Proposed Action include aircraft operations (based and transient FA-18 aircraft, C-40A, and C-2 aircraft), aircraft engine maintenance runups (engine on aircraft), GSE, GOVs associated with the squadrons, and POVs associated with commuting staff. Appendix A contains the complete calculations for all of the aircraft, GSE, and motor vehicles included in the baseline and the Proposed Action. In addition, the drawdown of the FA-18 C/D FRS is included because, while not part of the action, will occur during the timeframe of the strikefighter realignment and so influences the total air emissions associated with annual operations at NAS Lemoore. The No Action Alternative calculations are also included in Appendix A.

5.2 Aircraft

Aircraft emissions were calculated based on the following inputs:

- Flight profiles for the FA-18 C/D and E/F aircraft were obtained from *Aircraft Noise Study for NAS Lemoore* (Wyle Labs, December 2010).
- Flight operations were obtained from LemooreDataValidationSec5-With no action added 20110404.xlsx (Wyle Labs, 2011).
- Engine Maintenance Run Up Data from LemoreDataValidationSec6-MaintenanceRunups20110124.xlsx (Wyle Labs, 2011) with updates by NASL personnel (Carbajal/Blazich, 2011).
- Indoor test cell data from AESO Memorandum Report No. 2000-22, Revision A, March 2011 and email communication with AESO (Coffer 2011) and NASL (Bugay 2011).
- Start/shut off, taxi, and hot refueling profiles were provided by Qinetiq contractor personnel at NAS Lemoore.
- FFR (fuel consumption), and emission indices for FA-18 aircraft were obtained from AESO Memorandum Report No. 9734, Rev C (November 2002), AESO Memorandum Report No. 9815, Rev G (March 2011), AESO Memorandum Report No.2003-01 (November 2002), AESO Memorandum Report No. 9725, Rev D (February 2011).
- LTO cycle data, FFR (fuel consumption), and emission indices for C-40A aircraft were obtained from Engine Datasheet 8CM061 04102007, ICAO Engine Exhaust Emissions Data Bank (ICAO, 2007).
- LTO cycle data, FFR (fuel consumption), and emission indices for C-2 aircraft were obtained from AESO Memoranda 9919C (September 2010), and 9936C (February 2010).
- Sulfur dioxide for transient aircraft other than the FA-18s were calculated based on 0.04% sulfur content in *Trace Element and Polycyclic Aromatic Hydrocarbon Analyses of Jet*

Engine Fuels: Jet A, JP5, and JP8, Technical Report 1845, SSC San Diego, 2000 and assuming that all the sulfur in the fuel is converted to SOx (as SO_2) during combustion.
- H-60 helicopter LTO cycle data, FFR, emission indices, and engine maintenance runup data were obtained from AESO Memorandum Report No. 9929, Revision A (November 2009).

5.1.1 FA-18 Aircraft Engine Maintenance Runups

Maintenance runup emissions were calculated using the following reference materials:

- Annual engine maintenance runup totals and times for the FA-18 C/D and E/F aircraft were obtained from *Aircraft Noise Study for NAS Lemoore* (Wyle Labs, December 2010).
- FFR (fuel consumption), and emission indices for FA-18 aircraft were obtained from AESO Memorandum Report No. 9734, Rev C (November 2002), AESO Memorandum Report No.2003-01 (November 2002), AESO Memorandum Report No. 9725, Rev D (February 2011).

5.2 Ground Support Equipment

A list of the GSE associated with aircraft based at NAS Lemoore was provided by installation personnel (FRC West) and included the number of pieces of equipment, type, horsepower, and the average amount of fuel consumed on a monthly basis.

- Emission factors obtained from Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition (EPA, 2010), Table A4 (Tier 1 assumed).
- $PM_{2.5}$ calculated as 97% of PM_{10} emissions, in accordance with EPA OTAQ/OAQPS guidance, Commercial Marine, Airports, and Trains Approach, EPA Docket #OAR-2003-0053-1696.

5.3 Fleet Vehicles (GOVs) and Privately owned Vehicles (POVs)

POV emissions from commuting staff were calculated using information regarding baseline staff population and staffing changes associated with the Proposed Action. Data on the type of GOV and annual mileage were provided by PWT. Data on the population commuting on-base and the population commuting off-base were provided by Base Housing. Emission factors used to calculate emissions from the vehicles were obtained from EMFAC 2007 spreadsheets prepared by South Coast Air Quality Management District, onroadEF07_26.xls and onroadEFHHDT07_26.xls (SCAQMD 2009).

5.4 Assumptions

Assumptions used in this conformity applicability analysis include:

- All FA-18 C/D aircraft equipped with F404-GE-402 engines would be removed from operation at NAS Lemoore by 2013.
- Transient jets population comprised of 50% FA-18 C/D aircraft and 50% FA-18 E/F aircraft. All of the transient C/D aircraft are assumed to be equipped with F404-GE-400 engines.
- Transient large/heavy assumed to be C-40A Clipper aircraft or equivalent.
- Transient propeller assumed to be C-2 aircraft or equivalent.
- All future year transient aircraft operations would remain appreciably the same as baseline transient aircraft operations.
- Two MH-60 helicopters would arrive at NAS Lemoore in 2012.

- MH-60 onsite operations would consist of takeoffs and landings.
- Future year (post 2012) helicopter operations would remain appreciably the same as 2012.
- All additional personnel as a result of the proposed action would be off-base commuters.
- GOV operations would remain appreciably the same as baseline operations.
- Hangar 1 interior renovations would occur in 2013, last approximately 9 months, and require a 45-person daily average construction worker population. Hangar 2 renovations would occur in 2014 and will last approximately a year, involving a 30-person daily average construction worker population. Hangar 4 renovations would occur in 2013, last approximately 12 months, and are anticipated to require a crane, backhoe and two skid steer loaders, as well as a 140-person daily average construction worker population. Renovation work would occur during a regular 8-hour, 5-day work week.
- No significant air emissions would result from the actual renovation activities (painting for example, would utilize low VOC coatings).
- Existing CAA compliance permits would be modified and new permits obtained as necessary to maintain compliance with CARB and SJVAPCD requirements.

6.0 RESULTS AND CONCLUSION

The annual emissions for the pollutants of concern for 2012-2015, along with the baseline emissions and GCR *de minimis* thresholds are presented in Table 6.

Table 6. Total Annual Emissions 2012-2015 Compared to Baseline Emissions and de minimis Thresholds

Activity	Tons/Year			
	VOC	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Baseline Air Emissions	1,066.80	1,174.20	471.64	457.18
Total 2012 Emissions	1014.84	1113.31	443.50	429.90
Total 2013 Emissions	925.19	1061.32	392.34	380.26
Total 2014 Emissions	988.97	1153.03	412.33	399.64
Total 2015 Emissions	994.07	1163.43	412.71	400.00
2015 Compared to Baseline	**-72.72**	**-10.76**	**-58.93**	**-57.18**
***de minimis* Thresholds**	**10**	**10**	**100**	**100**

As indicated in Table 6, the emissions generated as a result of implementation of the proposed action are net decreases for each year and would not exceed the GCR *de minimis* threshold levels for VOCs, NO_x, PM_{10} or $PM_{2.5}$. Therefore, a formal Conformity Determination would not be required for the Proposed Action.

7.0 References

AESO Memorandum Report No. 9725, Rev D, Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine. February 2011.

AESO Memorandum Report 9734, Revision C F404-GE-400 Engine Fuel Flow and Emission Indexes by Percentage of Core RPM (%N2)

AESO Memorandum Report No. 9815, Rev G, Aircraft Emission Estimates: F/A-18 Landing and Takeoff Cycle and In-Frame Maintenance Testing Using JP-5. March 2011.

AESO Memorandum Report No. 9919C, Aircraft Emission Estimates: C-2A Landing and Takeoff cycle and In-Frame Maintenance Testing Using JP-5. Sept 2010.

AESO Memorandum Report No. 9929 Rev A, Aircraft Emission Estimates: H-60 Landing and Takeoff Cycle and In-Frame, Maintenance Testing Using JP-5. Nov 2009.

AESO Memorandum Report No. 9936C Aircraft Emission Estimates: C-2 Mission Operations Using JP-5. Feb 2010.

AESO Memorandum Report No.2003-01, F404-GE-402 Engine Fuel Flow and Emission Indexes by Percentage of Core RPM. November 2002.

U.S. Environmental Protection Agency (USEPA). Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition. 2010.

Appendix A: Air Emission Tables

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Table 1. Construction Calculations

Onsite Driving by Construction Workers, 2013 - 2014

Year	# vehicles	# days	mi/day	[1]ROG as VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
2013	140	230	5	7.457E-04	7.092E-03	7.116E-04	1.072E-05	9.0667E-05	5.8345E-05	364.00	0.03	0.03	120	1142	115	2	15	9	58604000	4991	5152
												Tons per Year	**0.06**	**0.57**	**0.06**	**0.00**	**0.01**	**0.00**			
												Metric Tons per Year							**59**	**0.0050**	**0.0052**
																		CO2e in metric tons/year	**60**		
Year	# vehicles	# days	mi/day	[1]ROG as VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
2014	30	230	5	7.023E-04	6.604E-03	6.548E-04	1.069E-05	9.1849E-05	5.93866E-05	364.00	0.03	0.03	24	228	23	0	3	2	12558000	1070	1104
												Tons per Year	**0.01**	**0.11**	**0.01**	**0.00**	**0.00**	**0.00**			
												Metric Tons per Year							**13**	**0.0011**	**0.0011**
																		CO2e in metric tons/year	**13**		

[1]Emission Factors from onroadEF07_26.xls and onroadEFHHDT07_26.xls (SCAQMD 2009)

[2]Emission Factors from *Federal Greenhouse Gas Accounting and Reporting Guidance: Technical Support Documen* (CEQ. 2010), Table D-2

[3]Emission Factors from *Federal Greenhouse Gas Accounting and Reporting Guidance: Technical Support Documen* (CEQ. 2010), Table D-4 (Tier 1)

Construction Equipment

Year	*Equipment*	*MaxHP*	*Number*	*Hr/day*	*# days*	*LF*	[1]ROG as VOC lb/day	[1]CO lb/day	[1]NOx lb/day	[1]SO2 lb/day	[1]PM lb/day	[1]CO2 lb/day	[1]CH4 lb/day	ROG as VOC total lbs	CO total lbs	NOx total lbs	SO2 total lbs	PM total lbs	CO2 total lbs	CH4 total lbs
2013	Cranes	250	1	8	90	0.5	0.1039396	0.2945188	0.9938233	0.0012608	0.0350602	112.05817	0.009378302	37.418269	106.02678	357.77638	0.453904804	12.621684	40340.941	3.3761888
Hangars 1 & 4	Tractors/Loaders/Backhoes	175	1	8	20	0.5	0.0986879	0.5855779	0.768897	0.0011398	0.0427397	101.2959	0.008904446	7.8950285	46.846236	61.511759	0.091180215	3.4191753	8103.6718	0.7123557
	Skid Steer Loaders	50	2	8	180	0.5	0.0516392	0.2260441	0.2276634	0.0003296	0.015678	25.496242	0.004659325	74.360496	325.50349	327.83532	0.474628156	22.576263	36714.588	6.7094281
													Tons per Year	**0.06**	**0.24**	**0.37**	**0.00**	**0.02**		
													Metric Tons per Year						**38.63**	**0.00**
2014	Cranes	250	1	8	33	0.5	0.0978546	0.2814369	0.9079598	0.0012608	0.0316492	112.05819	0.0088293	13.034228	37.487394	120.94025	0.167944902	4.2156747	14926.151	1.176058
Hangar 2	Tractors/Loaders/Backhoes	175	1	8	7	0.5	0.0923120	0.5851298	0.7154032	0.0011398	0.0379707	101.29587	0.0083292	2.7324349	17.319842	21.175933	0.033736678	1.1239323	2998.3576	0.2465432
	Skid Steer Loaders	50	2	8	67	0.5	0.0442705	0.219438	0.2159106	0.0003296	0.0134181	25.49625	0.0039945	23.587338	116.91658	115.03718	0.175612425	7.1491478	13584.402	2.128247
													Tons per Year	**0.02**	**0.09**	**0.13**	**0.00**	**0.01**		
													Metric Tons per Year						**14.29**	**0.00**

[1]Emission factors from Offroad 2007

Table A-2. Comparison of Baseline to Proposed Annual Operational Emissions, 2011-2015 & No Action Alternative

Baseline includes 100 F-18 C/D & 138 F-18 E/F Aircraft							
	VOCs	**CO**	**NOx**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Subtotal Aircraft	**1055.77**	**4875.31**	**1147.04**	**33.93**	**469.43**	**455.34**	**234123**
GSE	1.51	6.50	17.49	ND	1.30	1.26	372
Total Airfield Operations	**1057.28**	**4881.81**	**1164.53**	**33.93**	**470.72**	**456.60**	**234495**
Subtotal Highway Vehicles	9.51	85.97	9.67	0.11	0.92	0.58	7994
Grand Total	**1066.80**	**4967.78**	**1174.20**	**34.05**	**471.64**	**457.18**	**242489**
2012 includes 91 F-18 C/D & 138 F-18 E/F Aircraft							
	VOCs	**CO**	**NOx**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Subtotal Aircraft	**1005.21**	**4730.10**	**1088.35**	**31.79**	**441.36**	**428.11**	**218238**
GSE	1.45	6.26	16.83	ND	1.25	1.21	358
Total Airfield Operations	**1006.66**	**4736.36**	**1105.18**	**31.79**	**442.60**	**429.32**	**218596**
Subtotal Highway Vehicles	**8.18**	**77.37**	**8.13**	**0.11**	**0.90**	**0.57**	**7639**
Grand Total	**1014.84**	**4813.73**	**1113.31**	**31.90**	**443.50**	**429.90**	**226235**
Net Change:	**-51.96**	**-154.05**	**-60.88**	**-2.15**	**-28.14**	**-27.28**	**-16254**
2013 includes 45 F-18 C/D & 168 F-18 E/F Aircraft							
	VOCs	**CO**	**NOx**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Subtotal Aircraft	**916.15**	**4786.98**	**1037.80**	**28.06**	**390.28**	**378.57**	**193878**
GSE	1.35	5.82	15.65	ND	1.16	1.12	333
Total Airfield Operations	**917.50**	**4792.80**	**1053.45**	**28.06**	**391.44**	**379.69**	**194211**
Subtotal Highway Vehicles	7.63	71.59	7.49	0.10	0.88	0.57	7485
Onsite Construction Equipment	0.06	0.24	0.37	0.00	0.02	0.00	38.73
Grand Total	**925.19**	**4864.63**	**1061.32**	**28.16**	**392.34**	**380.26**	**201735**
Net Change:	**-141.60**	**-103.15**	**-112.88**	**-5.89**	**-79.30**	**-76.92**	**-40754**
2014 includes 30 F-18 C/D & 202 F-18 E/F Aircraft							
	VOCs	**CO**	**NOx**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Subtotal Aircraft	**979.38**	**5331.42**	**1128.05**	**29.50**	**410.07**	**397.77**	**203702**
GSE	1.47	6.34	17.05	ND	1.26	1.22	363
Total Airfield Operations	**980.85**	**5337.76**	**1145.10**	**29.50**	**411.33**	**398.99**	**204065**
Subtotal Highway Vehicles	8.09	75.32	7.80	0.12	1.00	0.64	8323
Onsite Construction Equipment	0.02	0.09	0.13	0.00	0.01	0.00	14.33
Grand Total	**988.97**	**5413.17**	**1153.03**	**29.61**	**412.33**	**399.64**	**212403**
Net Change:	**-77.83**	**445.38**	**-21.17**	**-4.43**	**-59.30**	**-57.54**	**-30086**
2015 includes 20 F-18 C/D & 214 F-18 E/F Aircraft							
	VOCs	**CO**	**NOx**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Subtotal Aircraft	**984.76**	**5463.21**	**1138.83**	**29.51**	**410.42**	**398.11**	**203730**
GSE	1.48	6.39	17.20	ND	1.27	1.24	366
Total Airfield Operations	**986.24**	**5469.60**	**1156.02**	**29.51**	**411.70**	**399.35**	**204095**
Subtotal Highway Vehicles	7.83	71.98	7.41	0.12	1.01	0.66	8403
Grand Total	**994.07**	**5541.59**	**1163.43**	**29.63**	**412.71**	**400.00**	**212498**
Net Change:	**-72.72**	**573.80**	**-10.76**	**-4.42**	**-58.93**	**-57.18**	**-29991**
2015 No Action Alternative includes 70 F-18 C/D & 138 F-18 E/F Aircraft							
	VOCs	**CO**	**NOx**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Subtotal Aircraft	**886.54**	**4387.12**	**962.49**	**27.02**	**378.29**	**366.94**	**184865**
GSE	1.32	5.68	15.29	ND	1.13	1.10	325
Total Airfield Operations	**887.86**	**4392.80**	**977.77**	**27.02**	**379.42**	**368.03**	**185190**
Subtotal Highway Vehicles	6.97	64.11	6.60	0.10	0.90	0.58	7486
Grand Total	**894.84**	**4456.91**	**984.37**	**27.12**	**380.32**	**368.62**	**192676**
Net Change:	**-171.96**	**-510.87**	**-189.82**	**-6.92**	**-91.32**	**-88.56**	**-49812**

Table A-3. Summary of Baseline Mobile Source Emissions

Aircraft	VOCs	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
[1]F-18 C/D	308.46	893.19	263.72	10.69	144.18	139.85	74391
[1]Engine Maintenance Runups	40.58	99.43	5.06	0.50	13.29	12.89	3321
[2]F-18 C/D	66.90	197.92	66.69	2.63	34.14	33.12	19248
[2]Engine Maintenance Runups	9.06	22.31	1.25	0.12	3.09	3.00	790
F-18 E/F	518.82	3356.16	681.11	16.91	226.97	220.16	116706
Engine Maintenance Runups	95.28	221.81	96.85	2.17	37.20	36.08	13463
Transients	16.68	84.48	32.36	0.92	10.57	10.25	6203
Subtotal Aircraft	**1055.77**	**4875.31**	**1147.04**	**33.93**	**469.43**	**455.34**	**234123**
GSE	1.51	6.50	17.49	ND	1.30	1.26	372
Total Aircraft Operations	**1057.28**	**4881.81**	**1164.53**	**33.93**	**470.72**	**456.60**	**234495**
Fleet Vehicles	0.02	0.12	0.13	0.00	0.01	0.01	20.57
Commuters	9.50	85.85	9.54	0.11	0.90	0.57	7973
Subtotal Highway Vehicles	**9.51**	**85.97**	**9.67**	**0.11**	**0.92**	**0.58**	**7994**
Grand Total	**1066.80**	**4967.78**	**1174.20**	**34.05**	**471.64**	**457.18**	**242489**

[1]F-18 C/D Aircraft with 404-GE-400 Engines

[2]F-18 C/D Aircraft with 404-GE-402 Engines

Table A-4. Summary of 2012 Mobile Source Emissions.

Aircraft	VOCs	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
[1]F-18 C/D	287.12	831.27	240.20	9.81	132.58	128.61	68209
[2]F-18 C/D	40.07	118.33	31.46	1.34	17.84	17.31	9310
Engine Maintenance Runups	46.92	115.27	5.57	0.59	15.66	15.19	3905
F-18 E/F	518.82	3356.16	681.11	16.91	226.97	220.16	116706
Engine Maintenance Runups	95.28	221.81	96.85	2.17	37.20	36.08	13463
H-60 Helo Ops	0.32	2.78	0.79	0.06	0.54	0.52	443
Transients	16.68	84.48	32.36	0.92	10.57	10.25	6203
Subtotal Aircraft	**1005.21**	**4730.10**	**1088.35**	**31.79**	**441.36**	**428.11**	**218238**
GSE	1.45	6.26	16.83	ND	1.25	1.21	358
Total Aircraft Operations	**1006.66**	**4736.36**	**1105.18**	**31.79**	**442.60**	**429.32**	**218596**
Fleet Vehicles	0.02	0.12	0.13	0.00	0.01	0.01	20.57
Commuters	8.16	77.25	8.01	0.11	0.88	0.56	7618
Subtotal Highway Vehicles	**8.18**	**77.37**	**8.13**	**0.11**	**0.90**	**0.57**	**7639**
Grand Total	**1014.84**	**4813.73**	**1113.31**	**31.90**	**443.50**	**429.90**	**226235**

[1]F-18 C/D Aircraft with 404-GE-400 Engines

[2]F-18 C/D Aircraft with 404-GE-402 Engines

Table A-5. Summary of 2013 Mobile Source Emissions.

Aircraft	VOCs	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
[1]F-18 C/D	149.55	432.61	111.30	4.73	64.81	62.87	32812
Engine Maintenance Runups	24.69	60.76	2.62	0.31	8.34	8.09	2054
F-18 E/F	608.35	3935.41	772.75	19.39	260.52	252.71	133681
Engine Maintenance Runups	116.55	270.95	117.97	2.65	45.50	44.13	18684
Transients	16.68	84.48	32.36	0.92	10.57	10.25	6203
H-60 Helo Ops	0.32	2.78	0.79	0.06	0.54	0.52	443
Subtotal Aircraft	**916.15**	**4786.98**	**1037.80**	**28.06**	**390.28**	**378.57**	**193878**
GSE	1.35	5.82	15.65	ND	1.16	1.12	333
Total Aircraft Operations	**917.50**	**4792.80**	**1053.45**	**28.06**	**391.44**	**379.69**	**194211**
Fleet Vehicles	0.02	0.12	0.13	0.00	0.01	0.01	20.57
Commuters	7.55	70.90	7.31	0.10	0.86	0.55	7404
Construction Workers Onsite	0.06	0.57	0.06	0.00	0.01	0.00	60.31
Subtotal Highway Vehicles	**7.63**	**71.59**	**7.49**	**0.10**	**0.88**	**0.57**	**7485**
Construction Equipment	**0.06**	**0.24**	**0.37**	**0.00**	**0.02**	**0.00**	**39**
Grand Total	**925.19**	**4864.63**	**1061.32**	**28.16**	**392.34**	**380.26**	**201735**

[1]F-18 C/D Aircraft with 404-GE-400 Engines

Table A-6. Summary of 2014 Mobile Source Emissions.

Aircraft	VOCs	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
[1]F-18 C/D	92.16	266.40	61.42	2.72	37.74	36.61	18812
[1]Engine Maintenance Runups	17.39	42.87	1.68	0.22	5.96	5.78	1458
F-18 E/F	709.83	4591.88	876.62	22.20	298.56	289.60	152920
Engine Maintenance Runups	143.01	343.01	155.17	3.38	56.71	55.01	23866
H-60 Helo Ops	0.32	2.78	0.79	0.06	0.54	0.52	443
Transients	16.68	84.48	32.36	0.92	10.57	10.25	6203
Subtotal Aircraft	**979.38**	**5331.42**	**1128.05**	**29.50**	**410.07**	**397.77**	**203702**
GSE	1.47	6.34	17.05	ND	1.26	1.22	363
Total Aircraft Operations	**980.85**	**5337.76**	**1145.10**	**29.50**	**411.33**	**398.99**	**204065**
Fleet Vehicles	0.02	0.12	0.13	0.00	0.01	0.01	20.57
Commuters	8.06	75.08	7.66	0.12	0.98	0.63	8290
Construction Workers Onsite	0.01	0.11	0.01	0.00	0.00	0.00	12.92
Subtotal Highway Vehicles	**8.09**	**75.32**	**7.80**	**0.12**	**1.00**	**0.64**	**8323**
Construction Equipment	**0.02**	**0.09**	**0.13**	**0.00**	**0.01**	**0.00**	**14**
Grand Total	**988.97**	**5413.17**	**1153.03**	**29.61**	**412.33**	**399.64**	**212403**

[1]F-18 C/D Aircraft with 404-GE-400 Engines

Table A-7. Summary of 2015 Mobile Source Emissions.

Aircraft	VOCs	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
[1]F-18 C/D	61.44	177.60	40.95	1.81	25.16	24.40	12541
[1]Engine Maintenance Runups	11.59	28.58	1.12	0.15	3.97	3.85	972
F-18 E/F	745.64	4823.58	913.27	23.19	311.98	302.62	159710
Engine Maintenance Runups	149.09	346.19	150.33	3.38	58.21	56.46	23860
H-60 Helo Ops	0.32	2.78	0.79	0.06	0.54	0.52	443
Transients	16.68	84.48	32.36	0.92	10.57	10.25	6203
Subtotal Aircraft	**984.76**	**5463.21**	**1138.83**	**29.51**	**410.42**	**398.11**	**203730**
GSE	1.48	6.39	17.20	ND	1.27	1.24	366
Total Aircraft Operations	**986.24**	**5469.60**	**1156.02**	**29.51**	**411.70**	**399.35**	**204095**
Fleet Vehicles	0.02	0.12	0.13	0.00	0.01	0.01	20.57
Commuters	7.81	71.86	7.28	0.12	1.00	0.65	8382
Subtotal Highway Vehicles	**7.83**	**71.98**	**7.41**	**0.12**	**1.01**	**0.66**	**8403**
Grand Total	**994.07**	**5541.59**	**1163.43**	**29.63**	**412.71**	**400.00**	**212498**

[1]F-18 C/D Aircraft with 404-GE-400 Engines

Table A-8. Summary of 2015 No Action Alternative Mobile Source Emissions (reduction of 30 FA-18C/D FRS aircraft)

Aircraft	VOCs	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
[1]F-18 C/D	175.11	506.16	116.70	5.16	71.70	69.55	35742
[1]Engine Maintenance Runups	33.04	81.46	3.20	0.42	11.32	10.98	2770
[2]F-18 C/D	40.07	118.33	31.46	1.34	17.84	17.31	9310
[2]Engine Maintenance Runups	7.55	18.72	0.81	0.10	2.69	2.61	672
F-18 E/F	518.82	3356.16	681.11	16.91	226.97	220.16	116706
Engine Maintenance Runups	95.28	221.81	96.85	2.17	37.20	36.08	13463
Transients	16.68	84.48	32.36	0.92	10.57	10.25	6203
Subtotal Aircraft	**886.54**	**4387.12**	**962.49**	**27.02**	**378.29**	**366.94**	**184865**
GSE	1.32	5.68	15.29	ND	1.13	1.10	325
Total Aircraft Operations	**887.86**	**4392.80**	**977.77**	**27.02**	**379.42**	**368.03**	**185190**
Fleet Vehicles	0.02	0.11	0.11	0.00	0.01	0.01	17.98
Commuters	6.96	64.00	6.49	0.10	0.89	0.57	7468
Subtotal Highway Vehicles	**6.97**	**64.11**	**6.60**	**0.10**	**0.90**	**0.58**	**7486**
Grand Total	**894.84**	**4456.91**	**984.37**	**27.12**	**380.32**	**368.62**	**192676**

[1]F-18 C/D Aircraft with 404-GE-400 Engines

[2]F-18 C/D Aircraft with 404-GE-402 Engines

Table A-9. Baseline Fleet FA-18C/D Operations[5] (No Action Alternative is Identical) **Aircraft with F404-GE-400**

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	9,668	21.842	52.019	0.503	0.156	5.295	1,080	105.59	251.47	2.43	0.76	25.60	5,219
Departure	9,668	0.170	17.842	12.547	0.395	0.670	3,094	0.82	86.25	60.65	1.91	3.24	14,959
Straight-In Arrival	1,540	0.285	1.731	4.723	0.245	3.704	1,935	0.22	1.33	3.64	0.19	2.85	1,489
Overhead Break Arrival	8,079	0.161	0.739	3.642	0.175	2.453	1,379	0.65	2.98	14.71	0.71	9.91	5,572
Touch and Go	0	0.000	0.000	0.000	0.000	0.000	0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	312	0.752	3.474	30.653	0.823	9.441	6,493	0.12	0.54	4.79	0.13	1.47	1,014
FCLP	6,282	0.270	1.127	9.210	0.315	3.888	2,485	0.85	3.54	28.93	0.99	12.21	7,805
Taxi/Idle In	9,668	10.768	25.874	0.261	0.079	2.670	546	52.05	125.08	1.26	0.38	12.91	2,642
Hot Refuel	1,450	20.427	48.221	0.407	0.140	4.842	964	14.81	34.97	0.30	0.10	3.51	699
							Total in Tons/Year	**175.1**	**506.2**	**116.7**	**5.2**	**71.7**	
							Total in Metric Tons/Year						**35742**

[5] Flight operations from *LemooreDataValidationSec5-With noaction added 20110404.xlsx* (Wyle Labs, 2011)

Table A-10. Baseline FRS FA-18C/D Operations[5] **Aircraft with F404-GE-400**

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	7,286	21.842	52.019	0.503	0.156	5.295	1080	79.57	189.52	1.83	0.57	19.29	3934
Departure	7,286	0.170	17.842	12.547	0.395	0.670	3094	0.62	65.00	45.71	1.44	2.44	11274
Straight-In Arrival	1129	0.285	1.731	4.723	0.245	3.704	1935	0.16	0.98	2.67	0.14	2.09	1092
Overhead Break Arrival	5924	0.161	0.739	3.642	0.175	2.453	1379	0.48	2.19	10.79	0.52	7.27	4085
Touch and Go	5421	0.221	0.853	11.772	0.269	2.706	2124	0.60	2.31	31.91	0.73	7.34	5757
GCA Box	384	0.752	3.474	30.653	0.823	9.441	6493	0.14	0.67	5.88	0.16	1.81	1246
FCLP	10220	0.270	1.127	9.210	0.315	3.888	2485	1.38	5.76	47.06	1.61	19.87	12698
Taxi/Idle In	7,286	10.768	25.874	0.261	0.079	2.670	546	39.23	94.27	0.95	0.29	9.73	1991
Hot Refuel	1,093	20.427	48.221	0.407	0.140	4.842	964	11.16	26.35	0.22	0.08	2.65	527
							Total in Tons/Year	**133.3**	**387.0**	**147.0**	**5.5**	**72.5**	
							Total in Metric Tons/Year						**38649**

Table A-11. Baseline 82 FA-18C/D Aircraft w/400 Engines - Engine Maintenance Runups[6] 25 = FRS; 57 = Fleet

Aircraft	Single Engine Operations							Emissions in lbs/1000 lbs fuel						Emissions (lbs)					
	Location	Annual	Power Setting		Duration														
	Name		Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.91	23.29	72.79	4.66	2.56	36918
	In-Frame/Outdoor	887	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	16096.56	37997.61	320.94	110.67	3815.25	760008
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	231.05	2152.08	1043.03	88.02	1786.80	690953
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.09	0.75	2.34	0.15	0.08	1187
	In-Frame/	29	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	258.67	610.61	5.16	1.78	61.31	12213
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	1.90	6.42	153.93	2.45	17.19	19309
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.88	155.93	62.18	2.70	ND	21056
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.91	23.29	72.79	4.66	2.56	36918
	In-Frame/Outdoor	887	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	16096.56	37997.61	320.94	110.67	3815.25	760008
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	231.05	2152.08	1043.03	88.02	1786.80	690953
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.04	0.32	1.00	0.06	0.04	509
	In-Frame/	12	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	110.86	261.69	2.21	0.76	26.28	5234
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.81	2.75	65.97	1.05	7.37	8275
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.38	66.83	26.65	1.16	ND	9024
FA-18C/D Fleet	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.91	23.29	72.79	4.66	2.56	36918
	In-Frame/Outdoor	887	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	16096.56	37997.61	320.94	110.67	3815.25	760008

	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	231.05	2152.08	1043.03	88.02	1786.80	690953
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.09	0.75	2.34	0.15	0.08	1187
	In-Frame/	29	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	258.67	610.61	5.16	1.78	61.31	12213
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	1.90	6.42	153.93	2.45	17.19	19309
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.88	155.93	62.18	2.70	ND	21056
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.91	23.29	72.79	4.66	2.56	36918
	In-Frame/Outdoor	887	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	16096.56	37997.61	320.94	110.67	3815.25	760008
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	231.05	2152.08	1043.03	88.02	1786.80	690953
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.04	0.34	1.07	0.07	0.04	542
	In-Frame/	13	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	118.25	279.14	2.36	0.81	28.03	5583
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.87	2.94	70.37	1.12	7.86	8827
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.40	71.28	28.43	1.23	ND	9625
													Total Fleet Emissions i	**33.04**	**81.46**	**3.20**	**0.42**	**11.32**	
													Total Fleet Emissions in Metric Tons/yr						**2770**
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.36	10.88	34.00	2.18	1.20	17243
	In-Frame/Outdoor	414	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	3759.01	8873.54	74.95	25.84	890.97	177484
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.04	0.31	0.96	0.06	0.03	486
	In-Frame/Outdoor	12	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	9.83	33.31	798.18	12.69	89.14	100122
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.36	63.83	25.45	1.10	ND	8619
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.36	10.88	34.00	2.18	1.20	17243
	In-Frame/Outdoor	414	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	3759.01	8873.54	74.95	25.84	890.97	177484
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.04	0.31	0.96	0.06	0.03	486
	In-Frame/Outdoor	12	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	9.83	33.31	798.18	12.69	89.14	100122
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.36	63.83	25.45	1.10	ND	8619
FA-18C/D FRS	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.36	10.88	34.00	2.18	1.20	17243
	In-Frame/Outdoor	414	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	3759.01	8873.54	74.95	25.84	890.97	177484
	Low Power																		
	APU Use		On		4	197.00	13.13	0.25	2.00	6.25	0.40	0.22	3170	0.04	0.31	0.96	0.06	0.03	486
	In-Frame/Outdoor	12	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	9.83	33.31	798.18	12.69	89.14	100122
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.36	63.83	25.45	1.10	ND	8619
	APU Use		On		4	197.00	13.13	0.25	2.00	6.25	0.40	0.22	3170	1.36	10.88	34.00	2.18	1.20	17243
	In-Frame/Outdoor	414	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	3759.01	8873.54	74.95	25.84	890.97	177484
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.04	0.31	0.96	0.06	0.03	486
	In-Frame/Outdoor	12	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	9.83	33.31	798.18	12.69	89.14	100122
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.36	63.83	25.45	1.10	ND	8619
													Total FRS Emissions in Tons/yr	**7.54**	**17.96**	**1.87**	**0.08**	**1.96**	
													Total in Metric Tons/yr						**551**
													Grand Total Tons/yr	**40.58**	**99.43**	**5.06**	**0.50**	**13.29**	
													Grand Total Metric Tons/yr						**3321**

[6] Engine Maintenance Run Up Data from *LemoreDataValidationSec6-MaintenanceRunups20110124.xlsx,* Wyle Labs, 2011.

Future Years

Table A-12. 2012 Fleet FA-18C/D Operations[5] **Aircraft with F404-GE-400** **Emissions in lbs/op** No change from Baseline

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	9,668	21.842	52.019	0.503	0.156	5.295	1,080	105.59	251.47	2.43	0.76	25.60	5,219
Departure	9,668	0.170	17.842	12.547	0.395	0.670	3,094	0.82	86.25	60.65	1.91	3.24	14,959
Straight-In Arrival	1,540	0.285	1.731	4.723	0.245	3.704	1,935	0.22	1.33	3.64	0.19	2.85	1,489
Overhead Break Arrival	8,079	0.161	0.739	3.642	0.175	2.453	1,379	0.65	2.98	14.71	0.71	9.91	5,572
Touch and Go	0	0.000	0.000	0.000	0.000	0.000	0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	312	0.752	3.474	30.653	0.823	9.441	6,493	0.12	0.54	4.79	0.13	1.47	1,014
FCLP	6,282	0.270	1.127	9.210	0.315	3.888	2,485	0.85	3.54	28.93	0.99	12.21	7,805
Taxi/Idle In	9,668	10.768	25.874	0.261	0.079	2.670	546	52.05	125.08	1.26	0.38	12.91	2,642
Hot Refuel	1450	20.427	48.221	0.407	0.140	4.842	964	14.81	34.97	0.30	0.10	3.51	699
							Total in Tons/Year	**175.1**	**506.2**	**116.7**	**5.2**	**71.7**	
							Total in Metric Tons/Year						**35742**

Table A-13. 2012 FRS FA-18C/D Operations[5] **Aircraft with F404-GE-400** **Emissions in lbs/op** -4 aircraft

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	6,121	21.842	52.019	0.503	0.156	5.295	1080	66.84	159.19	1.54	0.48	16.21	3304
Departure	6,121	0.170	17.842	12.547	0.395	0.670	3094	0.52	54.60	38.40	1.21	2.05	9470
Straight-In Arrival	948	0.285	1.731	4.723	0.245	3.704	1935	0.14	0.82	2.24	0.12	1.76	917
Overhead Break Arrival	4976	0.161	0.739	3.642	0.175	2.453	1379	0.40	1.84	9.06	0.44	6.10	3432
Touch and Go	4554	0.221	0.853	11.772	0.269	2.706	2124	0.50	1.94	26.80	0.61	6.16	4836
GCA Box	323	0.752	3.474	30.653	0.823	9.441	6493	0.12	0.56	4.94	0.13	1.52	1047
FCLP	8585	0.270	1.127	9.210	0.315	3.888	2485	1.16	4.84	39.53	1.35	16.69	10667
Taxi/Idle In	6,121	10.768	25.874	0.261	0.079	2.670	546	32.95	79.18	0.80	0.24	8.17	1672
Hot Refuel	918	20.427	48.221	0.407	0.140	4.842	964	9.38	22.14	0.19	0.06	2.22	443
							Total in Tons/Year	**112.0**	**325.1**	**123.5**	**4.6**	**60.9**	
							Total in Metric Tons/Year						**32466**

Table A-14. FA-18C/D Aircraft w/400 Engines 2012 Engine Maintenance Runups[6]

21 = FRS; 57 = Fleet

Aircraft	Single Engine Operations							Emissions in lbs/1000 lbs fuel						Emissions (lbs)					
	Location	Annual	Power Setting		Duration														
	Name		Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	HC	CO	NOx	SO2	PM	CO2
FA-18C/D Fleet	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.91	23.29	72.79	4.66	2.56	36918
	In-Frame/Outdoor	887	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	16096.56	37997.61	320.94	110.67	3815.25	760008
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	231.05	2152.08	1043.03	88.02	1786.80	690953
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.09	0.75	2.34	0.15	0.08	1187
	In-Frame/	29	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	258.67	610.61	5.16	1.78	61.31	12213
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	1.90	6.42	153.93	2.45	17.19	19309
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.88	155.93	62.18	2.70	ND	21056
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.91	23.29	72.79	4.66	2.56	36918
	In-Frame/Outdoor	887	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	16096.56	37997.61	320.94	110.67	3815.25	760008
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	231.05	2152.08	1043.03	88.02	1786.80	690953
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.04	0.32	1.00	0.06	0.04	509
	In-Frame/	12	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	110.86	261.69	2.21	0.76	26.28	5234
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.81	2.75	65.97	1.05	7.37	8275
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.38	66.83	26.65	1.16	ND	9024
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.91	23.29	72.79	4.66	2.56	36918
	In-Frame/Outdoor	887	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	16096.56	37997.61	320.94	110.67	3815.25	760008
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	231.05	2152.08	1043.03	88.02	1786.80	690953
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.09	0.75	2.34	0.15	0.08	1187
	In-Frame/	29	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	258.67	610.61	5.16	1.78	61.31	12213
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	1.90	6.42	153.93	2.45	17.19	19309
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.88	155.93	62.18	2.70	ND	21056
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.91	23.29	72.79	4.66	2.56	36918
	In-Frame/Outdoor	887	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	16096.56	37997.61	320.94	110.67	3815.25	760008
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	231.05	2152.08	1043.03	88.02	1786.80	690953
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.04	0.34	1.07	0.07	0.04	542
	In-Frame/	13	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	118.25	279.14	2.36	0.81	28.03	5583
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.87	2.94	70.37	1.12	7.86	8827
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.40	71.28	28.43	1.23	ND	9625
													Total Fleet Emissions in Tons/yr	**33.04**	**81.46**	**3.20**	**0.42**	**11.32**	
													Total Fleet Emissions in Metric Tons/yr						**2770**
FA-18C/D FRS	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.14	9.14	28.56	1.83	1.01	14484
	In-Frame/Outdoor	348	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	3157.57	7453.77	62.96	21.71	748.42	149086
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.03	0.26	0.80	0.05	0.03	408
	In-Frame/Outdoor	10	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	8.26	27.98	670.47	10.66	74.88	84102
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.30	53.62	21.38	0.93	ND	7240
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.14	9.14	28.56	1.83	1.01	14484
	In-Frame/Outdoor	348	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	3157.57	7453.77	62.96	21.71	748.42	149086
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.03	0.26	0.80	0.05	0.03	408
	In-Frame/Outdoor	10	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	8.26	27.98	670.47	10.66	74.88	84102
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.30	53.62	21.38	0.93	ND	7240
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.14	9.14	28.56	1.83	1.01	14484
	In-Frame/Outdoor	348	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	3157.57	7453.77	62.96	21.71	748.42	149086
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.03	0.26	0.80	0.05	0.03	408
	In-Frame/Outdoor	10	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	8.26	27.98	670.47	10.66	74.88	84102
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.30	53.62	21.38	0.93	ND	7240
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.14	9.14	28.56	1.83	1.01	14484
	In-Frame/Outdoor	348	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	3157.57	7453.77	62.96	21.71	748.42	149086
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.03	0.26	0.80	0.05	0.03	408
	In-Frame/Outdoor	10	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	8.26	27.98	670.47	10.66	74.88	84102
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.30	53.62	21.38	0.93	ND	7240
													Total FRS Emissions in Tons/yr	**6.33**	**15.09**	**1.57**	**0.07**	**1.65**	
													Total in Metric Tons/yr						**463**

	HC	CO	NOx	SO2	PM10	CO2e
Grand Total Tons/yr	**39.37**	**96.55**	**4.76**	**0.49**	**12.97**	
Grand Total Metric Tons/yr						**3233**

Table A-15. 2013 Fleet FA-18C/D Operations[5] **Aircraft with F404-GE-400** -17 aircraft

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	^{4}SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	6,785	21.842	52.019	0.503	0.156	5.295	1,079.7	74.09	176.47	1.71	0.53	17.96	3,663
Departure	6,785	0.170	17.842	12.547	0.395	0.670	3,094.4	0.58	60.53	42.56	1.34	2.27	10,497
Straight-In Arrival	1,081	0.285	1.731	4.723	0.245	3.704	1,934.5	0.15	0.94	2.55	0.13	2.00	1,045
Overhead Break Arrival	5,670	0.161	0.739	3.642	0.175	2.453	1,379.2	0.46	2.09	10.32	0.50	6.95	3,910
Touch and Go	0	0.000	0.000	0.000	0.000	0.000	0.0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	219	0.752	3.474	30.653	0.823	9.441	6,492.8	0.08	0.38	3.36	0.09	1.03	711
FCLP	4,408	0.270	1.127	9.210	0.315	3.888	2,485.1	0.60	2.48	20.30	0.69	8.57	5,477
Taxi/Idle In	6,785	10.768	25.874	0.261	0.079	2.670	546.5	36.53	87.77	0.89	0.27	9.06	1,854
Hot Refuel	1018	20.427	48.221	0.407	0.140	4.842	964	10.39	24.54	0.21	0.07	2.46	491
Total in Tons/Year								**122.9**	**355.2**	**81.9**	**3.6**	**50.3**	
Total in Metric Tons/Year													**25082**

Table A-16. 2013 FRS FA-18C/D Operations[5] **Aircraft with F404-GE-400** -16 aircraft

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	^{4}SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	1,457	21.842	52.019	0.503	0.156	5.295	1080	15.91	37.90	0.37	0.11	3.86	787
Departure	1,457	0.170	17.842	12.547	0.395	0.670	3094	0.12	13.00	9.14	0.29	0.49	2255
Straight-In Arrival	226	0.285	1.731	4.723	0.245	3.704	1935	0.03	0.20	0.53	0.03	0.42	218
Overhead Break Arrival	1185	0.161	0.739	3.642	0.175	2.453	1379	0.10	0.44	2.16	0.10	1.45	817
Touch and Go	1084	0.221	0.853	11.772	0.269	2.706	2124	0.12	0.46	6.38	0.15	1.47	1151
GCA Box	77	0.752	3.474	30.653	0.823	9.441	6493	0.03	0.13	1.18	0.03	0.36	249
FCLP	2044	0.270	1.127	9.210	0.315	3.888	2485	0.28	1.15	9.41	0.32	3.97	2540
Taxi/Idle In	1,457	10.768	25.874	0.261	0.079	2.670	546	7.85	18.85	0.19	0.06	1.95	398
Hot Refuel	219	20.427	48.221	0.407	0.140	4.842	964	2.23	5.27	0.04	0.02	0.53	105
Total in Tons/Year								**26.7**	**77.4**	**29.4**	**1.1**	**14.5**	
Total in Metric Tons/Year													**7730**

Table A-17. FA-18C/D Aircraft w/400 Engines 2013 Engine Maintenance Runups[6]

5 = FRS; 40 = Fleet

Aircraft	Single Engine Operations							Emissions in lbs/1000 lbs fuel						Emissions (lbs)					
	Location	Annual	Power Setting		Duration														
	Name		Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.04	16.35	51.08	3.27	1.80	25907
	In-Frame/Outdoor	622	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	11295.83	26664.99	225.22	77.66	2677.37	533339
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	162.14	1510.23	731.95	61.77	1253.89	484879
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.07	0.53	1.64	0.11	0.06	833
	In-Frame/	20	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	181.52	428.50	3.62	1.25	43.02	8571
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	1.33	4.51	108.02	1.72	12.06	13550
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.62	109.42	43.64	1.89	ND	14776
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.04	16.35	51.08	3.27	1.80	25907
	In-Frame/Outdoor	622	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	11295.83	26664.99	225.22	77.66	2677.37	533339
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	162.14	1510.23	731.95	61.77	1253.89	484879
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.03	0.23	0.70	0.05	0.02	357
	In-Frame/	9	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	77.79	183.64	1.55	0.53	18.44	3673
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.57	1.93	46.30	0.74	5.17	5807
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.26	46.90	18.70	0.81	ND	6333
FA-18C/D Fleet	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.04	16.35	51.08	3.27	1.80	25907
	In-Frame/Outdoor	622	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	11295.83	26664.99	225.22	77.66	2677.37	533339
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	162.14	1510.23	731.95	61.77	1253.89	484879
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.07	0.53	1.64	0.11	0.06	833
	In-Frame/	20	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	181.52	428.50	3.62	1.25	43.02	8571
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	1.33	4.51	108.02	1.72	12.06	13550
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.62	109.42	43.64	1.89	ND	14776
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	2.04	16.35	51.08	3.27	1.80	25907
	In-Frame/Outdoor	622	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	11295.83	26664.99	225.22	77.66	2677.37	533339
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	162.14	1510.23	731.95	61.77	1253.89	484879
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.03	0.24	0.75	0.05	0.03	381
	In-Frame/	9	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	82.98	195.89	1.65	0.57	19.67	3918
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.61	2.06	49.38	0.79	5.52	6194
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.28	50.02	19.95	0.87	ND	6755
													Total Fleet Emissions in Tons/yr	**23.18**	**57.17**	**2.24**	**0.29**	**7.95**	
													Total Fleet Emissions in Metric Tons/yr						**1944**
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.27	2.18	6.80	0.44	0.24	3449
	In-Frame/Outdoor	83	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	751.80	1774.71	14.99	5.17	178.19	35497
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.01	0.06	0.19	0.01	0.01	97
	In-Frame/Outdoor	2	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	1.97	6.66	159.64	2.54	17.83	20024
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.07	12.77	5.09	0.22	ND	1724
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.27	2.18	6.80	0.44	0.24	3449
	In-Frame/Outdoor	83	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	751.80	1774.71	14.99	5.17	178.19	35497
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.01	0.06	0.19	0.01	0.01	97
	In-Frame/Outdoor	2	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	1.97	6.66	159.64	2.54	17.83	20024
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.07	12.77	5.09	0.22	ND	1724
FA-18C/D FRS	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.27	2.18	6.80	0.44	0.24	3449
	In-Frame/Outdoor	83	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	751.80	1774.71	14.99	5.17	178.19	35497
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.01	0.06	0.19	0.01	0.01	97
	In-Frame/Outdoor	2	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	1.97	6.66	159.64	2.54	17.83	20024
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.07	12.77	5.09	0.22	ND	1724
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.27	2.18	6.80	0.44	0.24	3449
	In-Frame/Outdoor	83	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	751.80	1774.71	14.99	5.17	178.19	35497
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.01	0.06	0.19	0.01	0.01	97
	In-Frame/Outdoor	2	8–30 min. Mil power	97%	19	8587.0	2719.22	0.31	1.05	25.16	0.40	2.81	3156	1.97	6.66	159.64	2.54	17.83	20024
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.07	12.77	5.09	0.22	ND	1724
													Total FRS Emissions in Tons/yr	**1.51**	**3.59**	**0.37**	**0.02**	**0.39**	
													Total in Metric Tons/yr						**110**

Grand Total Tons/yr	24.69	60.76	2.62	0.31	8.34	
Grand Total Metric Tons/yr						2054

Table A-18. 2014 Fleet FA-18C/D Operations[5] **Aircraft with F404-GE-400** -10 aircraft

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	5,089	21.842	52.019	0.503	0.156	5.295	1,079.7	55.57	132.35	1.28	0.40	13.47	2,747
Departure	5,089	0.170	17.842	12.547	0.395	0.670	3,094.4	0.43	45.39	31.92	1.01	1.71	7,873
Straight-In Arrival	810	0.285	1.731	4.723	0.245	3.704	1,934.5	0.12	0.70	1.91	0.10	1.50	784
Overhead Break Arrival	4,252	0.161	0.739	3.642	0.175	2.453	1,379.2	0.34	1.57	7.74	0.37	5.22	2,932
Touch and Go	0	0.000	0.000	0.000	0.000	0.000	0.0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	164	0.752	3.474	30.653	0.823	9.441	6,492.8	0.06	0.29	2.52	0.07	0.78	534
FCLP	3,306	0.270	1.127	9.210	0.315	3.888	2,485.1	0.45	1.86	15.22	0.52	6.43	4,108
Taxi/Idle In	5,089	10.768	25.874	0.261	0.079	2.670	546.5	27.40	65.83	0.67	0.20	6.79	1,390
Hot Refuel	763	20.427	48.221	0.407	0.140	4.842	964	7.80	18.40	0.16	0.05	1.85	368
							Total in Tons/Year	**92.2**	**266.4**	**61.4**	**2.7**	**37.7**	
							Total in Metric Tons/Year						**18812**

Table A-19. 2014 FRS FA-18C/D Operations[5] **Aircraft with F404-GE-400** -5 aircraft

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	0	21.842	52.019	0.503	0.156	5.295	1080	0.00	0.00	0.00	0.00	0.00	0
Departure	0	0.170	17.842	12.547	0.395	0.670	3094	0.00	0.00	0.00	0.00	0.00	0
Straight-In Arrival	0	0.285	1.731	4.723	0.245	3.704	1935	0.00	0.00	0.00	0.00	0.00	0
Overhead Break Arrival	0	0.161	0.739	3.642	0.175	2.453	1379	0.00	0.00	0.00	0.00	0.00	0
Touch and Go	0	0.221	0.853	11.772	0.269	2.706	2124	0.00	0.00	0.00	0.00	0.00	0
GCA Box	0	0.752	3.474	30.653	0.823	9.441	6493	0.00	0.00	0.00	0.00	0.00	0
FCLP	0	0.270	1.127	9.210	0.315	3.888	2485	0.00	0.00	0.00	0.00	0.00	0
Taxi/Idle In	0	10.768	25.874	0.261	0.079	2.670	546	0.00	0.00	0.00	0.00	0.00	0
Hot Refuel	0	20.427	48.221	0.407	0.140	4.842	964	0.00	0.00	0.00	0.00	0.00	0
							Total in Tons/Year	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	
							Total in Metric Tons/Year						**0**

Table A-20. FA-18C/D Aircraft w/400 Engines 2014 Engine Maintenance Runups[6] 0 = FRS; 30 = Fleet

Aircraft	Location	Annual	Single Engine Operations: Power Setting		Duration			Emissions in lbs/1000 lbs fuel						Emissions (lbs)					
	Name		Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.53	12.26	38.31	2.45	1.35	19431
	In-Frame/Outdoor	467	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	8471.87	19998.74	168.91	58.25	2008.03	400004
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	121.61	1132.67	548.96	46.33	940.42	363660
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.05	0.39	1.23	0.08	0.04	624
	In-Frame/	15	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	136.14	321.38	2.71	0.94	32.27	6428
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	1.00	3.38	81.02	1.29	9.05	10163
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.46	82.07	32.73	1.42	ND	11082
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.53	12.26	38.31	2.45	1.35	19431
	In-Frame/Outdoor	467	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	8471.87	19998.74	168.91	58.25	2008.03	400004
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	121.61	1132.67	548.96	46.33	940.42	363660
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.02	0.17	0.53	0.03	0.02	268
	In-Frame/	6	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	58.35	137.73	1.16	0.40	13.83	2755
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.43	1.45	34.72	0.55	3.88	4355
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.20	35.17	14.03	0.61	ND	4749
FA-18C/D Fleet	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.53	12.26	38.31	2.45	1.35	19431
	In-Frame/Outdoor	467	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	8471.87	19998.74	168.91	58.25	2008.03	400004
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	121.61	1132.67	548.96	46.33	940.42	363660
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.05	0.39	1.23	0.08	0.04	624
	In-Frame/	15	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	136.14	321.38	2.71	0.94	32.27	6428
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	1.00	3.38	81.02	1.29	9.05	10163
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.46	82.07	32.73	1.42	ND	11082
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.53	12.26	38.31	2.45	1.35	19431
	In-Frame/Outdoor	467	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	8471.87	19998.74	168.91	58.25	2008.03	400004
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	121.61	1132.67	548.96	46.33	940.42	363660
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.02	0.18	0.56	0.04	0.02	285
	In-Frame/	7	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	62.24	146.91	1.24	0.43	14.75	2939
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.46	1.55	37.04	0.59	4.14	4646
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.21	37.52	14.96	0.65	ND	5066
													Grand Total Tons/yr	**17.39**	**42.87**	**1.68**	**0.22**	**5.96**	
													Grand Total Metric Tons/yr						**1458**

Table A-21. 2015 Fleet FA-18C/D Operations[5] **Aircraft with F404-GE-400** -10 aircraft

Type of Operation	Total Number of Operations	Emissions in lbs/op: HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	3,392	21.842	52.019	0.503	0.156	5.295	1,079.7	37.05	88.23	0.85	0.27	8.98	1,831
Departure	3,392	0.170	17.842	12.547	0.395	0.670	3,094.4	0.29	30.26	21.28	0.67	1.14	5,249
Straight-In Arrival	540	0.285	1.731	4.723	0.245	3.704	1,934.5	0.08	0.47	1.28	0.07	1.00	523
Overhead Break Arrival	2,835	0.161	0.739	3.642	0.175	2.453	1,379.2	0.23	1.05	5.16	0.25	3.48	1,955
Touch and Go	0	0.000	0.000	0.000	0.000	0.000	0.0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	110	0.752	3.474	30.653	0.823	9.441	6,492.8	0.04	0.19	1.68	0.05	0.52	356
FCLP	2,204	0.270	1.127	9.210	0.315	3.888	2,485.1	0.30	1.24	10.15	0.35	4.28	2,739
Taxi/Idle In	3,392	10.768	25.874	0.261	0.079	2.670	546.5	18.26	43.89	0.44	0.13	4.53	927
Hot Refuel	509	20.427	48.221	0.407	0.140	4.842	964	5.20	12.27	0.10	0.04	1.23	245
							Total in Tons/Year	**61.4**	**177.6**	**40.9**	**1.8**	**25.2**	
							Total in Metric Tons/Year						**12541**

Table A-22. FA-18C/D Aircraft w/400 Engines 2015 Engine Maintenance Runups[6] 0 = FRS; 20 = Fleet

Aircraft	Single Engine Operations							Emissions in lbs/1000 lbs fuel						Emissions (lbs)					
	Location	Annual	Power Setting		Duration														
	Name		Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	**HC**	**CO**	**NOx**	**SO2**	**PM**	**CO2**
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.02	8.17	25.54	1.63	0.90	12954
	In-Frame/Outdoor	311	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	5647.91	13332.50	112.61	38.83	1338.69	266669
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	81.07	755.11	365.98	30.88	626.95	242440
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.03	0.26	0.82	0.05	0.03	416
	In-Frame/	10	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	90.76	214.25	1.81	0.62	21.51	4285
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.67	2.25	54.01	0.86	6.03	6775
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.31	54.71	21.82	0.95	ND	7388
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.02	8.17	25.54	1.63	0.90	12954
	In-Frame/Outdoor	311	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	5647.91	13332.50	112.61	38.83	1338.69	266669
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	81.07	755.11	365.98	30.88	626.95	242440
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.01	0.11	0.35	0.02	0.01	178
	In-Frame/	4	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	38.90	91.82	0.78	0.27	9.22	1837
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.29	0.97	23.15	0.37	2.59	2904
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.13	23.45	9.35	0.41	ND	3166
FA-18C/D Fleet	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.02	8.17	25.54	1.63	0.90	12954
	In-Frame/Outdoor	311	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	5647.91	13332.50	112.61	38.83	1338.69	266669
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	81.07	755.11	365.98	30.88	626.95	242440
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.03	0.26	0.82	0.05	0.03	416
	In-Frame/	10	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	90.76	214.25	1.81	0.62	21.51	4285
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.67	2.25	54.01	0.86	6.03	6775
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.31	54.71	21.82	0.95	ND	7388
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	1.02	8.17	25.54	1.63	0.90	12954
	In-Frame/Outdoor	311	30 min. @ idle	66%	30	624.00	312.00	58.18	137.34	1.16	0.40	13.79	2747	5647.91	13332.50	112.61	38.83	1338.69	266669
	Low Power		7 min. @ 80%	80%	7	2127.00	248.15	1.05	9.78	4.74	0.40	8.12	3140	81.07	755.11	365.98	30.88	626.95	242440
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.02	0.12	0.38	0.02	0.01	190
	In-Frame/	5	10–20 min. @ idle	66%	15	624.00	156.00	58.18	137.34	1.16	0.40	13.79	2747	41.49	97.94	0.83	0.29	9.83	1959
	Outdoor		1–2 min. Mil power	97%	1.5	8587.0	214.68	0.31	1.05	25.16	0.40	2.81	3156	0.30	1.03	24.69	0.39	2.76	3097
	High Power		30 sec. Afterburner	-	0.5	28397.00	236.64	0.13	23.12	9.22	0.40	ND	3122	0.14	25.01	9.97	0.43	ND	3377
													Grand Total Tons/yr	**11.59**	**28.58**	**1.12**	**0.15**	**3.97**	
													Grand Total Metric Tons/yr						**972**

Table A-23. Baseline Fleet FA-18C/D Operations[5] (No Action Alternative is Identical) **Aircraft with F404-GE-402**

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
		Emissions in lbs/op											
Taxi/Idle Out	2,205	21.850	52.084	0.508	0.157	5.309	1,084	24.09	57.42	0.56	0.17	5.85	1195
Departure	2,205	0.197	19.982	14.590	0.452	0.817	3,534	0.22	22.03	16.08	0.50	0.90	3895
Straight-In Arrival	351	0.338	2.033	5.694	0.294	4.425	2,321	0.06	0.36	1.00	0.05	0.78	407
Overhead Break Arrival	1,843	0.195	0.896	4.425	0.212	2.976	1,674	0.18	0.83	4.08	0.20	2.74	1543
Touch and Go	0	0.000	0.000	0.000	0.000	0.000	0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	71	0.909	4.172	37.325	0.999	11.416	7,879	0.03	0.15	1.33	0.04	0.41	281
FCLP	1,432	0.330	1.377	11.247	0.385	4.752	3,037	0.24	0.99	8.06	0.28	3.40	2175
Taxi/Idle In	2,205	10.776	25.939	0.266	0.079	2.684	551	11.88	28.60	0.29	0.09	2.96	607
Hot Refuel	331	20.427	48.221	0.407	0.140	4.842	964	3.38	7.97	0.07	0.02	0.80	159
							Total in Tons/Year	**40.1**	**118.3**	**31.5**	**1.3**	**17.8**	
							Total in Metric Tons/Year						**9310**

[5] Flight operations from *LemooreDataValidationSec5-With noaction added 20110404.xlsx* (Wyle Labs, 2011)

Table A-24. Baseline FRS FA-18C/D Operations[5] (No Action Alternative is Identical) **Aircraft with F404-GE-402**

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
		Emissions in lbs/op											
Taxi/Idle Out	1,458	21.850	52.084	0.508	0.157	5.309	1084	15.92	37.96	0.37	0.11	3.87	790
Departure	1,458	0.197	19.982	14.590	0.452	0.817	3534	0.14	14.56	10.63	0.33	0.60	2575
Straight-In Arrival	226	0.338	2.033	5.694	0.294	4.425	2321	0.04	0.23	0.64	0.03	0.50	262
Overhead Break Arrival	1185	0.195	0.896	4.425	0.212	2.976	1674	0.12	0.53	2.62	0.13	1.76	992
Touch and Go	1084	0.270	1.041	14.360	0.329	3.305	2593	0.15	0.56	7.79	0.18	1.79	1406
GCA Box	77	0.909	4.172	37.325	0.999	11.416	7879	0.03	0.16	1.43	0.04	0.44	302
FCLP	2044	0.330	1.377	11.247	0.385	4.752	3037	0.34	1.41	11.50	0.39	4.86	3104
Taxi/Idle In	1,458	10.776	25.939	0.266	0.079	2.684	551	7.85	18.90	0.19	0.06	1.96	401
Hot Refuel	219	20.427	48.221	0.407	0.140	4.842	964.483	2.23	5.27	0.04	0.02	0.53	105
							Total in Tons/Year	**26.8**	**79.6**	**35.2**	**1.3**	**16.3**	
							Total in Metric Tons/Year						**9938**

Table A-25. Baseline FA-18C/D Aircraft w/402 Engines - Engine Maintenance Runups[6] **(No Action Alternative is Identical)** 5 = FRS; 13 = Fleet

Aircraft	Single Engine Operations							Emissions in lbs/1000 lbs fuel						Emissions (lbs)					
	Location	Annual	Power Setting		Duration														
	Name		Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.664	5.312	16.601	1.062	0.584	8420
	In-Frame/Outdoor	202	30 min. @ idle	66%	30	624.000	312.000	58.180	137.340	1.160	0.400	13.790	2747	3671.145	8666.123	73.196	25.240	870.146	173335
	Low Power		7 min. @ 80%	80%	7	2408.000	280.933	1.050	9.780	4.740	0.400	8.120	3140	59.658	555.668	269.311	22.727	461.352	178405
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.021	0.171	0.534	0.034	0.019	271
	In-Frame/	7	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	58.995	139.263	1.176	0.406	13.983	2785
	Outdoor		1–2 min. Mil power	96%	1.5	10467.0	261.68	0.31	1.05	25.16	0.40	2.81	3156	0.527	1.786	42.794	0.680	4.779	5368
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.224	39.779	15.863	0.688	ND	5372
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.664	5.312	16.601	1.062	0.584	8420
	In-Frame/Outdoor	202	30 min. @ idle	66%	30	624.000	312.000	58.180	137.340	1.160	0.400	13.790	2747	3671.145	8666.123	73.196	25.240	870.146	173335
	Low Power		7 min. @ 80%	80%	7	2408.000	280.933	1.050	9.780	4.740	0.400	8.120	3140	59.658	555.668	269.311	22.727	461.352	178405
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.009	0.073	0.229	0.015	0.008	116
	In-Frame/	3	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	25.283	59.684	0.504	0.174	5.993	1194
	Outdoor		1–2 min. Mil power	96%	1.5	10467.0	261.68	0.31	1.05	25.16	0.40	2.81	3156	0.226	0.765	18.340	0.292	2.048	2301
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.096	17.048	6.799	0.295	ND	2302
FA-18C/D Fleet	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.664	5.312	16.601	1.062	0.584	8420
	In-Frame/Outdoor	202	30 min. @ idle	66%	30	624.000	312.000	58.180	137.340	1.160	0.400	13.790	2747	3671.145	8666.123	73.196	25.240	870.146	173335
	Low Power		7 min. @ 80%	80%	7	2408.000	280.933	1.050	9.780	4.740	0.400	8.120	3140	59.658	555.668	269.311	22.727	461.352	178405
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.021	0.171	0.534	0.034	0.019	271
	In-Frame/	7	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	58.995	139.263	1.176	0.406	13.983	2785
	Outdoor		1–2 min. Mil power	96%	1.5	10467.0	261.68	0.31	1.05	25.16	0.40	2.81	3156	0.527	1.786	42.794	0.680	4.779	5368
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.224	39.779	15.863	0.688	ND	5372
	APU Use		On		4	197.000	13.133	0.250	2.000	6.250	0.400	0.220	3170	0.664	5.312	16.601	1.062	0.584	8420
	In-Frame/Outdoor	202	30 min. @ idle	66%	30	624.000	312.000	58.180	137.340	1.160	0.400	13.790	2747	3671.145	8666.123	73.196	25.240	870.146	173335
	Low Power		7 min. @ 80%	80%	7	2408.000	280.933	1.050	9.780	4.740	0.400	8.120	3140	59.658	555.668	269.311	22.727	461.352	178405
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.010	0.078	0.244	0.016	0.009	124
	In-Frame/	3	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	26.969	63.663	0.538	0.185	6.392	1273
	Outdoor		1–2 min. Mil power	96%	1.5	10467.0	261.68	0.31	1.05	25.16	0.40	2.81	3156	0.241	0.816	19.563	0.311	2.185	2454
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.102	18.185	7.252	0.315	ND	2456
													Total Fleet Emissions in Tons/yr	**7.549**	**18.715**	**0.805**	**0.101**	**2.691**	
													Total Fleet Emissions in Metric Tons/yr						**672**
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.272	2.176	6.799	0.435	0.239	3449
	In-Frame/Outdoor	83	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	751.802	1774.707	14.990	5.169	178.194	35497
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.008	0.061	0.192	0.012	0.007	97
	In-Frame/Outdoor	2	8–30 min. Mil power	96%	19	10467.0	3314.55	0.31	1.05	25.16	0.40	2.81	3156	2.398	8.121	194.586	3.094	21.732	24408
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.080	14.280	5.695	0.247	ND	1928
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.272	2.176	6.799	0.435	0.239	3449
	In-Frame/Outdoor	83	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	751.802	1774.707	14.990	5.169	178.194	35497
	Low Power																		
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.008	0.061	0.192	0.012	0.007	97
	In-Frame/Outdoor	2	8–30 min. Mil power	96%	19	10467.0	3314.55	0.31	1.05	25.16	0.40	2.81	3156	2.398	8.121	194.586	3.094	21.732	24408
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.080	14.280	5.695	0.247	ND	1928
FA-18C/D FRS	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.272	2.176	6.799	0.435	0.239	3449

In-Frame/Outdoor Low Power	83	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	751.802	1774.707	14.990	5.169	178.194	35497
APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.008	0.061	0.192	0.012	0.007	97
In-Frame/Outdoor	2	8–30 min. Mil power	96%	19	10467.0	3314.55	0.31	1.05	25.16	0.40	2.81	3156	2.398	8.121	194.586	3.094	21.732	24408
High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.080	14.280	5.695	0.247	ND	1928
APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.272	2.176	6.799	0.435	0.239	3449
In-Frame/Outdoor Low Power	83	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	751.802	1774.707	14.990	5.169	178.194	35497
APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.008	0.061	0.192	0.012	0.007	97
In-Frame/Outdoor	2	8–30 min. Mil power	96%	19	10467.0	3314.55	0.31	1.05	25.16	0.40	2.81	3156	2.398	8.121	194.586	3.094	21.732	24408
High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.080	14.280	5.695	0.247	ND	1928
Total FRS Emissions in Tons/yr													**1.509**	**3.599**	**0.445**	**0.018**	**0.400**	
Total in Metric Tons/yr																		**119**
Grand Total Tons/yr													**9.06**	**22.31**	**1.25**	**0.12**	**3.09**	
Grand Total Metric Tons/yr																		**790**

[6] Engine Maintenance Run Up Data from *LemoreDataValidationSec6-MaintenanceRunups20110124.xlsx,* Wyle Labs, 2011.

Future Years

Table A-26. 2012 Fleet FA-18C/D Operations[5] **Aircraft with F404-GE-402** No change from Baseline

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	2,205	21.850	52.084	0.508	0.157	5.309	1,084	24.09	57.42	0.56	0.17	5.85	1195
Departure	2,205	0.197	19.982	14.590	0.452	0.817	3,534	0.22	22.03	16.08	0.50	0.90	3895
Straight-In Arrival	351	0.338	2.033	5.694	0.294	4.425	2,321	0.06	0.36	1.00	0.05	0.78	407
Overhead Break Arrival	1,843	0.195	0.896	4.425	0.212	2.976	1,674	0.18	0.83	4.08	0.20	2.74	1543
Touch and Go	0	0.000	0.000	0.000	0.000	0.000	0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	71	0.909	4.172	37.325	0.999	11.416	7,879	0.03	0.15	1.33	0.04	0.41	281
FCLP	1,432	0.330	1.377	11.247	0.385	4.752	3,037	0.24	0.99	8.06	0.28	3.40	2175
Taxi/Idle In	2,205	10.776	25.939	0.266	0.079	2.684	551	11.88	28.60	0.29	0.09	2.96	607
Hot Refuel	331	20.427	48.221	0.407	0.140	4.842	964.483	3.38	7.97	0.07	0.02	0.80	159
Total in Tons/Year								**40.1**	**118.3**	**31.5**	**1.3**	**17.8**	
Total in Metric Tons/Year													**9310**

Table A-27. 2012 FRS FA-18C/D Operations[5] **Aircraft with F404-GE-402** -5 aircraft

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	0	21.850	52.084	0.508	0.157	5.309	1084	0.00	0.00	0.00	0.00	0.00	0
Departure	0	0.197	19.982	14.590	0.452	0.817	3534	0.00	0.00	0.00	0.00	0.00	0
Straight-In Arrival	0	0.338	2.033	5.694	0.294	4.425	2321	0.00	0.00	0.00	0.00	0.00	0
Overhead Break Arrival	0	0.195	0.896	4.425	0.212	2.976	1674	0.00	0.00	0.00	0.00	0.00	0
Touch and Go	0	0.270	1.041	14.360	0.329	3.305	2593	0.00	0.00	0.00	0.00	0.00	0
GCA Box	0	0.909	4.172	37.325	0.999	11.416	7879	0.00	0.00	0.00	0.00	0.00	0
FCLP	0	0.330	1.377	11.247	0.385	4.752	3037	0.00	0.00	0.00	0.00	0.00	0
Taxi/Idle In	0	10.776	25.939	0.266	0.079	2.684	551	0.00	0.00	0.00	0.00	0.00	0
Hot Refuel	0	20.427	48.221	0.407	0.140	4.842	964.483	0.00	0.00	0.00	0.00	0.00	0
Total in Tons/Year								**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	
Total in Metric Tons/Year													**0**

Table A-28. 2012 FA-18C/D Aircraft w/402 Engines - Engine Maintenance Runups[6] 0 = FRS; 13 = Fleet

Aircraft	Single Engine Operations							Emissions in lbs/1000 lbs fuel						Emissions (lbs)					
	Location	Annual	Power Setting		Duration														
	Name		Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.664	5.312	16.601	1.062	0.584	8420
	In-Frame/Outdoor	202	30 min. @ idle	66%	30	624.000	312.000	58.180	137.340	1.160	0.400	13.790	2747	3671.145	8666.123	73.196	25.240	870.146	173335
	Low Power		7 min. @ 80%	80%	7	2408.000	280.933	1.050	9.780	4.740	0.400	8.120	3140	59.658	555.668	269.311	22.727	461.352	178405
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.021	0.171	0.534	0.034	0.019	271
	In-Frame/	7	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	58.995	139.263	1.176	0.406	13.983	2785
	Outdoor		1–2 min. Mil power	96%	1.5	10467.0	261.68	0.31	1.05	25.16	0.40	2.81	3156	0.527	1.786	42.794	0.680	4.779	5368
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.224	39.779	15.863	0.688	ND	5372
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.664	5.312	16.601	1.062	0.584	8420
	In-Frame/Outdoor	202	30 min. @ idle	66%	30	624.000	312.000	58.180	137.340	1.160	0.400	13.790	2747	3671.145	8666.123	73.196	25.240	870.146	173335
	Low Power		7 min. @ 80%	80%	7	2408.000	280.933	1.050	9.780	4.740	0.400	8.120	3140	59.658	555.668	269.311	22.727	461.352	178405
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.009	0.073	0.229	0.015	0.008	116
	In-Frame/	3	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	25.283	59.684	0.504	0.174	5.993	1194
	Outdoor		1–2 min. Mil power	96%	1.5	10467.0	261.68	0.31	1.05	25.16	0.40	2.81	3156	0.226	0.765	18.340	0.292	2.048	2301
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.096	17.048	6.799	0.295	ND	2302
FA-18C/D Fleet	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.664	5.312	16.601	1.062	0.584	8420
	In-Frame/Outdoor	202	30 min. @ idle	66%	30	624.000	312.000	58.180	137.340	1.160	0.400	13.790	2747	3671.145	8666.123	73.196	25.240	870.146	173335
	Low Power		7 min. @ 80%	80%	7	2408.000	280.933	1.050	9.780	4.740	0.400	8.120	3140	59.658	555.668	269.311	22.727	461.352	178405
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.021	0.171	0.534	0.034	0.019	271
	In-Frame/	7	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	58.995	139.263	1.176	0.406	13.983	2785
	Outdoor		1–2 min. Mil power	96%	1.5	10467.0	261.68	0.31	1.05	25.16	0.40	2.81	3156	0.527	1.786	42.794	0.680	4.779	5368
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.224	39.779	15.863	0.688	ND	5372
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.664	5.312	16.601	1.062	0.584	8420
	In-Frame/Outdoor	202	30 min. @ idle	66%	30	624.000	312.000	58.180	137.340	1.160	0.400	13.790	2747	3671.145	8666.123	73.196	25.240	870.146	173335
	Low Power		7 min. @ 80%	80%	7	2408.000	280.933	1.050	9.780	4.740	0.400	8.120	3140	59.658	555.668	269.311	22.727	461.352	178405
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.010	0.078	0.244	0.016	0.009	124
	In-Frame/	3	10–20 min. @ idle	66%	15	624.000	156.000	58.180	137.340	1.160	0.400	13.790	2747	26.969	63.663	0.538	0.185	6.392	1273
	Outdoor		1–2 min. Mil power	96%	1.5	10467.0	261.68	0.31	1.05	25.16	0.40	2.81	3156	0.241	0.816	19.563	0.311	2.185	2454
	High Power		30 sec. Afterburner	-	0.5	31764.000	264.700	0.130	23.120	9.220	0.400	ND	3122	0.102	18.185	7.252	0.315	ND	2456
													Grand Total Tons/yr	**7.55**	**18.72**	**0.81**	**0.10**	**2.69**	
													Grand Total Metric Tons/yr						**672**

2013 All 13 FA-18C/Ds with 402 engines removed
C/D Aircraft Inventory with 402 engines depleted.

Table A-29. Baseline Fleet FA-18E/F Operations[5] (No Action Alternative is Identical) **Aircraft with F414-GE-400**

Type of Operation	Total Number of Operations	Emissions in lbs/op											
		HC	CO	NOx	SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	11,138	27.257	41.178	1.442	0.175	5.452	1304	151.79	229.32	8.03	0.97	30.36	7263
Departure	11,138	4.571	255.849	22.880	0.521	0.985	3707	25.46	1424.82	127.42	2.90	5.48	20646
Straight-In Arrival	1765	0.118	0.793	16.594	0.389	5.852	3097	0.10	0.70	14.64	0.34	5.16	2733
Overhead Break Arrival	9262	0.058	0.347	7.110	0.193	3.163	1538	0.27	1.61	32.93	0.89	14.65	7125
Touch and Go	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	361	0.329	2.000	66.324	1.098	13.910	8749	0.06	0.36	11.95	0.20	2.51	1577
FCLP	9332	0.116	0.690	18.576	0.385	5.614	3072	0.54	3.22	86.68	1.80	26.20	14334
Taxi/Idle In	11138	13.403	20.353	0.747	0.089	2.771	663	74.64	113.34	4.16	0.49	15.43	3694
Hot Refuel	1671	33.127	49.784	1.612	0.203	6.409	1508	27.67	41.59	1.35	0.17	5.35	1259
	31,858						**Total in Tons/Year**	**280.5**	**1815.0**	**287.2**	**7.8**	**105.1**	
							Total in Metric Tons/Year						**53189**

[5] Flight operations from *LemooreDataValidationSec5-With noaction added 20110404.xlsx* (Wyle Labs, 2011)

Table A-30. Baseline FRS FA-18E/F Operations[5] **Aircraft with F414-GE-400**

Type of Operation	Total Number of Operations	Emissions in lbs/op											
		HC	CO	NOx	SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	9,430	27.257	41.178	1.442	0.175	5.452	1304	128.52	194.16	6.80	0.82	25.71	6149
Departure	9,430	4.571	255.849	22.880	0.521	0.985	3707	21.55	1206.33	107.88	2.46	4.64	17480
Straight-In Arrival	1455	0.118	0.793	16.594	0.389	5.852	3097	0.09	0.58	12.07	0.28	4.26	2253
Overhead Break Arrival	7644	0.058	0.347	7.110	0.193	3.163	1538	0.22	1.33	27.18	0.74	12.09	5880
Touch and Go	6614	0.105	0.617	24.394	0.349	3.843	2775	0.35	2.04	80.67	1.15	12.71	9178
GCA Box	632	0.329	2.000	66.324	1.098	13.910	8749	0.10	0.63	20.96	0.35	4.40	2765
FCLP	14399	0.116	0.690	18.576	0.385	5.614	3072	0.83	4.97	133.74	2.77	40.42	22117
Taxi/Idle In	9,430	13.403	20.353	0.747	0.089	2.771	663	63.19	95.96	3.52	0.42	13.07	3127
Hot Refuel	1,415	33.127	49.784	1.612	0.203	6.409	1508	23.43	35.21	1.14	0.14	4.53	1066
	40,174						**Total in Tons/Year**	**238.3**	**1541.2**	**394.0**	**9.1**	**121.8**	
							Total in Metric Tons/Year						**63517**

Table A-31. Baseline 138 FA-18E/F Aircraft Engine Maintenance Runups[6] 44 = FRS; 94 = Fleet

Aircraft	Location Name	Single Engine Operations				Emissions in lbs/1000 lbs fuel								Emissions (lbs)					
		Annual	Power Setting		Duration														
			Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	4.00	32.02	100.06	6.40	3.52	50750
	In-Frame/Outdoor	1219	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	27683.91	41604.25	1347.54	169.50	5356.26	1259929
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	61.30	814.37	3931.72	175.13	3844.16	1403192
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.06	0.47	1.48	0.09	0.05	749
	In-Frame/	18	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	204.39	307.17	9.95	1.25	39.55	9302
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	0.64	3.71	202.13	2.12	14.72	16840
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	273.62	207.40	27.64	0.97	ND	6860
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	4.00	32.02	100.06	6.40	3.52	50750
	In-Frame/Outdoor	1219	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	27683.91	41604.25	1347.54	169.50	5356.26	1259929
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	61.30	814.37	3931.72	175.13	3844.16	1403192
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.06	0.47	1.48	0.09	0.05	749
	In-Frame/	18	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	204.39	307.17	9.95	1.25	39.55	9302
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	0.64	3.71	202.13	2.12	14.72	16840
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	273.62	207.40	27.64	0.97	ND	6860
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	4.00	32.02	100.06	6.40	3.52	50750
	In-Frame/Outdoor	1219	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	27683.91	41604.25	1347.54	169.50	5356.26	1259929
FA-18E/F Fleet	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	61.30	814.37	3931.72	175.13	3844.16	1403192
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.06	0.47	1.48	0.09	0.05	749
	In-Frame/	18	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	204.39	307.17	9.95	1.25	39.55	9302
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	0.64	3.71	202.13	2.12	14.72	16840
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	273.62	207.40	27.64	0.97	ND	6860
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	4.00	32.02	100.06	6.40	3.52	50750
	In-Frame/Outdoor	1219	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	27683.91	41604.25	1347.54	169.50	5356.26	1259929
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	61.30	814.37	3931.72	175.13	3844.16	1403192
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.06	0.47	1.48	0.09	0.05	749
	In-Frame/	18	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	204.39	307.17	9.95	1.25	39.55	9302
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	0.64	3.71	202.13	2.12	14.72	16840
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	273.62	207.40	27.64	0.97	ND	6860
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.13	1.08	3.37	0.22	0.12	1707
	In-Frame/	41	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	465.56	699.66	22.66	2.85	90.08	21188
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.45	8.44	460.41	4.82	33.53	38358
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	623.25	472.42	62.96	2.21	ND	15625
													Total Fleet Emissions in Tons/yr	**57.00**	**86.53**	**11.52**	**0.72**	**18.58**	
													Total Fleet Emissions in Metric Tons/yr						**3179**

FA-18E/F FRS	APU Use	2000	On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	6.57	52.53	164.17	10.51	5.78	83265
	In-Frame/Outdoor		30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	45420.68	68259.65	2210.90	278.10	8787.96	2067152
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	100.57	1336.12	6450.74	287.34	6307.07	2302201
	APU Use	100	On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.33	2.63	8.21	0.53	0.29	4163
	In-Frame/		10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	1135.52	1706.49	55.27	6.95	219.70	51679
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	3.53	20.59	1122.96	11.77	81.79	93556
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	1520.12	1152.24	153.55	5.40	ND	38111
Total FRS Emissions in Tons/yr														**24.09**	**36.27**	**5.08**	**0.30**	**7.70**	
Total in Metric Tons/yr																			**2105**
Aircraft	**Test Type**	**# Annual Tests**			**Duration (minutes)**	Fuel Use in lbs		EIHC	EICO	EINOx	EISO2	EIPM	EICO2	**HC**	**CO**	**NOx**	**SO2**	**PM**	**CO2**
								Emissions in lbs/test						Annual Emissions (lbs)					
FA-18E/F Indoor Test Cells	Break In	236	-	-	207	20551		90.70	617.70	578.50	8.20	78.70	64289	21385.93	145645.94	136403.07	1933.46	18556.48	15158472
	Performance	89			114	10459		78.22	587.18	270.16	4.18	36.72	32204	6978.20	52383.80	24101.65	372.91	3275.88	2873015
Total Test Cell Emissions in Tons/yr														**14.18**	**99.01**	**80.25**	**1.15**	**10.92**	
Total Test Cell Emissions in Metric Tons/yr																			**8179**
Grand Total Tons/yr														**95.28**	**221.81**	**96.85**	**2.17**	**37.20**	
Grand Total Metric Tons/yr																			**13463**

[6] Engine Maintenance Run Up Data from *LemoreDataValidationSec6-MaintenanceRunups20110124.xlsx,* Wyle Labs, 2011 and indoor test cell data from AESO Memorandum Report No. 2000-22, Revision A, March 2011 and email communication with Lyn Coffer, AESO, 6/21/2011 and Simeon Bugay, NASL, 6/17/ 2011.

Future Years

2012 - No change from Baseline

Table A-32. 2013 Fleet FA-18E/F Operations[5] **Aircraft with F414-GE-400** +30 Aircraft

Type of Operation	Total Number of Operations	HC	CO	NOx	SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
		Emissions in lbs/op											
Taxi/Idle Out	14,693	27.257	41.178	1.442	0.175	5.452	1304	200.24	302.51	10.59	1.28	40.05	9581
Departure	14,693	4.571	255.849	22.880	0.521	0.985	3707	33.58	1879.55	168.08	3.83	7.23	27236
Straight-In Arrival	2328	0.118	0.793	16.594	0.389	5.852	3097	0.14	0.92	19.32	0.45	6.81	3605
Overhead Break Arrival	12218	0.058	0.347	7.110	0.193	3.163	1538	0.35	2.12	43.44	1.18	19.32	9399
Touch and Go	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	476	0.329	2.000	66.324	1.098	13.910	8749	0.08	0.48	15.77	0.26	3.31	2080
FCLP	12310	0.116	0.690	18.576	0.385	5.614	3072	0.71	4.25	114.34	2.37	34.56	18908
Taxi/Idle In	14693	13.403	20.353	0.747	0.089	2.771	663	98.46	149.52	5.49	0.65	20.36	4873
Hot Refuel	2,204	33.127	49.784	1.612	0.203	6.409	1508	36.50	54.86	1.78	0.22	7.06	1661
Total in Tons/Year								**370.1**	**2394.2**	**378.8**	**10.3**	**138.7**	
Total in Metric Tons/Year													**70165**

Table A-33. 2013 FRS FA-18E/F Operations[5] **Aircraft with F414-GE-400** same as baseline

Type of Operation	Total Number of Operations	HC	CO	NOx	SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
		Emissions in lbs/op											
Taxi/Idle Out	9,430	27.257	41.178	1.442	0.175	5.452	1304	128.52	194.16	6.80	0.82	25.71	6149
Departure	9,430	4.571	255.849	22.880	0.521	0.985	3707	21.55	1206.33	107.88	2.46	4.64	17480
Straight-In Arrival	1455	0.118	0.793	16.594	0.389	5.852	3097	0.09	0.58	12.07	0.28	4.26	2253
Overhead Break Arrival	7644	0.058	0.347	7.110	0.193	3.163	1538	0.22	1.33	27.18	0.74	12.09	5880
Touch and Go	6614	0.105	0.617	24.394	0.349	3.843	2775	0.35	2.04	80.67	1.15	12.71	9178
GCA Box	632	0.329	2.000	66.324	1.098	13.910	8749	0.10	0.63	20.96	0.35	4.40	2765
FCLP	14399	0.116	0.690	18.576	0.385	5.614	3072	0.83	4.97	133.74	2.77	40.42	22117
Taxi/Idle In	9,430	13.403	20.353	0.747	0.089	2.771	663	63.19	95.96	3.52	0.42	13.07	3127
Hot Refuel	1,415	33.127	49.784	1.612	0.203	6.409	1508	23.43	35.21	1.14	0.14	4.53	1066
							Total in Tons/Year	**238.3**	**1541.2**	**394.0**	**9.1**	**121.8**	
							Total in Metric Tons/Year						**63517**

Table A-34. 2013 FA-18E/F Aircraft Engine Maintenance Runups[6] 44 = FRS; 124 = Fleet

Aircraft	Location Name	Annual	Single Engine Operations: Power Setting: Reported	Modeled	Duration (minutes)	FFR, lb/hr	Fuel Use lb	Emissions in lbs/1000 lbs fuel: EIHC	EICO	EINOx	EISO2	EIPM	EICO2	Emissions (lbs): HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	5.28	42.24	131.99	8.45	4.65	66947
	In-Frame/Outdoor	1608	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	36519.20	54882.21	1777.61	223.60	7065.71	1662034
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	80.86	1074.27	5186.53	231.03	5071.02	1851019
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.08	0.62	1.95	0.12	0.07	989
	In-Frame/	24	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	269.62	405.20	13.12	1.65	52.17	12271
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	0.84	4.89	266.64	2.79	19.42	22214
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	360.95	273.60	36.46	1.28	ND	9049
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	5.28	42.24	131.99	8.45	4.65	66947
	In-Frame/Outdoor	1608	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	36519.20	54882.21	1777.61	223.60	7065.71	1662034
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	80.86	1074.27	5186.53	231.03	5071.02	1851019
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.08	0.62	1.95	0.12	0.07	989
	In-Frame/	24	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	269.62	405.20	13.12	1.65	52.17	12271
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	0.84	4.89	266.64	2.79	19.42	22214
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	360.95	273.60	36.46	1.28	ND	9049
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	5.28	42.24	131.99	8.45	4.65	66947
	In-Frame/Outdoor	1608	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	36519.20	54882.21	1777.61	223.60	7065.71	1662034
FA-18E/F Fleet	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	80.86	1074.27	5186.53	231.03	5071.02	1851019
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.08	0.62	1.95	0.12	0.07	989
	In-Frame/	24	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	269.62	405.20	13.12	1.65	52.17	12271
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	0.84	4.89	266.64	2.79	19.42	22214
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	360.95	273.60	36.46	1.28	ND	9049
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	5.28	42.24	131.99	8.45	4.65	66947
	In-Frame/Outdoor	1608	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	36519.20	54882.21	1777.61	223.60	7065.71	1662034
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	80.86	1074.27	5186.53	231.03	5071.02	1851019
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.08	0.62	1.95	0.12	0.07	989
	In-Frame/	24	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	269.62	405.20	13.12	1.65	52.17	12271
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	0.84	4.89	266.64	2.79	19.42	22214
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	360.95	273.60	36.46	1.28	ND	9049
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.18	1.42	4.44	0.28	0.16	2252
	In-Frame/	54	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	614.15	922.96	29.89	3.76	118.82	27951
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.91	11.14	607.35	6.36	44.23	50600
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	822.16	623.19	83.05	2.92	ND	20612
													Total Fleet Emissions in Tons/yr	**75.19**	**114.15**	**15.19**	**0.94**	**24.51**	
													Total Fleet Emissions in Metric Tons/yr						**6622**
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	6.57	52.53	164.17	10.51	5.78	83265
	In-Frame/Outdoor	2000	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	45420.68	68259.65	2210.90	278.10	8787.96	2067152
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	100.57	1336.12	6450.74	287.34	6307.07	2302201
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.33	2.63	8.21	0.53	0.29	4163
FA-18E/F FRS	In-Frame/	100	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	1135.52	1706.49	55.27	6.95	219.70	51679
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	3.53	20.59	1122.96	11.77	81.79	93556
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	1520.12	1152.24	153.55	5.40	ND	38111
													Total FRS Emissions in Tons/yr	**24.09**	**36.27**	**5.08**	**0.30**	**7.70**	
													Total in Metric Tons/yr						**2105**
Aircraft	**Test Type**	**# Annual Tests**			**Duration (minutes)**	Fuel Use in lbs		Emissions in lbs/test: EIHC	EICO	EINOx	EISO2	EIPM	EICO2	Annual Emissions (lbs): **HC**	**CO**	**NOx**	**SO2**	**PM**	**CO2**
FA-18E/F		287	-	-	207	20551		90.70	617.70	578.50	8.20	78.70	64289	26035.04	177308.10	166055.91	2353.77	22590.49	18453792
Indoor Test Cells		109			114	10459		78.22	587.18	270.16	4.18	36.72	32204	8495.20	63771.58	29341.14	453.98	3988.03	3497583
													Total Test Cell Emissions in Tons/yr	**17.27**	**120.54**	**97.70**	**1.40**	**13.29**	
													Total Test Cell Emissions in Metric Tons/yr						**9957**
													Grand Total Tons/yr	**116.55**	**270.95**	**117.97**	**2.65**	**45.50**	
													Grand Total Metric Tons/yr						**18684**

Table A-35. 2014 Fleet FA-18E/F Operations[5] **Aircraft with F414-GE-400** +34 Aircraft

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	18,721	27.257	41.178	1.442	0.175	5.452	1304	255.14	385.46	13.49	1.64	51.04	12208
Departure	18,721	4.571	255.849	22.880	0.521	0.985	3707	42.79	2394.92	214.17	4.88	9.22	34704
Straight-In Arrival	2967	0.118	0.793	16.594	0.389	5.852	3097	0.18	1.18	24.62	0.58	8.68	4593
Overhead Break Arrival	15568	0.058	0.347	7.110	0.193	3.163	1538	0.45	2.70	55.35	1.50	24.62	11976
Touch and Go	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	606	0.329	2.000	66.324	1.098	13.910	8749	0.10	0.61	20.09	0.33	4.21	2651
FCLP	15686	0.116	0.690	18.576	0.385	5.614	3072	0.91	5.41	145.69	3.02	44.03	24093
Taxi/Idle In	18721	13.403	20.353	0.747	0.089	2.771	663	125.46	190.51	6.99	0.83	25.94	6209
Hot Refuel	2,808	33.127	49.784	1.612	0.203	6.409	1508	46.51	69.90	2.26	0.28	9.00	2117
Total in Tons/Year								**471.5**	**3050.7**	**482.7**	**13.1**	**176.7**	
Total in Metric Tons/Year													**89403**

Table A-36. 2014 FRS FA-18E/F Operations[5] **Aircraft with F414-GE-400** same as baseline

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	9,430	27.257	41.178	1.442	0.175	5.452	1304	128.52	194.16	6.80	0.82	25.71	6149
Departure	9,430	4.571	255.849	22.880	0.521	0.985	3707	21.55	1206.33	107.88	2.46	4.64	17480
Straight-In Arrival	1455	0.118	0.793	16.594	0.389	5.852	3097	0.09	0.58	12.07	0.28	4.26	2253
Overhead Break Arrival	7644	0.058	0.347	7.110	0.193	3.163	1538	0.22	1.33	27.18	0.74	12.09	5880
Touch and Go	6614	0.105	0.617	24.394	0.349	3.843	2775	0.35	2.04	80.67	1.15	12.71	9178
GCA Box	632	0.329	2.000	66.324	1.098	13.910	8749	0.10	0.63	20.96	0.35	4.40	2765
FCLP	14399	0.116	0.690	18.576	0.385	5.614	3072	0.83	4.97	133.74	2.77	40.42	22117
Taxi/Idle In	9,430	13.403	20.353	0.747	0.089	2.771	663	63.19	95.96	3.52	0.42	13.07	3127
Hot Refuel	1,415	33.127	49.784	1.612	0.203	6.409	1508	23.43	35.21	1.14	0.14	4.53	1066
Total in Tons/Year								**238.3**	**1541.2**	**394.0**	**9.1**	**121.8**	
Total in Metric Tons/Year													**63517**

Table A-37. 2014 FA-18E/F Aircraft Engine Maintenance Runups[6] 44 = FRS; 158 = Fleet

Aircraft	Location Name	Single Engine Operations				Emissions in lbs/1000 lbs fuel								Emissions (lbs)					
		Annual	Power Setting		Duration														
			Reported	Modeled	(minutes)	FFR, lb/hr	Fuel Use lb	EIHC	EICO	EINOx	EISO2	EIPM	EICO2	HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	6.73	53.82	168.19	10.76	5.92	85304
	In-Frame/Outdoor	2049	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	46532.52	69930.55	2265.01	284.91	9003.08	2117753
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	103.03	1368.83	6608.64	294.37	6461.46	2358556
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.10	0.79	2.48	0.16	0.09	1260
	In-Frame/	30	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	343.55	516.30	16.72	2.10	66.47	15636
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.07	6.23	339.76	3.56	24.75	28306
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	459.92	348.61	46.46	1.63	ND	11531
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	6.73	53.82	168.19	10.76	5.92	85304
	In-Frame/Outdoor	2049	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	46532.52	69930.55	2265.01	284.91	9003.08	2117753
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	103.03	1368.83	6608.64	294.37	6461.46	2358556
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.10	0.79	2.48	0.16	0.09	1260
	In-Frame/	30	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	343.55	516.30	16.72	2.10	66.47	15636
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.07	6.23	339.76	3.56	24.75	28306
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	459.92	348.61	46.46	1.63	ND	11531
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	6.73	53.82	168.19	10.76	5.92	85304
	In-Frame/Outdoor	2049	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	46532.52	69930.55	2265.01	284.91	9003.08	2117753
FA-18E/F Fleet	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	103.03	1368.83	6608.64	294.37	6461.46	2358556
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.10	0.79	2.48	0.16	0.09	1260
	In-Frame/	30	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	343.55	516.30	16.72	2.10	66.47	15636
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.07	6.23	339.76	3.56	24.75	28306
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	459.92	348.61	46.46	1.63	ND	11531
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	6.73	53.82	168.19	10.76	5.92	85304
	In-Frame/Outdoor	2049	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	46532.52	69930.55	2265.01	284.91	9003.08	2117753
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	103.03	1368.83	6608.64	294.37	6461.46	2358556
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.10	0.79	2.48	0.16	0.09	1260
	In-Frame/	30	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	343.55	516.30	16.72	2.10	66.47	15636
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.07	6.23	339.76	3.56	24.75	28306
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	459.92	348.61	46.46	1.63	ND	11531
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.23	1.81	5.66	0.36	0.20	2869
	In-Frame/	69	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	782.54	1176.03	38.09	4.79	151.41	35614
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	2.43	14.19	773.89	8.11	56.36	64474
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	1047.59	794.07	105.82	3.72	ND	26264
													Total Fleet Emissions in Tons/yr	**95.81**	**145.44**	**19.36**	**1.20**	**31.23**	
													Total Fleet Emissions in Metric Tons/yr						**8438**
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	6.57	52.53	164.17	10.51	5.78	83265
	In-Frame/Outdoor	2000	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	45420.68	68259.65	2210.90	278.10	8787.96	2067152
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	100.57	1336.12	6450.74	287.34	6307.07	2302201
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.33	2.63	8.21	0.53	0.29	4163
FA-18E/F FRS	In-Frame/	100	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	1135.52	1706.49	55.27	6.95	219.70	51679
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	3.53	20.59	1122.96	11.77	81.79	93556
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	1520.12	1152.24	153.55	5.40	ND	38111
													Total FRS Emissions in Tons/yr	**24.09**	**36.27**	**5.08**	**0.30**	**7.70**	
													Total in Metric Tons/yr						**2105**
		# Annual			Duration			Emissions in lbs/test						Annual Emissions (lbs)					
Aircraft	**Test Type**	**Tests**			**(minutes)**	Fuel Use in lbs		EIHC	EICO	EINOx	EISO2	EIPM	EICO2	**HC**	**CO**	**NOx**	**SO2**	**PM**	**CO2**
FA-18E/F		384	-	-	207	20551		90.70	617.70	578.50	8.20	78.70	64289	34838.36	237261.93	222205.00	3149.66	30229.10	24693640
Indoor Test Cells		145			114	10459		78.22	587.18	270.16	4.18	36.72	32204	11367.72	85334.89	39262.36	607.48	5336.52	4680233
													Total Test Cell Emissions in Tons/yr	**23.10**	**161.30**	**130.73**	**1.88**	**17.78**	
													Total Test Cell Emissions in Metric Tons/yr						**13324**
													Grand Total Tons/yr	**143.01**	**343.01**	**155.17**	**3.38**	**56.71**	
													Grand Total Metric Tons/yr						**23866**

Table A-38. 2015 Fleet FA-18E/F Operations[5] **Aircraft with F414-GE-400** +12 Aircraft

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	20,143	27.257	41.178	1.442	0.175	5.452	1304	274.52	414.73	14.52	1.76	54.91	13135
Departure	20,143	4.571	255.849	22.880	0.521	0.985	3707	46.04	2576.81	230.44	5.25	9.92	37339
Straight-In Arrival	3192	0.118	0.793	16.594	0.389	5.852	3097	0.19	1.27	26.48	0.62	9.34	4942
Overhead Break Arrival	16750	0.058	0.347	7.110	0.193	3.163	1538	0.48	2.91	59.55	1.62	26.49	12885
Touch and Go	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0
GCA Box	652	0.329	2.000	66.324	1.098	13.910	8749	0.11	0.65	21.62	0.36	4.53	2852
FCLP	16877	0.116	0.690	18.576	0.385	5.614	3072	0.98	5.82	156.76	3.25	47.37	25923
Taxi/Idle In	20143	13.403	20.353	0.747	0.089	2.771	663	134.99	204.98	7.52	0.89	27.91	6680
Hot Refuel	3,021	33.127	49.784	1.612	0.203	6.409	1508	50.05	75.21	2.44	0.31	9.68	2278
							Total in Tons/Year	**507.4**	**3282.4**	**519.3**	**14.1**	**190.2**	
							Total in Metric Tons/Year						**96193**

Table A-39. 2015 FRS FA-18E/F Operations[5] **Aircraft with F414-GE-400** same as baseline

Emissions in lbs/op

Type of Operation	Total Number of Operations	HC	CO	NOx	SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	9,430	27.257	41.178	1.442	0.175	5.452	1304	128.52	194.16	6.80	0.82	25.71	6149
Departure	9,430	4.571	255.849	22.880	0.521	0.985	3707	21.55	1206.33	107.88	2.46	4.64	17480
Straight-In Arrival	1455	0.118	0.793	16.594	0.389	5.852	3097	0.09	0.58	12.07	0.28	4.26	2253
Overhead Break Arrival	7644	0.058	0.347	7.110	0.193	3.163	1538	0.22	1.33	27.18	0.74	12.09	5880
Touch and Go	6614	0.105	0.617	24.394	0.349	3.843	2775	0.35	2.04	80.67	1.15	12.71	9178
GCA Box	632	0.329	2.000	66.324	1.098	13.910	8749	0.10	0.63	20.96	0.35	4.40	2765
FCLP	14399	0.116	0.690	18.576	0.385	5.614	3072	0.83	4.97	133.74	2.77	40.42	22117
Taxi/Idle In	9,430	13.403	20.353	0.747	0.089	2.771	663	63.19	95.96	3.52	0.42	13.07	3127
Hot Refuel	1,415	33.127	49.784	1.612	0.203	6.409	1508	23.43	35.21	1.14	0.14	4.53	1066
							Total in Tons/Year	**238.3**	**1541.2**	**394.0**	**9.1**	**121.8**	
							Total in Metric Tons/Year						**63517**

Table A-40. 2015 FA-18E/F Aircraft Engine Maintenance Runups[6] 44 = FRS; 170 = Fleet

Aircraft	Location Name	Annual	Single Engine Operations: Power Setting Reported	Modeled	Duration (minutes)	FFR, lb/hr	Fuel Use lb	Emissions in lbs/1000 lbs fuel: EIHC	EICO	EINOx	EISO2	EIPM	EICO2	Emissions (lbs): HC	CO	NOx	SO2	PM	CO2
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	7.24	57.88	180.88	11.58	6.37	91741
	In-Frame/Outdoor	2204	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	50043.93	75207.61	2435.94	306.41	9682.46	2277562
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	110.80	1472.12	7107.34	316.59	6949.04	2536536
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.10	0.83	2.59	0.17	0.09	1314
	In-Frame/	32	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	358.29	538.45	17.44	2.19	69.32	16306
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.11	6.50	354.33	3.71	25.81	29520
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	479.65	363.57	48.45	1.70	ND	12025
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	7.24	57.88	180.88	11.58	6.37	91741
	In-Frame/Outdoor	2204	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	50043.93	75207.61	2435.94	306.41	9682.46	2277562
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	110.80	1472.12	7107.34	316.59	6949.04	2536536
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.10	0.83	2.59	0.17	0.09	1314
	In-Frame/	32	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	358.29	538.45	17.44	2.19	69.32	16306
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.11	6.50	354.33	3.71	25.81	29520
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	479.65	363.57	48.45	1.70	ND	12025
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	7.24	57.88	180.88	11.58	6.37	91741
	In-Frame/Outdoor	2204	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	50043.93	75207.61	2435.94	306.41	9682.46	2277562
FA-18E/F Fleet	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	110.80	1472.12	7107.34	316.59	6949.04	2536536
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.10	0.83	2.59	0.17	0.09	1314
	In-Frame/	32	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	358.29	538.45	17.44	2.19	69.32	16306
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.11	6.50	354.33	3.71	25.81	29520
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	479.65	363.57	48.45	1.70	ND	12025
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	7.24	57.88	180.88	11.58	6.37	91741
	In-Frame/Outdoor	2204	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	50043.93	75207.61	2435.94	306.41	9682.46	2277562
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	110.80	1472.12	7107.34	316.59	6949.04	2536536
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.10	0.83	2.59	0.17	0.09	1314
	In-Frame/	32	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	358.29	538.45	17.44	2.19	69.32	16306
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	1.11	6.50	354.33	3.71	25.81	29520
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	479.65	363.57	48.45	1.70	ND	12025
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.25	1.97	6.17	0.39	0.22	3129
	In-Frame/	75	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	853.33	1282.41	41.54	5.22	165.10	38836
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	2.65	15.48	843.89	8.84	61.46	70306
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	1142.35	865.90	115.39	4.06	ND	28640
													Total Fleet Emissions in Tons/yr	**103.00**	**156.38**	**20.80**	**1.29**	**33.58**	
													Total Fleet Emissions in Metric Tons/yr						**9072**
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	6.57	52.53	164.17	10.51	5.78	83265
	In-Frame/Outdoor	2000	30 min. @ idle	63.96%	30	695.25	347.63	65.33	98.18	3.18	0.40	12.64	2973	45420.68	68259.65	2210.90	278.10	8787.96	2067152
	Low Power		7 min. @ 80%	80%	7	3078.62	359.17	0.14	1.86	8.98	0.40	8.78	3205	100.57	1336.12	6450.74	287.34	6307.07	2302201
	APU Use		On		4	197	13.13	0.25	2	6.25	0.4	0.22	3170	0.33	2.63	8.21	0.53	0.29	4163
FA-18E/F FRS	In-Frame/	100	10–20 min. @ idle	63.96%	15	695.25	173.81	65.33	98.18	3.18	0.40	12.64	2973	1135.52	1706.49	55.27	6.95	219.70	51679
	Outdoor		1–2 min. Mil power	96%	1.5	11768.0	294.2	0.1	0.7	38.2	0.4	2.8	3180.0	3.53	20.59	1122.96	11.77	81.79	93556
	High Power		30 sec. Afterburner	-	0.5	16205.93	135.05	112.56	85.32	11.37	0.40	ND	2822	1520.12	1152.24	153.55	5.40	ND	38111
													Total FRS Emissions in Tons/yr	**24.09**	**36.27**	**5.08**	**0.30**	**7.70**	
													Total in Metric Tons/yr						**2105**
Aircraft	**Test Type**	**# Annual Tests**			**Duration (minutes)**	Fuel Use in lbs		EIHC	EICO	Emissions in lbs/test: EINOx	EISO2	EIPM	EICO2	Annual Emissions (lbs): **HC**	**CO**	**NOx**	**SO2**	**PM**	**CO2**
FA-18E/F		366	-	-	207	20551		90.70	617.70	578.50	8.20	78.70	64289	33163.68	225856.75	211523.60	2998.26	28775.98	23506616
Indoor Test Cells		138			114	10459		78.22	587.18	270.16	4.18	36.72	32204	10821.27	81232.84	37375.02	578.28	5079.99	4455254
													Total Test Cell Emissions in Tons/yr	**21.99**	**153.54**	**124.45**	**1.79**	**16.93**	
													Total Test Cell Emissions in Metric Tons/yr						**12683**
													Grand Total Tons/yr	**149.09**	**346.19**	**150.33**	**3.38**	**58.21**	
													Grand Total Metric Tons/yr						**23860**

Transient Aircraft

Transient Jet - Assume 50/50 mix of C/D & E/F

Table A-41. Baseline Transient FA-18C/D Operations **Aircraft with F404-GE-400**

Emissions in lbs/op

[1]Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	382	21.84	52.02	0.50	0.16	5.30	1080	4.1663273	9.9227115	0.0958906	0.0298308	1.0100923	206
Departure	382	0.17	17.84	12.55	0.40	0.67	3094	0.0324221	3.4033391	2.3933178	0.075437	0.1278764	590
Straight-In Arrival	79	0.29	1.73	4.72	0.25	3.70	1935	0.0112639	0.0683868	0.1865599	0.0096948	0.1463084	76
Overhead Break Arrival	302	0.16	0.74	3.64	0.17	2.45	1379	0.0242946	0.1115697	0.5498796	0.0264072	0.3703866	208
Touch and Go	186	0.22	0.85	11.77	0.27	2.71	2124	0.0205568	0.0791849	1.0933602	0.0250049	0.2513461	197
GCA Box	341	0.75	3.47	30.65	0.82	9.44	6493	0.1280731	0.591379	5.2186699	0.1401567	1.607391	1105
FCLP	0	0	0	0	0	0	0	0	0	0	0	0	0
Taxi/Idle In	382	10.77	25.87	0.26	0.08	2.67	546	2.0540308	4.9355307	0.0498642	0.0150589	0.5093287	104
Total in Tons/Year								**6.4**	**19.1**	**9.6**	**0.3**	**4.0**	
Total in Metric Tons/Year													**2257**

[1] Flight operations from (Wyle Labs, 2010)

Table A-42. Baseline Transient FA-18E/F Operations — **Aircraft with F414-GE-400 Emissions in lbs/op**

[1]Type of Operation	Total Number of Operations	HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Taxi/Idle Out	382	27.2570085	41.178307	1.441567157	0.17486845	5.45220964	1304	5.1992744	7.8547621	0.2749789	0.0333562	1.040009	249
Departure	382	4.57148955	255.8490254	22.87974594	0.52102674	0.98483389	3707	0.8720116	48.803202	4.3643115	0.0993859	0.1878571	707
Straight-In Arrival	79	0.11841267	0.793361783	16.59422618	0.38854451	5.85164425	3097	0.0046773	0.0313378	0.6554719	0.0153475	0.2311399	122
Overhead Break Arrival	302	0.05785373	0.347244793	7.110200518	0.19283777	3.16280589	1538	0.0087359	0.052434	1.0736403	0.0291185	0.4775837	232
Touch and Go	186	0.10457256	0.617209246	24.3942349	0.3485752	3.84275204	2775	0.0097122	0.0573233	2.2656146	0.0323739	0.3568956	258
GCA Box	341	0.32943312	1.999812186	66.32356787	1.09811041	13.9097212	8749	0.056086	0.340468	11.291587	0.1869533	2.36813	1490
FCLP	0	0	0	0	0	0	0	0	0	0	0	0	0
Taxi/Idle In	382	13.4028795	20.35254861	0.746723349	0.08873462	2.77115951	663	2.5565993	3.8822486	0.1424375	0.0169261	0.5285987	127
Total in Tons/Year								**8.7**	**61.0**	**20.1**	**0.4**	**5.2**	
Total in Metric Tons/Year													**2889**

[1] Flight operations from (Wyle Labs, 2010)

Transient Large/Heavy - Assume C-40 A (Boeing 737-700C)

SOx % 0.04 Sulfur oxides calculated based on weight percent sulfur content of JP-5, as identified in *JP-5 Technical Specification Document* (Chevron Phillips,2010)

EFSOx = 20 * S where EFSOx = SOX emission factor [pounds SOX emitted per thousand pounds of fuel combusted (lb/1000 lb)]

20 = Factor which is derived by converting "weight percent" into units of "lb/1000 lb" and then multiplying times the ratio of the molecular weight of SO2 to the molecular weight of sulfur

S = Weight percent sulfur content of the fuel

Table A-43. Baseline Operations Transient Clipper C-40A — **Emissions in lbs/1000 lbs fuel**

Type of Operation	Total Number of Operations	Engine Power Setting	Time in Mode/engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	[1]HC	[1]CO	[1]NOx	[2]SO2	[1]PM10	[3]CO2	HC	CO	NOx	SO2	PM10	CO2e
[4]Departure	493	100	1	6,683	78	0.029	0.167	14.806	0.8	8.04	1442	1.1146552	6.4188763	569.08911	30.749108	309.02853	55435
[4]Approach	494	30	4	2,032	135	0.084	5.538	7.781	0.8	2.054	1442	5.6207164	370.5658	520.65231	53.530632	137.4399	96507
Idle	273	7	26	730	316	4.511	46.64	3.652	0.8	2.054	1442	389.65668	4028.7271	315.45693	69.10338	177.42293	124582
Total in Tons/Year												**0.198196**	**2.2028559**	**0.7025992**	**0.0766916**	**0.3119457**	
Total in Metric Tons/Year																	**277**

[1]EFs from Engine Datasheet 8CM061 04102007, ICAO Engine Exhaust Emissions Data Bank (ICAO, 2007)

[2]Sulfur dioxide calculated based on 0.04% sulfur content in JP-5, from *Trace Element and Polycyclic Aromatic Hydrocarbon Analyses of Jet Engine Fuels: Jet A, JP5, and JP8* , Technical Report 1845, SSC San Diego, 2000; and equation in Section 3.4 of *Air Emission Inventory Guidance Document for Mobile Sources at Air Force Installations* (2003)

[3]Carbon dioxide EF from Table D-2 of *Federal Greenhouse Gas Accounting and Reporting Guidance: Technical Support Document* (CEQ, 2010) and fuel density from from *Aviation Fuels Technical Review* (Chevron, 2006)

[4]222 Touch & go operations conservatively combined with Departure and Approach; 172 GCA box operations not modeled. Patterns are not included in flight emission profiles for this aircraft.

Transient/Based Prop -Assume C-2

Table A-44. Baseline Operations Transient C-2

[1]Type of Operation	Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/1000 lbs fuel: HC	CO	NOx	[4]SO2	PM10	CO2	HC	CO	NOx	SO2	PM10	CO2e
Departure																		
APU Use		On	1	5	197	33	0.25	2.00	6.25	0.4	0.22	3170	0.0017935	0.0143482	0.044838	0.0028696	0.0015783	23
Start/Warm up		L/S G Idle	2	12.0	599	240	22.32	30.11	3.53	0.4	3.97	3149	1.16851	1.5763368	0.1848047	0.020941	0.20783982	165
Taxi Out		H/S G Idle	2	5.0	756	126	1.42	5.65	6.35	0.4	3.97	3182	0.039094	0.1555502	0.1748219	0.0110124	0.10929807	88
Engine Run-up		62% SHP	2	0.5	1,600	27	0.25	1.12	9.47	0.4	3.97	3226	0.0014567	0.0065259	0.0551785	0.0023307	0.02313187	19
Takeoff		Military	2	0.5	2,219	37	0.16	0.65	10.45	0.4	3.97	3229	0.0012929	0.0052526	0.084445	0.0032323	0.03208101	26
Climbout		Military	2	2.0	2,219	148	0.16	0.65	10.45	0.4	3.97	3229	0.0051717	0.0210102	0.3377799	0.0129294	0.12832403	104
Total	437																	
Straight In Arrival																		
Approach		30% SHP	2	5.0	1100	183	0.49	2.16	8.06	0.4	3.97	3212	0.0195837	0.086328	0.3221313	0.0159867	0.15866767	128
On runway		Flight Idle	2	1.0	836	28	1.1	4.54	6.52	0.4	3.97	3192	0.0066824	0.0275802	0.0396086	0.00243	0.02411749	19
Taxi		H/S G Idle	2	2.0	756	50	1.42	5.65	6.35	0.4	3.97	3182	0.0156018	0.0620777	0.0697687	0.0043949	0.04361918	35
Shut down		L/S G Idle	1	1.0	599	10	22.32	30.11	3.53	0.4	3.97	3149	0.0485765	0.0655304	0.0076826	0.0008705	0.00864018	7
Total	436																	
Touch and Go																		
Approach		30% SHP	2	1.0	1100	37	0.49	2.16	8.06	0.4	3.97	3212	0.0034406	0.0151668	0.0565946	0.0028087	0.02787602	23
Climbout		88% SHP	2	2.0	2025	135	0.18	0.8	10.15	0.4	3.97	3230	0.0046535	0.020682	0.2624029	0.010341	0.10263443	84
Circle		30% SHP	2	4.0	1100	147	0.49	2.16	8.06	0.4	3.97	3212	0.0137625	0.0606672	0.2263785	0.0112347	0.11150407	90
Total	383																	
GCA Box																		
Approach		43% SHP	2	2.0	1300	87	0.36	1.58	8.75	0.4	3.97	3219	0.001014	0.0044503	0.0246458	0.0011267	0.01118217	9
Climbout		88% SHP	2	2.0	2025	135	0.18	0.8	10.15	0.4	3.97	3230	0.0007898	0.00351	0.0445331	0.001755	0.01741838	14
Circle		30% SHP	2	7.0	1100	257	0.49	2.16	8.06	0.4	3.97	3212	0.0040874	0.018018	0.0672338	0.0033367	0.03311642	27
Total	65																	
												Total in Tons/Year	**1.3**	**2.1**	**2.0**	**0.1**	**1.0**	
												Total in Metric Tons/Year						**781**

[1] Flight operations from AESO Memoranda 9919C (Sept 2010) and 9936C (Feb 2010).

Future Years Assume transient aircraft operations remain appreciably the same

Table A-45. [1]H-60 Operations 2 aircraft
Assume operations do not change year to year 816 average annual operations
Note that a departure and a landing are counted as 2 operations

						Emissions in lbs/1000 lbs fuel						Total Emissions, lb/op					
Flight Operation	**Engine Power Setting**	**# Engines**	**Time in Mode**	**Fuel Flow per engine lb/hr**	**Fuel used lb**	**HC**	**CO**	**NOx**	**SO2**	**PM10**	**CO2**	**HC**	**CO**	**NOx**	**SO2**	**PM10**	**CO2**
Departure:																	
APU Use	On	1	30	102	51	9.04	42.77	3.94	0.4	0.22	3154	0.461	2.181	0.201	0.020	0.011	161
rt/Warm Up	15% Torque	2	10	274	91	0.77	18.65	4.6	0.4	4.2	3183	0.070	1.697	0.419	0.036	0.382	290
Unstick	25% Torque	2	0.3	341	3	0.61	14.04	5.07	0.4	4.2	3205	0.002	0.042	0.015	0.001	0.013	10
Taxi Out	20% Torque	2	5	308	51	0.66	16.01	4.85	0.4	4.2	3196	0.034	0.817	0.247	0.020	0.214	163
Hover	80% Torque	2	2	707	47	0.55	4.61	6.9	0.4	4.2	3220	0.026	0.217	0.324	0.019	0.197	151
Climbout	90% Torque	2	2	786	52	0.55	3.74	7.27	0.4	4.2	3219	0.029	0.194	0.378	0.021	0.218	167
											Total for One H-60 Departure:	0.62	5.15	1.58	0.12	1.04	942
											Total H-60 Departures (408), tons/yr:	**0.13**	**1.05**	**0.32**	**0.02**	**0.21**	**192**
Arrival:																	
APU Use	On	1	35	102	60	9.04	42.77	3.94	0.4	0.22	3154	0.54	2.57	0.24	0.02	0.01	189
Approach	50% Torque	2	5	501	84	0.55	8.34	5.93	0.4	4.2	3220	0.05	0.70	0.50	0.03	0.35	271
Unstick	25% Torque	2	0.3	341	3	0.61	14.04	5.07	0.4	4.2	3205	0.00	0.04	0.02	0.00	0.01	10
/shut down	20% Torque	2	8	308	82	0.66	16.01	4.85	0.4	4.2	3196	0.05	1.31	0.40	0.03	0.34	262
Hot refuel	15% Torque	2	15	274	137	0.77	18.65	4.6	0.4	4.2	3183	0.11	2.56	0.63	0.05	0.58	436
											Total for One H-60 Arrival:	0.75	7.18	1.78	0.15	1.30	1168
											Total H-60 Arrivals (408), tons/yr:	**0.2**	**1.5**	**0.4**	**0.0**	**0.3**	**238**
Engine Maintenance/Aircraft/year					18,216							39.0	265.3	108.0	7.3	63.3	58280
											Total Baseline Engine Maintenance tons/yr:	**0.0**	**0.3**	**0.1**	**0.0**	**0.1**	**58**
											Grand Total for Baseline Ops tons/yr:	**0.3**	**2.8**	**0.8**	**0.1**	**0.5**	
																CO2e (metric tons)	**443**

1H-60 operations from AESO Memorandum 9929 Rev A (Nov 09)

Table A-46. [1]Baseline F-18 GSE 238 aircraft

Designation	AGE Type	Total Items	Avg Fuel consumption in gal/month/unit	Brake Horsepower (BHP)	[1]Estimated Fuel Flow Rate (gal/hr)	[2]VOCs lb/hr	[2]CO lb/hr	[2]NOx lb/hr	[2]SO_2 lb/hr	[2]PM_{10} lb/hr	[3]$PM_{2.5}$ lb/hr	[4]CO_2 g/gal	[5]CH_4 g/gal	[5]N_2O g/gal	VOCs lb/yr	CO lb/yr	NOx lb/yr	SO_2 lb/yr	PM_{10} lb/yr	$PM_{2.5}$ lb/yr	CO_2 kg/yr	CH_4 kg/yr	N_2O kg/yr
TOWTRACTOR	A/S32A-45	48	37.4	88	4.89	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	2297.97	10427.48	24680.35	ND	2085.05	2022.50	218742	12.500	5.603
TOWTRACTOR	A/S32A-37	1	1.0	192	10.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	0.36	0.87	6.52	ND	0.29	0.29	127	0.007	0.003
TURBINE	MSU-200	5	0.6	396	22.00	0.2025	1.306	6.0153	ND	0.2008	0.2008	10150	0.58	0.26	0.32	2.07	9.55	ND	0.32	0.31	354	0.020	0.009
AIR COMPRESSOR	ACU-20M	2	0.5	58	3.22	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	2.02	9.16	21.67	ND	1.83	1.78	127	0.007	0.003
HYDRAULIC POWER SUPPLY (-15)	HYD, PORTABLE TEST STAND	37	3.6	111	6.17	0.68	2.7	8.38	ND	0.402	0.402	10150	0.58	0.26	178.09	707.14	2194.75	ND	105.29	102.13	16393	0.937	0.420
AIRCON	A/M32C-17	8	1.0	210	11.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	2.64	6.39	47.70	ND	2.16	2.09	1013	0.058	0.026
MEPP	A/M32A-108	34	28.1	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	295.70	716.49	5345.84	ND	241.64	234.39	116207	6.640	2.977
MEPP	NC-10	3	28.1	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	26.09	63.22	471.69	ND	21.32	20.68	10254	0.586	0.263
FLOOD LIGHT ASSY	A/M42M-2A	14	3.1	19	1.06	0.438	2.161	4.4399	ND	0.2665	0.2665	10150	0.58	0.26	217.35	1072.37	2203.25	ND	132.25	128.28	5317	0.304	0.136
														Total in Tons/Year	**1.51**	**6.50**	**17.49**	**ND**	**1.30**	**1.26**			
														Total in Metric Tons/Year							**369**	**0.02**	**0.01**
																			CO2e in metric tons/year		**372**		

[1]Fuel flow rate based on 1 gal fuel consumed per 18 Horsepower

[2] specific GSE equipment for F-16 flight ops from NAS Lemoore (FRC West); emission factors from *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition* (EPA, 2010), Table A4 (Tier 1 assumed).

[3]PM2.5 calculated as 97% of PM10 emissions, in accordance with EPA OTAQ/OAQPS guidance, *Commercial Marine, Airports, and Trains Approach*, EPA Docket #OAR-2003-0053-1696.

[4]CO2 EF derived from *Direct Emissions from Mobile Combustion Sources* (EPA, 2008), Table **B**-1.

[5]CH4 and N2O EFs derived from *Direct Emissions from Mobile Combustion Sources* (EPA, 2008), Table A-6.

Table A-47. 2012 F-18 GSE 229 aircraft

Designation	AGE Type	Total Items	Avg Fuel consumption in gal/month/unit	Brake Horsepower (BHP)	[1]Estimated Fuel Flow Rate (gal/hr)	[2]VOCs lb/hr	[2]CO lb/hr	[2]NOx lb/hr	[2]SO_2 lb/hr	[2]PM_{10} lb/hr	[3]$PM_{2.5}$ lb/hr	[4]CO_2 g/gal	[5]CH_4 g/gal	[5]N_2O g/gal	VOCs lb/yr	CO lb/yr	NOx lb/yr	SO_2 lb/yr	PM_{10} lb/yr	$PM_{2.5}$ lb/yr	CO_2 kg/yr	CH_4 kg/yr	N_2O kg/yr
TOWTRACTOR	A/S32A-45	48	36	88	4.89	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	2211.07	10033.16	23747.06	ND	2006.21	1946.02	210470	12.027	5.391
TOWTRACTOR	A/S32A-37	1	1	192	10.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	0.35	0.84	6.27	ND	0.28	0.28	122	0.007	0.003
TURBINE	MSU-200	5	0.56	396	22.00	0.2025	1.306	6.0153	ND	0.2008	0.2008	10150	0.58	0.26	0.31	1.99	9.19	ND	0.31	0.30	341	0.019	0.009
AIR COMPRESSOR	ACU-20M	2	0.5	58	3.22	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	1.94	8.81	20.85	ND	1.76	1.71	122	0.007	0.003
HYDRAULIC POWER SUPPLY (-15)	HYD, PORTABLE TEST STAND	37	3.5	111	6.17	0.68	2.7	8.38	ND	0.402	0.402	10150	0.58	0.26	171.36	680.40	2111.76	ND	101.30	98.26	15773	0.901	0.404
AIRCON	A/M32C-17	8	1	210	11.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	2.54	6.15	45.89	ND	2.07	2.01	974	0.056	0.025
MEPP	A/M32A-108	34	27	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	284.52	689.40	5143.68	ND	232.50	225.53	111812	6.389	2.864
MEPP	NC-10	3	27	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	25.10	60.83	453.85	ND	20.52	19.90	9866	0.564	0.253
FLOOD LIGHT ASSY	A/M42M-2A	14	3	19	1.06	0.438	2.161	4.4399	ND	0.2665	0.2665	10150	0.58	0.26	209.13	1031.82	2119.94	ND	127.25	123.43	5116	0.292	0.131
														Total in Tons/Year	**1.45**	**6.26**	**16.83**	**ND**	**1.25**	**1.21**			
														Total in Metric Tons/Year							**354.60**	**0.02**	**0.01**
																			CO2e in metric tons/year		**358**		

Table A-48. 2013 F-18 GSE 213 aircraft

Designation	AGE Type	Total Items	Avg Fuel consumption in gal/month/unit	Brake Horsepower (BHP)	[1]Estimated Fuel Flow Rate (gal/hr)	[2]VOCs lb/hr	[2]CO lb/hr	[2]NOx lb/hr	[2]SO_2 lb/hr	[2]PM_{10} lb/hr	[3]$PM_{2.5}$ lb/hr	[4]CO_2 g/gal	[5]CH_4 g/gal	[5]N_2O g/gal	VOCs lb/yr	CO lb/yr	NOx lb/yr	SO_2 lb/yr	PM_{10} lb/yr	$PM_{2.5}$ lb/yr	CO_2 kg/yr	CH_4 kg/yr	N_2O kg/yr
TOWTRACTOR	A/S32A-45	48	33.5	88	4.89	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	2056.58	9332.15	22087.87	ND	1866.04	1810.06	195765	11.187	5.015
TOWTRACTOR	A/S32A-37	1	0.9	192	10.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	0.32	0.78	5.84	ND	0.26	0.26	113	0.006	0.003
TURBINE	MSU-200	5	0.5	396	22.00	0.2025	1.306	6.0153	ND	0.2008	0.2008	10150	0.58	0.26	0.29	1.86	8.55	ND	0.29	0.28	317	0.018	0.008
AIR COMPRESSOR	ACU-20M	2	0.5	58	3.22	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	1.81	8.19	19.39	ND	1.64	1.59	113	0.006	0.003
HYDRAULIC POWER SUPPLY (-15)	HYD, PORTABLE TEST STAND	37	3.3	111	6.17	0.68	2.7	8.38	ND	0.402	0.402	10150	0.58	0.26	159.39	632.86	1964.21	ND	94.23	91.40	14671	0.838	0.376
AIRCON	A/M32C-17	8	0.9	210	11.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	2.36	5.72	42.69	ND	1.93	1.87	906	0.052	0.023
MEPP	A/M32A-108	34	25.1	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	264.64	641.23	4784.30	ND	216.26	209.77	104000	5.943	2.664
MEPP	NC-10	3	25.1	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	23.35	56.58	422.14	ND	19.08	18.51	9176	0.524	0.235
FLOOD LIGHT ASSY	A/M42M-2A	14	2.8	19	1.06	0.438	2.161	4.4399	ND	0.2665	0.2665	10150	0.58	0.26	194.52	959.73	1971.82	ND	118.36	114.81	4758	0.272	0.122
														Total in Tons/Year	**1.35**	**5.82**	**15.65**	**ND**	**1.16**	**1.12**			
														Total in Metric Tons/Year							**330**	**0.02**	**0.01**
																			CO2e in metric tons/year		**333**		

Table A-49. 2014 F-18 GSE 232 aircraft

Designation	AGE Type	Total Items	Avg Fuel consumption in gal/month/unit	Brake Horsepower (BHP)	[1]Estimated Fuel Flow Rate (gal/hr)	[2]VOCs lb/hr	[2]CO lb/hr	[2]NOx lb/hr	[2]SO_2 lb/hr	[2]PM_{10} lb/hr	[3]$PM_{2.5}$ lb/hr	[4]CO_2 g/gal	[5]CH_4 g/gal	[5]N_2O g/gal	VOCs lb/yr	CO lb/yr	NOx lb/yr	SO_2 lb/yr	PM_{10} lb/yr	$PM_{2.5}$ lb/yr	CO_2 kg/yr	CH_4 kg/yr	N_2O kg/yr
TOWTRACTOR	A/S32A-45	48	36.5	88	4.89	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	2240.04	10164.60	24058.15	ND	2032.49	1971.52	213228	12.184	5.462
TOWTRACTOR	A/S32A-37	1	1.0	192	10.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	0.35	0.85	6.36	ND	0.29	0.28	123	0.007	0.003
TURBINE	MSU-200	5	0.6	396	22.00	0.2025	1.306	6.0153	ND	0.2008	0.2008	10150	0.58	0.26	0.31	2.02	9.31	ND	0.31	0.30	346	0.020	0.009
AIR COMPRESSOR	ACU-20M	2	0.5	58	3.22	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	1.97	8.92	21.12	ND	1.78	1.73	123	0.007	0.003
HYDRAULIC POWER SUPPLY (-15)	HYD, PORTABLE TEST STAND	37	3.5	111	6.17	0.68	2.7	8.38	ND	0.402	0.402	10150	0.58	0.26	173.60	689.31	2139.42	ND	102.63	99.55	15980	0.913	0.409
AIRCON	A/M32C-17	8	1.0	210	11.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	2.57	6.23	46.49	ND	2.10	2.04	987	0.056	0.025
MEPP	A/M32A-108	34	27.4	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	288.25	698.43	5211.07	ND	235.55	228.48	113277	6.473	2.902
MEPP	NC-10	3	27.4	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	25.43	61.63	459.80	ND	20.78	20.16	9995	0.571	0.256
FLOOD LIGHT ASSY	A/M42M-2A	14	3.0	19	1.06	0.438	2.161	4.4399	ND	0.2665	0.2665	10150	0.58	0.26	211.87	1045.34	2147.71	ND	128.91	125.05	5183	0.296	0.133
														Total in Tons/Year	**1.47**	**6.34**	**17.05**	**ND**	**1.26**	**1.22**			
														Total in Metric Tons/Year							**359**	**0.02**	**0.01**
																			CO2e in metric tons/year		**363**		

Table A-50. 2015 F-18 GSE 234 aircraft

Designation	AGE Type	Total Items	Avg Fuel consumption in gal/month/unit	Brake Horsepower (BHP)	[1]Estimated Fuel Flow Rate (gal/hr)	[2]VOCs lb/hr	[2]CO lb/hr	[2]NOx lb/hr	[2]SO_2 lb/hr	[2]PM_{10} lb/hr	[3]$PM_{2.5}$ lb/hr	[4]CO_2 g/gal	[5]CH_4 g/gal	[5]N_2O g/gal	VOCs lb/yr	CO lb/yr	NOx lb/yr	SO_2 lb/yr	PM_{10} lb/yr	$PM_{2.5}$ lb/yr	CO_2 kg/yr	CH_4 kg/yr	N_2O kg/yr
TOWTRACTOR	A/S32A-45	48	36.8	88	4.89	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	2259.35	10252.23	24265.55	ND	2050.01	1988.51	215066	12.289	5.509
TOWTRACTOR	A/S32A-37	1	1.0	192	10.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	0.35	0.86	6.41	ND	0.29	0.28	124	0.007	0.003
TURBINE	MSU-200	5	0.6	396	22.00	0.2025	1.306	6.0153	ND	0.2008	0.2008	10150	0.58	0.26	0.32	2.04	9.39	ND	0.31	0.30	348	0.020	0.009
AIR COMPRESSOR	ACU-20M	2	0.5	58	3.22	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	1.98	9.00	21.31	ND	1.80	1.75	124	0.007	0.003
HYDRAULIC POWER SUPPLY (-15)	HYD, PORTABLE TEST STAND	37	3.6	111	6.17	0.68	2.7	8.38	ND	0.402	0.402	10150	0.58	0.26	175.10	695.26	2157.87	ND	103.52	100.41	16117	0.921	0.413
AIRCON	A/M32C-17	8	1.0	210	11.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	2.59	6.29	46.89	ND	2.12	2.06	996	0.057	0.026
MEPP	A/M32A-108	34	27.6	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	290.73	704.45	5255.99	ND	237.58	230.45	114254	6.529	2.927
MEPP	NC-10	3	27.6	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	25.65	62.16	463.76	ND	20.96	20.33	10081	0.576	0.258
FLOOD LIGHT ASSY	A/M42M-2A	14	3.1	19	1.06	0.438	2.161	4.4399	ND	0.2665	0.2665	10150	0.58	0.26	213.70	1054.35	2166.22	ND	130.03	126.12	5227	0.299	0.134
														Total in Tons/Year	**1.48**	**6.39**	**17.20**	**ND**	**1.27**	**1.24**			
														Total in Metric Tons/Year							**362**	**0.02**	**0.01**
																			CO2e in metric tons/year		**366**		

Table A-51. 2015 F-18 GSE - No Action Alternative 208 aircraft

Designation	AGE Type	Total Items	Avg Fuel consumption in gal/month/unit	Brake Horsepower (BHP)	[1]Estimated Fuel Flow Rate (gal/hr)	[2]VOCs lb/hr	[2]CO lb/hr	[2]NOx lb/hr	[2]SO_2 lb/hr	[2]PM_{10} lb/hr	[3]$PM_{2.5}$ lb/hr	[4]CO_2 g/gal	[5]CH_4 g/gal	[5]N_2O g/gal	VOCs lb/yr	CO lb/yr	NOx lb/yr	SO_2 lb/yr	PM_{10} lb/yr	$PM_{2.5}$ lb/yr	CO_2 kg/yr	CH_4 kg/yr	N_2O kg/yr
TOWTRACTOR	A/S32A-45	48	32.7	88	4.89	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	2008.31	9113.09	21569.38	ND	1822.23	1767.57	191170	10.924	4.897
TOWTRACTOR	A/S32A-37	1	0.9	192	10.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	0.32	0.76	5.70	ND	0.26	0.25	111	0.006	0.003
TURBINE	MSU-200	5	0.5	396	22.00	0.2025	1.306	6.0153	ND	0.2008	0.2008	10150	0.58	0.26	0.28	1.81	8.34	ND	0.28	0.27	310	0.018	0.008
AIR COMPRESSOR	ACU-20M	2	0.5	58	3.22	0.5213	2.3655	5.5988	ND	0.473	0.473	10150	0.58	0.26	1.76	8.00	18.94	ND	1.60	1.55	111	0.006	0.003
HYDRAULIC POWER SUPPLY (-15)	HYD, PORTABLE TEST STAND	37	3.2	111	6.17	0.68	2.7	8.38	ND	0.402	0.402	10150	0.58	0.26	155.65	618.01	1918.11	ND	92.01	89.25	14327	0.819	0.367
AIRCON	A/M32C-17	8	0.9	210	11.67	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	2.31	5.59	41.68	ND	1.88	1.83	885	0.051	0.023
MEPP	A/M32A-108	34	24.5	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	258.43	626.18	4671.99	ND	211.18	204.85	101559	5.803	2.602
MEPP	NC-10	3	24.5	215	11.94	0.3085	0.7475	5.5772	ND	0.2521	0.2521	10150	0.58	0.26	22.80	55.25	412.23	ND	18.63	18.07	8961	0.512	0.230
FLOOD LIGHT ASSY	A/M42M-2A	14	2.7	19	1.06	0.438	2.161	4.4399	ND	0.2665	0.2665	10150	0.58	0.26	189.96	937.20	1925.53	ND	115.58	112.11	4646	0.266	0.119
														Total in Tons/Year	**1.32**	**5.68**	**15.29**	**ND**	**1.13**	**1.10**			
														Total in Metric Tons/Year							**322.08**	**0.02**	**0.01**
																			CO2e in metric tons/year		**325.02**		

[1]**Personnel Vehicles**

Table A-52. Baseline Commuters

Commuters - on base

	# vehicles	# days	mi/day	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
carpool	270	240	14	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	182.00	0.02	0.02	829	7496	833	10	79	50	165110400	14515.2	14515.2
cars	618	240	14	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	364.00	0.03	0.03	1898	17157	1907	22	181	114	755838720	64370.88	66447.36
SUV/pickups	324	240	14	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	519.00	0.04	0.05	995	8995	1000	12	95	60	565004160	39191.04	51166.08
8-cyl	108	240	14	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	364.00	0.03	0.03	332	2998	333	4	32	20	132088320	11249.28	11612.16
												Tons per Year	**2.03**	**18.32**	**2.04**	**0.02**	**0.19**	**0.12**			
												Metric Tons per Year							**1618**	**0.13**	**0.14**
																		CO2e in metric tons/year	**1665**		

Commuters - off base

	# vehicles	# days	mi/day	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
carpool	425	240	25	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	182.00	0.02	0.02	2331	21070	2341	27	222	140	464100000	40800	40800
cars	1375	240	25	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	364.00	0.03	0.03	7540	68168	7575	89	718	452	3003000000	255750	264000
SUV/pickups	692	240	25	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	519.00	0.04	0.05	3795	34307	3812	45	361	227	2154888000	149472	195144
8-cyl	232	240	25	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	364.00	0.03	0.03	1272	11502	1278	15	121	76	506688000	43152	44544
												Tons per Year	**7.47**	**67.52**	**7.50**	**0.09**	**0.71**	**0.45**			
												Metric Tons per Year							**6129**	**0.49**	**0.54**
																		CO2e in metric tons/year	**6308**		

[1]Emission Factors from onroadEF07_26.xls and onroadEFHHDT07_26.xls (SCAQMD 2009)

[2]Emission Factors from *Federal Greenhouse Gas Accounting and Reporting Guidance: Technical Support Document* (CEQ. 2010), Table D-11

[3]Emission Factors from *Federal Greenhouse Gas Accounting and Reporting Guidance: Technical Support Document* (CEQ. 2010), Table D-12

Future Years   Worst case - Assume all fluctuations impact off-base commuters

Table A-53. Off Base Commuters 2012

Commuters - off base

	# vehicles	# days	mi/day	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
carpool	425	240	25	7.963E-04	7.655E-03	7.758E-04	1.073E-05	8.97916E-05	5.74957E-05	182.00	0.02	0.02	2031	19520	1978	27	229	147	464100000	40800	40800
cars	1217	240	25	7.963E-04	7.655E-03	7.758E-04	1.073E-05	8.97916E-05	5.74957E-05	364.00	0.03	0.03	5814	55895	5665	78	656	420	2657928000	226362	233664
SUV/pickups	692	240	25	7.963E-04	7.655E-03	7.758E-04	1.073E-05	8.97916E-05	5.74957E-05	519.00	0.04	0.05	3306	31783	3221	45	373	239	2154888000	149472	195144
8-cyl	232	240	25	7.963E-04	7.655E-03	7.758E-04	1.073E-05	8.97916E-05	5.74957E-05	364.00	0.03	0.03	1108	10655	1080	15	125	80	506688000	43152	44544
												Tons per Year	**6.13**	**58.93**	**5.97**	**0.08**	**0.69**	**0.44**			
												Metric Tons per Year							**5784**	**0.46**	**0.51**
																		CO2e in metric tons/year	**5953**		

Table A-54. Off Base Commuters 2013

Commuters - off base

	# vehicles	# days	mi/day	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
carpool	425	240	25	7.457E-04	7.092E-03	7.116E-04	1.072E-05	9.06667E-05	5.8345E-05	182.00	0.02	0.02	1901	18085	1815	27	231	149	464100000	40800	40800
cars	1122	240	25	7.457E-04	7.092E-03	7.116E-04	1.072E-05	9.06667E-05	5.8345E-05	364.00	0.03	0.03	5020	47745	4790	72	610	393	2450448000	208692	215424
SUV/pickups	692	240	25	7.457E-04	7.092E-03	7.116E-04	1.072E-05	9.06667E-05	5.8345E-05	519.00	0.04	0.05	3096	29447	2954	45	376	242	2154888000	149472	195144
8-cyl	232	240	25	7.457E-04	7.092E-03	7.116E-04	1.072E-05	9.06667E-05	5.8345E-05	364.00	0.03	0.03	1038	9872	991	15	126	81	506688000	43152	44544
												Tons per Year	**5.53**	**52.58**	**5.27**	**0.08**	**0.67**	**0.43**			
												Metric Tons per Year							**5576**	**0.44**	**0.50**
																		CO2e in metric tons/year	**5739**		

Table A-55. Off Base Commuters 2014

Commuters - off base

	# vehicles	# days	mi/day	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
carpool	425	240	25	7.023E-04	6.604E-03	6.548E-04	1.069E-05	9.1849E-05	5.93866E-05	182.00	0.02	0.02	1791	16839	1670	27	234	151	464100000	40800	40800
cars	1516	240	25	7.023E-04	6.604E-03	6.548E-04	1.069E-05	9.1849E-05	5.93866E-05	364.00	0.03	0.03	6388	60066	5956	97	835	540	3310944000	281976	291072
SUV/pickups	692	240	25	7.023E-04	6.604E-03	6.548E-04	1.069E-05	9.1849E-05	5.93866E-05	519.00	0.04	0.05	2916	27418	2719	44	381	247	2154888000	149472	195144
8-cyl	232	240	25	7.023E-04	6.604E-03	6.548E-04	1.069E-05	9.1849E-05	5.93866E-05	364.00	0.03	0.03	978	9192	912	15	128	83	506688000	43152	44544
												Tons per Year	**6.04**	**56.76**	**5.63**	**0.09**	**0.79**	**0.51**			
												Metric Tons per Year							**6437**	**0.52**	**0.57**
																		CO2e in metric tons/year	**6625**		

Table A-56. Off Base Commuters 2015

Commuters - off base

	# vehicles	# days	mi/day	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
carpool	425	240	25	6.635E-04	6.141E-03	6.019E-04	1.070E-05	9.25881E-05	6.01496E-05	182.00	0.02	0.02	1692	15660	1535	27	236	153	464100000	40800	40800
cars	1557	240	25	6.635E-04	6.141E-03	6.019E-04	1.070E-05	9.25881E-05	6.01496E-05	364.00	0.03	0.03	6199	57370	5623	100	865	562	3400488000	289602	298944
SUV/pickups	692	240	25	6.635E-04	6.141E-03	6.019E-04	1.070E-05	9.25881E-05	6.01496E-05	519.00	0.04	0.05	2755	25498	2499	44	384	250	2154888000	149472	195144
8-cyl	232	240	25	6.635E-04	6.141E-03	6.019E-04	1.070E-05	9.25881E-05	6.01496E-05	364.00	0.03	0.03	924	8548	838	15	129	84	506688000	43152	44544
												Tons per Year	**5.78**	**53.54**	**5.25**	**0.09**	**0.81**	**0.52**			
												Metric Tons per Year							**6526**	**0.52**	**0.58**
																		CO2e in metric tons/year	**6717**		

Table A-57. Commuters 2015 - No Action Alternative

Assume the FRS reduction affected commuters on-base and off-base at 50/50; 319 personnel total, 159 on base & 160 off base

Commuters - on base

	# vehicles	# days	mi/day	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
carpool	238	240	14	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	182.00	0.02	0.02	732	6613	735	9	70	44	145664064	12805.632	12805.632
cars	571	240	14	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	364.00	0.03	0.03	1753	15847	1761	21	167	105	698111232	59454.528	61372.416
SUV/pickups	286	240	14	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	519.00	0.04	0.05	878	7935	882	10	84	53	498389472	34570.368	45133.536
8-cyl	95	240	14	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.47813E-05	364.00	0.03	0.03	293	2646	294	3	28	18	116555712	9926.448	10246.656
												Tons per Year	**1.83**	**16.52**	**1.84**	**0.02**	**0.17**	**0.11**			
												Metric Tons per Year							**1459**	**0.12**	**0.13**
																		CO2e in metric tons/year	**1501**		

Commuters - off base

	# vehicles	# days	mi/day	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,3]CO_2 g/mi	[2,3]CH_4 g/mi	[2,3]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
carpool	400	240	25	6.635E-04	6.141E-03	6.019E-04	1.070E-05	9.25881E-05	6.01496E-05	182.00	0.02	0.02	1593	14746	1445	26	222	144	437018400	38419	38419
cars	1307	240	25	6.635E-04	6.141E-03	6.019E-04	1.070E-05	9.25881E-05	6.01496E-05	364.00	0.03	0.03	5203	48155	4720	84	726	472	2854269600	243083	250925
SUV/pickups	652	240	25	6.635E-04	6.141E-03	6.019E-04	1.070E-05	9.25881E-05	6.01496E-05	519.00	0.04	0.05	2594	24009	2353	42	362	235	2029082400	140746	183751
8-cyl	218	240	25	6.635E-04	6.141E-03	6.019E-04	1.070E-05	9.25881E-05	6.01496E-05	364.00	0.03	0.03	870	8047	789	14	121	79	476985600	40622	41933
												Tons per Year	**5.13**	**47.48**	**4.65**	**0.08**	**0.72**	**0.47**			
												Metric Tons per Year							**5797**	**0.46**	**0.52**
																		CO2e in metric tons/year	**5967**		

Table A-58. Baseline GOV emissions 238 aircraft

	# vehicles	mi/yr	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,4]CO_2 g/mi	[3,4]CH_4 g/mi	[3,4]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
7-passenger van	2	1,508	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.478E-05	548.59375	0.0452	0.0871	2.76	24.92	2.77	0.03	0.26	0.17	1654559	136	263
1/2-ton pickup truck	18	500	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.478E-05	626.96429	0.0655	0.175	8.22	74.34	8.26	0.10	0.78	0.49	5640798	589	1574
1/2-ton flat bed truck	2	1,508	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.478E-05	626.96429	0.0655	0.175	2.76	24.92	2.77	0.03	0.26	0.17	1890924	198	528
Compact pickup trucks	4	1,508	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.478E-05	438.875	0.0452	0.0871	5.51	49.84	5.54	0.06	0.52	0.33	2647294	273	525
44-passenger buses	4	1,530	3.042E-03	1.195E-02	3.822E-02	4.131E-05	0.003519236	0.0031552	1275.81	0.0051	0.0048	18.61	73.14	233.84	0.25	21.53	19.30	7805406	31	29
											Tons per Year	0.02	0.12	0.13	0.00	0.01	0.01			
											Metric Tons per Year							20	0.0012	0.0029
																	CO2e in metric tons/year	**21**		

[1]Emission Factors from onroadEF07_26.xls and onroadEFHHDT07_26.xls (SCAQMD 2009)

[2]Emission Factors from *Federal Greenhouse Gas Accounting and Reporting Guidance: Technical Support Document* (CEQ. 2010), Table D-2

[3]Emission Factors from *Federal Greenhouse Gas Accounting and Reporting Guidance: Technical Support Document* (CEQ. 2010), Table D-4 (Tier 1)

[4]Fuel consumption based on average fuel economy for vehicle type (www.fueleconomy.gov, 2005 model year for all) and applying Table D-2 data:

gasoline:	HHV	0.125 MMBtu/gal	diesel:	HHV	0.138	MMBtu/gal
	EF	70.22 kg CO2/MMBtu		EF	73.96	kg CO2/MMBtu
		8.7775 kg CO2/gal			10.20648	kg CO2/gal

Future Years Assume that GOV operations do not appreciably change

Table A-59. No Action Alternative GOV emissions 208 aircraft

	# vehicles	mi/yr	[1]VOCs lb/mi	[1]CO lb/mi	[1]NOx lb/mi	[1]SO_2 lb/mi	[1]PM_{10} lb/mi	[1]$PM_{2.5}$ lb/mi	[2,4]CO_2 g/mi	[3,4]CH_4 g/mi	[3,4]N_2O g/mi	VOCs lb	CO lb	NOx lb	SO_2 lb	PM_{10} lb	$PM_{2.5}$ lb	CO_2 g	CH_4 g	N_2O g
7-passenger van	2	1,318	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.478E-05	548.59375	0.0452	0.0871	2.41	21.78	2.42	0.03	0.23	0.14	1446001	119	230
1/2-ton pickup truck	18	437	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.478E-05	626.96429	0.0655	0.175	7.19	64.97	7.22	0.08	0.68	0.43	4929773	515	1376
1/2-ton flat bed truck	2	1,318	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.478E-05	626.96429	0.0655	0.175	2.41	21.78	2.42	0.03	0.23	0.14	1652572	173	461
Compact pickup trucks	4	1,318	9.140E-04	8.263E-03	9.181E-04	1.077E-05	8.69788E-05	5.478E-05	438.875	0.0452	0.0871	4.82	43.56	4.84	0.06	0.46	0.29	2313601	238	459
44-passenger buses	4	1,337	3.042E-03	1.195E-02	3.822E-02	4.131E-05	0.003519236	0.0031552	1275.81	0.0051	0.0048	16.26	63.92	204.36	0.22	18.82	16.87	6821531	27	26
											Tons per Year	0.02	0.11	0.11	0.00	0.01	0.01			
											Metric Tons per Year							17	0.0011	0.0026
																	CO2e in metric tons/year	**18**		

DEPARTMENT OF THE NAVY
RECORD OF NON-APPLICABILITY (RONA)
FOR CLEAN AIR ACT CONFORMITY

The proposed action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

PROPOSED ACTION

Action Proponent: U.S. Fleet Forces Command

Proposed Action Name: Strike Fighter Realignment at NAS Lemoore

Location: NAS Lemoore, California

Introduction: This proposed action involves relocating two 12-plane, East Coast FA-18E/F squadrons to NAS Lemoore and transitioning in-place up to 54 FA-18C/D aircraft to FA-18E/F aircraft at NAS Lemoore during the 2012 to 2015 timeframe.

Proposed Action Summary: East Coast VFA squadrons would be identified based on operational availability to execute the relocation to NAS Lemoore tentatively planned for the timeline. The timing of the in-place transitions is dependent on FA-18E/F acquisition schedules and the availability of training resources. Additionally, two H-60 helicopters are expected to be based at NAS Lemoore beginning in 2012. The Proposed Action would include a net decrease of four fixed-wing aircraft, a net increase of two rotary-wing aircraft, a net increase of approximately 140 personnel, and Hangars 1, 2, and 4 are slated for renovation, including second story additions to Hangars 2 and 4.No additional facilities construction or modification, and no changes to aircraft operations, ranges, or airspace, are proposed.

Air Emissions Summary: Emissions resulting from the proposed action were estimated based on the expected number, type, and duration of aircraft operations, GSE operations and personnel on an annual basis to complete the proposed action. (Table 1). The projected net change in emissions for each year is compared to the *de minimis* threshold for each pollutant. Because the Proposed Action would result in a net reduction in emissions for all of the pollutants, there would be no exceedance of the thresholds.

Similarly, the emission reductions that would occur ensure that there is no issue with the requirement that emissions from a Proposed Action not exceed 10 percent of the regional emissions (USN 2007).

Table 1 Projected Mobile Source Emissions. 2012 – 2015, NAS Lemoore

	Pollutant (Tons per year)			
	VOCs	NO_X	PM_{10}	$PM_{2.5}$
Baseline Emissions	1,066.80	1,174.20	471.64	457.18
2012 Emissions	1,014.84	1,113.31	443.50	429.90
Net Change	-51.96	-60.88	-28.14	-27.28
2013 Emissions	925.19	1,061.32	392.34	380.26
Net Change	-141.60	-112.88	-79.30	-76.92
2014 Emissions	988.97	1153.03	412.33	399.64
Net Change	-77.83	-21.17	-59.30	-57.54
2015 Emissions	994.07	1,163.43	412.71	400.00
Net Change	-72.72	-10.76	-58.93	-57.18
[1]General Conformity *de minimis* Thresholds	10	10	100	100
Exceed threshold	No	No	No	No

[1] 40 CFR 93.153

Emissions were calculated using:

- Flight profiles for the FA-18 C/D and E/F aircraft were obtained from Aircraft Noise Study for NAS Lemoore (Wyle Labs, December 2010).
- Flight operations were obtained from LemooreDataValidationSec5-With no action added 20110404.xlsx (Wyle Labs, 2011).
- Engine Maintenance Run Up Data from LemoreDataValidationSec6-MaintenanceRunups20110124.xlsx (Wyle Labs, 2011)
- Indoor test cell data from AESO Memorandum Report No. 2000-22, Revision A, March 2011 and email communication with (Coffer, AESO, 6/21/2011) and (Bugay, NASL, 6/17/ 2011).
- Start/shut off, taxi, and hot refueling profiles were provided by Qinetiq contractor personnel at NAS Lemoore.
- FFR (fuel consumption), and emission indices for FA-18 aircraft were obtained from AESO Memorandum Report No. 9734, Rev C (November 2002), AESO Memorandum Report No. 9815, Rev G (March 2011), AESO Memorandum Report No.2003-01 (November 2002), AESO Memorandum Report No. 9725, Rev D (February 2011).
- LTO cycle data, FFR (fuel consumption), and emission indices for C-40A aircraft were obtained from Engine Datasheet 8CM061 04102007, ICAO Engine Exhaust Emissions Data Bank (ICAO, 2007).
- LTO cycle data, FFR (fuel consumption), and emission indices for C-2 aircraft were obtained from AESO Memoranda 9920C (Feb 2010), 9943C (Feb 2010), 9919C (Sept 2010), and 9936C (Feb 2010).
- Sulfur dioxide for transient aircraft other than the FA-18s were calculated based on 0.04% sulfur content in Trace Element and Polycyclic Aromatic Hydrocarbon Analyses of Jet Engine Fuels: Jet A, JP5, and JP8, Technical Report 1845, SSC San Diego, 2000; and assuming that all the sulfur in the fuel is converted to SOX (as SO_2) during combustion.
- H-60 helicopter LTO cycle data, FFR, emission indices, and engine maintenance runup data were obtained from AESO Memorandum Report No. 9929, Revision A (November 2009).
- Emission factors obtained from Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition (EPA, 2010), Table A4 (Tier 1 assumed).
- PM2.5 calculated as 97% of PM10 emissions, in accordance with EPA OTAQ/OAQPS guidance, Commercial Marine, Airports, and Trains Approach, EPA Docket #OAR-2003-0053-1696.
- Data on the type of GOV and annual mileage were provided by PWT.
- Data on the population commuting on-base and the population commuting off-base were provided by Base Housing.
- Emission factors used to calculate emissions from the vehicles were obtained from EMFAC 2007 spreadsheets prepared by South Coast Air Quality Management District, onroadEF07_26.xls and onroadEFHHDT07_26.xls (SCAQMD 2009).
- Emission factors used to calculate emissions from the vehicles were obtained from the California Air Resources Board model Offroad 2007 (CARB 2007).

Affected Air Basin(s): San Joaquin Valley Air Pollution Control District

Date RONA prepared: July 18, 2011

RONA Prepared By: Naval Facilities Engineering Command Southwest

Proposed Action Exemption(s): The Proposed Action is exempt from General Conformity Rule Requirements based on the determination that Proposed Action emissions are below all *de Minimis* thresholds.

Attainment Area Status and Emissions Evaluation Conclusion: The proposed action is located within San Joaquin Valley Air Pollution Control District, which is currently designated as nonattainment for the following National Ambient Air Quality Standards: 8-hour ozone (extreme), 24-hour $PM_{2.5}$, and annual $PM_{2.5}$ (40 CFR 81.305). Additionally, the SJVAPCD has achieved attainment for PM_{10}, and is therefore a PM_{10} Maintenance Area.

The Navy concludes that *de minimis* thresholds for applicable criteria pollutants would not be exceeded nor would the projected emissions be regionally significant.

The emissions data supporting that conclusion are shown in Table 1, which are summaries of the calculations, methodology, data, and references included in the Conformity Applicability Analysis contained in Appendix D of the Environmental Assessment for the Strikefighter Realignment at Naval Air Station Lemoore, California. Therefore, the Navy concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA APPROVAL

To the best of my knowledge, the information presented in this RONA is correct and accurate and I concur in the finding that the Proposed Action is not subject to the General Conformity Rule.

Signature: ____

Name/Rank: Date: ____

Position: Commanding Officer ___________Activity: ____________________________

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APPENDIX D
REVISED FINAL AIRCRAFT NOISE STUDY

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REVISED FINAL

Aircraft Noise Study for Strike Fighter Realignment Environmental Assessment Naval Air Station Lemoore, CA

Wyle Technical Note
TN 11-01
Job No. T58024

July 2011

Courtesy of www.navy.mil

Table of Contents

Figures

Tables

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1 Introduction

The purpose of this Technical Note (TN) is to define the aircraft noise exposure on and in the vicinity of Naval Air Station (NAS) Lemoore (NASL), California in support of the Strike Fighter Realignment Environmental Assessment (EA) resulting from nominal yearly flight and maintenance (run-up) operations of based and transient military aircraft for two scenarios. The Baseline scenario represents the current condition at NASL, including the arrival of squadron VFA-86 comprised of ten Super Hornet F/A-18E aircraft. The No Action scenario considers the future operating environment if the proposed action did not occur. The Proposed scenario is based on the full implementation of the proposed Strike Fighter Realignment action occurring in CY 2015. Under the proposed action the Navy anticipates the following changes:

- Four F/A-18C 10-aircraft squadrons would transition to four F/A-18 E/F 10-aircraft squadrons,
- Addition of three F/A-18E/F 12-aircraft squadrons, and
- One F/A-18C 10-aircraft squadron replaced by one F/A-18E/F 12-aircraft squadron.

This report is organized into four sections. Sections 2, 3 and 4 provide operations data and noise exposure for Baseline, No Action and Proposed conditions, respectively. Appendix A shows the representative modeled flight profiles for the legacy and Super Hornet at NASL.

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2 Baseline Scenario and Noise Exposure

The Baseline scenario for the EA is defined as the current condition at NASL whose noise exposure originates from the most recent aircraft noise study, i.e., Wyle Report 08-11 (WR 08-11; Wyle 2010), primarily updated to reflect calendar year (CY) 2010 data and including the arriving VFA-86 F/A-18E ten aircraft squadron and the current ratio of based legacy to Super Hornet aircraft.

As the Baseline scenario of this TN is simply an update to WR 08-11, it is sufficient to present only those parameters which have changed relative to WR 08-11. As such, Section 2.1 presents the list of contacts and Section 2.2 discusses flight events by aircraft type. Section 2.3 discusses runway/helipad utilization, flight track utilization, flight profiles and daily events by aircraft type. Section 2.4 describes maintenance run-up operations and Section 2.5 discusses the flight demonstration training. Section 2.6 discusses the resultant average daily noise exposure. Section 2.7 describes the supplemental noise metrics analysis.

2.1 Data Collection

Even though the most recent noise study is as recent as 2010, the primary purpose of this effort is to accurately estimate existing and potential future noise exposure. In order to achieve this goal, TEC Inc. entered into a subcontract agreement with Wyle Laboratories, Inc. (Wyle) in October 2010 to validate the 2010 study and collect any outstanding data. Wyle, along with TEC, conducted a site visit to NAS Lemoore in October of 2010 and began the data collection and validation phase. An initial data validation package was provided in electronic format to NAS Lemoore personnel in the weeks following the site visit (Kester 2010). Specific contact information is shown in Table 2-1. The package was used to gather and/or confirm airfield information (e.g., weather data, geographic coordinates of navigational aids, runways, etc.), points of interest and noise-sensitive receptors, numbers of baseline and proposed flight operations (including aircraft distribution), flight tracks, runway and flight track utilization, run-up operations, and flight tracks.

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2.2 Baseline Flight Operations

The first step in the noise analysis process is to determine the number of annual flight operations for the year studied. Flight operations consist of departures (from brake release), full-stop arrivals (either 'straight-in' or from an overhead break), touch-and-go's (T&G), Field Carrier Landing Practice (FCLP), and Ground Controlled Approach (GCA) Box patterns. Each loop of a T&G, FCLP or GCA Box is counted as two operations. Each overhead break arrival is counted as one operation.

The computer noise model requires input of the daily events by aircraft type, operation type, and temporal period (local daytime hours of 0700-1900, evening hours of 1900-2200 and nighttime hours of 2200-0700). Events during the evening period are weighted (penalized) by 5 decibels (dB) and events during the nighttime period are weighted (penalized) by 10 dB.

In the baseline condition legacy Hornet aircraft comprise seven Fleet squadrons and a portion of the Fleet Replacement Squadron (FRS) for a total of 100 aircraft. The Super Hornets comprise eight Fleet squadrons and a portion of the FRS for a total of 138 aircraft, as follows:

Fleet squadrons:

- 7 legacy Hornet squadrons @ 10 aircraft each
- 7 Super Hornet squadrons @ 12 aircraft each and 1@ 10 aircraft (VFA-86)

FRS:

- 30 legacy Hornet aircraft
- 44 Super Hornet aircraft

As shown in Table 2-2, Baseline annual flight operations total 209,420 and were compiled by TEC (Campe 2011a) and approved by the Navy (Robusto 2011). The total is within 0.2 percent of the 210,000 flight operations modeled for WR 08-11. These operations reflect aircraft activity to/from NAS Lemoore, i.e., no overflights or aircraft transiting Lemoore airspace.

The baseline Hornet flight operations were primarily derived from a recent Naval Aviation Simulation Model (NASMOD) Study (ATAC 2010). The NASMOD study FY08 scenario reflects only 137,548 annual total flight operations with 97 percent of the flight operations from based Hornets. In terms of fleet squadrons, the NASMOD study considered 6 legacy Hornet squadrons and 8 Super Hornet squadrons with the same number of aircraft in each squadron as listed above. Annual FRS operations are strongly dependent on the number of pilots. Although the NASMOD study considered 90 FRS aircraft consisting of 36 legacy Hornets and 54 Super Hornets, the FRS flight operations would not need to be adjusted for the current legacy/Super Hornet blend in the FRS because there would be no significant change in the number of pilots.

NASMOD (fleet and FRS) Hornet flight operations were multiplied by 1.47 to make the Hornet flight operations be 95 percent of the 209,420 total[1]. Fleet legacy Hornet NASMOD operations were further adjusted by a factor of 7/6 (1.16) and fleet Super Hornet NASMOD operations were further adjusted by a factor of 7/8 (0.875) to reflect the current numbers of fleet squadrons. Per the Navy, the Hornet Fleet squadrons do not conduct T&G patterns at NAS Lemoore. Table 2-2 includes this accounting.

Annual flight operations for the VFA-86 (10 Super Hornet aircraft) squadron were estimated to be 4,420 based on the average of fleet Super Hornet flight operations from the NASMOD study. Table 2-2 includes VFA-86 flight operations in the fleet Super Hornet counts.

[1] Annual flight operation of 209,420 based on the seven year average from 2002 through 2008. The 95% figure is consistent with WR 08-11 modeling.

Consistent with WR 08-11, 84 percent of the Hornet arrivals were assigned as overhead breaks. Numbers of flight operations by other types of operations were derived directly from the NASMOD study, including the distribution of operations by CNEL time periods for legacy and Super Hornet aircraft, accounting for fleet and FRS categories. Consistent with the NASMOD study, none of the fleet squadrons conduct T&G operations. Consistent with the NASMOD study, Table 2-2 shows Hornet departures are greater than Hornet arrival by 2 percent overall. The difference in CNEL due to this discrepancy would be inconsequential.

Transient aircraft flight operations are directly from WR 08-11 and, consistent with WR 08-11, they were not modeled due to their negligible contribution to the overall aircraft noise environment relative to the contribution of the Hornets.

Table 2-2 Annual Flight Operations for Baseline Scenario at NAS Lemoore

Operation Type	Based F/A-18C/D (Fleet)				Based F/A-18C/D (FRS)				Based F/A-18E/F (Fleet)				Based F/A-18E/F (FRS)			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	9,736	2,137	0	11,873	7,405	1,198	140	8,743	8,884	2,082	171	11,137	7,821	1,395	213	9,429
Straight-In Arrival	1,418	284	189	1,891	1,057	203	95	1,355	1,324	265	176	1,765	1,135	218	102	1,455
Overhead Break Arrival	7,442	1,488	992	9,922	5,545	1,066	498	7,109	6,947	1,389	926	9,262	5,962	1,147	535	7,644
Touch and Go*	0	0	0	0	10,748	1,252	1,012	13,012	0	0	0	0	10,154	1,793	1,281	13,228
FCLP*	8838	4336	2254	15,428	11,841	8,645	4,042	24,528	10,030	5,176	3,458	18,664	13,468	10,423	4,907	28,798
GCA Box*	604	88	75	767	506	199	216	921	573	66	83	722	667	316	281	1,264
Total	28,038	8,333	3,510	39,881	37,102	12,563	6,003	55,668	27,758	8,978	4,814	41,550	39,207	15,292	7,319	61,818

Operation Type	Transient Jet[1]				Transient Large/Heavy[1]				Transient/Based Prop[1]				Transient/Based GA[1]			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	684	73	6	763	214	43	15	272	398	35	4	437	579	38	8	625
Straight-In Arrival	138	18	2	158	236	35	2	273	357	57	11	425	536	75	15	626
Overhead Break Arrival	597	7	0	604	0	0	0	0	11	0	0	11	0	0	0	0
Touch and Go*	651	77	15	743	385	53	5	443	646	107	33	786	1,853	316	70	2,239
FCLP*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCA Box*	1,219	136	7	1,362	305	38	0	343	107	18	5	130	202	54	7	263
Total	3,289	311	30	3,630	1,140	169	22	1,331	1,519	217	53	1,789	3,170	483	100	3,753

Operation Type	All Based Hornets				All Transient[1]				All Aircraft			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	33,846	6,812	524	41,182	1,875	189	33	2,097	**35,721**	**7,001**	**557**	**43,279**
Straight-In Arrival	4,934	970	562	6,466	1,267	185	30	1,482	**6,201**	**1,155**	**592**	**7,948**
Overhead Break Arrival	25,896	5,090	2,951	33,937	608	7	0	615	**26,504**	**5,097**	**2,951**	**34,552**
Touch and Go*	20,902	3,045	2,293	26,240	3,535	553	123	4,211	**24,437**	**3,598**	**2,416**	**30,451**
FCLP*	44,177	28,580	14,661	87,418	0	0	0	0	**44,177**	**28,580**	**14,661**	**87,418**
GCA Box*	2,350	669	655	3,674	1,833	246	19	2,098	**4,183**	**915**	**674**	**5,772**
Total	132,105	45,166	21,646	198,917	9,118	1,180	205	10,503	**141,223**	**46,346**	**21,851**	**209,420**

* Patterns counted as 2 operations per circuit

[1] Not Modeled.

2.3 Runway and Flight Track Utilization, Flight Profiles and Annual Average Daily Events

The next step in the noise modeling process is assignment of the flight operations to runways and pads via runway/pad utilization percentages for each aircraft type, operation type and CNEL time period. For all operation types the average daily flight runway/pad utilization percentages for each CNEL period for each type of operation as applied to the Hornet operations were taken directly from previous modeling (WR 08-11).

The next step in the noise modeling process is assignment of runway operations to flight track via flight track utilization percentages for each aircraft type, operation type, and CNEL time period. Flight tracks from the Baseline condition from the previous noise study (WR 08-11) were modeled unchanged except one flight track. Ground Controlled Approach (GCA) Box flight track 2RG1 was modified to extend the downwind leg approximately 2 miles so the base leg avoids overflight of Stratford. The adjusted flight track reflects a recent change NAS Lemoore has made to minimize noise exposure at Stratford and is shown in Figure 2-1. This modified track was part of the proposed condition from WR 08-11. Flight track utilization percentages remain unchanged relative to WR 08-11.

Flight profiles (i.e., altitudes, power settings and airspeeds at various points along flight tracks) are unchanged from the Baseline condition of the previous noise study (WR 08-11) except the flight profiles on flight track 2RG1 were adjusted to compensate for the updated flight track. The representative legacy and Super Hornet flight profiles are shown in Appendix A. These representative profiles were applied to all flight tracks for identical types of operations for each aircraft type.

Fixed-wing departure profiles can also be automatically modeled with a pre-flight run-up, conducted at the runway threshold prior to brake release. Prior to brake release on each legacy Hornet departure, pilots run-up the engine for no more than 5 seconds at 97 percent NC Takeoff Power. Super Hornets do not typically conduct pre-flight run-ups. Pre-flight run-ups occur on the runway, at the runway centerline endpoint on runway heading.

The next step in the noise modeling process is the computation of the modeled Annual Average Daily (AAD) day, evening and night events for each profile. This is accomplished by dividing the track operations by 365 and further dividing closed-pattern operations (e.g., touch-and-go, FCLP and GCA Box) by 2. The resultant numbers of events are presented in Table 2-3. There are approximately 384 total modeled average daily flight events.

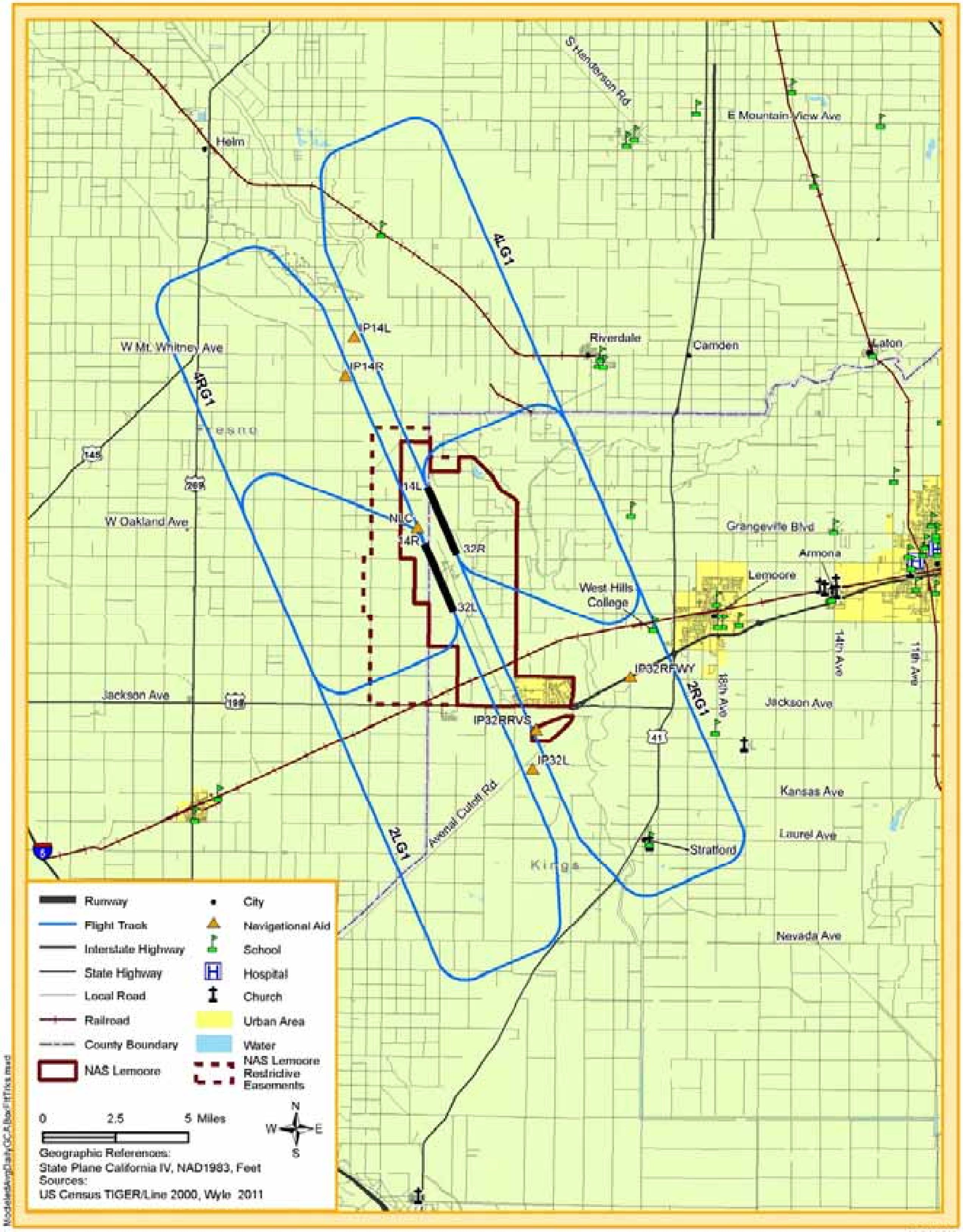

Figure 2-1 Modeled Average Daily GCA Box Flight Tracks

Table 2-3 Modeled Average Daily Events for Baseline Scenario

Operation Type	Run-way	Flight Track ID	F/A-18C/D				F/A-18E/F				All Modeled			
			Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	14L	4LD1	0.3194	0.0713	-	0.3907	0.3112	0.0743	-	0.3855	0.6306	0.1456	-	0.7762
		4LD2	0.0939	0.0201	-	0.1140	0.0915	0.0210	-	0.1125	0.1854	0.0411	-	0.2265
		4LD3	0.0564	-	-	0.0564	0.0549	-	-	0.0549	0.1113	-	-	0.1113
	14R	4RD1	0.9581	0.1425	-	1.1006	0.9337	0.1486	-	1.0823	1.8918	0.2911	-	2.1829
		4RD2	0.2818	0.0402	-	0.3220	0.2746	0.0419	-	0.3165	0.5564	0.0821	-	0.6385
		4RD3	0.1691	-	-	0.1691	0.1648	-	-	0.1648	0.3339	-	-	0.3339
	32L	2LD1	0.0845	0.0238	-	0.1083	0.0824	0.0248	-	0.1072	0.1669	0.0486	-	0.2155
		2LD2	0.9299	0.1188	-	1.0487	0.9063	0.1238	-	1.0301	1.8362	0.2426	-	2.0788
		2LD3	0.1409	-	-	0.1409	0.1373	-	-	0.1373	0.2782	-	-	0.2782
		2LD4	0.1409	0.0402	-	0.1811	0.1373	0.0419	-	0.1792	0.2782	0.0821	-	0.3603
		2LD5	0.1127	-	-	0.1127	0.1098	-	-	0.1098	0.2225	-	-	0.2225
	32R	2RD1	2.6207	1.1283	-	3.7490	2.5540	1.1766	-	3.7306	5.1747	2.3049	-	7.4796
		2RD2	28.8274	5.6414	-	34.4688	28.0940	5.8828	-	33.9768	56.9214	11.5242	-	68.4456
		2RD3	4.3678	-	-	4.3678	4.2567	-	-	4.2567	8.6245	-	-	8.6245
		2RD4	4.3678	1.9094	0.2308	6.5080	4.2567	1.9911	0.6319	6.8797	8.6245	3.9005	0.8627	13.3877
		2RD5	3.4942	-	-	3.4942	3.4053	-	-	3.4053	6.8995	-	-	6.8995
		2RD6	-	-	0.1538	0.1538	-	-	0.4213	0.4213	-	-	0.5751	0.5751
Straight-in Arrival (non-break)	14L	4LA1	0.1356	0.1201	-	0.2557	0.1304	0.1228	-	0.2532	0.2660	0.2429	-	0.5089
	14R	4RA1	0.2034	-	-	0.2034	0.1956	-	-	0.1956	0.3990	-	-	0.3990
	32L	2LA1	4.4753	0.9473	0.6536	6.0762	4.3036	0.9687	0.7894	6.0617	8.7789	1.9160	1.4430	12.1379
	32R	2RA1	1.9664	0.2668	0.1245	2.3577	1.8910	0.2729	0.1504	2.3143	3.8574	0.5397	0.2749	4.6720
Overhead Break Arrival	14L	4LO1a	0.6405	0.1239	0.0735	0.8379	1.8484	0.4186	0.2440	2.5110	2.4889	0.5425	0.3175	3.3489
		4LO1b	0.1601	0.0310	0.0184	0.2095	0.4621	0.1047	0.0610	0.6278	0.6222	0.1357	0.0794	0.8373
		4LO1c	0.2669	0.0516	0.0306	0.3491	0.7702	0.1744	0.1017	1.0463	1.0371	0.2260	0.1323	1.3954
		4LO2a	10.2473	1.9816	1.1757	13.4046	0.0616	0.0140	0.0081	0.0837	10.3089	1.9956	1.1838	13.4883
		4LO2b	2.5618	0.4954	0.2939	3.3511	0.0154	0.0035	0.0020	0.0209	2.5772	0.4989	0.2959	3.3720
		4LO2c	4.2697	0.8257	0.4899	5.5853	0.0257	0.0058	0.0034	0.0349	4.2954	0.8315	0.4933	5.6202
		4LO3a	0.3843	0.0743	0.0441	0.5027	0.0616	0.0140	0.0081	0.0837	0.4459	0.0883	0.0522	0.5864
		4LO3b	0.0961	0.0186	0.0110	0.1257	0.0154	0.0035	0.0020	0.0209	0.1115	0.0221	0.0130	0.1466
		4LO3c	0.1601	0.0310	0.0184	0.2095	0.0257	0.0058	0.0034	0.0349	0.1858	0.0368	0.0218	0.2444
		4LO4a	1.1528	0.2229	0.1323	1.5080	0.2465	0.0558	0.0325	0.3348	1.3993	0.2787	0.1648	1.8428
		4LO4b	0.2882	0.0557	0.0331	0.3770	0.0616	0.0140	0.0081	0.0837	0.3498	0.0697	0.0412	0.4607
		4LO4c	0.4803	0.0929	0.0551	0.6283	0.1027	0.0233	0.0136	0.1396	0.5830	0.1162	0.0687	0.7679
		4LO5a	0.3843	0.0743	0.0441	0.5027	0.2465	0.0558	0.0325	0.3348	0.6308	0.1301	0.0766	0.8375
		4LO5b	0.0961	0.0186	0.0110	0.1257	0.0616	0.0140	0.0081	0.0837	0.1577	0.0326	0.0191	0.2094
		4LO5c	0.1601	0.0310	0.0184	0.2095	0.1027	0.0233	0.0136	0.1396	0.2628	0.0543	0.0320	0.3491
	14R	4RO1a	0.1793	0.0336	0.0196	0.2325	1.0782	0.2576	0.1996	1.5354	1.2575	0.2912	0.2192	1.7679
		4RO1b	0.0448	0.0084	0.0049	0.0581	0.2696	0.0644	0.0499	0.3839	0.3144	0.0728	0.0548	0.4420
		4RO1c	0.0747	0.0140	0.0082	0.0969	0.4493	0.1073	0.0832	0.6398	0.5240	0.1213	0.0914	0.7367
		4RO2a	3.1382	0.5878	0.3429	4.0689	0.0359	0.0086	0.0067	0.0512	3.1741	0.5964	0.3496	4.1201
		4RO2b	0.7846	0.1469	0.0857	1.0172	0.0090	0.0021	0.0017	0.0128	0.7936	0.1490	0.0874	1.0300
		4RO2c	1.3076	0.2449	0.1429	1.6954	0.0150	0.0036	0.0028	0.0214	1.3226	0.2485	0.1457	1.7168
		4RO3a	0.4483	0.0840	0.0490	0.5813	0.0359	0.0086	0.0067	0.0512	0.4842	0.0926	0.0557	0.6325
		4RO3b	0.1121	0.0210	0.0122	0.1453	0.0090	0.0021	0.0017	0.0128	0.1211	0.0231	0.0139	0.1581
		4RO3c	0.1868	0.0350	0.0204	0.2422	0.0150	0.0036	0.0028	0.0214	0.2018	0.0386	0.0232	0.2636
		4RO4a	0.2242	0.0420	0.0245	0.2907	0.1438	0.0343	0.0266	0.2047	0.3680	0.0763	0.0511	0.4954
		4RO4b	0.0560	0.0105	0.0061	0.0726	0.0359	0.0086	0.0067	0.0512	0.0919	0.0191	0.0128	0.1238
		4RO4c	0.0934	0.0175	0.0102	0.1211	0.0599	0.0143	0.0111	0.0853	0.1533	0.0318	0.0213	0.2064
		4RO5a	0.1793	0.0336	0.0196	0.2325	0.1438	0.0343	0.0266	0.2047	0.3231	0.0679	0.0462	0.4372
		4RO5b	0.0448	0.0084	0.0049	0.0581	0.0359	0.0086	0.0067	0.0512	0.0807	0.0170	0.0116	0.1093
		4RO5c	0.0747	0.0140	0.0082	0.0969	0.0599	0.0143	0.0111	0.0853	0.1346	0.0283	0.0193	0.1822

Table 2-3 Modeled Average Daily Events for Baseline Scenario (concluded)

Operation Type	Run-way	Flight Track ID	F/A-18C/D				F/A-18E/F				All Modeled			
			Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Overhead Break Arrival (cont.)	32L	2LO1a	0.0448	0.0084	0.0049	0.0581	0.6161	0.1267	0.0887	0.8315	0.6609	0.1351	0.0936	0.8896
		2LO1b	0.0112	0.0021	0.0012	0.0145	0.1540	0.0317	0.0222	0.2079	0.1652	0.0338	0.0234	0.2224
		2LO1c	0.0187	0.0035	0.0020	0.0242	0.2567	0.0528	0.0370	0.3465	0.2754	0.0563	0.0390	0.3707
		2LO3a	0.2242	0.0420	0.0245	0.2907	9.8583	2.0266	1.4195	13.3044	10.0825	2.0686	1.4440	13.5951
		2LO3b	0.0560	0.0105	0.0061	0.0726	2.4646	0.5067	0.3549	3.3262	2.5206	0.5172	0.3610	3.3988
		2LO3c	0.0934	0.0175	0.0102	0.1211	4.1076	0.8444	0.5915	5.5435	4.2010	0.8619	0.6017	5.6646
		2LO5a	0.0448	0.0084	0.0049	0.0581	0.3697	0.0760	0.0532	0.4989	0.4145	0.0844	0.0581	0.5570
		2LO5b	0.0112	0.0021	0.0012	0.0145	0.0924	0.0190	0.0133	0.1247	0.1036	0.0211	0.0145	0.1392
		2LO5c	0.0187	0.0035	0.0020	0.0242	0.1540	0.0317	0.0222	0.2079	0.1727	0.0352	0.0242	0.2321
		2LO7a	1.9214	0.4093	0.2021	2.5328	1.1091	0.2280	0.1597	1.4968	3.0305	0.6373	0.3618	4.0296
		2LO7b	0.4803	0.1023	0.0505	0.6331	0.2773	0.0570	0.0399	0.3742	0.7576	0.1593	0.0904	1.0073
		2LO7c	0.8006	0.1706	0.0842	1.0554	0.4621	0.0950	0.0665	0.6236	1.2627	0.2656	0.1507	1.6790
		2LO8a	0.0640	0.0136	0.0067	0.0843	0.3697	0.0760	0.0532	0.4989	0.4337	0.0896	0.0599	0.5832
		2LO8b	0.0160	0.0034	0.0017	0.0211	0.0924	0.0190	0.0133	0.1247	0.1084	0.0224	0.0150	0.1458
		2LO8c	0.0267	0.0057	0.0028	0.0352	0.1540	0.0317	0.0222	0.2079	0.1807	0.0374	0.0250	0.2431
	32R	2RO1a	0.0640	0.0136	0.0067	0.0843	0.1725	0.0343	0.0237	0.2305	0.2365	0.0479	0.0304	0.3148
		2RO1b	0.0160	0.0034	0.0017	0.0211	0.0431	0.0086	0.0059	0.0576	0.0591	0.0120	0.0076	0.0787
		2RO1c	0.0267	0.0057	0.0028	0.0352	0.0719	0.0143	0.0099	0.0961	0.0986	0.0200	0.0127	0.1313
		2RO2a	0.2562	0.0546	0.0269	0.3377	3.0191	0.6011	0.4140	4.0342	3.2753	0.6557	0.4409	4.3719
		2RO2b	0.0640	0.0136	0.0067	0.0843	0.7548	0.1503	0.1035	1.0086	0.8188	0.1639	0.1102	1.0929
		2RO2c	0.1067	0.0227	0.0112	0.1406	1.2580	0.2505	0.1725	1.6810	1.3647	0.2732	0.1837	1.8216
		2RO3a	0.2562	0.0546	0.0269	0.3377	0.4313	0.0859	0.0591	0.5763	0.6875	0.1405	0.0860	0.9140
		2RO3b	0.0640	0.0136	0.0067	0.0843	0.1078	0.0215	0.0148	0.1441	0.1718	0.0351	0.0215	0.2284
		2RO3c	0.1067	0.0227	0.0112	0.1406	0.1797	0.0358	0.0246	0.2401	0.2864	0.0585	0.0358	0.3807
		2RO4a	1.1208	0.2519	0.1653	1.5380	0.2156	0.0429	0.0296	0.2881	1.3364	0.2948	0.1949	1.8261
		2RO4b	0.2802	0.0630	0.0413	0.3845	0.0539	0.0107	0.0074	0.0720	0.3341	0.0737	0.0487	0.4565
		2RO4c	0.4670	0.1050	0.0689	0.6409	0.0899	0.0179	0.0123	0.1201	0.5569	0.1229	0.0812	0.7610
		2RO5a	0.0374	0.0084	0.0055	0.0513	0.1725	0.0343	0.0237	0.2305	0.2099	0.0427	0.0292	0.2818
		2RO5b	0.0093	0.0021	0.0014	0.0128	0.0431	0.0086	0.0059	0.0576	0.0524	0.0107	0.0073	0.0704
		2RO5c	0.0156	0.0035	0.0023	0.0214	0.0719	0.0143	0.0099	0.0961	0.0875	0.0178	0.0122	0.1175
		2RO6a	0.0374	0.0084	0.0055	0.0513	0.0431	0.0086	0.0059	0.0576	0.0805	0.0170	0.0114	0.1089
		2RO6b	0.0093	0.0021	0.0014	0.0128	0.0108	0.0021	0.0015	0.0144	0.0201	0.0042	0.0029	0.0272
		2RO6c	0.0156	0.0035	0.0023	0.0214	0.0180	0.0036	0.0025	0.0241	0.0336	0.0071	0.0048	0.0455
		2RO7a	0.1494	0.0336	0.0220	0.2050	0.2156	0.0429	0.0296	0.2881	0.3650	0.0765	0.0516	0.4931
		2RO7b	0.0374	0.0084	0.0055	0.0513	0.0539	0.0107	0.0074	0.0720	0.0913	0.0191	0.0129	0.1233
		2RO7c	0.0623	0.0140	0.0092	0.0855	0.0899	0.0179	0.0123	0.1201	0.1522	0.0319	0.0215	0.2056
		2RO8a	0.1494	0.0336	0.0220	0.2050	0.0431	0.0086	0.0059	0.0576	0.1925	0.0422	0.0279	0.2626
		2RO8b	0.0374	0.0084	0.0055	0.0513	0.0108	0.0021	0.0015	0.0144	0.0482	0.0105	0.0070	0.0657
		2RO8c	0.0623	0.0140	0.0092	0.0855	0.0180	0.0036	0.0025	0.0241	0.0803	0.0176	0.0117	0.1096
T&G	14L	4LT1	1.7667	0.2229	0.1802	2.1698	8.3458	1.4489	1.0528	10.8475	10.1125	1.6718	1.2330	13.0173
	14R	4RT1	1.1778	0.1372	0.0970	1.4120	2.7819	0.4912	0.3509	3.6240	3.9597	0.6284	0.4479	5.0360
	32L	2LT1	8.8337	1.0117	0.8317	10.6771	1.6692	0.3193	0.2281	2.2166	10.5029	1.3310	1.0598	12.8937
	32R	2RT1	2.9446	0.3429	0.2772	3.5647	1.1128	0.1965	0.1228	1.4321	4.0574	0.5394	0.4000	4.9968
FCLP	14L	4LF1	1.6997	1.0669	0.5175	3.2841	1.9313	1.2821	0.6876	3.9010	3.6310	2.3490	1.2051	7.1851
	32L	2LF1	26.6281	16.7148	8.1074	51.4503	30.2567	20.0862	10.7720	61.1149	56.8848	36.8010	18.8794	112.5652
GCA Box	14L	4LG1	0.1369	0.0354	0.0359	0.2082	0.1528	0.0470	0.0448	0.2446	0.2897	0.0824	0.0807	0.4528
	14R	4RG1	0.0456	0.0118	0.0120	0.0694	0.0509	0.0157	0.0149	0.0815	0.0965	0.0275	0.0269	0.1509
	32L	2LG1	0.8517	0.2203	0.2233	1.2953	0.9507	0.2926	0.2787	1.5220	1.8024	0.5129	0.5020	2.8173
	32R	2RG1	0.4867	0.1259	0.1276	0.7402	0.5433	0.1672	0.1593	0.8698	1.0300	0.2931	0.2869	1.6100
Departure			46.9655	9.1360	0.3846	56.4861	45.7705	9.5268	1.0532	56.3505	92.7360	18.6628	1.4378	112.8366
Straight-in Arrival (non-break)			6.7807	1.3342	0.7781	8.8930	6.5206	1.3644	0.9398	8.8248	13.3013	2.6986	1.7179	17.7178
Overhead Break Arrival			35.5807	6.9974	4.0819	46.6600	34.2301	7.1562	4.9292	46.3155	69.8108	14.1536	9.0111	92.9755
T&G			14.7228	1.7147	1.3861	17.8236	13.9097	2.4559	1.7546	18.1202	28.6325	4.1706	3.1407	35.9438
FCLP			28.3278	17.7817	8.6249	54.7344	32.1880	21.3683	11.4596	65.0159	60.5158	39.1500	20.0845	119.7503
GCA Box			1.5209	0.3934	0.3988	2.3131	1.6977	0.5225	0.4977	2.7179	3.2186	0.9159	0.8965	5.0310
Total			133.8984	37.3574	15.6544	186.9102	134.3166	42.3941	20.6341	197.3448	268.2150	79.7515	36.2885	384.2550

2.4 Maintenance Run-Up Operations

If applicable, squadron and maintenance personnel conduct various types of tests on aircraft engines at one or more power settings for certain lengths of time. These tests are termed ‘run-ups’. During run-ups, engines can be kept in the airframe of the aircraft (i.e., “in-frame” run-up) or extracted from the airframe (i.e., “out-of-frame” run-up). Both types of run-ups can be conducted on the parking apron, in a maintenance hangar, or in specialized buildings for such tests called test cells or “hush houses”. Hush houses are acoustically-treated buildings specifically designed to attenuate the noise from run-ups. Only out-of-frame run-ups can be conducted on apparatus designed for the engines (called “test stands”).

Table 2-4 shows the modeled single-engine maintenance run-up events for the Baseline scenario. The baseline annual run-up events were calculated by scaling the WR 08-11 baseline run-up events by the ratio of based legacy and Super Hornet aircraft (Campe 2011b). The locations are identified in Figure 2-2 and are unchanged relative to WR 08-11. Figure 2-2 is reproduced here with additional annotation regarding headings relative to WR 08-11. Low power run-ups were modeled at each runway heading based on the runway’s utilization percentage from flight events. All other modeling assumptions from WR 08-11 were used for this TN.

2.5 Flight Demonstration Modeling

Legacy and Super Hornet aircraft practice demonstration flights in an area west of Runway 32L. No changes were made to the flight demonstration modeling for this study. The modeling parameters are explained in WR 08-11.

Table 2-4 Annual Single-Engine Maintenance Run-Up Events for Baseline Scenario

Aircraft	Location		Single Engine Operations						Duration (minutes)
			Annual Events	Day (0700 - 1900)	Evening (1900 - 2200)	Night (2200 - 0700)	Power Setting		
	I.D.	Name					Reported	Modeled	
F/A-18C/D Fleet	1H	In-Frame/Outdoor High Power	35	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	1L	In-Frame/Outdoor Low Power	1089	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	2H	In-Frame/Outdoor High Power	15	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	2L	In-Frame/Outdoor Low Power	1089	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	3H	In-Frame/Outdoor High Power	35	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	3L	In-Frame/Outdoor Low Power	1089	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	4H	In-Frame/Outdoor High Power	16	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	4L	In-Frame/Outdoor Low Power	1089	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
F/A-18C/D FRS	1H	In-Frame/Outdoor High Power	14	20%	40%	40%	8–30 min. Mil power	94%	19
							30 sec. Afterburner	95%	0.5
	1L	In-Frame/Outdoor Low Power	497	77%	12%	11%	10–20 min. @ idle	63%	15
	2H	In-Frame/Outdoor High Power	14	20%	40%	40%	8–30 min. Mil power	94%	19
							30 sec. Afterburner	95%	0.5
	2L	In-Frame/Outdoor Low Power	497	77%	12%	11%	10–20 min. @ idle	63%	15
	3H	In-Frame/Outdoor High Power	14	20%	40%	40%	8–30 min. Mil power	94%	19
							30 sec. Afterburner	95%	0.5
	3L	In-Frame/Outdoor Low Power	497	77%	12%	11%	10–20 min. @ idle	63%	15
	4H	In-Frame/Outdoor High Power	14	20%	40%	40%	8–30 min. Mil power	94%	19
							30 sec. Afterburner	95%	0.5
	4L	In-Frame/Outdoor Low Power	497	77%	12%	11%	10–20 min. @ idle	63%	15
F/A-18C/D	TC1	Indoor Test Cell (404 Engine)	40	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5
	TC2	Indoor Test Cell (404 Engine)	40	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5

Note: While one engine is run through the test procedure the second engine will typically be online and at idle power

Table 2-4 Annual Single-Engine Maintenance Run-Up Events for Baseline Scenario (concluded)

Aircraft	Location		Single Engine Operations						Duration (minutes)
	I.D.	Name	Annual Events	Day (0700 - 1900)	Evening (1900 - 2200)	Night (2200 - 0700)	Power Setting Reported	Power Setting Modeled	
F/A-18E/F Fleet	1H	In-Frame/Outdoor High Power	18	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	1L	In-Frame/Outdoor Low Power	1219	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	2H	In-Frame/Outdoor High Power	18	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	2L	In-Frame/Outdoor Low Power	1219	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	3H	In-Frame/Outdoor High Power	18	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	3L	In-Frame/Outdoor Low Power	1219	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	4H	In-Frame/Outdoor High Power	18	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	4L	In-Frame/Outdoor Low Power	1219	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	5H	In-Frame/Outdoor High Power	41	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
F/A-18E/F FRS	5H	In-Frame/Outdoor High Power	60	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	5L	In-Frame/Outdoor Low Power	2088	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
F/A-18E/F	TC1	Indoor Test Cell (404 Engine)	126	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5
	TC2	Indoor Test Cell (404 Engine)	126	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5

Note: While one engine is run through the test procedure the second engine will typically be online and at idle power

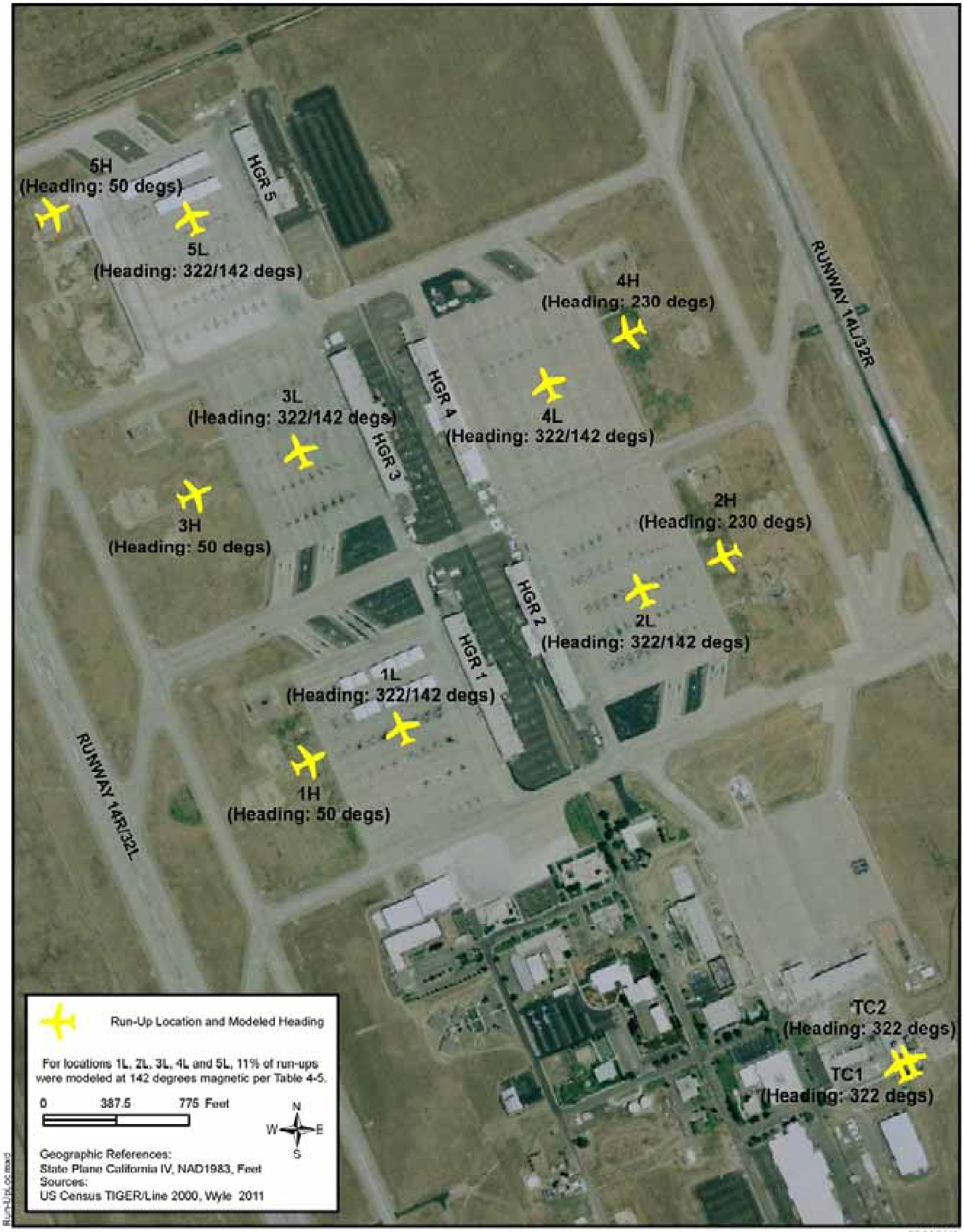

Figure 2-2 Modeled Run-Up Locations

2.6 Aircraft Noise Exposure

Using the data described in Sections 2.1 through 2.5, NOISEMAP Version 7 (Wyle 1998; Wasmer 2006a; Wasmer 2006b) and MR_NMAP Version 2 (US Air Force 1996), the same models used in WR 08-11, were used to calculate and plot the 60 dB through 85 dB CNEL contours for the Baseline AAD operations for NAS Lemoore. Modeling also utilized the same elevation and acoustic impedance data used in WR 08-11 (United States Geological Survey (USGS), 2007)

Grid point results (CNEL decibel values) from both models (NOISEMAP and MR_NMAP) were combined logarithmically within NMPlot (Wasmer 2006b) to calculate the overall aircraft noise exposure from airfield and demonstration operations. The resulting Baseline CNEL contours are shown in Figure 2-3 with colored 5-decibel bands. Maximum off-station exposure is 90-95 dB CNEL within 6,000 feet of the western boundary of the NAS. The 80-85 dB CNEL band extends less than 1.5 miles of the northern boundary of the NAS and within 2 miles of the western boundary. The CNEL lobes north of the NAS are primarily due to departure operations while other lobes are due to GCA Box operations. Most on-station noise exposure is due to T&G and FCLP operations. The effect of the demonstration operations is shown in the slight bulging of the CNEL contours on the west side of the airfield.

Fifteen Points of Interest (POI) in the vicinity of NAS Lemoore listed in Table 2-5 and shown in Figure 2-4, in relation to modeled flight tracks, were identified by the NAS (Benitez 2010) for the purposes of CNEL analysis. The POI represents communities and/or schools in the vicinity of NAS Lemoore. In the baseline condition none of the fifteen locations would experience a CNEL greater than 65 dB. Only three locations (communities of Burrel and Lanare, and the Neutra Elementary School) would experience a CNEL greater than or equal to 60 dB.

Table 2-5 Estimated Aircraft CNEL at Representative Points of Interest in the Vicinity of NAS Lemoore for Baseline Scenario

Point of Interest			Baseline CNEL
ID	**Description**	**Type**	**dBA**
1	Community of Burrel	School and Non-School	60
2	Community of Caruthers	School and Non-School	52
3	Central Union School	School	53
4	College Park Apartments	Non-School	50
5	Community of Conejo	School and Non-School	57
6	Fairway Homes at Lemoore Golf Course	Non-School	48
7	Community of Helm	School and Non-School	50
8	Huron Middle School	School	43
9	Island Elementary School	School	51
10	Community of Lanare	Non-School	60
11	Neutra Elementary School	School	60
12	Community of Riverdale	School and Non-School	50
13	Santa Rosa Racheria homes near Tachi Casino	Non-School	49
14	Community of Stratford	School and Non-School	50
15	West Hills College	School	58

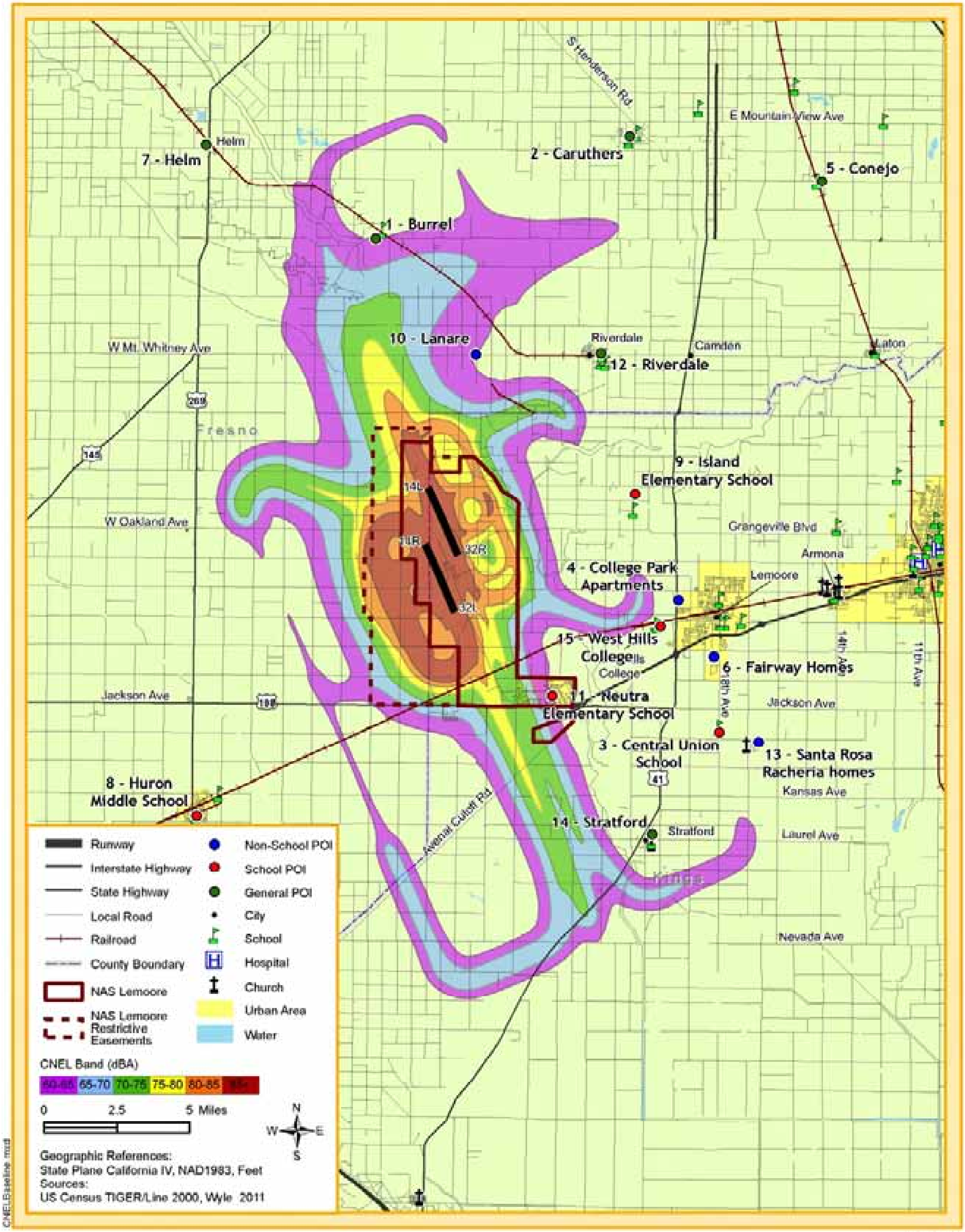

Figure 2-3 Bands of Aircraft CNEL for Baseline Average Daily Operations at NAS Lemoore

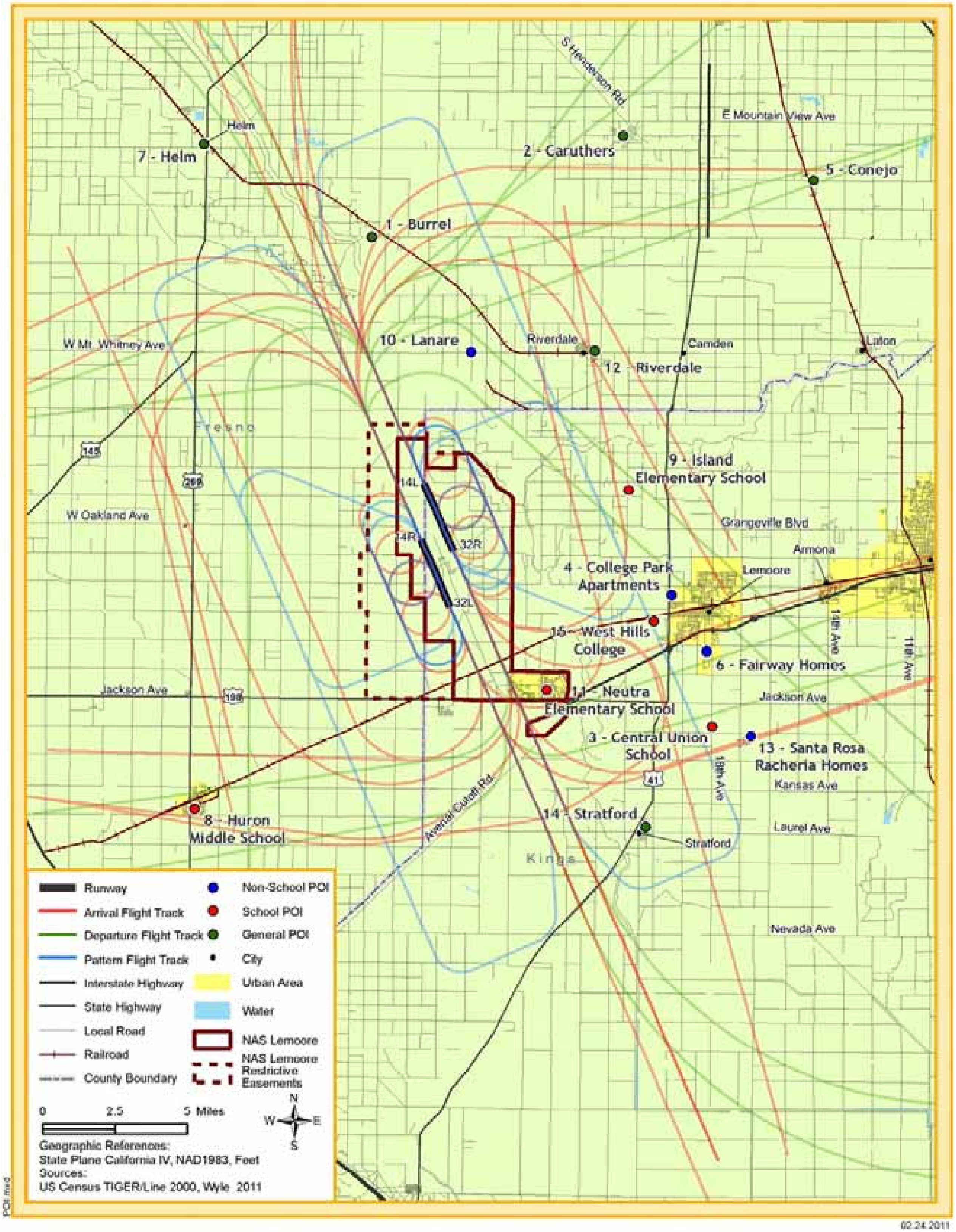

Figure 2-4 Representative Points of Interest in the Vicinity of NAS Lemoore in Relation to Modeled Flight Tracks

2.7 Supplemental Noise Metrics Analysis

CNEL contours provide broad based land use planning guidance. The purpose of this subsection is to provide supplemental noise analysis with regard to overall average daily noise exposure beyond what it is provided by a typical CNEL analysis. The supplemental analysis in this study is consistent with the methods used and described in Section 6 of WR 08-11 and DoD guidelines (Wyle, 2009)

For the analysis for the potential for indoor daytime/evening speech interference at the residential POI, the Number of Events at or Above a Selected Threshold (NA) metric was computed for CNEL daytime (7 a.m. to 7 p.m.) and evening (7 p.m. to 10 p.m.) periods. The selected noise threshold for NA was indoor 50 dB of Maximum Sound Level (L_{max}).

The analysis of potential for indoor nighttime sleep interference includes aircraft flight events only and does not consider maintenance run-ups events conducted on the ground.

For the analysis for the potential for classroom speech interference, two noise metrics were computed for each school: 9-hour Equivalent Sound Level ($L_{eq(9h)}$) and 9-hour NA L_{max}. The computation of $L_{eq(9h)}$ is based on aircraft flight events only and does not include maintenance run-ups conducted on the ground. The DoD guidelines point to an indoor $L_{eq(9h)}$ criteria of 40 dB.

Section 2.7.1 provides an introduction to the topic and a brief summary of the results. Sections 2.7.2 and 2.7.3 discuss the residential speech interference and sleep disturbance analyses and results, respectively. Section 2.7.4 presents the results of the classroom speech analysis.

2.7.1 Summary

The results of the analysis indicate speech interference and sleep disturbance effects are present in the Baseline scenario. The areas to the north of NAS in and around the communities of Lanare and Burrel are currently the most affected in terms of potential speech interference and sleep disturbance effects due to Hornet departure events from Runway 32R. The Santa Rosa Racheria homes near the Tachi Casino and the Community of Stratford may also be affected in terms of the potential for sleep disturbance caused primarily by Super Hornet nighttime overhead break arrivals to Runway 32L. The results indicate that Burrel Elementary, Conejo School, and Neutra Elementary School may be affected regarding potential for classroom speech interference. At Burrel and Conejo, this is due to departures from Runway 32R while the potential for classroom speech interference at Neutra is primarily caused by non-break arrivals to Runway 32R due to the school's close proximity to the Runway 32R arrival path. Much of these areas are affected by CNEL less than 65 dB for the baseline scenario.

2.7.2 Potential for Residential Speech Interference

Table 2-6 presents the results of the speech interference analysis for the Baseline scenario for the 10 applicable residential sites. The number of sites having more than one speech interfering event per hour are 6 and 3 for windows open and closed, respectively. The interfering events range from 2 to 8 per hour with windows open and 2 to 3 per hour with windows closed. Three sites exceeding one event per hour for both windows open and windows closed are communities of Burrel, Conejo and Lanare. The Hornet departures from Runway 32R generate most of the speech interference events at these three locations.

2.7.3 Potential for Nighttime Sleep Interference

Table 2-7 presents the results of the sleep disturbance analysis for the 10 applicable residential sites. The probability of awakening ranges from one percent to 10 percent with windows open and ranges from less than 1 percent to 5 percent with windows closed. The analysis identifies that the communities of Lanare, Stratford, and Santa Rosa Racheria have the greatest probabilities of awakening with estimates of 10, 7, and 7 percent, respectively. Lanare has the highest probability of awakening due to Hornet nighttime departures from Runway 32R and FCLP events on Runway 14L.

2.7.4 Potential for Classroom Speech Interference

Table 2-8 contains the results of the classroom speech interference analysis for the 11 applicable school sites for the Baseline scenario. Five schools experience more than one interfering event per hour ranging from three to eight per hour with windows open and range from two to three per hour with windows closed. Three of those five schools also exceed the indoor $L_{eq(9h)}$ criteria of 40 dB.

Of the considered schools, schools at which both the events per hour and the indoor $L_{eq(9h)}$ criteria are exceeded (with windows open) are:

- Burrel Elementary School,
- Conejo School, and
- Neutra Elementary School.

The primary cause for speech interference events at Burrel Elementary School are the departures from Runway 32R. None of the considered schools exceed both criteria with windows closed.

Table 2-6 Potential for Indoor Speech Interference for Applicable Points of Interest in the Vicinity of NAS Lemoore for Baseline Scenario

Point of Interest		Indoor Number of Events per Daytime/Evening Hour(1,2)	
ID	Description (All Residential)	Windows Open	Windows Closed
1	Community of Burrel	7	3
2	Community of Caruthers	5	-
4	College Park Apartments	1	-
5	Community of Conejo	5	2
6	Fairway Homes at Lemoore Golf Course	1	-
7	Community of Helm	1	-
10	Community of Lanare	8	3
12	Community of Riverdale	3	-
13	Santa Rosa Racheria homes near Tachi Casino	2	-
14	Community of Stratford	1	-
Number of Sites Exceeding 1 Intrusive Event per Hour		6	3
Minimum Number of Intrusive Events per Hour if Exceeding 1		2	2
Maximum Number of Intrusive Events per Hour if Exceeding 1		8	3

(1) Number of Annual Average Daily CNEL Daytime and Evening (7am - 10pm) Events At or Above an Indoor Maximum (single-event) Sound Level (L_{max}) of 50 dB;
(2) NLRs of 15 dB and 25 dB for windows open and closed, respectively

Table 2-7 Average Nightly (2200-0700) Probability of Awakening (%) for Representative Residential Receptors in the Vicinity of NAS Lemoore for Baseline Scenario

Point of Interest		Probability of Awakening	
ID	Description (All Residential)	Windows Open	Windows Closed
1	Community of Burrel	6%	3%
2	Community of Caruthers	1%	-
4	College Park Apartments	2%	1%
5	Community of Conejo	1%	-
6	Fairway Homes at Lemoore Golf Course	2%	1%
7	Community of Helm	3%	1%
10	Community of Lanare	10%	5%
12	Community of Riverdale	2%	1%
13	Santa Rosa Racheria homes near Tachi Casino	7%	3%
14	Community of Stratford	7%	2%

Note: NLRs of 15 dB and 25 dB for windows open and closed, respectively

Table 2-8 Potential for Indoor Classroom Speech Interference for Applicable School Locations in the Vicinity of NAS Lemoore for Baseline Scenario

Point of Interest		Baseline				
			Indoor(2)			
			Windows Open		Windows Closed	
ID	Description	Outdoor $L_{eq(9h)}$ (dB)	$L_{eq(9h)}$ (dB)	Events per Hour(1)	$L_{eq(9h)}$ (dB)	Events per Hour(1)
1	Burrel Elementary School	60	45	8	35	3
2	Caruthers High School	54	39	6	29	-
3	Central Union School	51	36	-	26	-
5	Conejo School	58	43	5	33	2
7	Helm Elementary School	48	33	1	23	-
8	Huron Middle School	37	22	-	12	-
9	Island Elementary School	50	35	1	25	-
11	Neutra Elementary School	59	44	4	34	2
12	Riverdale High School	50	35	3	25	-
14	Stratford Elementary School	47	32	1	22	-
15	West Hills College	54	39	1	29	-
Number of Sites Exceeding 1 Intrusive Event per Hour				5		3
Minimum Number of Intrusive Events per Hour if Exceeding 1				3		2
Maximum Number of Intrusive Events per Hour if Exceeding 1				8		3

Note: Does not account for differences between weekday and weekend activity
(1) Number of Annual Average Daily Events per hour during 9 hour school day At or Above an Indoor Maximum (single-event) Sound Level (L_{max}) of 50 dB;
(2) NLRs of 15 dB and 25 dB for windows open and closed, respectively

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3 No Action Scenario and Noise Exposure

Section 3.1 discusses flight operations by aircraft type. Section 3.2 discusses runway/helipad utilization, flight track utilization, flight profiles and daily operations by aircraft type. Section 3.3 describes maintenance run-up operations and Section 3.4 discusses the flight demonstration training. Section 3.5 discusses the resultant average daily noise exposure. Section 3.6 describes the supplemental noise metrics analysis.

3.1 No Action Scenario

The No Action scenario analyzes the future CY15 conditions if the Strike Fighter Realignment does not occur. The only change to the No Action scenario relative to the Baseline scenario would be to the legacy Hornet FRS. The primary goal of the FRS is to train new pilots for a specific aircraft. In the No Action scenario, the FRS would not exist because no new legacy Hornet pilots would need to be trained.

Future annual flight operations for the No Action scenario totaling 153,754 were provided by the Navy (Campe 2011c). The No Action flight operations were derived by removing the legacy Hornet FRS operations from the Baseline operations

In the No Action condition legacy Hornet aircraft comprise 7 Fleet squadrons for a total of 70 aircraft. The Super Hornets comprise 8 Fleet squadrons and one FRS for a total of 138 aircraft, as follows:

Fleet squadrons:

- 7 legacy Hornet squadrons @ 10 aircraft each
- 7 Super Hornet squadrons @ 12 aircraft each and 1@ 10 aircraft (VFA-86)

FRS:

- 44 Super Hornet aircraft

Based on the above data and assumptions, total annual flight operations for all Hornet aircraft are shown in Table 3-1 along with operations for non-modeled aircraft categories. Aircraft other than the legacy or Super Hornets were not modeled due to their negligible contribution to the overall aircraft noise environment relative to the contribution of the fighter aircraft. Consistent with Baseline, fleet Hornets would not conduct Touch and Go operations. Relative to Baseline, the No Action scenario would result in approximately 55,700 (27 percent) less flight operations.

3.2 Runway and Flight Track Utilization, Flight Profiles and Annual Average Daily Events

All modeled flight parameters (day/evening/night distribution runway utilization flight tracks, track utilization, and Hornet flight profiles) would remain identical to the Baseline scenario. The AAD concept and methodology applied to the Baseline scenario would also be applicable to the No Action scenario. Table 3-2 shows the modeled AAD events for the modeled aircraft types. The No Action scenario models approximately 284 total annual average daily flight events.

Table 3-1 Annual Flight Operations for No Action Scenario at NAS Lemoore

Operation Type	Based F/A-18C/D (Fleet)				Based F/A-18C/D (FRS)				Based F/A-18E/F (Fleet)				Based F/A-18E/F (FRS)			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	9,736	2,137	0	11,873	-	-	-	-	8,885	2,082	171	11,138	7,822	1,395	213	9,430
Straight-In Arrival	1,418	284	189	1,891	-	-	-	-	1,288	265	212	1,765	1,092	233	131	1,456
Overhead Break Arrival	7,442	1,488	992	9,922	-	-	-	-	6,761	1,389	1,111	9,261	5,733	1,223	688	7,644
Touch and Go*	0	0	0	0	-	-	-	-	0	0	0	0	10,154	1,793	1,281	13,228
FCLP*	8838	4336	2254	15,428	-	-	-	-	10,030	5,176	3,458	18,664	13,468	10,423	4,907	28,798
GCA Box*	604	88	75	767	-	-		-	573	66	83	722	667	316	281	1,264
Total	28,038	8,333	3,510	39,881	-	-	-	-	27,537	8,978	5,035	41,550	38,936	15,383	7,501	61,820

Operation Type	Transient Jet[1]				Transient Large/Heavy[1]				Transient/Based Prop[1]				Transient/Based GA[1]			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	684	73	6	763	214	43	15	272	398	35	4	437	579	38	8	625
Straight-In Arrival	138	18	2	158	236	35	2	273	357	57	11	425	536	75	15	626
Overhead Break Arrival	597	7	0	604	0	0	0	0	11	0	0	11	0	0	0	0
Touch and Go*	651	77	15	743	385	53	5	443	646	107	33	786	1,853	316	70	2,239
FCLP*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCA Box*	1,219	136	7	1,362	305	38	0	343	107	18	5	130	202	54	7	263
Total	3,289	311	30	3,630	1,140	169	22	1,331	1,519	217	53	1,789	3,170	483	100	3,753

Operation Type	All Based Hornets				All Transient[1]				All Aircraft			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	26,443	5,614	384	32,441	1,875	189	33	2,097	**28,318**	**5,803**	**417**	**34,538**
Straight-In Arrival	3,798	782	532	5,112	1,267	185	30	1,482	**5,065**	**967**	**562**	**6,594**
Overhead Break Arrival	19,936	4,100	2,791	26,827	608	7	0	615	**20,544**	**4,107**	**2,791**	**27,442**
Touch and Go*	10,154	1,793	1,281	13,228	3,535	553	123	4,211	**13,689**	**2,346**	**1,404**	**17,439**
FCLP*	32,336	19,935	10,619	62,890	0	0	0	0	**32,336**	**19,935**	**10,619**	**62,890**
GCA Box*	1,844	470	439	2,753	1,833	246	19	2,098	**3,677**	**716**	**458**	**4,851**
Total	94,511	32,694	16,046	143,251	9,118	1,180	205	10,503	**103,629**	**33,874**	**16,251**	**153,754**

* Patterns counted as 2 operations per circuit
[1] Not Modeled.

Table 3-2 Modeled Average Daily Events for No Action Scenario

Operation Type	Run-way	Flight Track ID	F/A-18C/D				F/A-18E/F				All Modeled			
			Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	14L	4LD1	0.1814	0.0457	-	0.2271	0.0824	0.0248	-	0.1072	0.2638	0.0705	-	0.3343
		4LD2	0.0533	0.0129	-	0.0662	0.9063	0.1238	-	1.0301	0.9596	0.1367	-	1.0963
		4LD3	0.0320	-	-	0.0320	0.1373	-	-	0.1373	0.1693	-	-	0.1693
	14R	4RD1	0.5441	0.0913	-	0.6354	0.1373	0.0419	-	0.1792	0.6814	0.1332	-	0.8146
		4RD2	0.1600	0.0258	-	0.1858	0.1098	-	-	0.1098	0.2698	0.0258	-	0.2956
		4RD3	0.0960	-	-	0.0960	2.5540	1.1766	-	3.7306	2.6500	1.1766	-	3.8266
	32L	2LD1	0.0480	0.0152	-	0.0632	28.0940	5.8828	-	33.9768	28.1420	5.8980	-	34.0400
		2LD2	0.5281	0.0761	-	0.6042	4.2567	-	-	4.2567	4.7848	0.0761	-	4.8609
		2LD3	0.0800	-	-	0.0800	4.2567	1.9911	0.6319	6.8797	4.3367	1.9911	0.6319	6.9597
		2LD4	0.0800	0.0258	-	0.1058	3.4053	-	-	3.4053	3.4853	0.0258	-	3.5111
		2LD5	0.0640	-	-	0.0640	-	-	0.4213	0.4213	0.0640	-	0.4213	0.4853
	32R	2RD1	1.4883	0.7231	-	2.2114	0.3112	0.0743	-	0.3855	1.7995	0.7974	-	2.5969
		2RD2	16.3711	3.6156	-	19.9867	0.0915	0.0210	-	0.1125	16.4626	3.6366	-	20.0992
		2RD3	2.4805	-	-	2.4805	0.0549	-	-	0.0549	2.5354	-	-	2.5354
		2RD4	2.4805	1.2237	-	3.7042	0.9337	0.1486	-	1.0823	3.4142	1.3723	-	4.7865
		2RD5	1.9844	-	-	1.9844	0.2746	0.0419	-	0.3165	2.2590	0.0419	-	2.3009
		2RD6	-	-	-	-	0.1648	-	-	0.1648	0.1648	-	-	0.1648
Straight-in Arrival (non-break)	14L	4LA1	0.0777	0.0700	-	0.1477	0.1304	0.1228	-	0.2532	0.2081	0.1928	-	0.4009
	14R	4RA1	0.1165	-	-	0.1165	0.1956	-	-	0.1956	0.3121	-	-	0.3121
	32L	2LA1	2.5639	0.5525	0.4350	3.5514	4.3036	0.9687	0.7894	6.0617	6.8675	1.5212	1.2244	9.6131
	32R	2RA1	1.1266	0.1556	0.0829	1.3651	1.8910	0.2729	0.1504	2.3143	3.0176	0.4285	0.2333	3.6794
Overhead Break Arrival	14L	4LO1a	0.3670	0.0722	0.0489	0.4881	1.8484	0.4186	0.2440	2.5110	2.2154	0.4908	0.2929	2.9991
		4LO1b	0.0917	0.0180	0.0122	0.1219	0.4621	0.1047	0.0610	0.6278	0.5538	0.1227	0.0732	0.7497
		4LO1c	0.1529	0.0301	0.0204	0.2034	0.7702	0.1744	0.1017	1.0463	0.9231	0.2045	0.1221	1.2497
		4LO2a	5.8717	1.1545	0.7828	7.8090	0.0616	0.0140	0.0081	0.0837	5.9333	1.1685	0.7909	7.8927
		4LO2b	1.4679	0.2886	0.1957	1.9522	0.0154	0.0035	0.0020	0.0209	1.4833	0.2921	0.1977	1.9731
		4LO2c	2.4465	0.4810	0.3262	3.2537	0.0257	0.0058	0.0034	0.0349	2.4722	0.4868	0.3296	3.2886
		4LO3a	0.2202	0.0433	0.0294	0.2929	0.0616	0.0140	0.0081	0.0837	0.2818	0.0573	0.0375	0.3766
		4LO3b	0.0550	0.0108	0.0073	0.0731	0.0154	0.0035	0.0020	0.0209	0.0704	0.0143	0.0093	0.0940
		4LO3c	0.0917	0.0180	0.0122	0.1219	0.0257	0.0058	0.0034	0.0349	0.1174	0.0238	0.0156	0.1568
		4LO4a	0.6606	0.1299	0.0881	0.8786	0.2465	0.0558	0.0325	0.3348	0.9071	0.1857	0.1206	1.2134
		4LO4b	0.1651	0.0325	0.0220	0.2196	0.0616	0.0140	0.0081	0.0837	0.2267	0.0465	0.0301	0.3033
		4LO4c	0.2752	0.0541	0.0367	0.3660	0.1027	0.0233	0.0136	0.1396	0.3779	0.0774	0.0503	0.5056
		4LO5a	0.2202	0.0433	0.0294	0.2929	0.2465	0.0558	0.0325	0.3348	0.4667	0.0991	0.0619	0.6277
		4LO5b	0.0550	0.0108	0.0073	0.0731	0.0616	0.0140	0.0081	0.0837	0.1166	0.0248	0.0154	0.1568
		4LO5c	0.0917	0.0180	0.0122	0.1219	0.1027	0.0233	0.0136	0.1396	0.1944	0.0413	0.0258	0.2615
	14R	4RO1a	0.1028	0.0196	0.0130	0.1354	1.0782	0.2576	0.1996	1.5354	1.1810	0.2772	0.2126	1.6708
		4RO1b	0.0257	0.0049	0.0033	0.0339	0.2696	0.0644	0.0499	0.3839	0.2953	0.0693	0.0532	0.4178
		4RO1c	0.0428	0.0082	0.0054	0.0564	0.4493	0.1073	0.0832	0.6398	0.4921	0.1155	0.0886	0.6962
		4RO2a	1.7982	0.3424	0.2283	2.3689	0.0359	0.0086	0.0067	0.0512	1.8341	0.3510	0.2350	2.4201
		4RO2b	0.4496	0.0856	0.0571	0.5923	0.0090	0.0021	0.0017	0.0128	0.4586	0.0877	0.0588	0.6051
		4RO2c	0.7493	0.1427	0.0951	0.9871	0.0150	0.0036	0.0028	0.0214	0.7643	0.1463	0.0979	1.0085
		4RO3a	0.2569	0.0489	0.0326	0.3384	0.0359	0.0086	0.0067	0.0512	0.2928	0.0575	0.0393	0.3896
		4RO3b	0.0642	0.0122	0.0082	0.0846	0.0090	0.0021	0.0017	0.0128	0.0732	0.0143	0.0099	0.0974
		4RO3c	0.1070	0.0204	0.0136	0.1410	0.0150	0.0036	0.0028	0.0214	0.1220	0.0240	0.0164	0.1624
		4RO4a	0.1284	0.0245	0.0163	0.1692	0.1438	0.0343	0.0266	0.2047	0.2722	0.0588	0.0429	0.3739
		4RO4b	0.0321	0.0061	0.0041	0.0423	0.0359	0.0086	0.0067	0.0512	0.0680	0.0147	0.0108	0.0935
		4RO4c	0.0535	0.0102	0.0068	0.0705	0.0599	0.0143	0.0111	0.0853	0.1134	0.0245	0.0179	0.1558
		4RO5a	0.1028	0.0196	0.0130	0.1354	0.1438	0.0343	0.0266	0.2047	0.2466	0.0539	0.0396	0.3401
		4RO5b	0.0257	0.0049	0.0033	0.0339	0.0359	0.0086	0.0067	0.0512	0.0616	0.0135	0.0100	0.0851
		4RO5c	0.0428	0.0082	0.0054	0.0564	0.0599	0.0143	0.0111	0.0853	0.1027	0.0225	0.0165	0.1417

Table 3-2 Modeled Average Daily Events for No Action Scenario (concluded)

Operation Type	Run-way	Flight Track ID	F/A-18C/D				F/A-18E/F				All Modeled			
			Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Overhead Break Arrival	32L	2LO1a	0.0257	0.0049	0.0033	0.0339	0.6161	0.1267	0.0887	0.8315	0.6418	0.1316	0.0920	0.8654
		2LO1b	0.0064	0.0012	0.0008	0.0084	0.1540	0.0317	0.0222	0.2079	0.1604	0.0329	0.0230	0.2163
		2LO1c	0.0107	0.0020	0.0014	0.0141	0.2567	0.0528	0.0370	0.3465	0.2674	0.0548	0.0384	0.3606
		2LO3a	0.1284	0.0245	0.0163	0.1692	9.8583	2.0266	1.4195	13.3044	9.9867	2.0511	1.4358	13.4736
		2LO3b	0.0321	0.0061	0.0041	0.0423	2.4646	0.5067	0.3549	3.3262	2.4967	0.5128	0.3590	3.3685
		2LO3c	0.0535	0.0102	0.0068	0.0705	4.1076	0.8444	0.5915	5.5435	4.1611	0.8546	0.5983	5.6140
		2LO5a	0.0257	0.0049	0.0033	0.0339	0.3697	0.0760	0.0532	0.4989	0.3954	0.0809	0.0565	0.5328
		2LO5b	0.0064	0.0012	0.0008	0.0084	0.0924	0.0190	0.0133	0.1247	0.0988	0.0202	0.0141	0.1331
		2LO5c	0.0107	0.0020	0.0014	0.0141	0.1540	0.0317	0.0222	0.2079	0.1647	0.0337	0.0236	0.2220
		2LO7a	1.1009	0.2385	0.1345	1.4739	1.1091	0.2280	0.1597	1.4968	2.2100	0.4665	0.2942	2.9707
		2LO7b	0.2752	0.0596	0.0336	0.3684	0.2773	0.0570	0.0399	0.3742	0.5525	0.1166	0.0735	0.7426
		2LO7c	0.4587	0.0994	0.0561	0.6142	0.4621	0.0950	0.0665	0.6236	0.9208	0.1944	0.1226	1.2378
		2LO8a	0.0367	0.0079	0.0045	0.0491	0.3697	0.0760	0.0532	0.4989	0.4064	0.0839	0.0577	0.5480
		2LO8b	0.0092	0.0020	0.0011	0.0123	0.0924	0.0190	0.0133	0.1247	0.1016	0.0210	0.0144	0.1370
		2LO8c	0.0153	0.0033	0.0019	0.0205	0.1540	0.0317	0.0222	0.2079	0.1693	0.0350	0.0241	0.2284
	32R	2RO1a	0.0367	0.0079	0.0045	0.0491	0.1725	0.0343	0.0237	0.2305	0.2092	0.0422	0.0282	0.2796
		2RO1b	0.0092	0.0020	0.0011	0.0123	0.0431	0.0086	0.0059	0.0576	0.0523	0.0106	0.0070	0.0699
		2RO1c	0.0153	0.0033	0.0019	0.0205	0.0719	0.0143	0.0099	0.0961	0.0872	0.0176	0.0118	0.1166
		2RO2a	0.1468	0.0318	0.0179	0.1965	3.0191	0.6011	0.4140	4.0342	3.1659	0.6329	0.4319	4.2307
		2RO2b	0.0367	0.0079	0.0045	0.0491	0.7548	0.1503	0.1035	1.0086	0.7915	0.1582	0.1080	1.0577
		2RO2c	0.0612	0.0132	0.0075	0.0819	1.2580	0.2505	0.1725	1.6810	1.3192	0.2637	0.1800	1.7629
		2RO3a	0.1468	0.0318	0.0179	0.1965	0.4313	0.0859	0.0591	0.5763	0.5781	0.1177	0.0770	0.7728
		2RO3b	0.0367	0.0079	0.0045	0.0491	0.1078	0.0215	0.0148	0.1441	0.1445	0.0294	0.0193	0.1932
		2RO3c	0.0612	0.0132	0.0075	0.0819	0.1797	0.0358	0.0246	0.2401	0.2409	0.0490	0.0321	0.3220
		2RO4a	0.6422	0.1468	0.1101	0.8991	0.2156	0.0429	0.0296	0.2881	0.8578	0.1897	0.1397	1.1872
		2RO4b	0.1606	0.0367	0.0275	0.2248	0.0539	0.0107	0.0074	0.0720	0.2145	0.0474	0.0349	0.2968
		2RO4c	0.2676	0.0611	0.0459	0.3746	0.0899	0.0179	0.0123	0.1201	0.3575	0.0790	0.0582	0.4947
		2RO5a	0.0214	0.0049	0.0037	0.0300	0.1725	0.0343	0.0237	0.2305	0.1939	0.0392	0.0274	0.2605
		2RO5b	0.0054	0.0012	0.0009	0.0075	0.0431	0.0086	0.0059	0.0576	0.0485	0.0098	0.0068	0.0651
		2RO5c	0.0089	0.0020	0.0015	0.0124	0.0719	0.0143	0.0099	0.0961	0.0808	0.0163	0.0114	0.1085
		2RO6a	0.0214	0.0049	0.0037	0.0300	0.0431	0.0086	0.0059	0.0576	0.0645	0.0135	0.0096	0.0876
		2RO6b	0.0054	0.0012	0.0009	0.0075	0.0108	0.0021	0.0015	0.0144	0.0162	0.0033	0.0024	0.0219
		2RO6c	0.0089	0.0020	0.0015	0.0124	0.0180	0.0036	0.0025	0.0241	0.0269	0.0056	0.0040	0.0365
		2RO7a	0.0856	0.0196	0.0147	0.1199	0.2156	0.0429	0.0296	0.2881	0.3012	0.0625	0.0443	0.4080
		2RO7b	0.0214	0.0049	0.0037	0.0300	0.0539	0.0107	0.0074	0.0720	0.0753	0.0156	0.0111	0.1020
		2RO7c	0.0357	0.0082	0.0061	0.0500	0.0899	0.0179	0.0123	0.1201	0.1256	0.0261	0.0184	0.1701
		2RO8a	0.0856	0.0196	0.0147	0.1199	0.0431	0.0086	0.0059	0.0576	0.1287	0.0282	0.0206	0.1775
		2RO8b	0.0214	0.0049	0.0037	0.0300	0.0108	0.0021	0.0015	0.0144	0.0322	0.0070	0.0052	0.0444
		2RO8c	0.0357	0.0082	0.0061	0.0500	0.0180	0.0036	0.0025	0.0241	0.0537	0.0118	0.0086	0.0741
T&G	14L	4LT1	-	-	-	-	1.6692	0.3193	0.2281	2.2166	1.6692	0.3193	0.2281	2.2166
	14R	4RT1	-	-	-	-	1.1128	0.1965	0.1228	1.4321	1.1128	0.1965	0.1228	1.4321
	32L	2LT1	-	-	-	-	8.3458	1.4489	1.0528	10.8475	8.3458	1.4489	1.0528	10.8475
	32R	2RT1	-	-	-	-	2.7819	0.4912	0.3509	3.6240	2.7819	0.4912	0.3509	3.6240
FCLP	14L	4LF1	0.7264	0.3563	0.1853	1.2680	1.9313	1.2821	0.6876	3.9010	2.6577	1.6384	0.8729	5.1690
	32L	2LF1	11.3809	5.5828	2.9024	19.8661	30.2567	20.0862	10.7720	61.1149	41.6376	25.6690	13.6744	80.9810
GCA Box	14L	4LG1	0.0745	0.0109	0.0092	0.0946	0.1528	0.0470	0.0448	0.2446	0.2273	0.0579	0.0540	0.3392
	14R	4RG1	0.0248	0.0036	0.0031	0.0315	0.0509	0.0157	0.0149	0.0815	0.0757	0.0193	0.0180	0.1130
	32L	2LG1	0.4633	0.0675	0.0575	0.5883	0.9507	0.2926	0.2787	1.5220	1.4140	0.3601	0.3362	2.1103
	32R	2RG1	0.2648	0.0386	0.0329	0.3363	0.5433	0.1672	0.1593	0.8698	0.8081	0.2058	0.1922	1.2061
Departure			26.6717	5.8552	-	32.5269	45.7705	9.5268	1.0532	56.3505	72.4422	15.3820	1.0532	88.8774
Straight-in Arrival (non-break)			3.8847	0.7781	0.5179	5.1807	6.5206	1.3644	0.9398	8.8248	10.4053	2.1425	1.4577	14.0055
Overhead Break Arrival			20.3876	4.0764	2.7182	27.1822	34.2301	7.1562	4.9292	46.3155	54.6177	11.2326	7.6474	73.4977
T&G			-	-	-	-	13.9097	2.4559	1.7546	18.1202	13.9097	2.4559	1.7546	18.1202
FCLP			12.1073	5.9391	3.0877	21.1341	32.1880	21.3683	11.4596	65.0159	44.2953	27.3074	14.5473	86.1500
GCA Box			0.8274	0.1206	0.1027	1.0507	1.6977	0.5225	0.4977	2.7179	2.5251	0.6431	0.6004	3.7686
Total			63.8787	16.7694	6.4265	87.0746	134.3166	42.3941	20.6341	197.3448	198.1953	59.1635	27.0606	284.4194

3.3 Maintenance Run-up Operations

The type and location of maintenance operations would not change in the No Action scenario relative to the Baseline scenario but the number of operations would change relative to the Baseline scenario. Table 3-3 lists the run-up activity estimated for the No Action scenario. The annual number of run-up events for legacy Hornets were calculated by scaling the baseline run-up events by number of based aircraft in the No Action scenario. The Super Hornet run-up events would not change for the No Action scenario relative to Baseline.

Table 3-3 Modeled Annual Single-Engine Maintenance Run-Up Events for No Action Scenario

Aircraft	Location I.D.	Location Name	Annual Events	Day (0700 - 1900)	Evening (1900 - 2200)	Night (2200 - 0700)	Power Setting Reported	Power Setting Modeled	Duration (minutes)
F/A-18C/D Fleet	1H	In-Frame/Outdoor High Power	35	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	1L	In-Frame/Outdoor Low Power	1089	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	2H	In-Frame/Outdoor High Power	15	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	2L	In-Frame/Outdoor Low Power	1089	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	3H	In-Frame/Outdoor High Power	35	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	3L	In-Frame/Outdoor Low Power	1089	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	4H	In-Frame/Outdoor High Power	16	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	4L	In-Frame/Outdoor Low Power	1089	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
F/A-18C/D	TC1	Indoor Test Cell (404 Engine)	36	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5
	TC2	Indoor Test Cell (404 Engine)	36	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5
F/A-18E/F Fleet	1H	In-Frame/Outdoor High Power	18	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	1L	In-Frame/Outdoor Low Power	1219	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	2H	In-Frame/Outdoor High Power	18	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	2L	In-Frame/Outdoor Low Power	1219	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	3H	In-Frame/Outdoor High Power	18	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	3L	In-Frame/Outdoor Low Power	1219	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	4H	In-Frame/Outdoor High Power	18	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	4L	In-Frame/Outdoor Low Power	1219	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	5H	In-Frame/Outdoor High Power	41	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
F/A-18E/F FRS	5H	In-Frame/Outdoor High Power	60	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	5L	In-Frame/Outdoor Low Power	2088	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
F/A-18E/F	TC1	Indoor Test Cell (404 Engine)	114	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5
	TC2	Indoor Test Cell (404 Engine)	114	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5

Note: While one engine is run through the test procedure the second engine will typically be online and at idle power

3.4 Flight Demonstration Modeling

Demonstration flights would continue in the area west of Runway 32L unchanged relative to the Baseline scenario.

3.5 Aircraft Noise Exposure

Using the data described in Sections 3.1 through 3-4, NOISEMAP Version 7 and MR NMAP Version 2 were used to calculate and plot the 60 dB through 85 dB CNEL contours for the No Action AAD operations for NAS Lemoore.

Consistent with the Baseline scenario, grid point results (CNEL decibel values) from both models (NOISEMAP and MR_NMAP) were combined logarithmically within NMPlot (Wasmer 2006b) to calculate the overall aircraft noise exposure from airfield and demonstration operations. Figure 3-1 shows the CNEL contours colored in 5-decibel bands. Maximum off-station exposure would be less than 95 dB CNEL but greater than 90 dB CNEL adjacent to the western boundary of the NAS under the No Action scenario. The CNEL lobes north of the NAS would be primarily due to departure operations while other lobes would be due to GCA Box operations. Most on-station noise exposure would be due to T&G and FCLP operations. The effect of the demonstration operations is shown in the slight bulging of the CNEL contours west of the airfield.

The noise exposure levels for the No Action scenario would decrease by nearly one dB relative to the Baseline condition. This reduction would be caused by the reduction in legacy Hornet FRS annual airfield operations.

The fifteen POI in the vicinity of NAS Lemoore were analyzed for the proposed scenario and the results are shown in Table 3-4. In the No Action scenario none of the fifteen locations would experience a CNEL greater than or equal to 60 dB. Eleven locations would experience a reduction of up to 1 dB under the No Action scenario relative to Baseline. This decrease would be due to the reduction in annual airfield operations by the legacy Hornets FRS.

Table 3-4 Estimated Aircraft CNEL at Representative Points of Interest in the Vicinity of NAS Lemoore for No Action Scenario

Point of Interest			CNEL (dBA)		
ID	Description	Type	Baseline	No Action	Change re Baseline
1	Community of Burrel	School and Non-School	60	59	-1
2	Community of Caruthers	School and Non-School	52	52	-
3	Central Union School	School	53	52	-1
4	College Park Apartments	Non-School	50	49	-1
5	Community of Conejo	School and Non-School	57	57	-
6	Fairway Homes at Lemoore Golf Course	Non-School	48	47	-1
7	Community of Helm	School and Non-School	50	49	-1
8	Huron Middle School	School	43	42	-1
9	Island Elementary School	School	51	51	-
10	Community of Lanare	Non-School	60	59	-1
11	Neutra Elementary School	School	60	59	-1
12	Community of Riverdale	School and Non-School	50	50	-
13	Santa Rosa Racheria homes near Tachi Casino	Non-School	49	48	-1
14	Community of Stratford	School and Non-School	50	49	-1
15	West Hills College	School	58	57	-1

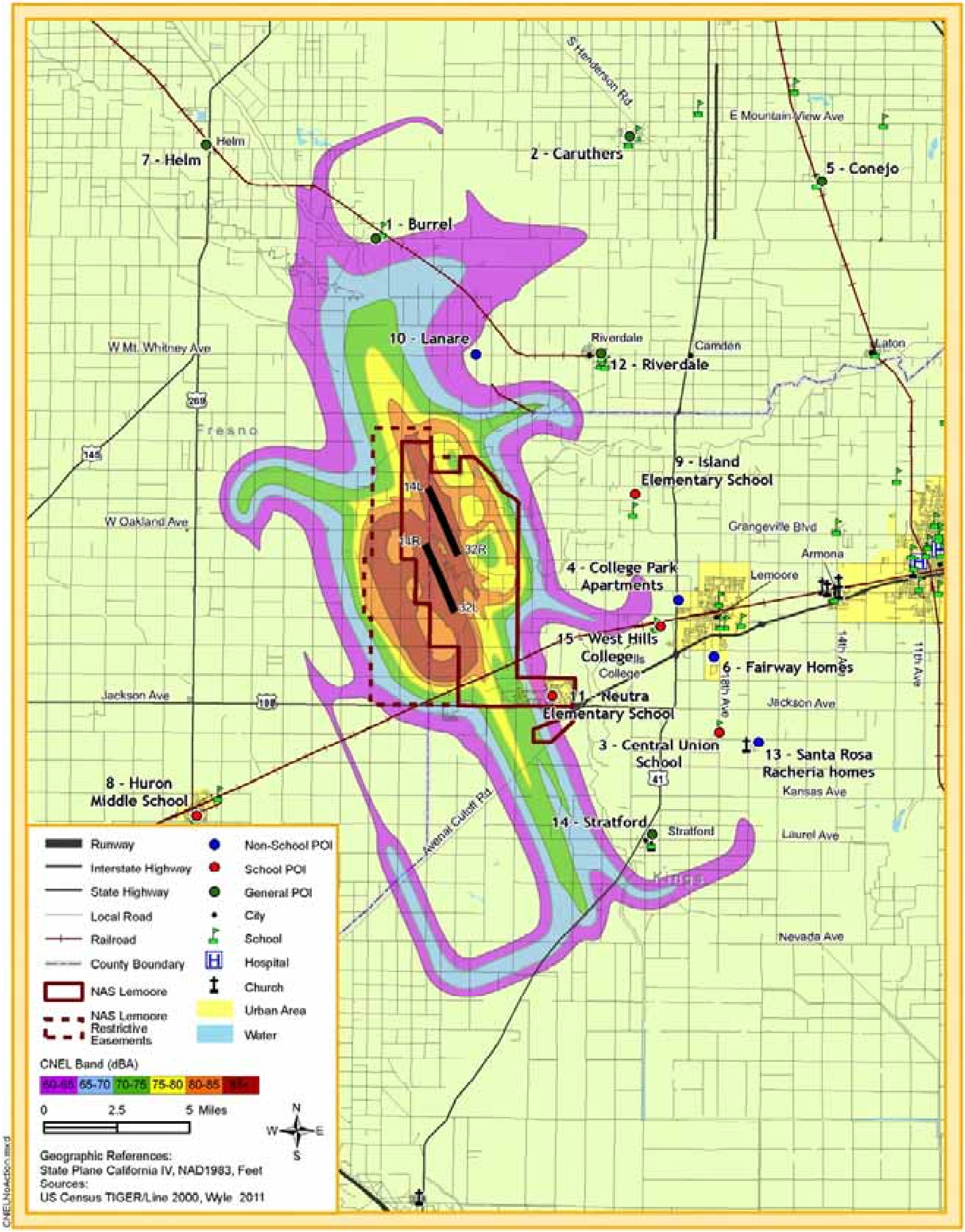

Figure 3-1 Bands of Aircraft CNEL for No Action Average Daily Operations at NAS Lemoore

3.6 Supplemental Noise Metrics and Analysis

Section 3.6.1 provides a brief summary of the results. Sections 3.6.2 and 3.6.3 discuss the residential speech interference and sleep disturbance analyses and results, respectively. Section 3.6.4 presents the results of the classroom speech analysis.

3.6.1 Summary

The results of the analysis indicate speech interference and sleep disturbance effects are present in the No Action scenario. The areas to the north of NAS in and around the communities of Lanare and Burrel would remain the most affected in terms of the potential for speech interference and sleep disturbance due to Hornet departure events from Runway 32R. The Santa Rosa Racheria homes near the Tachi Casino and the Community of Stratford would also be affected in terms of the potential for sleep disturbance due to Hornet departure events from Runway 32R. The results indicate that Burrel Elementary, Conejo School, and Neutra Elementary School would be affected in terms of the potential for classroom speech interference. At Burrel and Conejo, this would be due to departures from Runway 32R while the potential for classroom speech interference at Neutra would be primarily caused by non-break arrivals to Runway 32R due to the school's close proximity to the Runway 32R arrival path. Under the No Action scenario the noise impacts at all points of interest would decrease slightly due to the reduction of annual aircraft operations at NAS caused by the retirement of the legacy Hornet FRS.

3.6.2 Potential for Residential Speech Interference

Table 3-5 presents the results of the speech interference analysis for the No Action scenario for the 10 applicable residential sites. For the No Action scenario, six sites would have more than one speech interfering event per hour for windows open and three sites would have more than one speech interfering event per hour for windows closed. The interfering events would range from 2 to 7 per hour with windows open and 2 to 3 per hour with windows closed. The three sites exceeding one event per hour for both windows open and windows closed would be the communities of Burrel, Conejo and Lanare. Five locations would show a decrease of one event per hour with windows open for No Action relative to Baseline conditions. All other locations would have a negligible change for No Action relative to Baseline.

3.6.3 Potential for Nighttime Sleep Interference

Table 3-6 presents the results of the sleep disturbance analysis for the 10 applicable residential sites. The probability of awakening would range from 1 percent to 8 percent with windows open and would range from less than 1 percent to 4 percent with windows closed. Both the communities of Burrel and Lanare would expect a decrease of 2 percent under the No Action scenario relative to Baseline for windows open condition. Three other sites would expect a decrease of 1 percent under the No Action scenario relative to Baseline. All other locations would have a negligible change.

3.6.4 Potential for Classroom Speech Interference

Table 3-7 contains the results of the classroom speech interference analysis for the applicable school sites for the No Action scenario. Five schools would experience more than one interfering event per hour ranging from 3 to 6 per hour with windows open and would range from 2 to 3 per hour with windows closed. Three of those five schools would also exceed the indoor $L_{eq(9h)}$ criteria of 40 dB.

Of the considered schools, schools at which both the events per hour and the indoor $L_{eq(9h)}$ criteria are exceeded (with windows open) would be:

- Burrel Elementary School,
- Conejo School, and
- Neutra Elementary School

None of the considered schools exceed both criteria with windows closed.

Five locations would expect a decrease by one to two interfering events per hour for the No Action scenario relative to Baseline condition for windows open. The remaining locations would have negligible change. All locations except West Hills College would experience a reduction in indoor $L_{eq(9h)}$ of 1 dB while West Hills College would not experience a measureable change. The reduction in interfering events per hour and indoor $L_{eq(9h)}$ would be due to the reduction of annual airfield operations at NAS.

Table 3-5 Potential for Indoor Speech Interference for Applicable Points of Interest in the Vicinity of NAS Lemoore for No Action Scenario

Point of Interest		Indoor Number of Events per Daytime/Evening Hour(1,2)					
ID	Description (All Residential)	Baseline		No Action		Change re Baseline	
		Windows Open	Windows Closed	Windows Open	Windows Closed	Windows Open	Windows Closed
1	Community of Burrel	7	3	6	3	-1	-
2	Community of Caruthers	5	-	4	-	-1	-
4	College Park Apartments	1	-	-	-	-1	-
5	Community of Conejo	5	2	4	2	-1	-
6	Fairway Homes at Lemoore Golf Course	1	-	1	-	-	-
7	Community of Helm	1	-	1	-	-	-
10	Community of Lanare	8	3	7	3	-1	-
12	Community of Riverdale	3	-	3	-	-	-
13	Santa Rosa Racheria homes near Tachi Casino	2	-	2	-	-	-
14	Community of Stratford	1	-	1	-	-	-
Number of Sites Exceeding 1 Intrusive Event per Hour		6	3	6	3		
Minimum Number of Intrusive Events per Hour if Exceeding 1		2	2	2	2		
Maximum Number of Intrusive Events per Hour if Exceeding 1		8	3	7	3		

(1) Number of Annual Average Daily CNEL Daytime and Evening (7am - 10pm) Events At or Above an Indoor Maximum (single-event) Sound Level (L_{max}) of 50 dB;
(2) NLRs of 15 dB and 25 dB for windows open and closed, respectively

Table 3-6 Average Nightly (2200-0700) Probability of Awakening (%) for Representative Residential Receptors in the Vicinity of NAS Lemoore for No Action Scenario

Point of Interest		Baseline		No Action		Change Re Baseline	
ID	Description (All Residential)	Windows Open	Windows Closed	Windows Open	Windows Closed	Windows Open	Windows Closed
1	Community of Burrel	6%	3%	4%	2%	-2%	-1%
2	Community of Caruthers	1%	-	1%	-	-	-
4	College Park Apartments	2%	1%	2%	-	-	-
5	Community of Conejo	1%	-	1%	-	-	-
6	Fairway Homes at Lemoore Golf Course	2%	1%	2%	1%	-	-
7	Community of Helm	3%	1%	2%	1%	-1%	-
10	Community of Lanare	10%	5%	8%	4%	-2%	-1%
12	Community of Riverdale	2%	1%	2%	-	-	-
13	Santa Rosa Racheria homes near Tachi Casino	7%	3%	6%	3%	-1%	-
14	Community of Stratford	7%	2%	6%	2%	-1%	-

Note: NLRs of 15 dB and 25 dB for windows open and closed, respectively

Table 3-7 Potential for Indoor Classroom Speech Interference for Applicable School Locations in the Vicinity of NAS Lemoore for No Action Scenario

Point of Interest		Baseline					No Action					Change re Baseline				
			Indoor(2)					Indoor(2)					Indoor(2)			
			Windows Open		Windows Closed			Windows Open		Windows Closed			Windows Open		Windows Closed	
ID	Description	Outdoor $L_{eq(9h)}$ (dB)	$L_{eq(9h)}$ (dB)	Events per Hour(1)	$L_{eq(9h)}$ (dB)	Events per Hour(1)	Outdoor $L_{eq(9h)}$ (dB)	$L_{eq(9h)}$ (dB)	Events per Hour(1)	$L_{eq(9h)}$ (dB)	Events per Hour(1)	Outdoor $L_{eq(9h)}$ (dB)	$L_{eq(9h)}$ (dB)	Events per Hour(1)	$L_{eq(9h)}$ (dB)	Events per Hour(1)
1	Burrel Elementary School	60	45	8	35	3	60	45	6	35	3	-1	-1	-2	-1	0
2	Caruthers High School	54	39	6	29	-	53	38	4	28	-	-1	-1	-2	-1	0
3	Central Union School	51	36	-	26	-	50	35	-	25	-	-1	-1	0	-1	0
5	Conejo School	58	43	5	33	2	58	43	4	33	2	-1	-1	-1	-1	0
7	Helm Elementary School	48	33	1	23	-	47	32	1	22	-	-1	-1	0	-1	0
8	Huron Middle School	37	22	-	12	-	36	21	-	11	-	-1	-1	0	-1	0
9	Island Elementary School	50	35	1	25	-	49	34	-	24	-	-1	-1	-1	-1	0
11	Neutra Elementary School	59	44	4	34	2	58	43	4	33	2	-1	-1	0	-1	0
12	Riverdale High School	50	35	3	25	-	49	34	3	24	-	-1	-1	0	-1	0
14	Stratford Elementary School	47	32	1	22	-	47	32	1	22	-	-1	-1	0	-1	0
15	West Hills College	54	39	1	29	-	54	39	-	29	-	0	0	-1	0	0
Number of Sites Exceeding 1 Intrusive Event per Hour				5		3			5		3					
Minimum Number of Intrusive Events per Hour if Exceeding 1				3		2			3		2					
Maximum Number of Intrusive Events per Hour if Exceeding 1				8		3			6		3					

Note: Does not account for differences between weekday and weekend activity

(1) Number of Annual Average Daily Events per hour during 9 hour school day At or Above an Indoor Maximum (single-event) Sound Level (L_{max}) of 50 dB;

(2) NLRs of 15 dB and 25 dB for windows open and closed, respectively

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4 Proposed Scenario and Noise Exposure

Section 4.1 discusses flight operations by aircraft type. Section 4.2 discusses runway/helipad utilization, flight track utilization, flight profiles and daily operations by aircraft type. Section 4.3 describes maintenance run-up operations and Section 4.4 discusses the flight demonstration training. Section 4.5 discusses the resultant average daily noise exposure. Section 4.6 describes the supplemental noise metrics analysis.

4.1 Proposed Scenario

The Proposed scenario is based on the full implementation of the Strike Fighter Realignment action occurring in CY 2015. Under the proposed action the Navy anticipates the following changes:

- Four F/A-18C 10-aircraft squadrons would transition to four F/A-18 E/F 10-aircraft squadrons,
- Addition of two F/A-18E/F 12-aircraft squadrons, and
- One F/A-18C 10-aircraft squadron replaced by one F/A-18E/F 12-aircraft squadron.

Proposed annual flight operations totaling 158,858 were provided by the Navy (Campe 2011c). The proposed flight operations were derived by scaling the baseline operations to account for the change in number of based legacy and Super Hornet aircraft. In the Proposed scenario legacy Hornet aircraft would comprise two fleet squadrons and no portion of the Fleet Replacement Squadron (FRS) for a total of 20 aircraft. The Super Hornet aircraft would comprise 15 Fleet squadrons and the same number of FRS aircraft (44) as in the No Action scenario for a total of 214 aircraft. The transient operations would be identical to the No Action scenario. The following bullets summarize the based Hornet aircraft loading at NAS Lemoore.

Fleet squadrons:

- 2 legacy Hornet squadrons @ 10 aircraft each
- 10 Super Hornet squadrons @ 12 aircraft each
- 5 Super Hornet squadrons @ 10 aircraft each

FRS:

- 44 Super Hornet aircraft

Based on the above data and assumptions, total annual flight operations for all Hornet aircraft are shown in Table 4-1 along with operations for non-modeled aircraft categories. Aircraft other than the legacy or Super Hornets were not modeled due to their negligible contribution to the overall aircraft noise environment relative to the contribution of the fighter aircraft. Consistent with the No Action scenario, fleet Hornets would not conduct Touch and Go operations. Relative to No Action, the Proposed scenario would result in an increase of approximately 5,100 (3 percent) total flight operations.

Table 4-1 Annual Flight Operations for Proposed Scenario at NAS Lemoore

Operation Type	Based F/A-18C/D (Fleet)				Based F/A-18C/D (FRS)				Based F/A-18E/F (Fleet)				Based F/A-18E/F (FRS)			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	2,782	611	0	3,393	-	-	-	-	16,068	3,766	309	20,143	7,822	1,395	213	9,430
Straight-In Arrival	406	81	54	541	-	-	-	-	2,394	479	318	3,191	1,135	218	102	1,455
Overhead Break Arrival	2,126	425	283	2,834	-	-	-	-	12,564	2,512	1,675	16,751	5,962	1,147	535	7,644
Touch and Go*	0	0	0	0	-	-	-	-	0	0	0	0	10,154	1,793	1,281	13,228
FCLP*	2525	1239	644	4,408	-	-	-	-	18,139	9,360	6,254	33,753	13,468	10,423	4,907	28,798
GCA Box*	174	25	21	220	-	-		-	1,035	118	149	1,302	667	316	281	1,264
Total	8,013	2,381	1,002	11,396	-	-	-	-	50,200	16,235	8,705	75,140	39,208	15,292	7,319	61,819

Operation Type	Transient Jet[1]				Transient Large/Heavy[1]				Transient/Based Prop[1]				Transient/Based GA[1]			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	684	73	6	763	214	43	15	272	398	35	4	437	579	38	8	625
Straight-In Arrival	138	18	2	158	236	35	2	273	357	57	11	425	536	75	15	626
Overhead Break Arrival	597	7	0	604	0	0	0	0	11	0	0	11	0	0	0	0
Touch and Go*	651	77	15	743	385	53	5	443	646	107	33	786	1,853	316	70	2,239
FCLP*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCA Box*	1,219	136	7	1,362	305	38	0	343	107	18	5	130	202	54	7	263
Total	3,289	311	30	3,630	1,140	169	22	1,331	1,519	217	53	1,789	3,170	483	100	3,753

Operation Type	All Based Hornets				All Transient[1]				All Aircraft			
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	26,672	5,772	522	32,966	1,875	189	33	2,097	**28,547**	**5,961**	**555**	**35,063**
Straight-In Arrival	3,935	778	474	5,187	1,267	185	30	1,482	**5,202**	**963**	**504**	**6,669**
Overhead Break Arrival	20,652	4,084	2,493	27,229	608	7	0	615	**21,260**	**4,091**	**2,493**	**27,844**
Touch and Go*	10,154	1,793	1,281	13,228	3,535	553	123	4,211	**13,689**	**2,346**	**1,404**	**17,439**
FCLP*	34,132	21,022	11,805	66,959	0	0	0	0	**34,132**	**21,022**	**11,805**	**66,959**
GCA Box*	1,876	459	451	2,786	1,833	246	19	2,098	**3,709**	**705**	**470**	**4,884**
Total	97,421	33,908	17,026	148,355	9,118	1,180	205	10,503	**106,539**	**35,088**	**17,231**	**158,858**

Note: Patterns counted as 2 operations per circuit
(1) Not Modeled.

4.2 Runway and Flight Track Utilization, Flight Profiles and Annual Average Daily Events

Figure 4-2 compares 60 dB and 65 dB CNEL contours from No Action and Proposed scenarios. Overall, the contours of the Proposed scenario would be larger than the contours for the No Action scenario. This would be due to the increase in total Super Hornet operations of approximately 34,000 (32 percent) relative to the No Action scenario. The Super Hornet is approximately 5 to 10 dB louder than the legacy Hornet on a single event basis but this is offset by the decrease in legacy Hornet operations by approximately 28,000 (71 percent) so the effect on the noise contours is minimal.

Table 4-2 Modeled Annual Average Daily Flight Events for Proposed Scenario

Operation Type	Run-way	Flight Track ID	F/A-18C/D				F/A-18E/F				All Modeled			
			Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Departure	14L	4LD1	0.0518	0.0130	-	0.0648	0.4451	0.1103	-	0.5554	0.4969	0.1233	-	0.6202
		4LD2	0.0152	0.0037	-	0.0189	0.1309	0.0311	-	0.1620	0.1461	0.0348	-	0.1809
		4LD3	0.0091	-	-	0.0091	0.0785	-	-	0.0785	0.0876	-	-	0.0876
	14R	4RD1	0.1555	0.0261	-	0.1816	1.3352	0.2205	-	1.5557	1.4907	0.2466	-	1.7373
		4RD2	0.0457	0.0074	-	0.0531	0.3927	0.0622	-	0.4549	0.4384	0.0696	-	0.5080
		4RD3	0.0274	-	-	0.0274	0.2356	-	-	0.2356	0.2630	-	-	0.2630
	32L	2LD1	0.0137	0.0043	-	0.0180	0.1178	0.0368	-	0.1546	0.1315	0.0411	-	0.1726
		2LD2	0.1509	0.0217	-	0.1726	1.2959	0.1838	-	1.4797	1.4468	0.2055	-	1.6523
		2LD3	0.0229	-	-	0.0229	0.1964	-	-	0.1964	0.2193	-	-	0.2193
		2LD4	0.0229	0.0074	-	0.0303	0.1964	0.0622	-	0.2586	0.2193	0.0696	-	0.2889
		2LD5	0.0183	-	-	0.0183	0.1571	-	-	0.1571	0.1754	-	-	0.1754
	32R	2RD1	0.4253	0.2066	-	0.6319	3.6522	1.7460	-	5.3982	4.0775	1.9526	-	6.0301
		2RD2	4.6787	1.0329	-	5.7116	40.1744	8.7301	-	48.9045	44.8531	9.7630	-	54.6161
		2RD3	0.7089	-	-	0.7089	6.0870	-	-	6.0870	6.7959	-	-	6.7959
		2RD4	0.7089	0.3496	-	1.0585	6.0870	2.9548	0.8591	9.9009	6.7959	3.3044	0.8591	10.9594
		2RD5	0.5671	-	-	0.5671	4.8696	-	-	4.8696	5.4367	-	-	5.4367
		2RD6	-	-	-	-	-	-	0.5727	0.5727	-	-	0.5727	0.5727
Straight-in Arrival (non-break)	14L	4LA1	0.0222	0.0200	-	0.0422	0.1875	0.1756	-	0.3631	0.2097	0.1956	-	0.4053
	14R	4RA1	0.0333	-	-	0.0333	0.2812	-	-	0.2812	0.3145	-	-	0.3145
	32L	2LA1	0.7326	0.1578	0.1242	1.0146	6.1859	1.3850	1.1829	8.7538	6.9185	1.5428	1.3071	9.7684
	32R	2RA1	0.3219	0.0445	0.0237	0.3901	2.7181	0.3901	0.2253	3.3335	3.0400	0.4346	0.2490	3.7236
Overhead Break Arrival	14L	4LO1a	0.3145	0.0682	0.0384	0.4211	0.8857	0.1811	0.1330	1.1998	1.2002	0.2493	0.1714	1.6209
		4LO1b	0.0786	0.0170	0.0096	0.1052	0.2214	0.0453	0.0333	0.3000	0.3000	0.0623	0.0429	0.4052
		4LO1c	0.1311	0.0284	0.0160	0.1755	0.3690	0.0755	0.0554	0.4999	0.5001	0.1039	0.0714	0.6754
		4LO2a	0.0105	0.0023	0.0013	0.0141	14.1713	2.8979	2.1281	19.1973	14.1818	2.9002	2.1294	19.2114
		4LO2b	0.0026	0.0006	0.0003	0.0035	3.5428	0.7245	0.5320	4.7993	3.5454	0.7251	0.5323	4.8028
		4LO2c	0.0044	0.0009	0.0005	0.0058	5.9047	1.2074	0.8867	7.9988	5.9091	1.2083	0.8872	8.0046
		4LO3a	0.0105	0.0023	0.0013	0.0141	0.5314	0.1087	0.0798	0.7199	0.5419	0.1110	0.0811	0.7340
		4LO3b	0.0026	0.0006	0.0003	0.0035	0.1329	0.0272	0.0200	0.1801	0.1355	0.0278	0.0203	0.1836
		4LO3c	0.0044	0.0009	0.0005	0.0058	0.2214	0.0453	0.0333	0.3000	0.2258	0.0462	0.0338	0.3058
		4LO4a	0.0419	0.0091	0.0051	0.0561	1.5943	0.3260	0.2394	2.1597	1.6362	0.3351	0.2445	2.2158
		4LO4b	0.0105	0.0023	0.0013	0.0141	0.3986	0.0815	0.0599	0.5400	0.4091	0.0838	0.0612	0.5541
		4LO4c	0.0175	0.0038	0.0021	0.0234	0.6643	0.1358	0.0998	0.8999	0.6818	0.1396	0.1019	0.9233
		4LO5a	0.0419	0.0091	0.0051	0.0561	0.5314	0.1087	0.0798	0.7199	0.5733	0.1178	0.0849	0.7760
		4LO5b	0.0105	0.0023	0.0013	0.0141	0.1329	0.0272	0.0200	0.1801	0.1434	0.0295	0.0213	0.1942
		4LO5c	0.0175	0.0038	0.0021	0.0234	0.2214	0.0453	0.0333	0.3000	0.2389	0.0491	0.0354	0.3234
	14R	4RO1a	0.1835	0.0420	0.0314	0.2569	0.2480	0.0491	0.0355	0.3326	0.4315	0.0911	0.0669	0.5895
		4RO1b	0.0459	0.0105	0.0079	0.0643	0.0620	0.0123	0.0089	0.0832	0.1079	0.0228	0.0168	0.1475
		4RO1c	0.0764	0.0175	0.0131	0.1070	0.1033	0.0205	0.0148	0.1386	0.1797	0.0380	0.0279	0.2456
		4RO2a	0.0061	0.0014	0.0010	0.0085	4.3400	0.8595	0.6207	5.8202	4.3461	0.8609	0.6217	5.8287
		4RO2b	0.0015	0.0003	0.0003	0.0021	1.0850	0.2149	0.1552	1.4551	1.0865	0.2152	0.1555	1.4572
		4RO2c	0.0025	0.0006	0.0004	0.0035	1.8083	0.3581	0.2586	2.4250	1.8108	0.3587	0.2590	2.4285
		4RO3a	0.0061	0.0014	0.0010	0.0085	0.6200	0.1228	0.0887	0.8315	0.6261	0.1242	0.0897	0.8400
		4RO3b	0.0015	0.0003	0.0003	0.0021	0.1550	0.0307	0.0222	0.2079	0.1565	0.0310	0.0225	0.2100
		4RO3c	0.0025	0.0006	0.0004	0.0035	0.2583	0.0512	0.0369	0.3464	0.2608	0.0518	0.0373	0.3499
		4RO4a	0.0245	0.0056	0.0042	0.0343	0.3100	0.0614	0.0443	0.4157	0.3345	0.0670	0.0485	0.4500
		4RO4b	0.0061	0.0014	0.0010	0.0085	0.0775	0.0153	0.0111	0.1039	0.0836	0.0167	0.0121	0.1124
		4RO4c	0.0102	0.0023	0.0017	0.0142	0.1292	0.0256	0.0185	0.1733	0.1394	0.0279	0.0202	0.1875
		4RO5a	0.0245	0.0056	0.0042	0.0343	0.2480	0.0491	0.0355	0.3326	0.2725	0.0547	0.0397	0.3669
		4RO5b	0.0061	0.0014	0.0010	0.0085	0.0620	0.0123	0.0089	0.0832	0.0681	0.0137	0.0099	0.0917
		4RO5c	0.0102	0.0023	0.0017	0.0142	0.1033	0.0205	0.0148	0.1386	0.1135	0.0228	0.0165	0.1528

Table 4-2 – Modeled Annual Average Daily Flight Events for Proposed Scenario (concluded)

			F/A-18C/D				F/A-18E/F				All Modeled			
Operation Type	Run-way	Flight Track ID	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Overhead Break Arrival (continued)	32L	2LO1a	0.1048	0.0206	0.0140	0.1394	0.0620	0.0123	0.0089	0.0832	0.1668	0.0329	0.0229	0.2226
		2LO1b	0.0262	0.0052	0.0035	0.0349	0.0155	0.0031	0.0022	0.0208	0.0417	0.0083	0.0057	0.0557
		2LO1c	0.0437	0.0086	0.0058	0.0581	0.0258	0.0051	0.0037	0.0346	0.0695	0.0137	0.0095	0.0927
		2LO3a	1.6775	0.3301	0.2235	2.2311	0.3100	0.0614	0.0443	0.4157	1.9875	0.3915	0.2678	2.6468
		2LO3b	0.4194	0.0825	0.0559	0.5578	0.0775	0.0153	0.0111	0.1039	0.4969	0.0978	0.0670	0.6617
		2LO3c	0.6989	0.1376	0.0931	0.9296	0.1292	0.0256	0.0185	0.1733	0.8281	0.1632	0.1116	1.1029
		2LO5a	0.0629	0.0124	0.0084	0.0837	0.0620	0.0123	0.0089	0.0832	0.1249	0.0247	0.0173	0.1669
		2LO5b	0.0157	0.0031	0.0021	0.0209	0.0155	0.0031	0.0022	0.0208	0.0312	0.0062	0.0043	0.0417
		2LO5c	0.0262	0.0052	0.0035	0.0349	0.0258	0.0051	0.0037	0.0346	0.0520	0.0103	0.0072	0.0695
		2LO7a	0.1887	0.0371	0.0251	0.2509	2.6571	0.5986	0.3658	3.6215	2.8458	0.6357	0.3909	3.8724
		2LO7b	0.0472	0.0093	0.0063	0.0628	0.6643	0.1497	0.0914	0.9054	0.7115	0.1590	0.0977	0.9682
		2LO7c	0.0786	0.0155	0.0105	0.1046	1.1071	0.2494	0.1524	1.5089	1.1857	0.2649	0.1629	1.6135
		2LO8a	0.0629	0.0124	0.0084	0.0837	0.0886	0.0200	0.0122	0.1208	0.1515	0.0324	0.0206	0.2045
		2LO8b	0.0157	0.0031	0.0021	0.0209	0.0221	0.0050	0.0030	0.0301	0.0378	0.0081	0.0051	0.0510
		2LO8c	0.0262	0.0052	0.0035	0.0349	0.0369	0.0083	0.0051	0.0503	0.0631	0.0135	0.0086	0.0852
	32R	2RO1a	0.0294	0.0056	0.0037	0.0387	0.0886	0.0200	0.0122	0.1208	0.1180	0.0256	0.0159	0.1595
		2RO1b	0.0073	0.0014	0.0009	0.0096	0.0221	0.0050	0.0030	0.0301	0.0294	0.0064	0.0039	0.0397
		2RO1c	0.0122	0.0023	0.0016	0.0161	0.0369	0.0083	0.0051	0.0503	0.0491	0.0106	0.0067	0.0664
		2RO2a	0.5137	0.0979	0.0652	0.6768	0.3543	0.0798	0.0488	0.4829	0.8680	0.1777	0.1140	1.1597
		2RO2b	0.1284	0.0245	0.0163	0.1692	0.0886	0.0200	0.0122	0.1208	0.2170	0.0445	0.0285	0.2900
		2RO2c	0.2141	0.0408	0.0272	0.2821	0.1476	0.0333	0.0203	0.2012	0.3617	0.0741	0.0475	0.4833
		2RO3a	0.0734	0.0140	0.0093	0.0967	0.3543	0.0798	0.0488	0.4829	0.4277	0.0938	0.0581	0.5796
		2RO3b	0.0183	0.0035	0.0023	0.0241	0.0886	0.0200	0.0122	0.1208	0.1069	0.0235	0.0145	0.1449
		2RO3c	0.0306	0.0058	0.0039	0.0403	0.1476	0.0333	0.0203	0.2012	0.1782	0.0391	0.0242	0.2415
		2RO4a	0.0367	0.0070	0.0047	0.0484	1.5500	0.3684	0.2993	2.2177	1.5867	0.3754	0.3040	2.2661
		2RO4b	0.0092	0.0017	0.0012	0.0121	0.3875	0.0921	0.0748	0.5544	0.3967	0.0938	0.0760	0.5665
		2RO4c	0.0153	0.0029	0.0019	0.0201	0.6458	0.1535	0.1247	0.9240	0.6611	0.1564	0.1266	0.9441
		2RO5a	0.0294	0.0056	0.0037	0.0387	0.0517	0.0123	0.0100	0.0740	0.0811	0.0179	0.0137	0.1127
		2RO5b	0.0073	0.0014	0.0009	0.0096	0.0129	0.0031	0.0025	0.0185	0.0202	0.0045	0.0034	0.0281
		2RO5c	0.0122	0.0023	0.0016	0.0161	0.0215	0.0051	0.0042	0.0308	0.0337	0.0074	0.0058	0.0469
		2RO6a	0.0073	0.0014	0.0009	0.0096	0.0517	0.0123	0.0100	0.0740	0.0590	0.0137	0.0109	0.0836
		2RO6b	0.0018	0.0003	0.0002	0.0023	0.0129	0.0031	0.0025	0.0185	0.0147	0.0034	0.0027	0.0208
		2RO6c	0.0031	0.0006	0.0004	0.0041	0.0215	0.0051	0.0042	0.0308	0.0246	0.0057	0.0046	0.0349
		2RO7a	0.0367	0.0070	0.0047	0.0484	0.2067	0.0491	0.0399	0.2957	0.2434	0.0561	0.0446	0.3441
		2RO7b	0.0092	0.0017	0.0012	0.0121	0.0517	0.0123	0.0100	0.0740	0.0609	0.0140	0.0112	0.0861
		2RO7c	0.0153	0.0029	0.0019	0.0201	0.0861	0.0205	0.0166	0.1232	0.1014	0.0234	0.0185	0.1433
		2RO8a	0.0073	0.0014	0.0009	0.0096	0.2067	0.0491	0.0399	0.2957	0.2140	0.0505	0.0408	0.3053
		2RO8b	0.0018	0.0003	0.0002	0.0023	0.0517	0.0123	0.0100	0.0740	0.0535	0.0126	0.0102	0.0763
		2RO8c	0.0031	0.0006	0.0004	0.0041	0.0861	0.0205	0.0166	0.1232	0.0892	0.0211	0.0170	0.1273
T&G	14L	4LT1	-	-	-	-	1.6692	0.3193	0.2281	2.2166	1.6692	0.3193	0.2281	2.2166
	14R	4RT1	-	-	-	-	1.1128	0.1965	0.1228	1.4321	1.1128	0.1965	0.1228	1.4321
	32L	2LT1	-	-	-	-	8.3458	1.4489	1.0528	10.8475	8.3458	1.4489	1.0528	10.8475
	32R	2RT1	-	-	-	-	2.7819	0.4912	0.3509	3.6240	2.7819	0.4912	0.3509	3.6240
FCLP	14L	4LF1	0.2075	0.1018	0.0529	0.3622	2.5978	1.6261	0.9174	5.1413	2.8053	1.7279	0.9703	5.5035
	32L	2LF1	3.2513	1.5946	0.8294	5.6753	40.6983	25.4753	14.3720	80.5456	43.9496	27.0699	15.2014	86.2209
GCA Box	14L	4LG1	0.0213	0.0031	0.0026	0.0270	0.2099	0.0535	0.0530	0.3164	0.2312	0.0566	0.0556	0.3434
	14R	4RG1	0.0071	0.0010	0.0009	0.0090	0.0700	0.0178	0.0177	0.1055	0.0771	0.0188	0.0186	0.1145
	32L	2LG1	0.1324	0.0193	0.0164	0.1681	1.3058	0.3332	0.3300	1.9690	1.4382	0.3525	0.3464	2.1371
	32R	2RG1	0.0757	0.0111	0.0094	0.0962	0.7462	0.1904	0.1886	1.1252	0.8219	0.2015	0.1980	1.2214
Departure			7.6223	1.6727	-	9.2950	65.4518	14.1378	1.4318	81.0214	73.0741	15.8105	1.4318	90.3164
Straight-in Arrival (non-break)			1.1100	0.2223	0.1479	1.4802	9.3727	1.9507	1.4082	12.7316	10.4827	2.1730	1.5561	14.2118
Overhead Break Arrival			5.8243	1.1656	0.7757	7.7656	49.2059	10.2333	7.3899	66.8291	55.0302	11.3989	8.1656	74.5947
T&G			-	-	-	-	13.9097	2.4559	1.7546	18.1202	13.9097	2.4559	1.7546	18.1202
FCLP			3.4588	1.6964	0.8823	6.0375	43.2961	27.1014	15.2894	85.6869	46.7549	28.7978	16.1717	91.7244
GCA Box			0.2365	0.0345	0.0293	0.3003	2.3319	0.5949	0.5893	3.5161	2.5684	0.6294	0.6186	3.8164
Total			18.2519	4.7915	1.8352	24.8786	183.5681	56.4740	27.8632	267.9053	201.8200	61.2655	29.6984	292.7839

4.3 Maintenance Run-up Operations

The type and location of maintenance operations would not change in the Proposed scenario relative to the No Action scenario but the number of operations would change relative to the No Action scenario. Table 4-3 lists the run-up activity estimated for the Proposed scenario. The annual number of run-up events for legacy and Super Hornets was calculated by scaling the baseline run-up events by number of based aircraft in the proposed scenario.

Table 4-3 Annual Single Engine Maintenance Run-Up Events for Proposed Scenario

Aircraft	Location		Single Engine Operations						Duration (minutes)
	I.D.	Name	Annual Events	Day (0700 - 1900)	Evening (1900 - 2200)	Night (2200 - 0700)	Power Setting Reported	Power Setting Modeled	
F/A-18C/D Fleet	1H	In-Frame/Outdoor High Power	10	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	1L	In-Frame/Outdoor Low Power	311	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	2H	In-Frame/Outdoor High Power	5	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	2L	In-Frame/Outdoor Low Power	311	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	3H	In-Frame/Outdoor High Power	10	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	3L	In-Frame/Outdoor Low Power	311	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	4H	In-Frame/Outdoor High Power	5	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	4L	In-Frame/Outdoor Low Power	311	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
F/A-18C/D	TC1	Indoor Test Cell (404 Engine)	8	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5
	TC2	Indoor Test Cell (404 Engine)	8	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5

Note: While one engine is run through the test procedure the second engine will typically be online and at idle power

Table 4-3 Annual Single Engine Maintenance Run-Up Events for Proposed Scenario (concluded)

Aircraft	Location		Single Engine Operations						Duration (minutes)
	I.D.	Name	Annual Events	Day (0700 - 1900)	Evening (1900 - 2200)	Night (2200 - 0700)	Power Setting Reported	Power Setting Modeled	
F/A-18E/F Fleet	1H	In-Frame/Outdoor High Power	32	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	1L	In-Frame/Outdoor Low Power	2204	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	2H	In-Frame/Outdoor High Power	32	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	2L	In-Frame/Outdoor Low Power	2204	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	3H	In-Frame/Outdoor High Power	32	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	3L	In-Frame/Outdoor Low Power	2204	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	4H	In-Frame/Outdoor High Power	32	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	4L	In-Frame/Outdoor Low Power	2204	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
	5H	In-Frame/Outdoor High Power	75	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
F/A-18E/F FRS	5H	In-Frame/Outdoor High Power	60	10%	80%	10%	10–20 min. @ idle	63%	15
							1–2 min. Mil power	94%	1.5
							30 sec. Afterburner	95%	0.5
	5L	In-Frame/Outdoor Low Power	2088	10%	80%	10%	30 min. @ idle	63%	30
							7 min. @ 80%	80%	7
F/A-18E/F	TC1	Indoor Test Cell (404 Engine)	196	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5
	TC2	Indoor Test Cell (404 Engine)	196	26%	64%	0%	20 min. @ idle	63%	20
							30–40 min. Mil power	94%	35
							5 min. Afterburner	95%	5

Note: While one engine is run through the test procedure the second engine will typically be online and at idle power

4.4 Flight Demonstration Modeling

Demonstration flights would continue in the area west of Runway 32L unchanged relative to the No Action scenario.

4.5 Aircraft Noise Exposure

Using the data described in Sections 4.1 through 4-4, NOISEMAP Version 7 and MR NMAP Version 2 were used to calculate and plot the 60 dB through 85 dB CNEL contours for the proposed AAD operations for NAS Lemoore.

Consistent with the No Action scenario, grid point results (CNEL decibel values) from both models (NOISEMAP and MR_NMAP) were combined logarithmically within NMPlot (Wasmer 2006b) to calculate the overall aircraft noise exposure from airfield and demonstration operations. Figure 4-1 shows the CNEL contours colored in 5-decibel bands. Maximum off-station exposure would be less than 95 dB CNEL but greater than 90 dB CNEL adjacent to the western boundary of the NAS. The CNEL lobes north of the NAS would be primarily due to departure operations while other lobes would be due to GCA Box operations. Most on-station noise exposure would be due to T&G and FCLP operations. The effect of the demonstration operations is shown in the slight bulging of the CNEL contours west of the airfield.

Figure 4-2 compares 60 dB and 65 dB CNEL contours from No Action and Proposed scenarios. Overall, the contours of the Proposed scenario would be larger than the contours for the No Action scenario. This would be due to the increase in total Super Hornet operations of approximately 34,000 (32 percent) relative to the No Action scenario. The legacy Hornet operations would decrease by approximately 28,000 (71 percent) but this has only a very minimal impact on the noise contours because the Super Hornet is approximately 5 to 10 dB louder than the legacy Hornet on a single event basis.

The most significant increases (approximately 1 dB) in the proposed CNEL contours relative to No Action would occur at the departure lobe to the northeast of NAS. The increases in the departure lobes would be caused by the increase in Super Hornet departures. Super Hornet departure events would increase from approximately 21,000 in No Action to approximately 30,000, an increase of 44 percent. The noise exposure under the GCA pattern downwind area to the west of NAS would increase by almost 1 dB due to an increase in Super Hornet GCA pattern events of approximately 29 percent.

The fifteen POI in the vicinity of NAS Lemoore were analyzed for the proposed scenario and the results are shown in Table 4-4. In the proposed condition none of the fifteen locations would experience a CNEL greater than 65 dB. Only three locations (communities of Burrel and Lanare, and the Neutra Elementary School) would experience a CNEL greater than or equal to 60 dB. Eleven locations would experience an increase of up to 1 dB under the Proposed scenario relative to the No Action scenario. The increases are due to the increase in annual airfield operations by the Super Hornets.

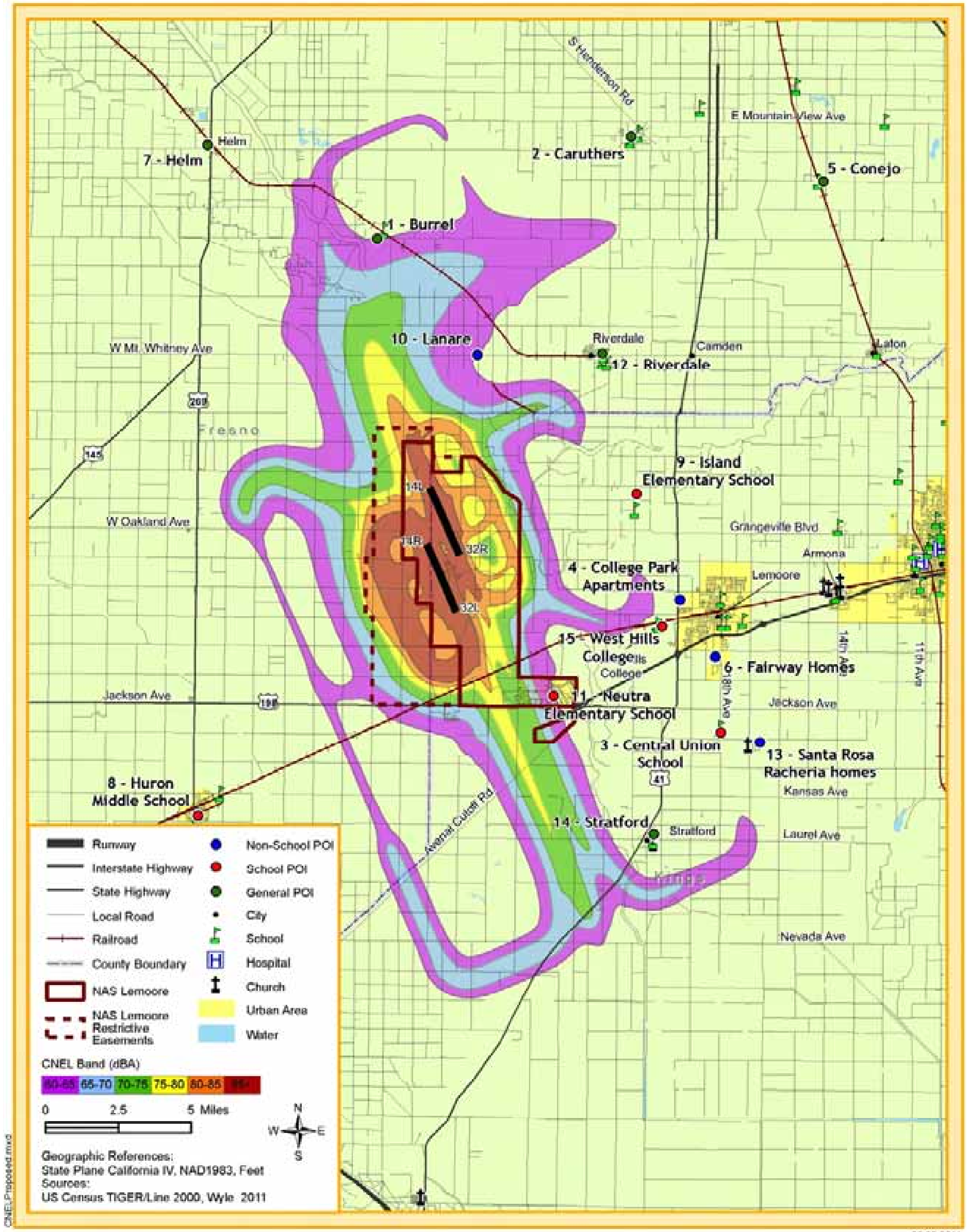

Figure 4-1 Bands of Aircraft CNEL for Proposed Average Daily Operations at NAS Lemoore

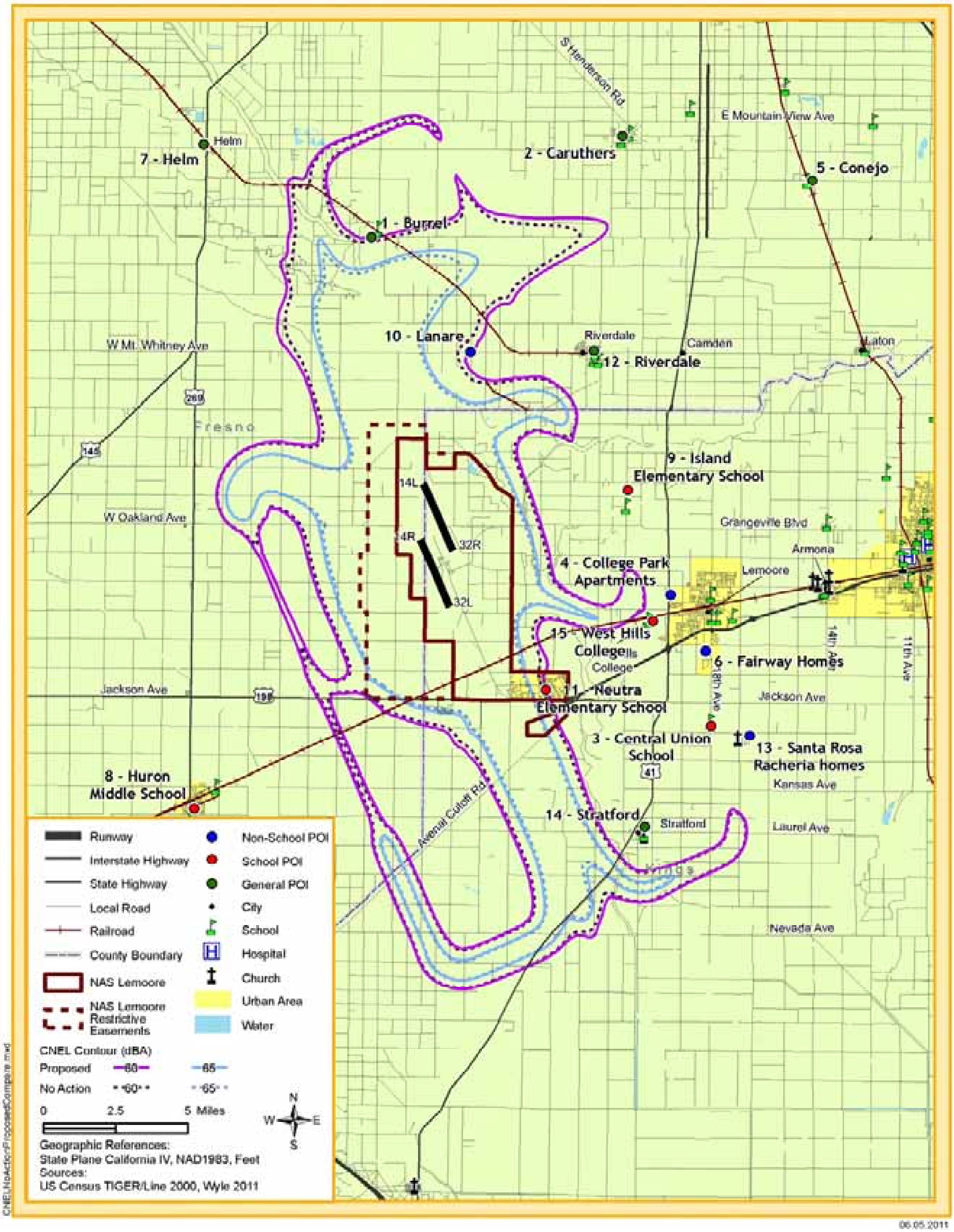

Figure 4-2 Comparison of No Action and Proposed CNEL Contours for Average Daily Aircraft Operations at NAS Lemoore

Table 4-4 Estimated Aircraft CNEL at Representative Points of Interest in the Vicinity of NAS Lemoore for Proposed Scenario

Point of Interest			CNEL (dBA)		
ID	Description	Type	No Action	Proposed	Change re No Action
1	Community of Burrel	School and Non-School	59	60	1
2	Community of Caruthers	School and Non-School	52	52	-
3	Central Union School	School	52	53	1
4	College Park Apartments	Non-School	49	50	1
5	Community of Conejo	School and Non-School	57	57	-
6	Fairway Homes at Lemoore Golf Course	Non-School	47	48	1
7	Community of Helm	School and Non-School	49	50	1
8	Huron Middle School	School	42	43	1
9	Island Elementary School	School	51	51	-
10	Community of Lanare	Non-School	59	60	1
11	Neutra Elementary School	School	59	60	1
12	Community of Riverdale	School and Non-School	50	50	-
13	Santa Rosa Racheria homes near Tachi Casino	Non-School	48	49	1
14	Community of Stratford	School and Non-School	49	50	1
15	West Hills College	School	57	58	1

4.6 Supplemental Noise Metrics and Analysis

Section 4.6.1 provides a brief summary of the results. Sections 4.6.2 and 4.6.3 discuss the residential speech interference and sleep disturbance analyses and results, respectively. Section 4.6.4 presents the results of the classroom speech analysis.

4.6.1 Introduction and Summary

The results of the analysis indicate speech interference and sleep disturbance effects are present in the Proposed scenario. The areas to the north of NAS in and around the communities of Lanare and Burrel would be the most affected in terms of potential speech interference and sleep disturbance effects due to Hornet departure events from Runway 32R. The Santa Rosa Racheria homes near the Tachi Casino and the Community of Stratford would also be affected in terms of the potential for sleep disturbance caused primarily by Super Hornet nighttime overhead break arrivals to Runway 32L. The results indicate that Burrel Elementary, Conejo School, and Neutra Elementary School would be affected in terms of the potential for classroom speech interference. At Burrel and Conejo, this would be due to departures from Runway 32R while the potential for classroom speech interference at Neutra would be primarily caused by non-break arrivals to Runway 32R due to the school's close proximity to the Runway 32R arrival path. Under the Proposed scenario the noise impacts at all points of interest would experience either no change or increase slightly due to the proposed action -- due to the relatively small increase in annual aircraft operations at the NAS by the Super Hornets.

4.6.2 Potential for Residential Speech Interference

Table 4-5 presents the results of the speech interference analysis for the Proposed Action for the 10 applicable residential sites. For the Proposed Action, 6 sites would have more than one speech interfering event per hour for windows open and 3 sites would have more than one speech interfering event per hour for windows closed. The interfering events would range from two to seven per hour with windows open and two to three per hour with windows closed. Three sites exceeding one event per hour for both windows open and windows closed would be the communities of Burrel, Conejo and Lanare. Although the proposed action would generate more annual aircraft operations at NAS, that increase would not be sufficient to generate a measurable change in indoor speech interference at any of the POI relative to the No Action scenario.

Table 4-5 Potential for Indoor Speech Interference for Applicable Points of Interest in the Vicinity of NAS Lemoore for Proposed Scenario

Point of Interest		Indoor Number of Events per Daytime/Evening Hour(1,2)					
		No Action		Proposed		Change re No Action	
ID	Description (All Residential)	Windows Open	Windows Closed	Windows Open	Windows Closed	Windows Open	Windows Closed
1	Community of Burrel	6	3	6	3	-	-
2	Community of Caruthers	4	-	4	-	-	-
4	College Park Apartments	-	-	-	-	-	-
5	Community of Conejo	4	2	4	2	-	-
6	Fairway Homes at Lemoore Golf Course	1	-	1	-	-	-
7	Community of Helm	1	-	1	-	-	-
10	Community of Lanare	7	3	7	3	-	-
12	Community of Riverdale	3	-	3	-	-	-
13	Santa Rosa Racheria homes near Tachi Casino	2	-	2	-	-	-
14	Community of Stratford	1	-	1	-	-	-
Number of Sites Exceeding 1 Intrusive Event per Hour		6	3	6	3		
Minimum Number of Intrusive Events per Hour if Exceeding 1		2	2	2	2		
Maximum Number of Intrusive Events per Hour if Exceeding 1		7	3	7	3		

(1) Number of Annual Average Daily CNEL Daytime and Evening (7am - 10pm) Events At or Above an Indoor Maximum (single-event) Sound Level (L_{max}) of 50 dB;
(2) NLRs of 15 dB and 25 dB for windows open and closed, respectively

4.6.3 Potential for Sleep Interference

Table 4-6 presents the results of the sleep disturbance analysis for the 10 applicable residential sites for the Proposed Action. The probability of awakening would range from 1 percent to 9 percent with windows open and would range from less than 1 percent to 5 percent with windows closed. The largest change under the Proposed Action relative the No Action would be an increase of 2 percent at the communities of Burrel and Stratford. Four additional locations would experience an increase of 1 percent relative to the No Action condition. The increase at Burrel would be due to the increase in Super Hornet departures on flight track 2RD4. The increase at Stratford would be caused by the increase in GCA pattern operations on flight track 2RG1 by the Super Hornets. All other POI would have a negligible change.

Table 4-6 Average Nightly (2200-0700) Probability of Awakening (%) for Representative Residential Receptors in the Vicinity of NAS Lemoore for Proposed Scenario

Point of Interest		No Action		Proposed		Change re No Action	
ID	Description (All Residential)	Windows Open	Windows Closed	Windows Open	Windows Closed	Windows Open	Windows Closed
1	Community of Burrel	4%	2%	6%	3%	2%	1%
2	Community of Caruthers	1%	-	1%	-	-	-
4	College Park Apartments	2%	-	2%	-	-	-
5	Community of Conejo	1%	-	2%	1%	1%	-
6	Fairway Homes at Lemoore Golf Course	2%	1%	2%	1%	-	-
7	Community of Helm	2%	1%	3%	1%	1%	-
10	Community of Lanare	8%	4%	9%	5%	1%	1%
12	Community of Riverdale	2%	-	2%	-	-	-
13	Santa Rosa Racheria homes near Tachi Casino	6%	3%	7%	4%	1%	1%
14	Community of Stratford	6%	2%	8%	2%	2%	-

Note: NLRs of 15 dB and 25 dB for windows open and closed, respectively

4.6.4 Potential for Classroom Disturbance

Table 4-7 contains the results of the classroom speech disturbance analysis for the applicable school sites. For the Proposed Action scenario, six schools would experience more than one interfering event per hour ranging from two to ten per hour with windows open and range from three to seven per hour with windows closed. Five of those six schools also exceed the indoor $L_{eq(9h)}$ criteria of 40 dB.

Of the considered schools, schools at which both the events per hour and the indoor $L_{eq(9h)}$ criteria are exceeded (with windows open) would be:

- Burrel Elementary School,
- Caruthers High School,
- Conejo School,
- Neutra Elementary School, and
- West Hill College.

None of the considered schools exceed both criteria with windows closed.

All locations would experience an increase in indoor $L_{eq(9h)}$ of two to three dB under the Proposed Action relative to No Action. Interfering events per hour would increase up to four dB for the proposed action. The increases in $L_{eq(9h)}$ and interfering events per hour would be due to the increase in the number of annual airfield operations at NAS by the Super Hornets.

Table 4-7 Potential for Indoor Classroom Speech Interference for Applicable School Locations in the Vicinity of NAS Lemoore for Proposed Scenario

Point of Interest		No Action					Prospective					Increase relative to No Action				
			Indoor[2]					Indoor[2]					Indoor[2]			
			Windows Open		Windows Closed			Windows Open		Windows Closed			Windows Open		Windows Closed	
ID	Description	Outdoor $L_{eq(9h)}$ (dB)	$L_{eq(9h)}$ (dB)	Events per Hour[1]	$L_{eq(9h)}$ (dB)	Events per Hour[1]	Outdoor $L_{eq(9h)}$ (dB)	$L_{eq(9h)}$ (dB)	Events per Hour[1]	$L_{eq(9h)}$ (dB)	Events per Hour[1]	Outdoor $L_{eq(9h)}$ (dB)	$L_{eq(9h)}$ (dB)	Events per Hour[1]	$L_{eq(9h)}$ (dB)	Events per Hour[1]
1	Burrel Elementary School	60	45	6	35	3	62	47	10	37	7	+3	+3	+4	+3	+4
2	Caruthers High School	53	38	4	28	-	55	40	7	30	1	+2	+2	+3	+2	+1
3	Central Union School	50	35	-	25	-	54	39	1	29	-	+3	+3	+1	+3	0
5	Conejo School	58	43	4	33	2	60	45	7	35	6	+3	+3	+3	+3	+4
7	Helm Elementary School	47	32	1	22	-	50	35	1	25	1	+3	+3	0	+3	+1
8	Huron Middle School	36	21	-	11	-	38	23	-	13	-	+2	+2	0	+2	0
9	Island Elementary School	49	34	-	24	-	53	38	1	28	1	+3	+3	+1	+3	+1
11	Neutra Elementary School	58	43	4	33	2	61	46	7	36	3	+3	+3	+3	+3	+1
12	Riverdale High School	49	34	3	24	-	52	37	6	27	-	+3	+3	+3	+3	0
14	Stratford Elementary School	47	32	1	22	-	50	35	2	25	-	+3	+3	+1	+3	0
15	West Hills College	54	39	-	29	-	57	42	1	32	-	+3	+3	+1	+3	0
Number of Sites Exceeding 1 Intrusive Event per Hour				5		3			6		3					
Minimum Number of Intrusive Events per Hour if Exceeding 1				3		2			2		3					
Maximum Number of Intrusive Events per Hour if Exceeding 1				6		3			10		7					

Note: Does not account for differences between weekday and weekend activity

(1) Number of Annual Average Daily Events per hour during 9 hour school day At or Above an Indoor Maximum (single-event) Sound Level (L_{max}) of 50 dB;

(2) NLRs of 15 dB and 25 dB for windows open and closed, respectively

References

ATAC 2010, Naval Air Station Lemoore *NASMOD Baseline Development and Alternatives Analysis of Navy F-35C Homebasing*. F-35 Homebasing NASMOD Analysis Final Report. ATAC Corporation, February 1, 2010

Benitez 2010. Electronic mail from Roman Benitez, NASL, to Patrick Kester, Wyle Laboratories, re "Final NAS Lemoore Data Validation Package"; Attachments "NASL Climedata 09.PDF.", "LemoreDataValidationSec5-BaselineFlightOps(fromAICUZ.xlsx", "LemooreATARs.xlsx" 12 August 2010.

Campe 2011a. Electronic mail from Jim Campe, TEC Inc., to Patrick Kester, Wyle Laboratories, re "Final ops validation"; Attachments "LemooreDataValidationSec5-2011014v2.xlsx." 1 January 2011.

Campe 2011b. Electronic mail from Jim Campe, TEC Inc., to Richard Keys, USFF and Patrick Kester, Wyle Laboratories, re "Lemoore" 17 January 2011.

Campe 2011c. Electronic mail from Jim Campe, TEC Inc., to Patrick Kester, Wyle Laboratories, re "SFREA DEA V1 comments" 26 April 2011.

Kester 2010. Electronic mail from Patrick Kester, Wyle Laboratories, to Roman Benitez, NASL re "Lemoore Data Validation Package"; Attachments "LemooreDataValidationSec1-GeneralAirfield.xlsx", "LemooreDataValidationSec3-ClimateData.xlsx", "LemooreDataValidationSec5-BaselineFligtOps(fromAICUZ).xlsx", "LemooreDataValidationSec6-BaselineMaintenanceRunups.xlsx." 10 October 2010.

Robusto 2011. Electronic mail from John Robusto, CNAL., to Richard Keys, USFF, Jim Campe, TEC inc., et. al., re "Data Validation Spreadsheet" 24 January 2011.United States Geological Survey, 2007. National Elevation Dataset (NED) 1 Arc Second. Available at http://seamless.usgs.gov/. Data retrieved October 9, 2007.

US Air Force 1996. Military Operating Area and Range Noise Model MR_NMAP User's Manual. Report AL/OE-1996-0001. June 1996.

US Geological Survey 2007. National Elevation Dataset (NED) 1 Arc Second. Available at http://seamless.usgs.gov/. Data retrieved October 9, 2007.

Wasmer. 2006a. "BaseOps 7.3 User's Guide". Fred Wasmer and Fiona Maunsell. Wasmer Consulting. 2006.

Wasmer 2006b. "NMPlot 4.955 User's Guide". Fred Wasmer and Fiona Maunsell. Wasmer Consulting, 2006.

Wyle 1998. Czech, Joseph J. and Plotkin, Kenneth J. Wyle Research Report WR 98-13, NMAP 7.0 User's Manual. Wyle Laboratories, Inc., November 1988.

Wyle 2009. Wyle Report WR 07-03, Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics, Guide to Using Supplemental Metrics, Wyle Laboratories, Inc., August 2009.

Wyle 2010. Czech, Joseph J. and Kester, Patrick H. Wyle Report WR 08-11, *Aircraft Noise Study for Naval Air Station Lemoore, California*. Wyle Laboratories, Inc., June 2010.

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APPENDIX A

Representative Flight Profiles for Modeled Aircraft Types

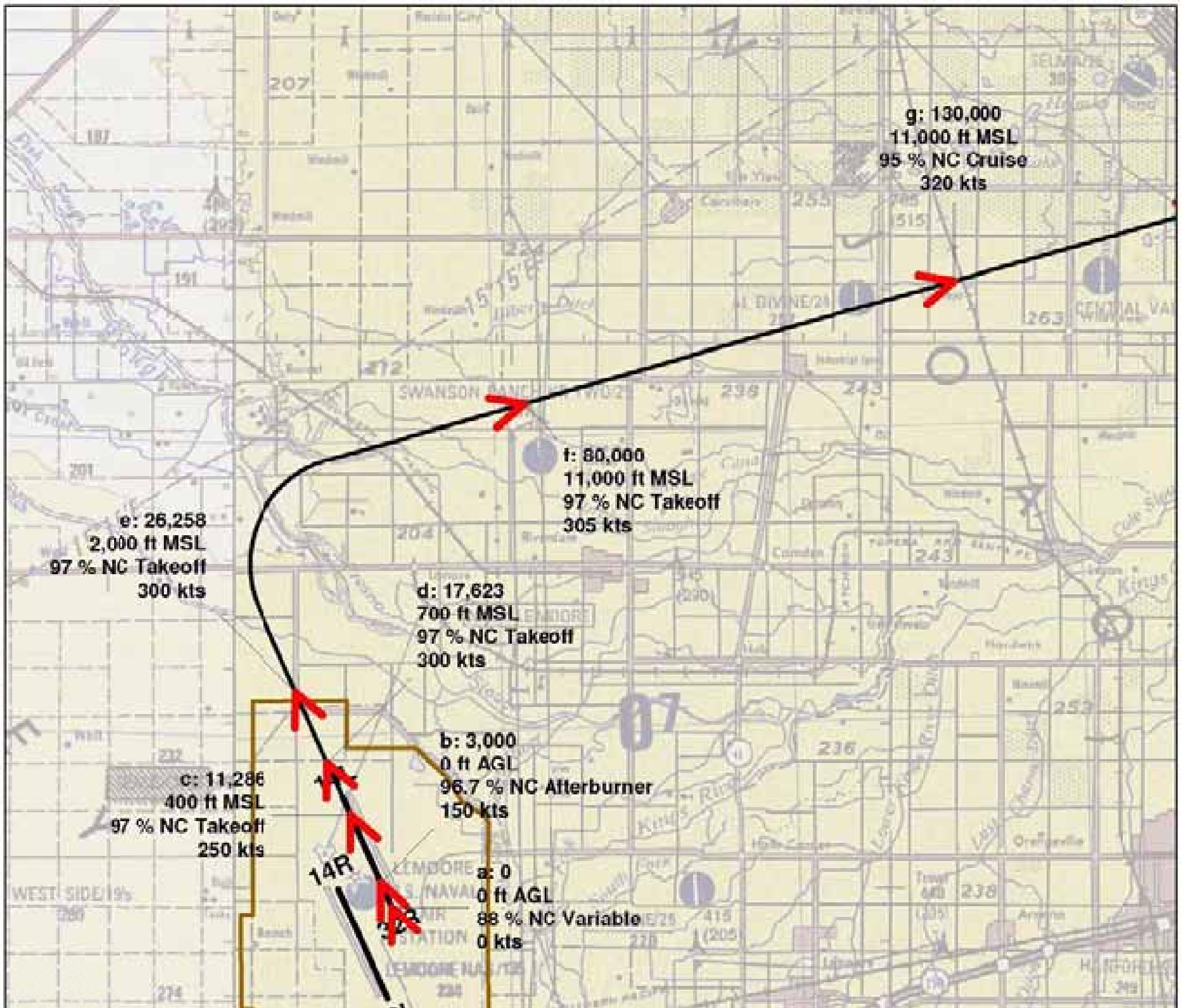
This appendix provides scaled plots of individual flight profiles for each modeled aircraft type. The background for each map is from the CAD Raster Graphics (CADRG) file NINM0914 (Ed. 9, February 2003) from the National Imagery Mapping Agency (NIMA).

The flight profiles are shown in the following order:

Profile Pages	**Aircraft**
A-3 - A-10	F/A-18C/D
A-11 - A-18	F/A-18E/F

Each figure includes a table describing the profile parameters of the associated flight track. The columns of the profile data tables are described below:

Column Heading	**Description**
Point	Sequence letter along flight track denoting change in flight parameters
Distance (feet)	Distance along flight track from runway threshold in feet
Height (feet)	Altitude of aircraft in feet Above Ground Level (AGL) or relative to Mean Sea Level (MSL); In this model, AGL reflects Altitude above Field Elevation (AFE); NAS Lemoore is located at 234 feet MSL
Power (Appropriate Unit)	Engine power setting and Drag Configuration/Interpolation Code (defines sets of interpolation code in NOISEMAP (F for FIXED, P for PARALLEL, V for VARIABLE))
Speed (kts)	Indicated airspeed of aircraft in knots



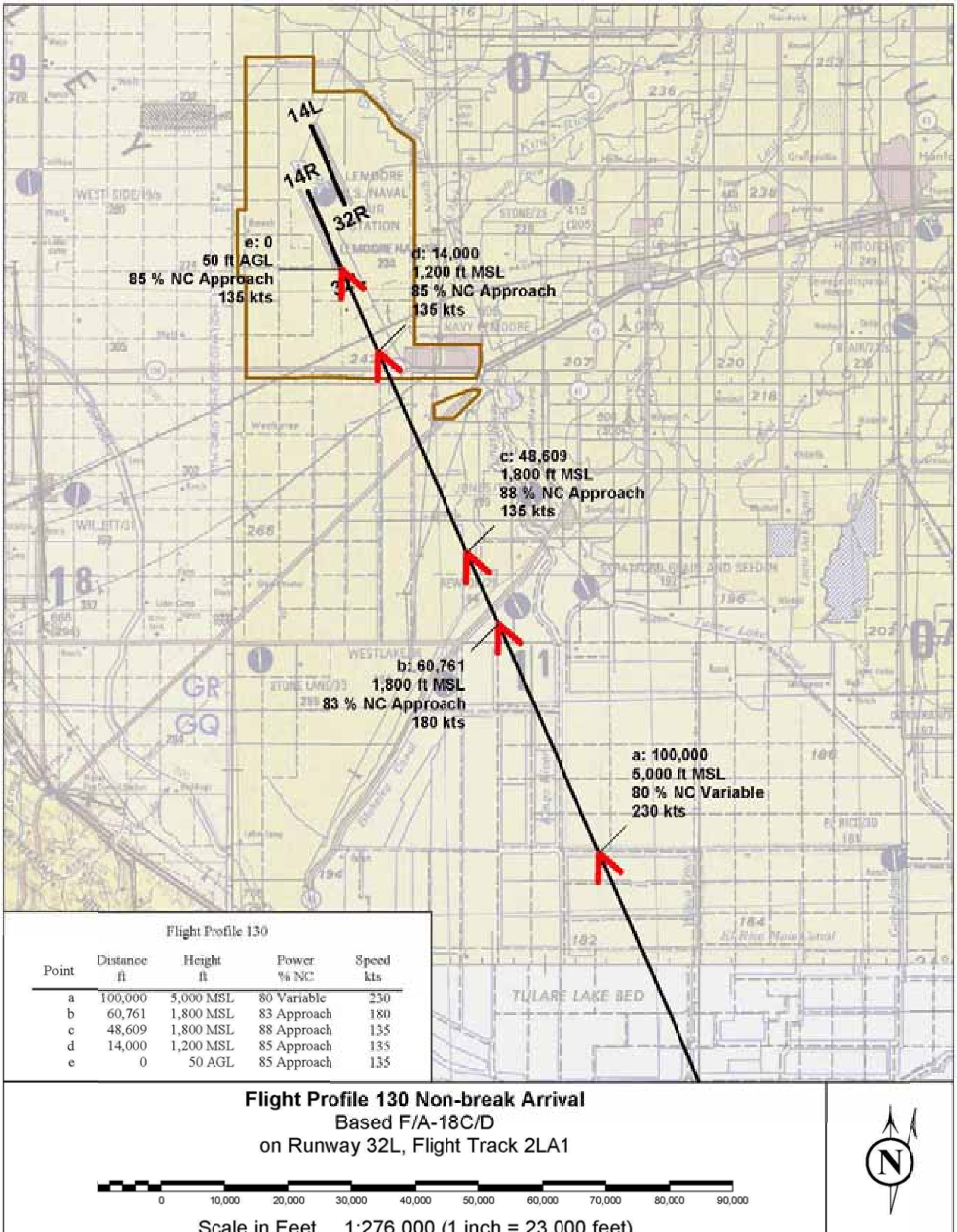
Flight Profile 106

Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	0	0 AGL	88 Variable	0	
b	3,000	0 AGL	96.7 Afterburner	150	rotate
c	11,286	400 MSL	97 Takeoff	250	
d	17,623	700 MSL	97 Takeoff	300	
e	26,258	2,000 MSL	97 Takeoff	300	
f	80,000	11,000 MSL	97 Takeoff	305	
g	130,000	11,000 MSL	95 Cruise	320	added pt at exit of MOA
h	160,000	15,000 MSL	95 Cruise	320	added extra pt for lengthened track; continued prev climb angle to 15k MSL
i	205,000	15,000 MSL	95 Cruise	320	added extra pt for lengthened track

Flight Profile 106 Departure
Based F/A-18C/D
on Runway 32R, Flight Track 2RD2
Prior to brake release, aircraft sits at 88 % NC Variable for 5 sec

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:242,000 (1 inch = 20,200 feet)

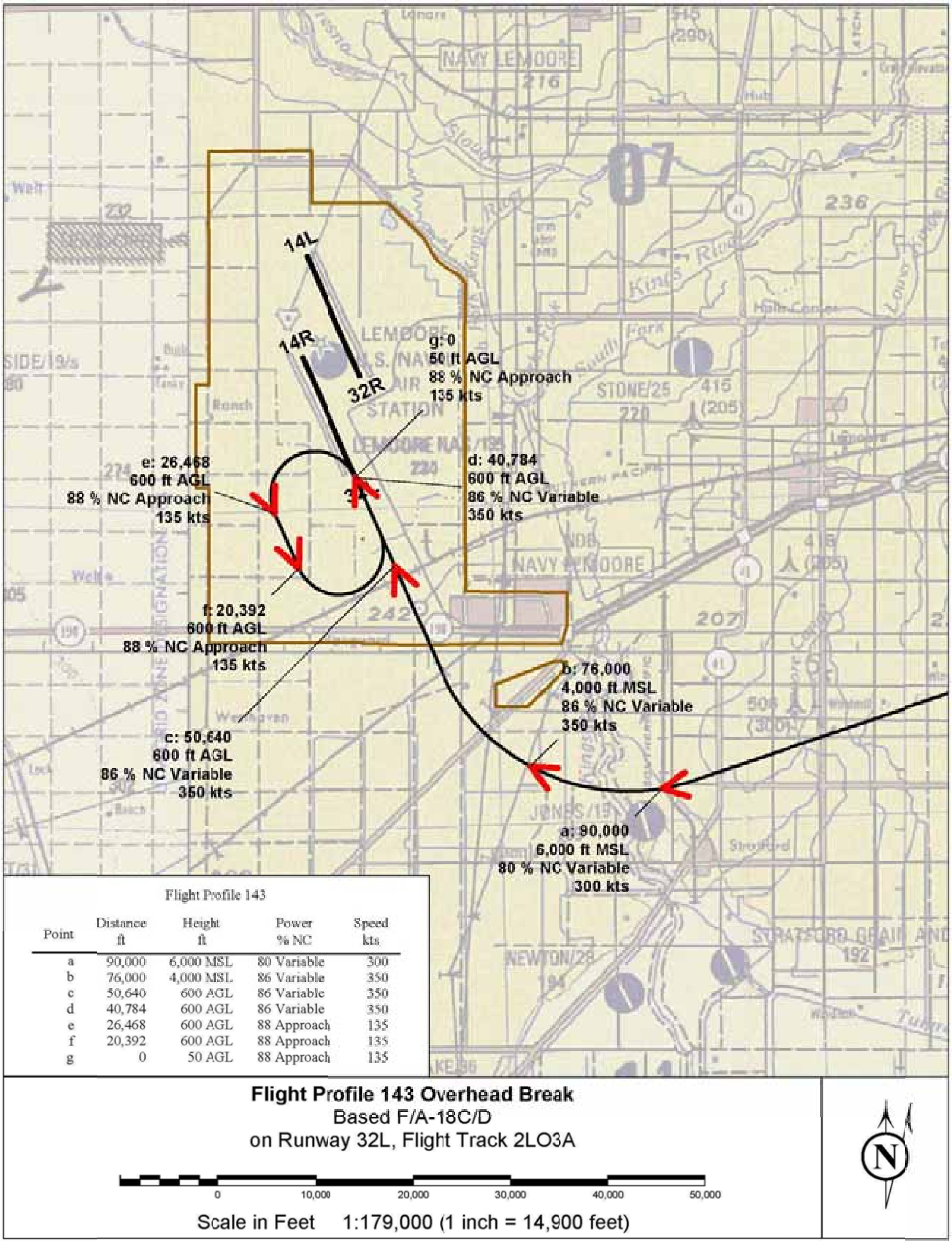


Flight Profile 130

Point	Distance ft	Height ft	Power % NC	Speed kts
a	100,000	5,000 MSL	80 Variable	230
b	60,761	1,800 MSL	83 Approach	180
c	48,609	1,800 MSL	88 Approach	135
d	14,000	1,200 MSL	85 Approach	135
e	0	50 AGL	85 Approach	135

Flight Profile 130 Non-break Arrival
Based F/A-18C/D
on Runway 32L, Flight Track 2LA1

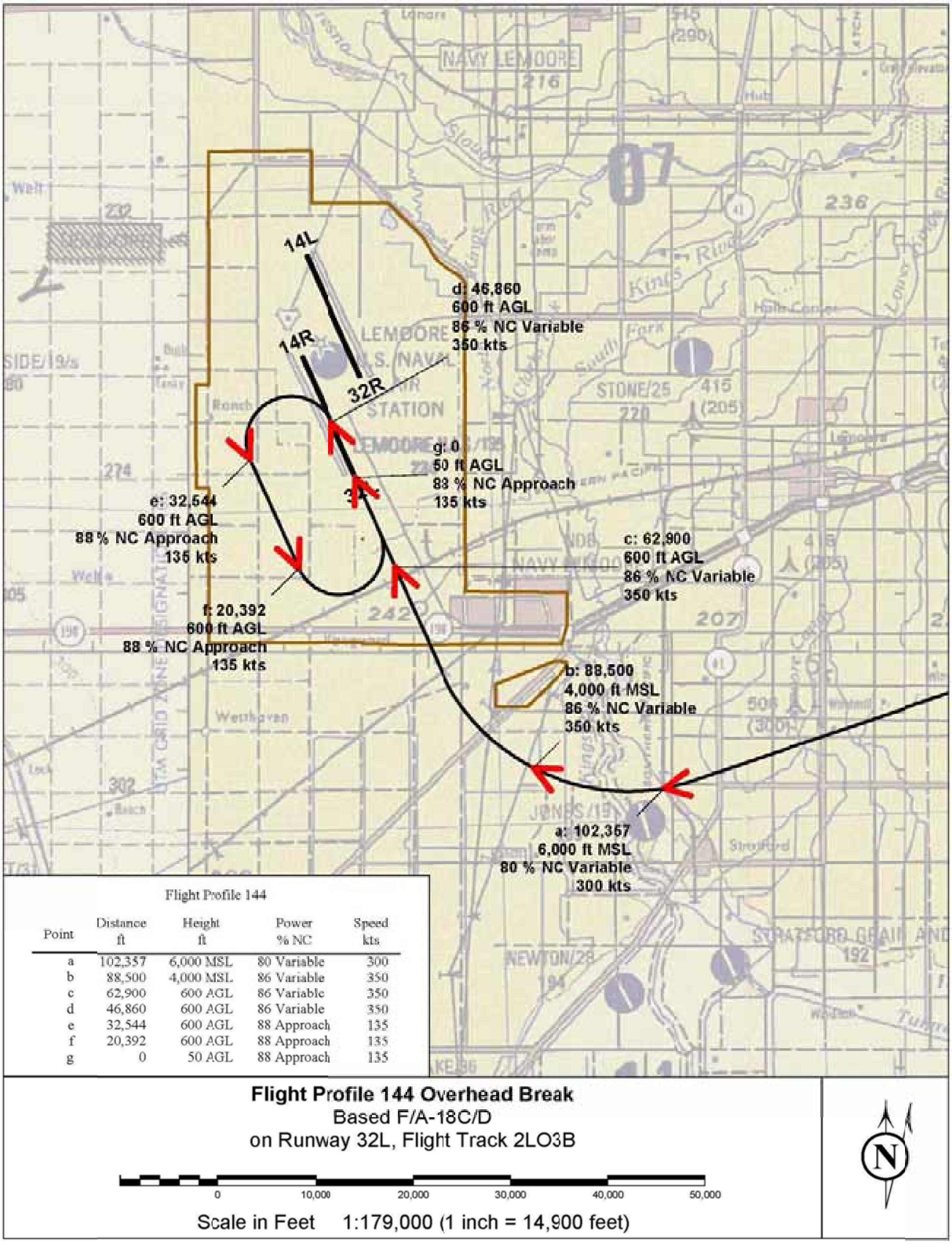
Scale in Feet 1:276,000 (1 inch = 23,000 feet)



Flight Profile 143

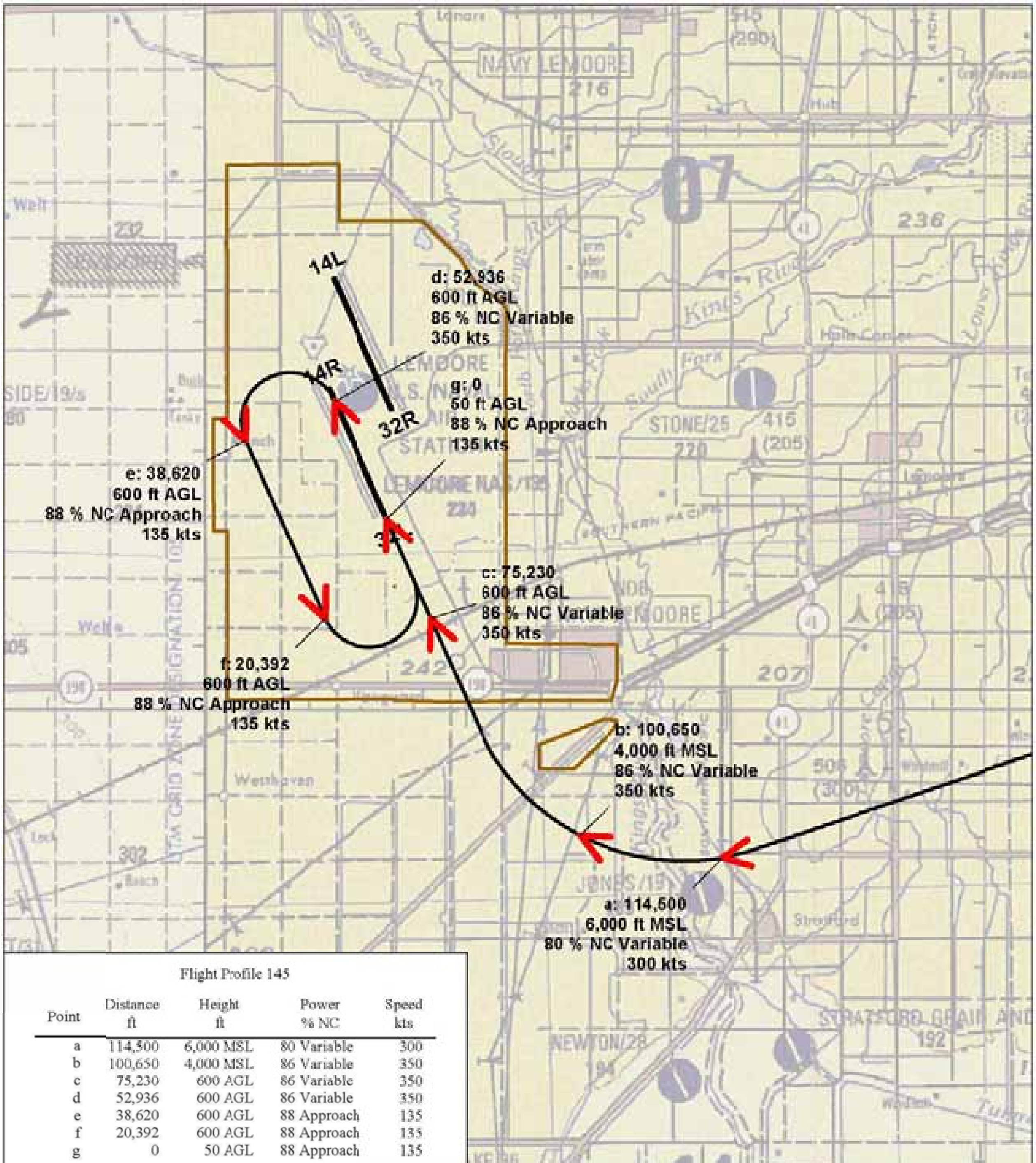
Point	Distance ft	Height ft	Power % NC	Speed kts
a	90,000	6,000 MSL	80 Variable	300
b	76,000	4,000 MSL	86 Variable	350
c	50,640	600 AGL	86 Variable	350
d	40,784	600 AGL	86 Variable	350
e	26,468	600 AGL	88 Approach	135
f	20,392	600 AGL	88 Approach	135
g	0	50 AGL	88 Approach	135

Flight Profile 143 Overhead Break
Based F/A-18C/D
on Runway 32L, Flight Track 2LO3A



Flight Profile 144

Point	Distance ft	Height ft	Power % NC	Speed kts
a	102,357	6,000 MSL	80 Variable	300
b	88,500	4,000 MSL	86 Variable	350
c	62,900	600 AGL	86 Variable	350
d	46,860	600 AGL	86 Variable	350
e	32,544	600 AGL	88 Approach	135
f	20,392	600 AGL	88 Approach	135
g	0	50 AGL	88 Approach	135



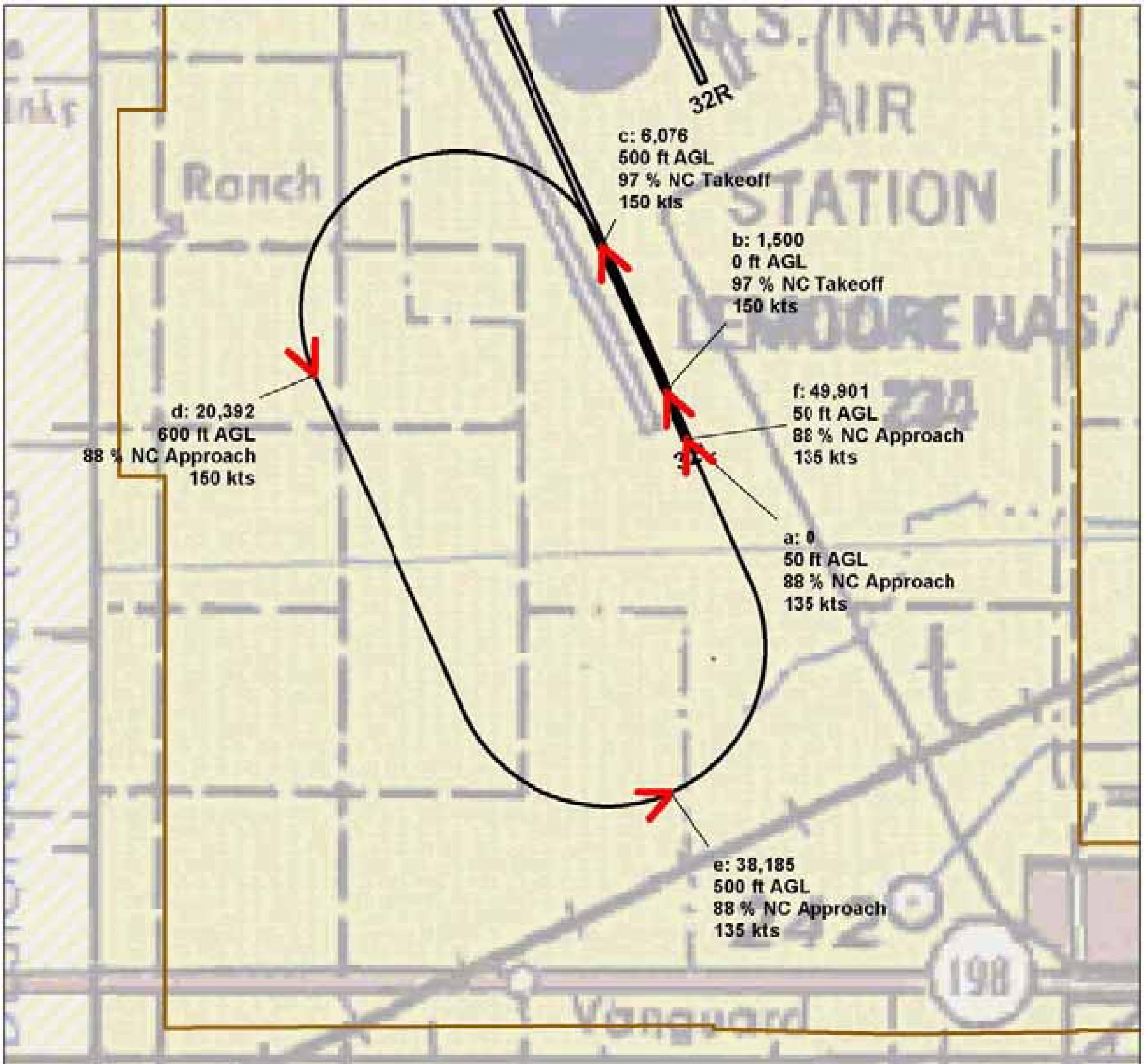
Flight Profile 145

Point	Distance ft	Height ft	Power % NC	Speed kts
a	114,500	6,000 MSL	80 Variable	300
b	100,650	4,000 MSL	86 Variable	350
c	75,230	600 AGL	86 Variable	350
d	52,936	600 AGL	86 Variable	350
e	38,620	600 AGL	88 Approach	135
f	20,392	600 AGL	88 Approach	135
g	0	50 AGL	88 Approach	135

Flight Profile 145 Overhead Break
Based F/A-18C/D
on Runway 32L, Flight Track 2LO3C

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:179,000 (1 inch = 14,900 feet)



Flight Profile 220

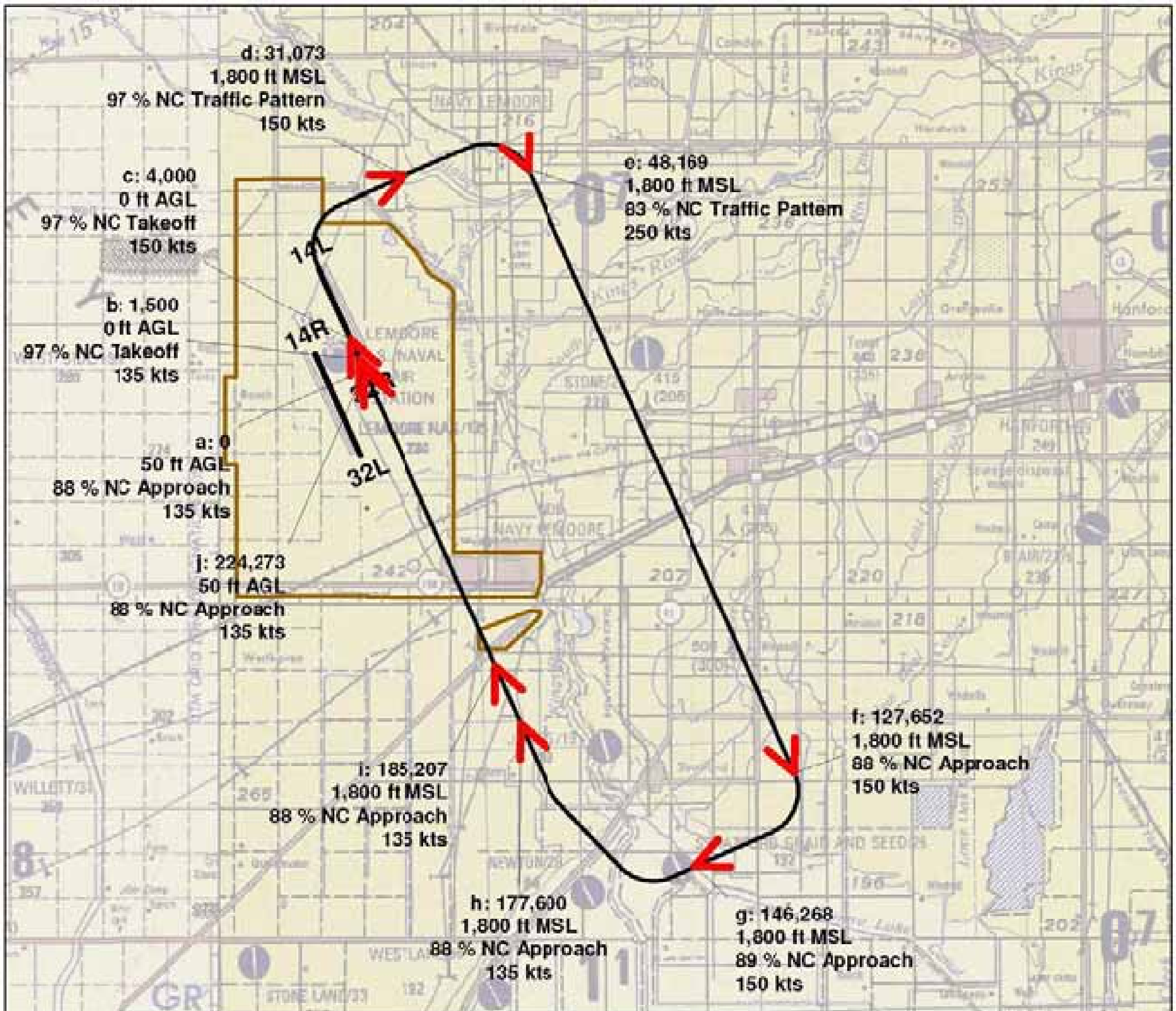
Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	0	50 AGL	88 Approach	135	
b	1,500	0 AGL	97 Takeoff	150	Using Takeoff due to extrapolation limits
c	6,076	500 AGL	97 Takeoff	150	Using Takeoff due to extrapolation limits
d	20,392	600 AGL	88 Approach	150	
e	38,185	500 AGL	88 Approach	135	
f	49,901	50 AGL	88 Approach	135	

Flight Profile 220 T&G
Based F/A-18C/D
on Runway 32L, Flight Track 2LT1

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:60,600 (1 inch = 5,050 feet)

N



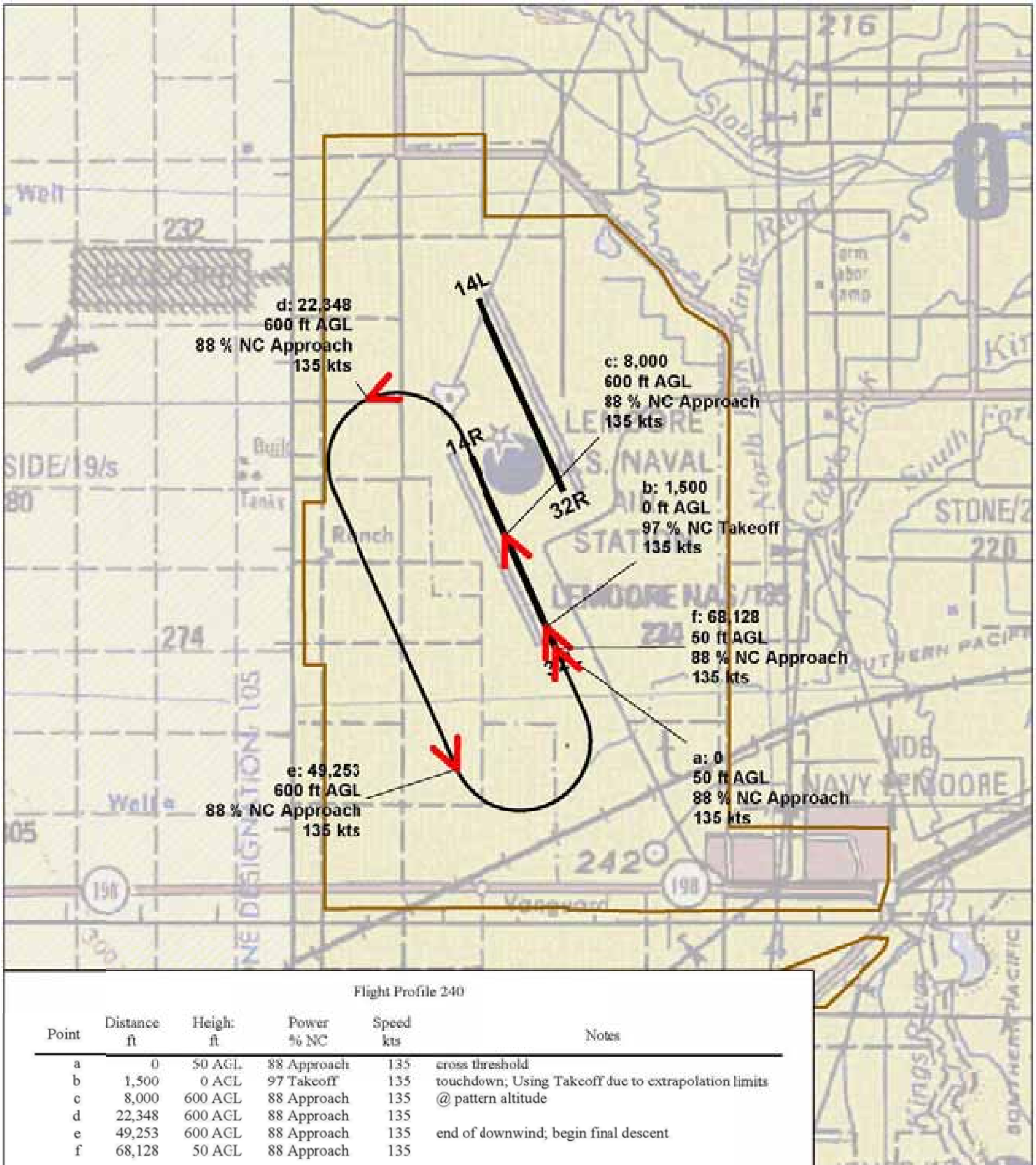
Flight Profile 231

Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	0	50 AGL	88 Approach	135	cross threshold
b	1,500	0 AGL	97 Takeoff	135	touchdown; Using Takeoff due to extrapolation limits
c	4,000	0 AGL	97 Takeoff	150	rotate and gear Up; Using Takeoff due to extrapolation limits
d	31,073	1,800 MSL	97 Traffic Pattern	150	@pattern altitude
e	48,169	1,800 MSL	83 Traffic Pattern	250	begin downwind
f	127,652	1,800 MSL	88 Approach	150	Gear Down; end downwind
g	146,268	1,800 MSL	89 Approach	150	Speed changed from 140 per AA
h	177,600	1,800 MSL	88 Approach	135	
i	185,207	1,800 MSL	88 Approach	135	begin final descent
j	224,273	50 AGL	88 Approach	135	

Flight Profile 231 GCA Box
Based F/A-18C/D
on Runway 32R, Flight Track 2RG1

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:261,000 (1 inch = 21,700 feet)



Flight Profile 240

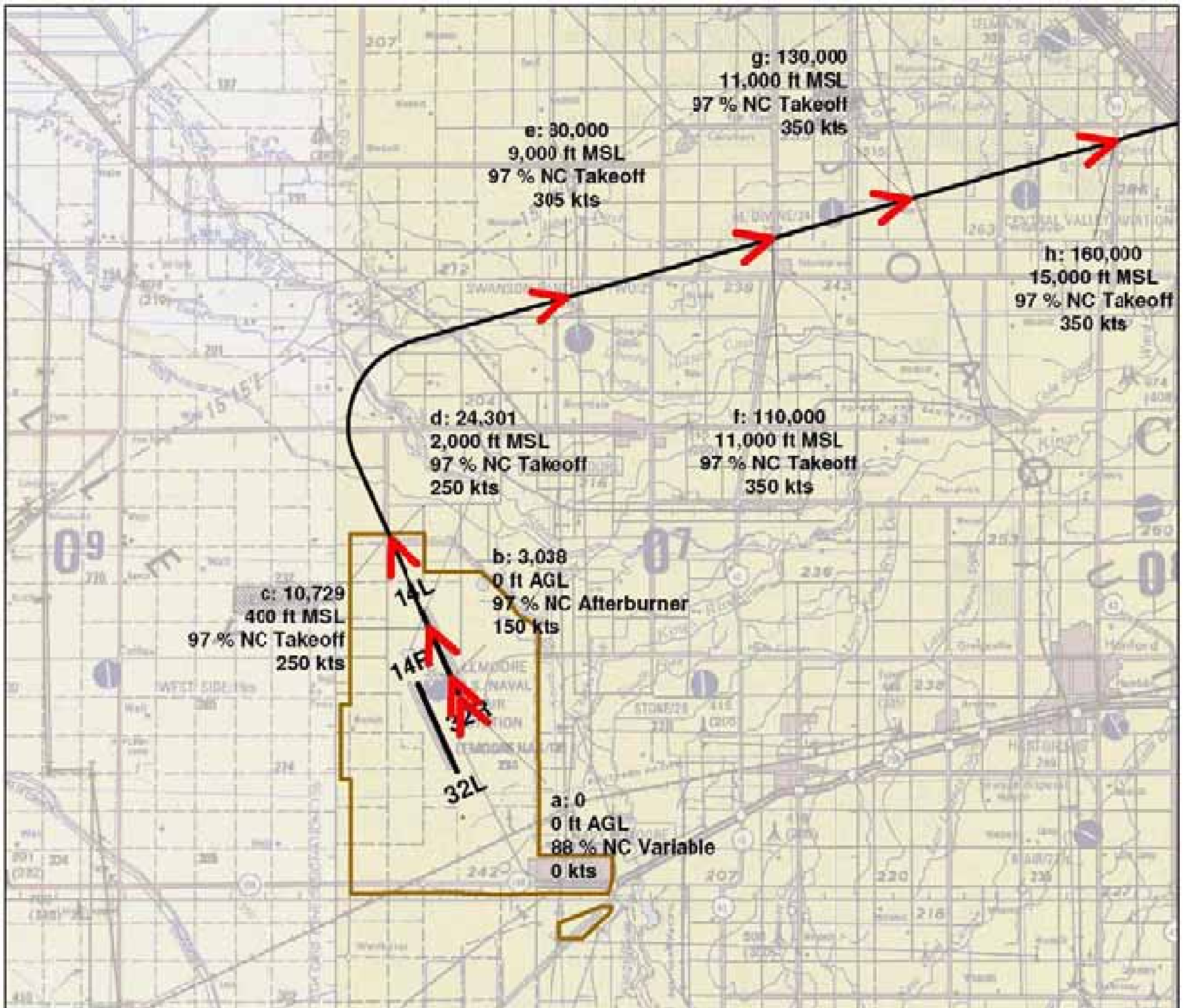
Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	0	50 AGL	88 Approach	135	cross threshold
b	1,500	0 AGL	97 Takeoff	135	touchdown; Using Takeoff due to extrapolation limits
c	8,000	600 AGL	88 Approach	135	@ pattern altitude
d	22,348	600 AGL	88 Approach	135	
e	49,253	600 AGL	88 Approach	135	end of downwind; begin final descent
f	68,128	50 AGL	88 Approach	135	

Flight Profile 240 FCLP
Based F/A-18C/D
on Runway 32L, Flight Track 2LF1

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:124,000 (1 inch = 10,300 feet)

N



Flight Profile 306

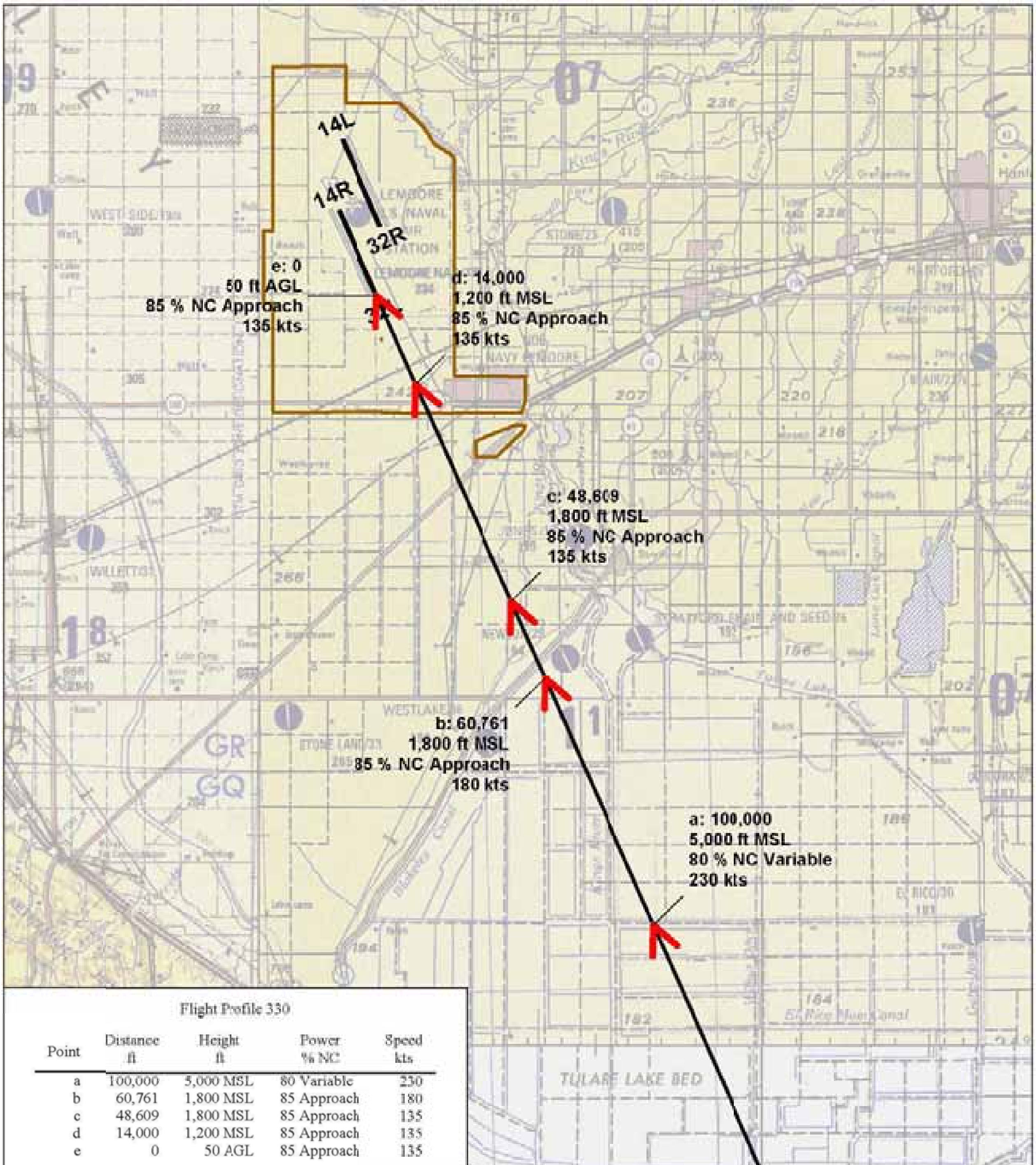
Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	0	0 AGL	88 Variable	0	
b	3,038	0 AGL	97 Afterburner	150	rotate
c	10,729	400 MSL	97 Takeoff	250	
d	24,301	2,000 MSL	97 Takeoff	250	
e	80,000	9,000 MSL	97 Takeoff	305	
f	110,000	11,000 MSL	97 Takeoff	350	
g	130,000	11,000 MSL	97 Takeoff	350	added pt at exit of MOA
h	160,000	15,000 MSL	97 Takeoff	350	added pt for lengthened track per AA; continued previous climb angle to 15K MSL
i	205,000	15,000 MSL	97 Takeoff	350	added pt for lengthened track per AA;

Flight Profile 306 Departure
Based F/A-18E/F
on Runway 32R, Flight Track 2RD2
Prior to brake release, aircraft sits at 88 % NC Variable for 5 sec

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000

Scale in Feet 1:304,000 (1 inch = 25,400 feet)

N

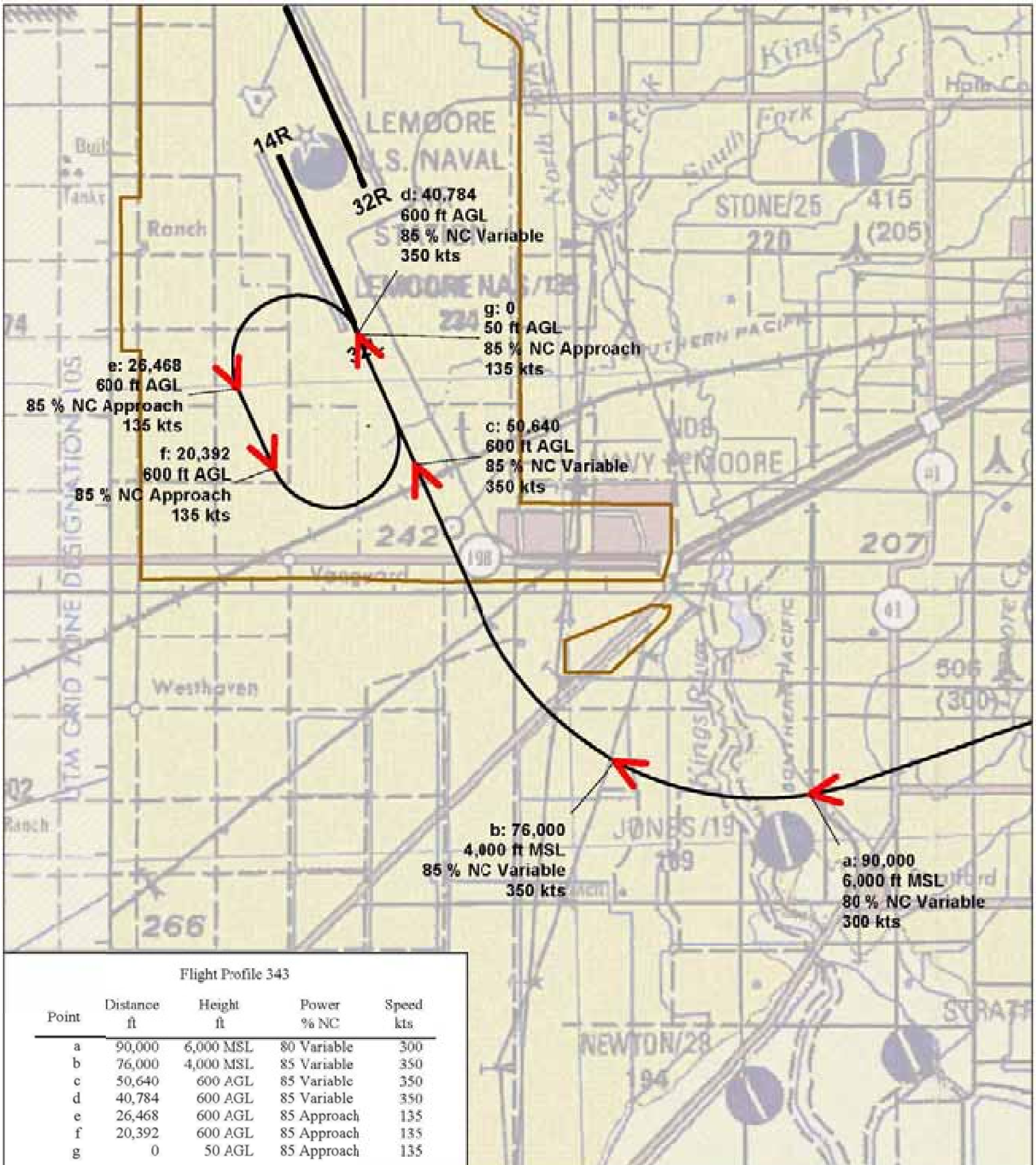


Flight Profile 330

Point	Distance ft	Height ft	Power % NC	Speed kts
a	100,000	5,000 MSL	80 Variable	230
b	60,761	1,800 MSL	85 Approach	180
c	48,609	1,800 MSL	85 Approach	135
d	14,000	1,200 MSL	85 Approach	135
e	0	50 AGL	85 Approach	135

Flight Profile 330 Non-break Arrival
Based F/A-18E/F
on Runway 32L, Flight Track 2LA1

Scale in Feet 1:277,000 (1 inch = 23,100 feet)



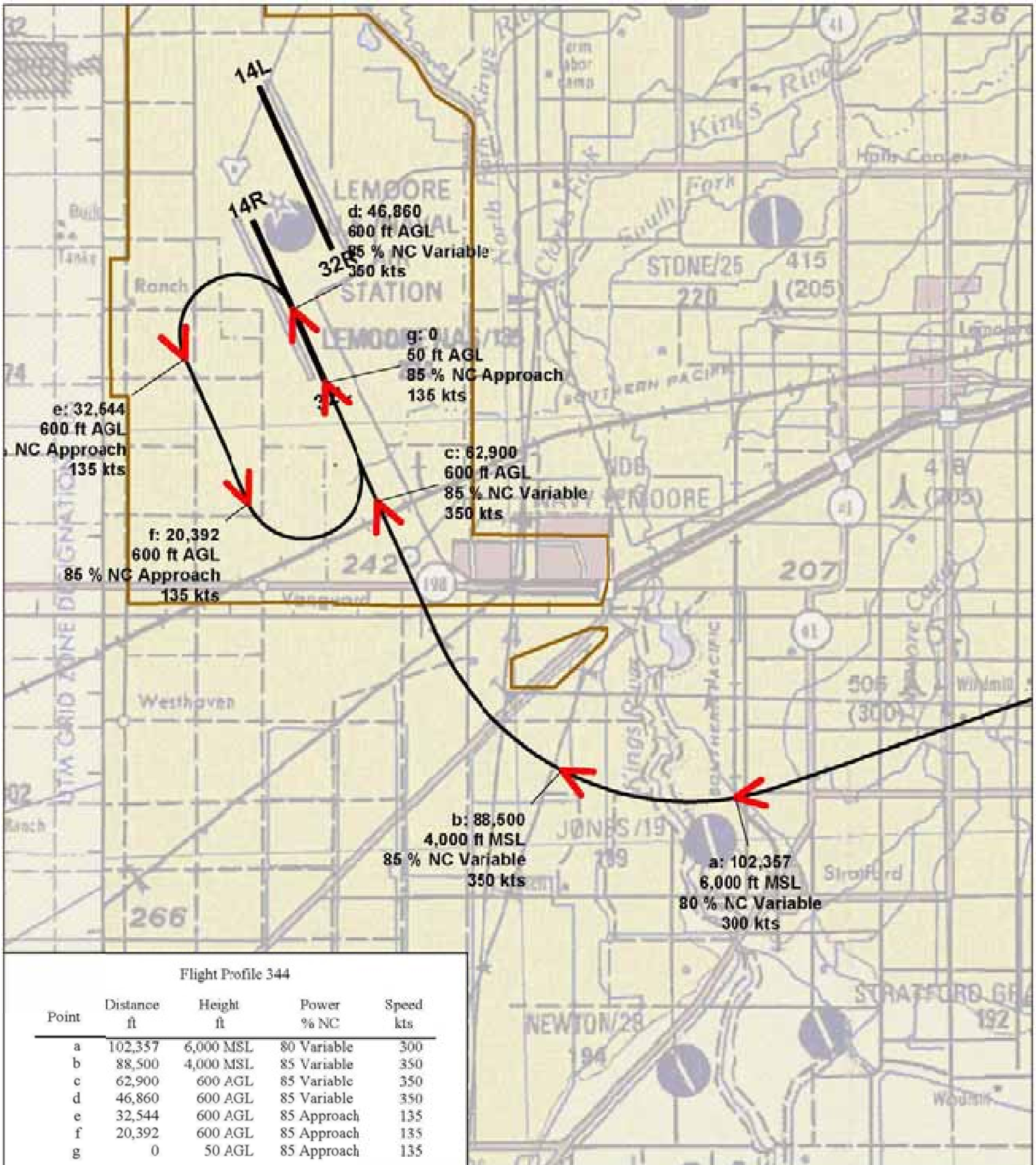
Flight Profile 343

Point	Distance ft	Height ft	Power % NC	Speed kts
a	90,000	6,000 MSL	80 Variable	300
b	76,000	4,000 MSL	85 Variable	350
c	50,640	600 AGL	85 Variable	350
d	40,784	600 AGL	85 Variable	350
e	26,468	600 AGL	85 Approach	135
f	20,392	600 AGL	85 Approach	135
g	0	50 AGL	85 Approach	135

Flight Profile 343 Overhead Break
Based F/A-18E/F
on Runway 32L, Flight Track 2LO3A

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40000 44,000

Scale in Feet 1:132,000 (1 inch = 11,000 feet)



Flight Profile 344

Point	Distance ft	Height ft	Power % NC	Speed kts
a	102,357	6,000 MSL	80 Variable	300
b	88,500	4,000 MSL	85 Variable	350
c	62,900	600 AGL	85 Variable	350
d	46,860	600 AGL	85 Variable	350
e	32,544	600 AGL	85 Approach	135
f	20,392	600 AGL	85 Approach	135
g	0	50 AGL	85 Approach	135

Flight Profile 344 Overhead Break
Based F/A-18E/F
on Runway 32L, Flight Track 2LO3B

Scale in Feet 1:146,000 (1 inch = 12,200 feet)

Flight Profile 345

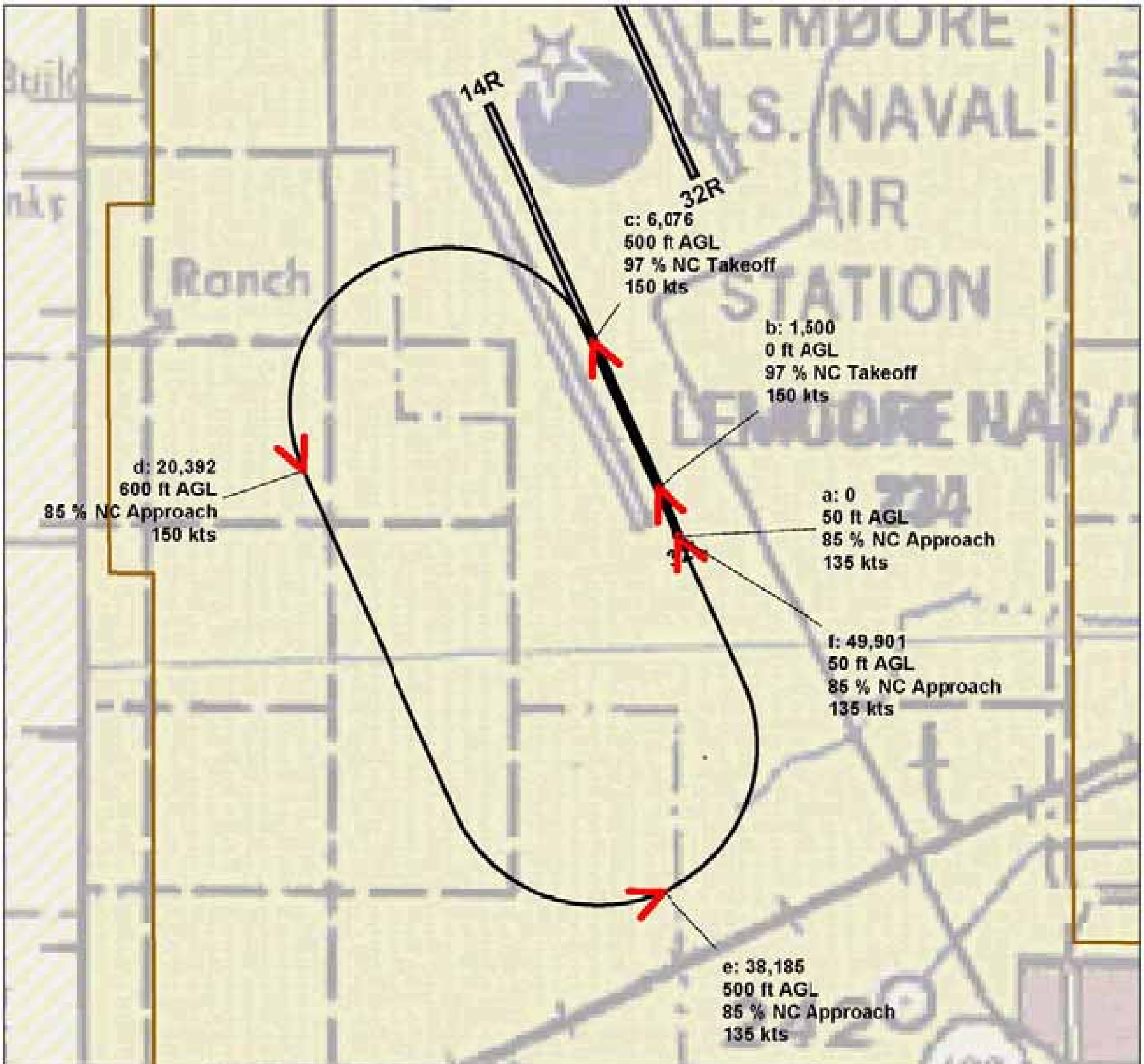
Point	Distance ft	Height ft	Power % NC	Speed kts
a	114,500	6,000 MSL	80 Variable	300
b	100,650	4,000 MSL	85 Variable	350
c	75,230	600 AGL	85 Variable	350
d	52,936	600 AGL	85 Variable	350
e	38,620	600 AGL	85 Approach	135
f	20,392	600 AGL	85 Approach	135
g	0	50 AGL	85 Approach	135

Flight Profile 345 Overhead Break
Based F/A-18E/F
on Runway 32L, Flight Track 2LO3C

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:114,000 (1 inch = 9,480 feet)

N

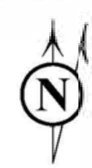


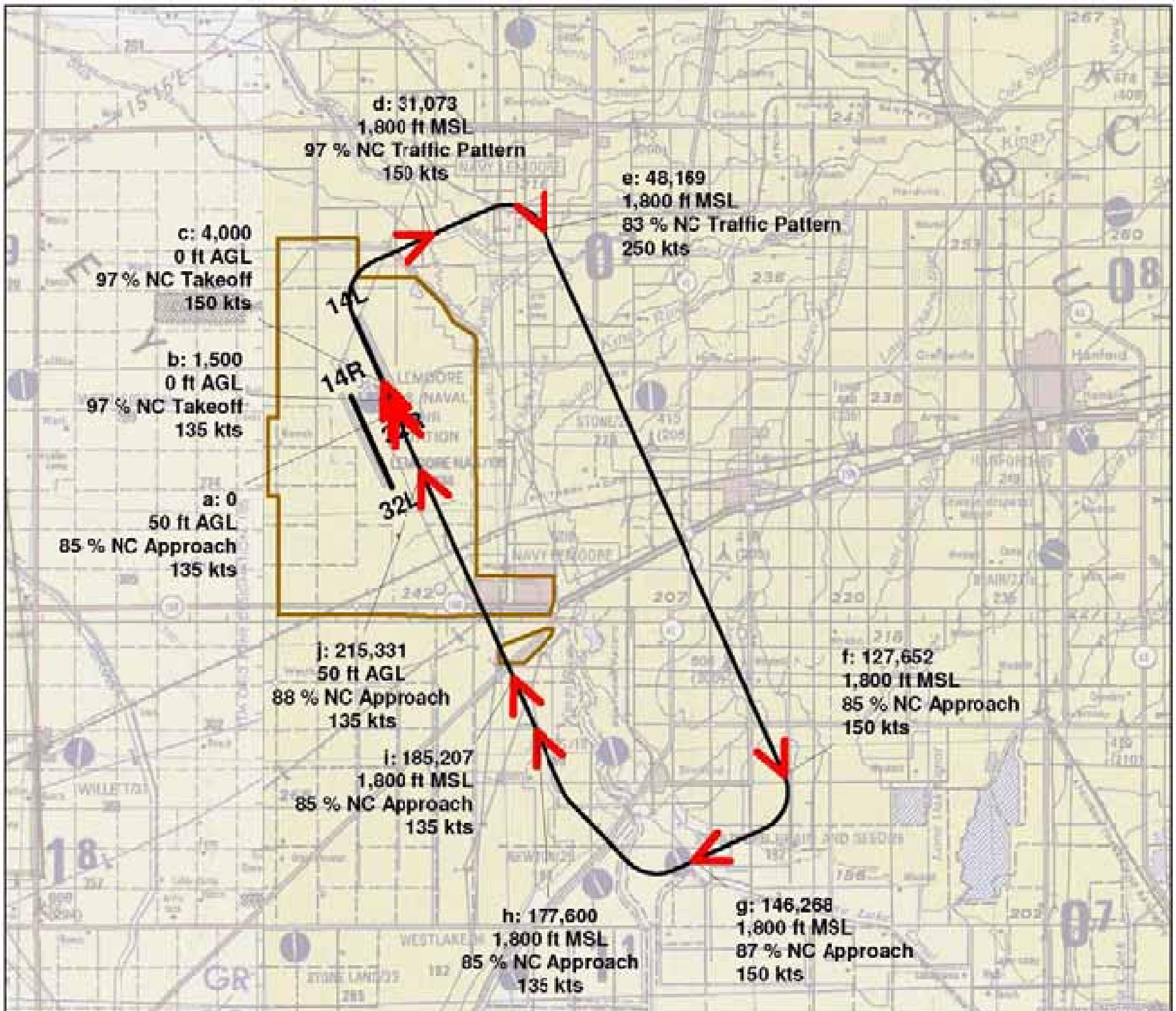
Flight Profile 420

Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	0	50 AGL	85 Approach	135	
b	1,500	0 AGL	97 Takeoff	150	Using Takeoff due to extrapolation limits
c	6,076	500 AGL	97 Takeoff	150	Using Takeoff due to extrapolation limits
d	20,392	600 AGL	85 Approach	150	
e	38,185	500 AGL	85 Approach	135	
f	49,901	50 AGL	85 Approach	135	

Flight Profile 420 T&G
Based F/A-18E/F
on Runway 32L, Flight Track 2LT1

Scale in Feet 1:60,200 (1 inch = 5,020 feet)



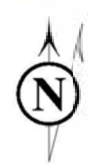


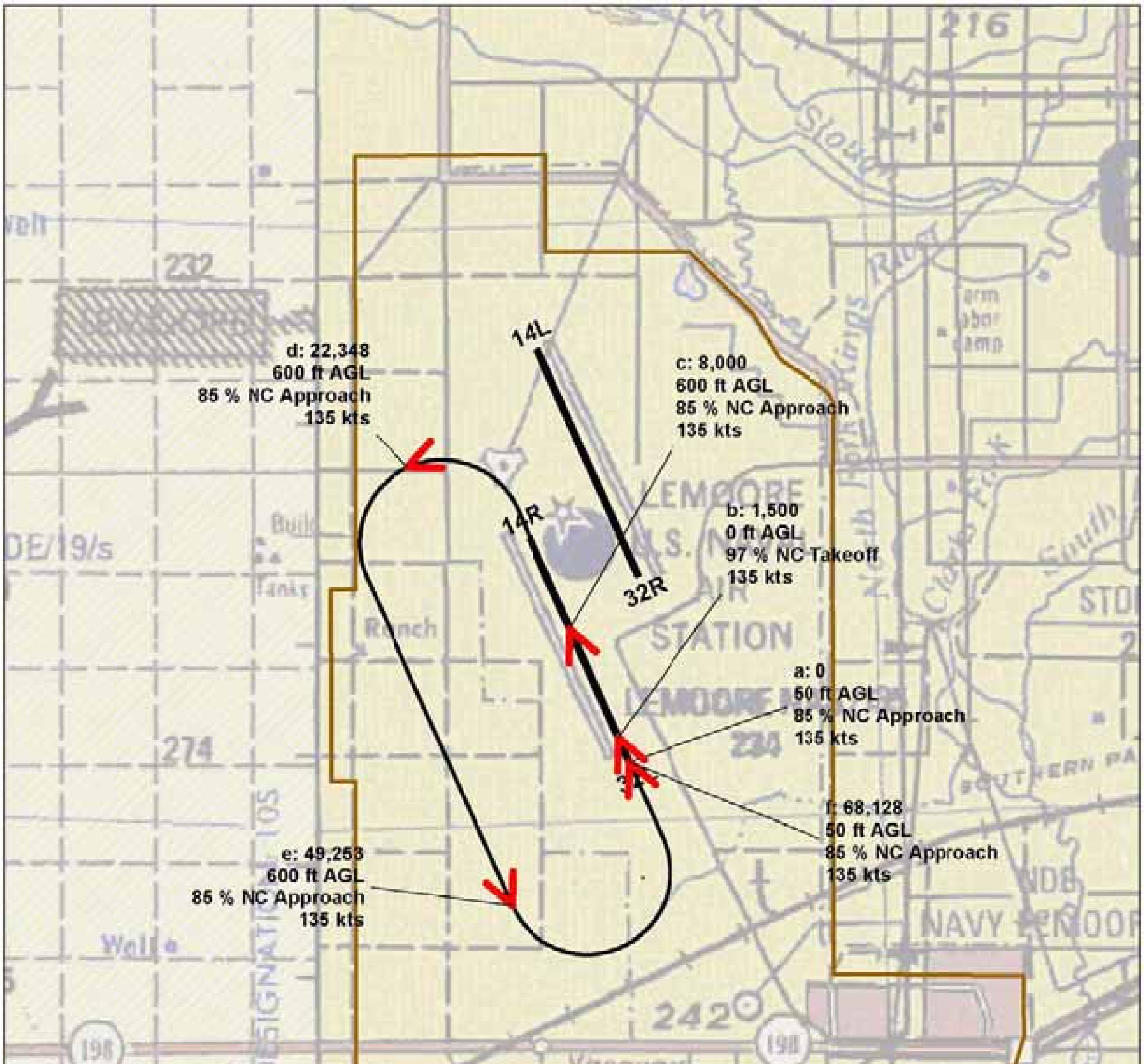
Flight Profile 431

Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	0	50 AGL	85 Approach	135	cross threshold
b	1,500	0 AGL	97 Takeoff	135	touchdown; Using Takeoff due to extrapolation limits
c	4,000	0 AGL	97 Takeoff	150	rotate & gear Up; Using Takeoff due to extrapolation limits
d	31,073	1,800 MSL	97 Traffic Pattern	150	@ pattern altitude
e	48,169	1,800 MSL	83 Traffic Pattern	250	begin downwind
f	127,652	1,800 MSL	85 Approach	150	Gear Down; end downwind
g	146,268	1,800 MSL	87 Approach	150	
h	177,600	1,800 MSL	85 Approach	135	
i	185,207	1,800 MSL	85 Approach	135	begin final descent
j	215,331	50 AGL	88 Approach	135	

Flight Profile 431 GCA Box
Based F/A-18E/F
on Runway 32R, Flight Track 2RG1

Scale in Feet 1:288,000 (1 inch = 24,000 feet)





Flight Profile 440

Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	0	50 AGL	85 Approach	135	cross threshold
b	1,500	0 AGL	97 Takeoff	135	touchdown; Using Takeoff due to extrapolation limits
c	8,000	600 AGL	85 Approach	135	@ pattern altitude
d	22,348	600 AGL	85 Approach	135	
e	49,253	600 AGL	85 Approach	135	end downwind; begin final descent
f	68,128	50 AGL	85 Approach	135	

Flight Profile 440 FCLP
Based F/A-18E/F
on Runway 32L, Flight Track 2LF1

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:116,000 (1 inch = 9,630 feet)

N