FINAL

ENVIRONMENTAL ASSESSMENT

ADDRESSING INSTALLATION DEVELOPMENT AND TRAINING

AT

FORT HUNTER LIGGETT, CALIFORNIA

MAY 2010

FINDING OF NO SIGNIFICANT IMPACT (FNSI)
FOR AN
ENVIRONMENTAL ASSESSMENT ADDRESSING
INSTALLATION DEVELOPMENT AND TRAINING AT FORT HUNTER LIGGETT, CALIFORNIA

Introduction

The United States Army Reserve Command (USARC) prepared an Environmental Assessment (EA) to identify and evaluate potential environmental effects associated with Installation Development and Training at Fort Hunter Liggett, California. The USARC prepared the EA in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (CEQ Regulations, 40 CFR Parts 1500-1508), and *Environmental Analysis of Army Actions* (32 CFR 651).

1. Description of Proposed Action and Alternatives

Proposed Action

The Proposed Action is to implement the approved *Fort Hunter Liggett Range Complex Master Plan* and the *Fort Hunter Liggett Real Property Master Plan* through the construction of cantonment area facilities, the improvement and construction of additional ranges, and the upgrade of tactical training base (TTB) facilities to meet U.S. Army standards for increasing maximum supportable annual training days from 750,000 to 1,500,000. Current urban planning areas, which are defined as those areas of Fort Hunter Liggett affected by multiple buildings, hardscape, or human use for extended periods of time, would increase from 639 acres to 1,220 acres. An additional 255 acres would be added to the existing cantonment area and 325 acres would be added to the current TTBs. Range development in the training areas would increase the current footprint from 800 acres to 1,040 acres. The total increase in development would decrease the non-developed portion of Fort Hunter Liggett from 99.1 percent to 98.6 percent.

The EA has been prepared using a constraints-based analysis. This approach enables a comprehensive evaluation of environmental concerns throughout the installation and also those concerns unique to specific areas of Fort Hunter Liggett. This analysis uses the information obtained from extensive recent NEPA evaluations for similar types of projects to determine the direct, indirect, and cumulative effects of projects that would be completed as part of the installation's development plans.

The projects analyzed in the EA are categorized as training infrastructure, range construction, cantonment area construction projects, and increased training. For the purposes of describing the specific types of projects included as the Proposed Action, representative projects from each of the categories are discussed. These representative projects provide examples of the various types of projects within each category; however, the total suite of projects that compose the Proposed Action are also briefly described and the total potential effects associated with implementation of each of the projects are evaluated in the EA. These projects have been selected for analysis in the EA because they are they are believed to be representative of the upper range of such projects and would have the highest potential to effect the natural and man-made environments, and therefore

are representative of the upper limits for potential effects that reasonably could be expected from the other projects in all three categories.

The EA addresses 15 training infrastructure projects, 9 range construction projects, 49 cantonment area construction projects, and an increase in training over the next 5 years to support future mission requirements and to comply with Anti-Terror/Force Protection criteria. Projects within these categories include primarily new facility construction and additions to existing facilities, but could also include renovations, repairs, and alterations. The construction of new training infrastructure, ranges, and cantonment area facilities would be zoned in accordance with appropriate land use areas in order to continue or enhance compatibility with currently designated land use areas. The EA identifies projects that would be representative of the types of training infrastructure, ranges, and cantonment area facilities proposed for development.

Alternatives Considered

In addition to the Proposed Action, the USARC analyzed a No Action Alternative. Under the No Action Alternative, the U.S. Army would not implement the projects proposed in the installation's community of plans. In general, implementation of the No Action Alternative would require that Fort Hunter Liggett continue to operate under substandard, inefficient, and, in some cases, unsafe conditions. Under the No Action Alternative, these deficiencies would impair Fort Hunter Liggett's future ability to successfully sustain current and future national security objectives and other mission requirements. Through implementation of the No Action Alternative, future installation development projects would continue to be evaluated for potential effects on an individual project basis. The preparation of separate NEPA documents would be required for each project to evaluate potential consequences. The No Action Alternative was carried forward and evaluated in detail in the EA.

2. Environmental Analysis

Based on the analysis contained in the EA, the USARC has determined that implementation of the approved Range Complex and Real Property Master Plans at Fort Hunter Liggett, and increase in training from the current 750,000 to 1,500,000 man-days, would not have any significantly adverse effects on the human or natural environments.

Implementation of the Proposed Action would result in resource impacts. Resources that could be adversely affected by the Proposed Action include airspace management and safety, land use, air quality, biological resources (including wetlands), threatened and endangered species, cultural resources, hazardous materials and waste, traffic and transportation systems, and health and safety. In all instances, effects on these resources are expected to be negligible to minor in significance, provided all installation plans, policies, procedures and mitigation measures identified within are adhered to. Noise, geological resources, water resources (including surface water, floodplains, and groundwater), and infrastructure could have impacts of minor to moderate significance but they would be short-term in duration and would be minimized through adherence to installation plans, policies, and procedures. Beneficial effects on socioeconomics would be expected, and long-term beneficial effects would result from upgrades to the cantonment area storm water system upgrade/expansion and infrastructure upon completion.

Mitigation

Some mitigation measures and best management practices would be implemented to ensure that potentially significant effects be reduced to less-than-significant levels. Procedures identified to minimize any impacts are identified in the EA and are summarized as follows:

- Future construction will not be sited on identified hazardous materials contamination sites without appropriate planning to protect human health and prevent pollutant migration.
- Fort Hunter Liggett would comply with the terms and conditions of the Programmatic Biological Opinion for Fort Hunter Liggett issued by the U.S. Fish and Wildlife Service in 2007, or as revised. The San Antonio River and other waterways would be protected from adverse effects on storm water runoff from the Cantonment area and other development sites to the maximum extent feasible. This would be achieved through continued compliance with the Clean Water Act (CWA) for construction and industrial activities, and Energy Independence and Security Act (EISA) Section 438 to address hydrology. As appropriate, Fort Hunter Liggett would use storm water catchments, permeable pavement, oil/water separators, or other applicable technologies for new development, and would review existing development sites for feasibility of adding these technologies. A riverine monitoring program would be developed and implemented for the San Antonio and Nacimiento Rivers to monitor at minimum three sites from each river on at minimum a quarterly basis for water quality parameters, such as pH, dissolved oxygen, and other measures.
- Storm water compliance would be included as an Environmental Management Action Plan as part of the federally mandated Environmental Management System to document and monitor success criteria. Fort Hunter Liggett would develop and implement an installation policy and standard operating procedure outlining installation procedures and responsibilities to comply with construction storm water requirements. Fort Hunter Liggett would develop and implement a drip-pan policy and inspection procedure.
- The installation Master Plan would include Cantonment area storm water system considerations to address future development needs.

3. Regulations

The Proposed Action would not violate any Federal, state, or local environmental regulations.

4. Commitment to Implementation

The USARC affirms its commitment to implement the EA in accordance with NEPA. Implementation is dependent on funding. The USARC Environmental Program and Training Division will ensure that adequate funds are requested in future years' budgets to achieve the goals and objectives set forth in the EA.

5. Public Review and Comment

The Draft EA was made available for public review and comment from 3 March 2010 to 2 April 2010.

The Draft EA and Draft FNSI were available for public review and comment for 30 days following publication of the public notice. Review locations were listed in the public notice. Copies could be obtained by mail, and written comments for Fort Hunter Liggett could be submitted to Liz Clark, Fort Hunter Liggett Environmental Office, P.O. Box 7090, Fort Hunter Liggett, CA 93928-7090, or email at liz.r.clark@us.army.mil.

6. Finding of No Significant Impact

After careful review of the EA, I have concluded that implementation of the Proposed Action would not generate significant controversy or have a significant impact on the quality of the human or natural environment. This analysis fulfills the requirements of NEPA and the CEQ Regulations. An Environmental Impact Statement will not be prepared, and the USARC is issuing this Finding of No Significant Impact.

2 JUNE 2010

James M. Suriano
Colonel, US Army
Commanding

Date

FINAL

ENVIRONMENTAL ASSESSMENT
ADDRESSING
INSTALLATION DEVELOPMENT AND TRAINING
AT
FORT HUNTER LIGGETT, CALIFORNIA

MAY 2010

COVER SHEET

FINAL ENVIRONMENTAL ASSESSMENT ADDRESSING INSTALLATION DEVELOPMENT AND TRAINING AT FORT HUNTER LIGGETT, CALIFORNIA

Responsible Agencies: U.S. Army Reserve Command (USARC), Fort Hunter Liggett, California, and U.S. Army Corps of Engineers, Kansas City District.

Affected Location: Fort Hunter Liggett (FHL), California.

Proposed Action: Environmental Assessment (EA) to address the potential environmental effects of implementation of the Range Complex and Real Property Master Plans for the U.S. Army Reserve Combat Support Training Center FHL, California, and associated increased training.

Report Designation: Final Environmental Assessment.

Abstract: The Headquarters Command of U.S. Army Garrison Fort Hunter Liggett (FHL) believe a comprehensive National Environmental Policy Act (NEPA) document would improve the continuing activity of installation development and training and facilitate the NEPA compliance process. As a result, FHL is preparing an EA that addresses the potential environmental effects of implementing all projects found in the Range Complex Master Plan and Real Property Master Plan for the U.S. Army Garrison FHL that are identified for the next 5 years. Also addressed are the associated increases in training. Since the establishment of FHL, as with many other U.S. Army installations, development of the installation has continuously occurred. Every year in the history of the installation, structures have been demolished, new facilities constructed, and infrastructure upgraded. This document constitutes an Installation Development and Training EA. The intent of this EA is to address the Proposed Action of implementing installation development actions as found in the community of all existing approved plans on FHL. This EA will help facilitate efforts to coordinate land use planning and infrastructure projects, expedite project execution by using early planning, and encourage agency coordination. In addition to evaluating the projects as described in this EA, the document will serve as a baseline for future environmental analysis of mission and training requirements.

Through this EA, FHL provides a constraints-based environmental effects analysis of installation development actions projected over the next 5 years. A constraints approach enables FHL to evaluate environmental concerns that exist throughout the installation and those unique to specific areas of the installation. The analysis draws from the knowledge gained from extensive recent evaluations for similar types of projects to determine the direct, indirect, and cumulative effects of projects that would be completed as part of the installation's development.

This EA has been prepared to evaluate the Proposed Action, alternatives to the Proposed Action, and the No Action Alternative. Areas that are considered in the effects analysis include airspace management and safety, noise, land use, air quality, geological resources, water resources, biological resources, threatened and endangered species, cultural resources, socioeconomics and environmental justice, traffic and transportation systems, infrastructure, hazardous materials and wastes, and health and safety. This EA will be made available to the public upon completion.

PRIVACY ADVISORY

Your comments on this document are welcome. Letters or other written comments provided to the proponent concerning this document may be published in this EA. Comments will normally be addressed in this EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of this EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of this EA. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and phone numbers will not be published in this EA.

FINAL
ENVIRONMENTAL ASSESSMENT
ADDRESSING INSTALLATION DEVELOPMENT AND TRAINING
AT FORT HUNTER LIGGETT, CALIFORNIA

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EXECUTIVE SUMMARY

The Headquarters Command of U.S. Army Garrison Fort Hunter Liggett (FHL) believes a comprehensive National Environmental Policy Act (NEPA) document would improve the continuing activity of installation development and training and facilitate the NEPA compliance process. As a result, FHL has prepared an Environmental Assessment (EA) that addresses the potential environmental effects of implementing all projects found in the *Fort Hunter Liggett Range Complex Master Plan* (FHL undated) and *Fort Hunter Liggett Real Property Master Plan* (FHL 2007a) for the U.S. Army Garrison FHL that are identified for the next 5 years. Also addressed are the associated increases in training.

This EA includes projects that will be reviewed on a 5-year basis and consequently, this EA might be updated to accommodate currently unforeseen changes in installation development plans. If during the course of the next 5 years any of the projects discussed or identified in this document change enough to be outside the coverage of the analysis provided in this EA, the specified project would be excluded from the NEPA analysis represented by this EA but without affecting other projects included in this EA.

Purpose and Need

The purpose of the Proposed Action is to increase levels of training, to construct cantonment area facilities and infrastructure to support that training, and to improve and construct additional new ranges and training facilities to meet U.S. Army standards for increasing maximum supportable training days (annual man-days of training) from 750,000 to 1,500,000. FHL installation development plans are linked to individual funding programs, such as Base Realignment and Closure (BRAC), Military Construction, Operations and Maintenance; Military Family Housing, Anti-Terrorism/Force Protection (AT/FP), Range Development Funds, and training dollars. The *Fort Hunter Liggett Range Complex Master Plan* and *Fort Hunter Liggett Real Property Master Plan* were examined to provide a consolidated list of projects that are planned and programmed over the next 5 years for the continued physical development of the installation to support combat support (CS) training missions and other readiness training and operational assignments. These plans provide for future developments of the installation to accommodate future mission and facility requirements. These plans include projects for the installation's future facility development, range improvements, utility infrastructure enhancements, development constraints and opportunities, and land use relationships.

The need for the Proposed Action is to meet current and future mission requirements and national security objectives associated with FHL. This involves meeting ongoing mission requirements to provide for ranges and training facilities to fully support the mission of FHL. This would necessitate increased training; repairing and upgrading installation utilities, pavements, and facilities; replacing older, substandard facilities with new buildings; and providing reliable utilities, quality housing, and morale and welfare projects that are a critical part of supporting the warfighter. Continued development at FHL must take into account future facility construction, demolition and renovation requirements; transportation needs; airfield alterations and enhancements; systems improvements; utilities improvements; land use planning; and development constraints and opportunities. Contributions by FHL to national security, and prospects for the assignment of additional missions in the future, dictate that the installation implement planning for the next 5 years. To ensure complete readiness at the installation for any tasks assigned, projects must take into account—and be capable of supporting—all functions inherent to a U.S. Army installation. These include security, administration, communications, billeting, supply and storage, training, transportation, and community quality of life.

Summary of Proposed Action

The Proposed Action is to implement the installation-approved *Fort Hunter Liggett Range Complex Master Plan* and *Fort Hunter Liggett Real Property Master Plan* projects. This would include the construction of cantonment area facilities, the improvement and construction of additional ranges, and the upgrading of tactical training base (TTB) facilities to meet U.S. Army standards for increasing maximum supportable annual training days from 750,000 to 1,500,000 man-days. Current urban planning areas, which are defined as those areas of FHL affected by multiple buildings, hardscape, or human use for extended periods of time, would increase from 639 acres to 1,220 acres. An additional 255 acres would be added to the existing cantonment area and 325 acres would be added to the current TTBs. Range development in the training areas would increase the current footprint from those areas from 800 acres to 1,040 acres. This total increase in development would decrease the nondeveloped portion of FHL from 99.1 percent to 98.6 percent.

This EA has been prepared using a constraints-based analysis (see **Section 2.1.1**). This approach enables a comprehensive evaluation of environmental concerns throughout the installation and also those concerns unique to specific areas of FHL. This analysis uses the information obtained from extensive recent NEPA evaluations for similar types of projects to determine the direct, indirect, and cumulative effects of projects that would be completed as part of the installation's development plans.

The projects analyzed in this EA are categorized as **training infrastructure**, **range construction**, and **cantonment area construction** projects, and **increased training**. For the purposes of describing the specific types of projects included as a part of the Proposed Action, representative projects from each of the categories are listed in **Sections 2.1.2**, **2.1.3**, and **2.1.4**, and the full list is provided in **Appendix A**. The total potential effects associated with implementation of each of the projects listed in **Appendix A** were evaluated in this EA.

This EA addresses 15 training infrastructure projects planned for the next 5 years to support future mission requirements and to comply with AT/FP requirements (see **Appendix A**). **Section 2** identifies projects that are believed to be representative of the types of training infrastructure upgrade projects proposed. These representative training infrastructure projects have been selected for detailed analysis in this EA because they are believed to be representative of the upper range of potential effects on the natural and man-made environment from such projects and thus frame the upper limits for potential effects that reasonably could be expected from other projects in the training infrastructure category.

This EA addresses nine range construction projects planned over the next 5 years to support future mission requirements and to comply with AT/FP criteria (see **Appendix A**). Projects within this category include primarily new facility construction and additions to existing range facilities, but could also include renovations, repairs, and alterations. The construction of new facilities would be zoned in accordance with appropriate land use areas in order to continue or enhance compatibility with currently designated land use areas. **Section 2** identifies projects that would be representative of the types of range construction projects proposed for development. These range construction projects have been selected for detailed analysis in this EA because they are believed to be representative of the upper range of potential effects that reasonably could be expected from the other projects in the range construction projects category.

This EA addresses 49 cantonment area construction projects planned over the next 5 years to support future mission requirements and to comply with AT/FP criteria (see **Appendix A**). Projects within this category include primarily new facility construction and additions to existing facilities, but could also include renovations, repairs, and alterations. The construction of new cantonment area facilities would be zoned in accordance with appropriate land use areas in order to continue or enhance compatibility with

currently designated land use areas. **Section 2** identifies projects that would be representative of the types of cantonment area construction projects proposed for development. These cantonment area construction projects have been selected for detailed analysis in this EA because they are believed to be representative of the upper range of potential effects that reasonably could be expected from the other projects in the cantonment area construction projects category.

This EA addresses the operational increase in training. An additional 40 classes a year involving an additional 1,000 students would increase the capacity of the FHL TASS Training Center (TTC) by 50 percent. Similar increases are anticipated for the Regional Training Center (RTC), raising RTC throughput to 800 soldiers a month with each soldier undertaking a 3-week training session. In addition to requirements for additional classroom space and associated amenities, there would be a corresponding increase in use of all existing and proposed training facilities to ensure that the qualification needs of individuals and units are met. Brigade-level training rotations in the form of Warrior Exercises (WAREXs) and Combat Support Training Centers (CSTCs) would be expected to double for fiscal year (FY) 2010 and beyond.

Summary of Environmental Consequences and Mitigation Measures

This EA contains a comprehensive evaluation of the existing conditions and environmental consequences of the Proposed Action and the No Action Alternative, as required by the National Environmental Policy Act of 1969 (NEPA). Implementation of the Proposed Action would not affect airspace management or alter currently planned land use. Beneficial effects on socioeconomics would be expected. Resources that potentially could experience negligible to minor adverse effects from the Proposed Action include air quality, cultural resources, geological resources, threatened and endangered species, water resources (including surface water, floodplains, and groundwater), hazardous materials, and traffic and transportation. Short-term, minor to moderate effects could occur on infrastructure with long-term, beneficial effects through eventual upgrades to utilities. Noise effects can be minor to moderate in significance but they would be short-term in duration. Minor to moderate effects on biological resources and infrastructure are anticipated. Adherence to the Goals and Objectives of FHL's *Integrated Natural Resources Management Plan* and Integrated Training Area Management (ITAM) programs would help minimize effects on biological resources while upgrades to parts of FHL's utilities would minimize adverse effects on infrastructure. Implementation of the No Action Alternative would not result in a change in current conditions; and therefore, no significant direct or indirect effects would occur under the No Action Alternative.

The potential for cumulative effects on the environment was evaluated by reviewing other projects in the vicinity of FHL that could affect the same environmental resources as the Proposed Action. Although some cumulative effects could occur, they are expected to be negligible to minor in significance. Implementation of the No Action Alternative would not result in a change in current conditions; therefore, no cumulative effects would occur to the quality of the human or natural environment.

Table ES-1 summarizes the effects of the Proposed Action and the mitigation actions or best management practices that could be implemented to avoid or minimize these effects. Identified effects were determined to be insignificant based on evaluation criteria presented for significant effects. Some practices to minimize effects would be required by Federal or state regulations. Most of these requirements are currently followed at the installation.

Table ES-1. Summary of Environmental Consequences for the Proposed Action

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Airspace Management and Safety	Long-term, negligible adverse effects on airspace management are expected from additional helicopter traffic. Long-term, beneficial effects are anticipated from an additional taxiway, which would provide greater flight scheduling flexibility.	No adverse effects are anticipated.	No adverse effects are anticipated.	No adverse effects are anticipated.	No adverse effects would be anticipated.
Noise	Long-term, minor to moderate, adverse effects are anticipated.	Long-term, minor, adverse effects are anticipated.	Short-term, minor, adverse effects are anticipated.	Long-term, minor to moderate, adverse effects are anticipated.	No adverse effects would be anticipated.
Land Use	Negligible to minor, adverse effects are anticipated.	Negligible to moderate, adverse effects are anticipated.	Negligible to minor, adverse effects are anticipated.	Negligible to minor, adverse effects are anticipated.	No adverse effects would be anticipated.
Air Quality	Short- and long-term, minor, adverse effects are anticipated. Dust control and good equipment maintenance would help reduce overall emissions.	Short- and long-term, minor, adverse effects are anticipated. Dust control and good equipment maintenance would help reduce overall emissions.	Short-term, minor, adverse effects are anticipated. Dust control and good equipment maintenance would help reduce overall emissions.	Short- and long-term, minor, adverse effects are anticipated. Dust control and good equipment maintenance would help reduce overall emissions.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Geological Resources	Long-term, negligible to moderate, adverse effects on geology and soils are anticipated. Use of BMPs identified in the installation's SWPPP and project-specific ESCPs would help minimize effects on soils.	Long-term, negligible to moderate, adverse effects on geology and soils are anticipated. Use of BMPs identified in the installation's SWPPP and project-specific ESCPs would help minimize effects on soils.	Long-term negligible to moderate adverse effects on geology and soils are anticipated. Use of BMPs identified in the installation's SWPPP and project-specific ESCPs would help minimize effects on soils.	Long-term, negligible to moderate, adverse effects on geology and soils are anticipated. Use of BMPs identified in the installation's SWPPP would help minimize effects on soils. Additionally, adherence to principles of the ITAM program would also help reduce effects.	No adverse effects would be anticipated.
Water Resources	Long-term, negligible to moderate, adverse effects are anticipated. Use of BMPs identified in the installation's SPCC Plan, SWPPP, and project-specific ESCP would help minimize effects on surface and groundwater resources. Construction in floodplains would be avoided.	Long-term, negligible to moderate, adverse effects are anticipated. Use of BMPs identified in the installation's SPCC Plan, SWPPP, and project-specific ESCP would help minimize effects on surface and groundwater resources. Construction in floodplains would be avoided.	Long-term, minor, beneficial effects are anticipated from upgrade of cantonment area storm water system. Short-term, negligible to moderate, adverse effects on water resources are anticipated during individual construction projects. Use of BMPs identified in the installation's SPCC Plan, SWPPP, and project-specific ESCPs would help minimize effects on surface and groundwater resources.	Long-term, minor, adverse effects are anticipated. Use of BMPs identified in the installation's SPCC Plan and SWPPP would help minimize effects on surface and groundwater resources.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Biological Resources	Short-term, minor to moderate, adverse effects on vegetation are anticipated. Short- and long-term, minor to moderate effects on wildlife are anticipated. Long-term, moderate, adverse effects on wetlands are anticipated due to habitat conversion. Adoption of the goals and objectives of the installation INRMP and the Integrated Training Area Management program would ensure the minimization of effects.	Short- and long-term, minor to moderate, adverse effects on vegetation and wildlife are anticipated. Long-term, minor to moderate, adverse effects on wetlands are anticipated. Adoption of the goals and objectives of the installation INRMP and the Integrated Training Area Management program would ensure the minimization of effects.	No adverse effects are anticipated.	Short-term, minor to moderate, adverse effects on vegetation are anticipated. Short- and long-term, minor to moderate effects on wildlife are anticipated. Long-term, moderate, adverse effects on wetlands are anticipated. Adoption of the goals and objectives of the installation INRMP and the Integrated Training Area Management program would ensure the minimization of effects.	No adverse effects would be anticipated.
Threatened and Endangered Species	Long-term, negligible to minor, adverse effects are anticipated. Adherence to Species Management Plans and goals and objectives of the installation INRMP would ensure the minimization of effects.	Short- and long-term, moderate, adverse effects are anticipated. Adherence to Species Management Plans and goals and objectives of the installation INRMP would ensure the minimization of effects.	No adverse effects are anticipated	Short- and long-term, negligible to minor, adverse effects are anticipated. Adherence to Species Management Plans and goals and objectives of the installation INRMP would ensure the minimization of effects. Additionally, adherence to principles of the ITAM program would also help reduce effects.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Cultural Resources	Minor adverse effects on historic buildings, structures, landscapes, or viewsheds are anticipated. Whereas no effects on archaeological sites are anticipated, archaeological sites could be inadvertently affected. Adherence to procedures outlined in the ICRMP would help minimize potential effects. No significant effects expected; action would be compatible or consultation with SHPO pursuant to Section 106 of NHPA (36 CFR 800) would occur.	No adverse effects on historic buildings, structures, landscapes, or viewsheds are anticipated. Whereas no effects on archaeological sites are anticipated, archaeological sites could be inadvertently affected. Adherence to procedures outlined in the ICRMP would help minimize potential effects. No significant effects expected; action would be compatible or consultation with SHPO pursuant to Section 106 of NHPA (36 CFR 800) would occur.	Minor, adverse effects on historic buildings are anticipated. Minor effects on landscapes and viewsheds are anticipated. Attention to compatible construction design would help minimize these effects. Whereas no effects on archaeological sites are anticipated, archaeological sites could be inadvertently affected. Adherence to procedures outlined in the ICRMP would help minimize potential effects. No significant effects expected; action would be compatible or consultation with SHPO pursuant to Section 106 of NHPA (36 CFR 800) would occur.	No adverse effects on historic buildings, structures, landscapes, or viewsheds are anticipated. Whereas no effects on archaeological sites are anticipated, archaeological sites could be inadvertently affected. Adherence to procedures outlined in the ICRMP would help minimize potential effects. No significant effects expected; action would be compatible or consultation with SHPO pursuant to Section 106 of NHPA (36 CFR 800) would occur.	No adverse effects would be anticipated.
Socioeconomics and Environmental Justice	No adverse effects on population, housing, or environmental justice are anticipated. Moderate, short-term, beneficial effects on local business, employment, and the local economy are anticipated.	No adverse effects on population, housing, or environmental justice are anticipated. Moderate, short-term, beneficial effects on local business, employment, and the local economy are anticipated.	No adverse effects on population, housing, or environmental justice are anticipated. Moderate, short-term, beneficial effects on local business, employment, and the local economy are anticipated.	Minor, short-term, beneficial effects on local business, employment, and the local economy are anticipated.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Infrastructure	No adverse effects on electrical systems and propane are anticipated. Long-term, minor, adverse effects on liquid fuel, communications, and solid waste are anticipated. Short- and long-term, minor, adverse effects on water supply and sanitary sewer and wastewater systems are anticipated.	No adverse effects on electrical systems anticipated. Short- and long-term, minor, adverse effects on water supply and sanitary sewer and wastewater systems are anticipated.	Minor to moderate, adverse effects on electrical systems. Short-term, negligible to minor, adverse effects on LPG are anticipated. Long-term, minor, adverse effects on solid waste and liquid fuel are anticipated. Short-term, minor, adverse effects on water supply are anticipated. Short- and long-term, minor to moderate, adverse effects on sanitary sewer and wastewater systems are anticipated. Short-term, negligible to minor, adverse and long-term, minor, beneficial effects on storm water systems are anticipated. Short-term, minor, adverse effects on communications are anticipated. Long-term, beneficial effects on infrastructure would occur through eventual upgrades to utilities.	No adverse effects on electrical systems and propane are anticipated. Long-term, minor, adverse effects on liquid fuel, communications, and solid waste are anticipated. Short- and long-term, minor, adverse effects on water supply and sanitary sewer and wastewater systems are anticipated.	No adverse effects would be anticipated.
Traffic and Transportation	No long-term, adverse effects are anticipated. Minor, short-term, intermittent, adverse effects are anticipated.	No long-term, adverse effects are anticipated. Minor, short-term, intermittent, adverse effects are anticipated.	No long-term, adverse effects are anticipated. Minor, intermittent, adverse effects are anticipated.	No long-term, adverse effects are anticipated. Minor, intermittent, adverse effects are anticipated	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Hazardous Materials and Waste	No adverse effects on ACM, radon, and ERP sites are anticipated. Long-term, minor, adverse effects on pollution prevention, hazardous materials, and hazardous wastes are anticipated. Use of Installation Hazardous Waste Management Plan and SPCC Plan would help minimize effects.	No adverse effects on ACM, radon, and ERP sites are anticipated. Long-term, minor, adverse effects on pollution prevention, hazardous materials, and hazardous wastes are anticipated. Short-term, minor and long-term, negligible to minor, adverse effects on lead-hazard management are anticipated. Use of Installation Hazardous Waste Management Plan and SPCC Plan would help minimize effects.	No adverse effects on ACM, radon are anticipated. ERP sites could be encountered on some projects with negligible to minor, short-term effects on safety and hazardous waste anticipated. Long-term minor, adverse effects on pollution prevention, hazardous materials, and hazardous wastes are anticipated. Use of Installation Hazardous Waste Management Plan and SPCC Plan would help minimize effects.	No adverse effects on ACM, radon, and ERP sites are anticipated. Long-term, minor, adverse effects on pollution prevention, hazardous materials, and hazardous wastes are anticipated. Short-term, minor and long-term, negligible to minor, adverse effects on lead-hazard management are anticipated. Use of Installation Hazardous Waste Management Plan and SPCC Plan would help minimize effects.	No adverse effects would be anticipated.
Health and Safety	Short-term, minor, adverse effects on construction contractor safety could occur during construction activities. Risk would be managed by adherence to established U.S. Army, Federal, state, and local safety regulations.	Short-term, minor, adverse effects on construction contractor safety could occur during construction activities. Long-term, minor, adverse effects on military personnel safety, public safety, explosives and munitions safety, and fire safety would be expected. Risk would be managed by adherence to established U.S. Army, Federal, state, and local safety regulations.	Short-term, minor, adverse effects on construction contractor safety could occur during construction activities. Risk would be managed by adherence to established U.S. Army, Federal, state, and local safety regulations.	Long-term, minor adverse effects on health and safety could occur from increased training and the possibility of increased accidents.	No adverse effects would be anticipated.

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1. Purpose of and Need for the Proposed Action

The Headquarters Command of U.S. Army Garrison Fort Hunter Liggett (FHL) believe a comprehensive National Environmental Policy Act (NEPA) document would improve the continuing activity of installation development and training and facilitate the NEPA compliance process. As a result, FHL has prepared an Environmental Assessment (EA) that addresses the potential environmental effects of implementing all projects found in the *Fort Hunter Liggett Range Complex Master Plan* (FHL undated), and the *Fort Hunter Liggett Real Property Master Plan* (FHL 2007a) for FHL that are identified for the next 5 years. Also addressed are the associated increases in training. Since the establishment of FHL, as with many other U.S. Army installations, development of the installation has continuously occurred. Every year in the history of the installation, structures have been demolished, new facilities constructed, and infrastructure upgraded. This document will constitute an Installation Development and Training EA. The intent of this EA is to address the Proposed Action of implementing installation development actions as found in the community of all existing approved plans on FHL. This EA will help facilitate efforts to coordinate land use planning and infrastructure projects, expedite project execution by using early planning, and encourage agency coordination. In addition to evaluating the projects as described in this EA, the document will serve as a baseline for future environmental analysis of mission and training requirements.

This section includes five subsections: the location and mission of FHL Garrison, the purpose of and the need for the Proposed Action, the scope of the analysis, key environmental compliance requirements, and how this EA is organized.

1.1 Introduction

FHL is situated about 25 miles southwest of King City and about 86 miles south of Fort Ord, California (see **Figure 1-1**). In 1940, in anticipation of training soldiers for combat on World War II European fronts, the War Department purchased more than 200,000 acres of local ranch lands between the Salinas River valley divide and the Pacific Ocean. Terrain varying from level valleys bordered by gentle hills to steep, rugged mountains has since provided opportunities for "real world" training and defense technology testing. FHL was a subinstallation of Fort Ord until November 1993 when the installation came under U.S. Army Reserve Command (USARC).

At present, the installation encompasses approximately 162,000 acres and provides a vast array of training ranges and other facilities year-round for the U.S. Army Reserve (USAR), and training opportunities for other branches of the U.S. military and government agencies. FHL is considered first class in its ability to provide training opportunities with more than 150,000 acres of training area, an airfield capable of handling C-17 aircraft, more than 20 drop zones (DZs), widely varied terrain, convoy live-fire areas, Tactical Training Bases (TTBs), firing ranges servicing up to Tank Table 12, training classrooms, barracks, dining facilities, and other billeting. FHL is also home to the Regional Training Center (RTC) West, and is a Combat Support Training Center (CSTC) (USARC 2009c).

FHL's mission is to maintain and allocate training areas, airspace, facilities, and ranges to support field maneuvers, live-fire exercises, testing, and institutional training. Additionally, the installation provides quality-of-life and logistical support to training units.

The Army Force Generation (ARFORGEN) process, which was implemented across the U.S. Army in February 2006, ensures that individual units receive adequate time to prepare for deployment through training and maintenance activities and that manning, equipping, and resourcing can be synchronized with unit deployments.

ARFORGEN categorizes Army Reserve units into three categories of training and readiness:

1. ***Reset/Train:*** Units recover from their previous deployment, reconstitute, and repair and replace equipment as necessary. Reconstituted units then train new and reassigned personnel as needed.
2. ***Ready:*** Units conduct more complex higher-level group exercises that involve greater levels of planning and coordination. Units train with other Headquarters operational groups in preparation for possible upcoming missions and units become eligible to fill operational surge requirements if necessary.
3. ***Available:*** Units are now in their planned deployment windows and are fully trained, equipped, and resourced to meet operational requirements.

During the first 1 to 3 years of the Reset/Train stage of ARFORGEN, the focus is on individual and unit-level Mission Essential Task Lists (METLs). The initial individual training is provided by The Army School System Training Centers referred to as TTCs. TTCs provide instruction in a classroom setting that ensures the individual soldier maintains his or her competency level in their military occupational specialty (MOS). MOSs include a wide variety of skills such as combat engineer, intelligence analyst, unit supply specialist, plumbers, and electricians. After ensuring a soldier's individual qualifications are in order, soldiers return with their respective units for unit-level training provided by RTCs.

RTCs provide individuals and units with realistic field training that encompasses small arms qualification, hand-to-hand combat, urban operations, reaction to direct and indirect fire, and various other warrior tasks and unit battle drills.

By the time Reserve Combat Support (CS) and Combat Support Services (CSS) units reach Year 3, the expectation is for units to have progressed to the Ready stage and training to occur up to the Brigade-level (2,000 to 5,000 soldiers). Initial Ready stage Brigade-level exercises have been designated as Warrior Exercises, or WAREXs, within the Army Reserve component (both Reserve and Guard) and are already being conducted.

Following the WAREXs, CSTC Operations Groups will provide a demanding collective training experience for ARFORGEN Ready units and prepare Army Reserve units for a Combat Training Center-level training event and subsequent Deployment or Readiness Expeditionary Force status. Combat Training Center training consists of Bridge-level exercises similar to the WAREXs.

In addition, the Quadrennial Defense Review (QDR) directed the Army to integrate with the U.S. Air Force (USAF), Navy, Marine Corps, and Coast Guard capabilities to provide greater interoperability and communication to enhance defense capability.

This commitment to the ARFORGEN process, the directives of the QDR, and the ongoing Global War on Terror ensure a continued increase in operational tempo at FHL for years to come.

1.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to increase levels of training, to construct cantonment area facilities and infrastructure to support that training, and to improve and construct additional new ranges and training facilities to meet U.S. Army standards for increasing maximum supportable training days (annual man-days of training) from 750,000 to 1,500,000. FHL installation development plans are linked to individual funding programs such as Base Realignment and Closure (BRAC), Military Construction, Operations and Maintenance, Military Family Housing, Anti-Terrorism/Force Protection (AT/FP), Range

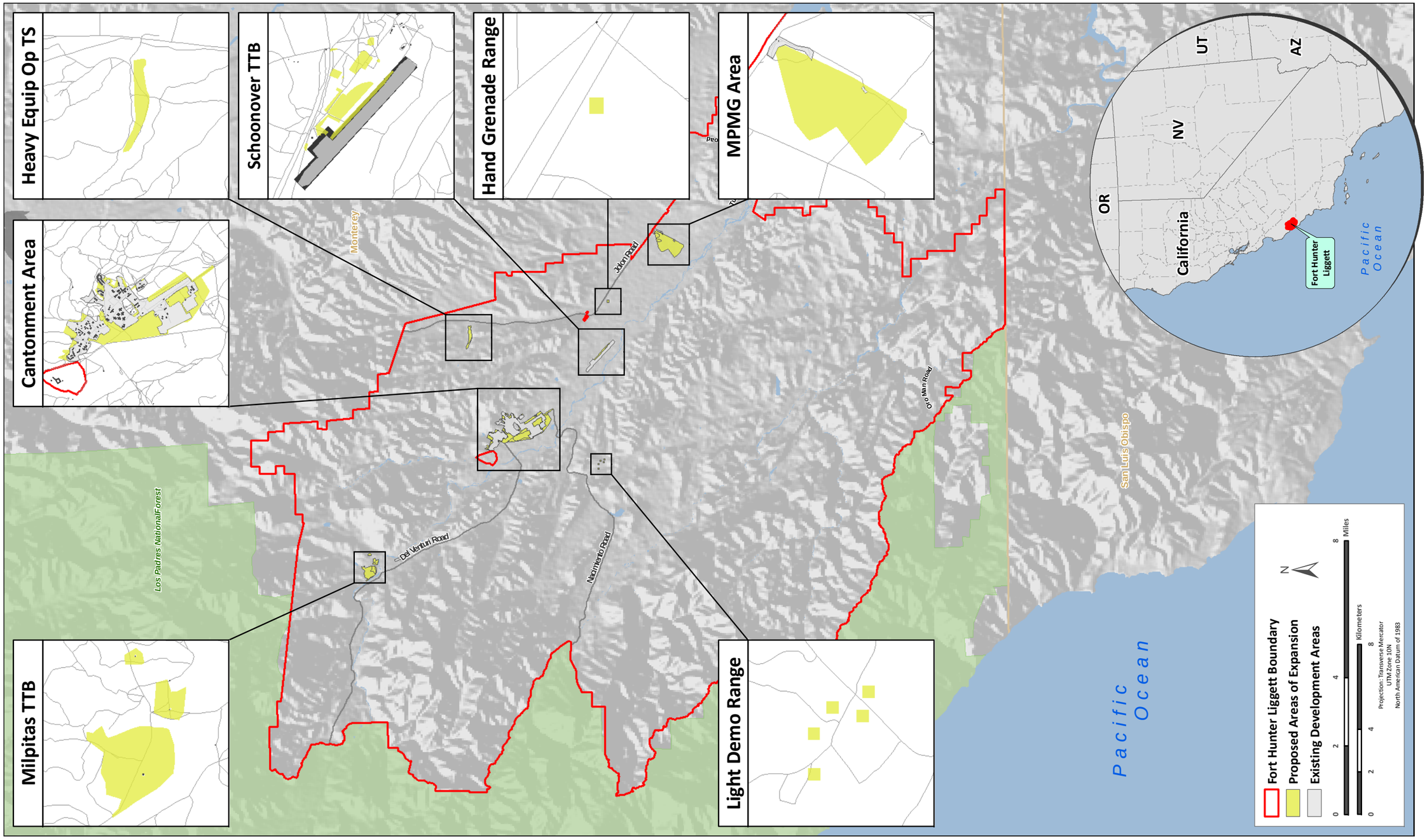

Figure 1-1. Location of FHL, California

Development Funds, and Training dollars. The *Fort Hunter Liggett Range Complex Master Plan* (FHL undated) and *Fort Hunter Liggett Real Property Master Plan* (FHL 2007a) were examined to provide a consolidated list of projects that are planned and programmed over the next 5 years for the continued physical development of the installation to support CS training missions and other readiness training and operational assignments. These plans provide for future development of the installation to accommodate future mission and facility requirements. These plans include projects for the installation's future facility development, range improvements, utility infrastructure enhancements, development constraints and opportunities, and land use relationships. Implementing these projects would aid in the proposed increase in training (FHL 2008a, FHL 2009b)

The need for the Proposed Action is to meet current and future mission requirements and national security objectives associated with FHL. This involves meeting ongoing mission requirements to provide for ranges and training facilities to fully support the mission of FHL and that also necessitate repairing and upgrading installation utilities, pavements, and facilities; replacing older, substandard facilities with new buildings; and providing reliable utilities, quality housing, and morale and welfare projects that are a critical part of supporting the warfighter. Continued development at FHL must take into account future facility construction, demolition, renovation, transportation needs, airfield alterations and enhancements, systems improvements, utilities improvements, land use planning, and development constraints and opportunities. Contributions by FHL to national security, and prospects for the assignment of additional missions in the future, dictate that the installation implement planning for the next 5 years. To ensure complete readiness at the installation for any tasks assigned, projects must take into account—and be capable of supporting—all functions inherent to a U.S. Army installation. These include security, administration, communications, billeting, supply and storage, training, transportation, and community quality of life.

1.3 Scope of the Analysis

FHL seeks to improve the continuing installation development process by evaluating in a single EA all actions proposed in installation plans for development and training. A compilation of all proposed projects from the installation-approved Range Complex and Real Property Plans addressed in this EA is presented in **Appendix A**. Some of the projects identified in the FHL installation development and range plans are appropriate for the application of Categorical Exclusions and therefore are not analyzed in this EA. Projects not discussed in the document but undertaken during the 5 year period would be compared to the analysis. If it is determined that impacts are similar to or less than projects analyzed, then the project can be assessed by using the appropriate Categorical Exclusion and referencing this EA. If however, it is determined that the project would have the potential for significant impacts then separate NEPA documentation would be required. The scope of this EA includes an evaluation of alternatives for the various projects and increased training and an analysis of the cumulative effects on the natural and man-made environments. The Proposed Action includes numerous projects, such as replacement of aging ranges, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, community living upgrades, infrastructure upgrades, and recreational upgrades that would be implemented during the next 5 years. Not all projects would be implemented in the next 5 years, but would be executed if funds become available. The assessment compiles information on constraints that might inhibit development or dictate courses of actions affecting development, improve the facility planning process, and capture the Installation Commander's vision of what facility and infrastructure improvements are necessary to support the installation's ongoing mission.

This EA documents and evaluates the effects of all currently identified activities involved in modernizing and upgrading FHL to meet future requirements. The scope of this EA includes an evaluation of the Proposed Action and alternatives, including the No Action Alternative. The Proposed Action, as

described in **Section 2**, contains four categories of installation development or training: training infrastructure, range development, cantonment area construction, and increased training projects. This EA analyzes in detail the environmental effects resulting from the activities for a subset of representative projects to determine the range of potential effects to be expected from projects within each group. These categories and the representative projects are described in **Sections 2.1.2**, **2.1.3**, and **2.1.4** and provide projects varying in size, acreage disturbed, and amount of air emissions; increases in impervious surfaces; vegetation disturbed; and other relevant factors associated with environmental and socioeconomic resources. The EA also analyzes the siting of range, construction, and training activities based on environmental constraints. All other projects listed in **Appendix A** are analyzed using the same methodology as applied to the representative projects, and those effects are summarized in tabular form in **Section 5** of this EA.

The collective analysis of all appropriate projects in a single EA will streamline the NEPA review process; eliminate project fractionation and segmentation; facilitate coordination of land use planning; reduce installation, reviewing agency, and major command workloads; provide cost savings; help better evaluate potential cumulative environmental effects; assist in maintaining a baseline for future analysis; and meet the U.S. Army's NEPA planning goals.

1.4 Summary of Key Environmental Compliance Requirements

1.4.1 National Environmental Policy Act

NEPA (42 United States Code [U.S.C.] Section 4321–4347) is a Federal statute requiring the identification and analysis of potential environmental effects associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decisionmakers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that was charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires Federal agencies to use an interdisciplinary and systematic approach in their decisionmaking process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action.

The process for implementing NEPA is codified in Title 40 Code of Federal Regulations (CFR), Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The CEQ was established under NEPA to implement and oversee Federal policy in this process. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FNSI) or whether the preparation of an Environmental Impact Statement (EIS) is necessary. This EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, states that the U.S. Army will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The U.S. Army's implementing regulation for NEPA is 32 CFR Part 651, the *Environmental Analysis of Army Actions*.

1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decisionmaking process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process,

however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decisionmaker to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

This EA examines potential effects of the Proposed Action and alternatives on 14 areas: airspace management and safety, noise, land use, air quality, geological resources, water resources, biological resources, threatened and endangered species, cultural resources, socioeconomics and environmental justice, infrastructure, traffic and transportation systems, hazardous materials and wastes, and health and safety. These resource areas were identified as being potentially affected by the Proposed Action and include applicable critical elements of the human environment that are mandated for review by Executive Order (EO), regulation, or policy. **Appendix B** contains examples of relevant laws, regulations, and other requirements that are often considered as part of the analysis. Where useful to provide the reader with better understanding, key provisions of the statutes and EOs are discussed in more detail in the text of this EA.

1.4.3 Interagency Coordination and Public Involvement

NEPA ensures that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information on their actions to state and local governments and the public and involve them in the planning process. The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. AR 200-1 states that the U.S. Army will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The U.S. Army's implementing regulation for NEPA is the *Environmental Analysis of Army Actions*, 32 CFR Part 651.

Through the coordination process, USARC has notified relevant Federal, state, and local agencies, and federally recognized Tribes, of the Proposed Action and provide them sufficient time to make known their environmental concerns specific to the action. Agency responses have been incorporated into this EA. USARC coordinated with such agencies as the U.S. Environmental Protection Agency (USEPA); U.S. Fish and Wildlife Service (USFWS); State Historic Preservation Office (SHPO); and other Federal, state, and local agencies. The coordination process also provided FHL the opportunity to cooperate with and consider state and local views in implementing the Federal proposal. **Appendix C** includes all coordination letters and responses. A Notice of Availability (NOA) for this EA and FNSI was published on 3 March 2010 in the *Monterey County Herald*, *King City Rustler*, *Greenfield News*, *Soledad Bee*, and the *Gonzales Tribune*. This was done to solicit comments on the Proposed Action and involve the local community in the decisionmaking process.

1.5 Organization of this Document

This EA is organized in 10 sections. **Section 1** contains background information on FHL and the locations of the Proposed Action, the purpose of and the need for the Proposed Action, and the scope of the Installation Development Environmental Assessment (IDEA) analysis; a summary of applicable regulatory requirements; and an introduction to the organization of this EA. **Section 2** provides a detailed description of the Proposed Action, and **Section 3** discusses alternatives to the Proposed Action that were considered, the No Action Alternative, and a description of the decision to be made and identification of the Preferred Alternative. **Section 4** provides a general description of the environmental and

socioeconomic resources and baseline conditions that potentially could be affected by the Proposed Action and the No Action Alternative. **Section 5** presents an analysis of the environmental consequences for a range of activities (i.e., construction and infrastructure projects to provide upgrades/replacements of facilities) covering future installation development. **Section 6** includes an analysis of the potential cumulative effects. **Section 7** provides conclusions and recommendations. **Section 8** contains a list of the preparers of this EA. **Section 9** provides a reference list of the sources of information used in preparing this document. **Section 10** contains a list of acronyms and abbreviations used throughout the document.

Appendix A presents a listing of proposed installation development projects compiled from the community of all existing installation plans, as well as conceptual design drawings for training ranges associated with the Proposed Action. **Appendix B** includes descriptions of applicable laws, regulations, policies, and planning criteria. **Appendix C** includes a copy of the coordination letter mailed to the agencies for this action, the distribution list, and any responses to the letter received. **Appendix D** contains air quality calculations. **Appendix D** shows the Safety Danger Zones (SDZs) at Fort Hunter Liggett.

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2. Description of Proposed Action

2.1 Detailed Description of the Proposed Action

The Proposed Action is to implement the projects contained in the installation-approved *Fort Hunter Liggett Range Complex Master Plan* (FHL undated) and *Fort Hunter Liggett Real Property Master Plan* (FHL 2007a) through the construction of cantonment area facilities, the improvement and construction of additional ranges, and the upgrading of TTB facilities to meet U.S. Army standards for increasing maximum supportable annual training days from 750,000 to 1,500,000. Current urban planning areas, which are defined as those areas of FHL affected by multiple buildings, hardscape, or human use for extended periods of time, would increase from approximately 639 acres to approximately 1,220 acres. An additional 255 acres would be added to the existing cantonment area and 325 acres would be added to the current TTBs. Range development in the training areas would increase the current footprint for those areas from approximately 800 acres to approximately 1,040 acres. This total increase in development would decrease the nondeveloped portion of FHL from 99.1 percent to 98.6 percent.

The projects contained in this EA will be reviewed every 5 years and this document would be updated if necessary. If during the course of the next 5 years any of the projects listed in **Appendix A** change enough to be outside the coverage of the analysis provided in this EA, the specified project would be excluded from the NEPA analysis represented by this EA but without affecting other projects included in this EA.

This EA has been prepared using a constraints-based analysis (see **Section 2.1.1**). This approach enables a comprehensive evaluation of environmental concerns throughout the installation and also those concerns unique to specific areas of FHL. This analysis uses the information obtained from extensive recent NEPA evaluations for similar types of projects to determine the direct, indirect, and cumulative effects of projects that would be completed as part of the installation's development plans.

The projects analyzed in this EA are categorized as **training infrastructure, range construction,** and **cantonment area construction** projects, and **increased training**. For the purposes of describing the specific types of projects included as the Proposed Action, representative projects from each of the categories are listed in **Sections 2.1.2**, **2.1.3**, and **2.1.4**. These representative projects provide examples of the various types of projects within each category; however, the total suite of projects that compose the Proposed Action are briefly described in **Appendix A**. The total potential effects associated with implementation of each of the projects in **Appendix A** are evaluated in this EA.

2.1.1 Major Installation Constraints

There are a number of land uses, regulatory, and mission-related constraints within the boundaries of FHL that will influence and could limit future development at the installation. The major constraints on FHL are discussed in the following bulleted paragraphs. The electronic mapping data from FHL's Geographical Information System (GIS) database were used to quantify the major installation constraints to development, unless another source of information is identified. Some constraint areas overlap, so the acreages listed in the bulleted items do not equal the total acreage of FHL. The acreage calculations include total acreages for each environmental constraint found on-installation, and do not include the portions of the constraint areas that extend off the installation.

Noise Zones (913.15 acres). Aircraft operations and range operations are the dominant components of the noise environment at FHL. U.S. Army, Federal Aviation Administration (FAA), and the U.S. Department of Housing and Urban Development criteria specify that noise levels in noise-sensitive

land use areas are normally considered unacceptable where they exceed a day-night average sound level (DNL) of 65 A-weighted decibels (dBA). FHL restricts development to compatible uses when noise levels exceed a DNL of 65 dBA.

Airfield Infrastructure, Clear Zones, and Imaginary Surfaces (518.24 acres). The airfield includes runways, overrun, apron and ramp, and arm/disarm pads. Clear zones and imaginary surfaces are areas where nonairfield development is constrained or discouraged for airfield safety. These areas would allow only airfield improvements and projects directly associated with airfield operations. All projects within this area must be approved by the Installation Master Planner and airfield management prior to commencing any construction-related activities.

Environmental Restoration Program (ERP) Sites (0.6 acres). FHL has 2 active ERP sites and 32 former sites that have been given status of no further remedial action planned. New facilities might be constructed within certain ERP sites depending upon the level of contamination, clean-up efforts, and land use controls. Approval of new construction within ERP sites must be obtained from the FHL Environmental Office.

Wetlands (146.3 acres). Jurisdictional and nonjurisdictional wetlands exist at FHL, and are either ephemeral or perennial. Vernal pools, which are seasonally filled pools that could contain sensitive species, are important producers of plankton and macroinvertebrates. It is USAR policy to avoid constructing new facilities within areas containing wetlands, where practicable. To construct within areas containing wetlands, appropriate permits from county, state, and Federal regulatory agencies must be obtained. In addition, a FNSI has been prepared and submitted for approval by Headquarters (HQ) USARC, as appropriate.

100-Year Floodplain (6,073.8 acres). It is USAR policy to avoid constructing new facilities within the 100-year floodplain in order to protect the functions of floodplains, minimize the potential damage to facilities, and ensure the safety of working personnel. Should construction within the 100-year floodplain be considered, mitigation approval must be obtained and the project must be approved by HQ USAR.

Threatened and Endangered Species and Associated Habitats. There are four species federally listed as endangered and four species federally listed as threatened that have the potential to occur within or near FHL. Because the potential existed for a federally protected species to be adversely affected by the Proposed Action, a Biological Assessment was prepared and submitted to the USFWS. The USFWS then prepared a Biological Opinion on the effects of the project proposal on federally protected species, as required under Section 7 of the Endangered Species Act (ESA) of 1973, and mitigation measures were determined. FHL would incorporate and abide by mitigation measures outlined in the Biological Opinion (see **Section 5.3.8**).

In addition, there are 19 California Environmental Quality Act (CEQA) species, and there are four species that are CEQA-eligible. State requirements for mitigation of effects on special status species are not applicable on Federal lands. However, documentation of potential effects for these species is required under NEPA.

Munitions and Range Safety Criteria. There are several areas that are constrained for safety reasons at FHL. The SDZs are areas designated to maintain safety and environmental conditions surrounding live-fire weapons ranges. The SDZs must be set back from installation boundaries, within appropriate areas to mitigate fire hazards, and seasonally outside of bald eagle nesting areas. SDZs would be taken into consideration during the design process.

Cultural Resources, Historic Buildings, and Archaeological Sites. There are almost 800 recorded historic properties on FHL. Additionally, there are 6 sites within the Area of Potential Effect (APE) that are listed on the National Register of Historic Places (NRHP) and 165 recorded historic sites. Projects would be implemented in accordance with the guidelines set forth in the *Fort Hunter Liggett Integrated Cultural Resources Management Plan* (ICRMP) and coordinated with the Cultural Resources Manager

for compliance with the National Historic Preservation Act (NHPA) and other appropriate authorities. State Historic Preservation Office (SHPO) consultation would occur as necessary for activities potentially affecting cultural resources. Tribal consultation would occur as required by NHPA, Native American Graves Protection and Repatriation Act (NAGPRA), and other authorities.

In addition, in 1991, Congress passed legislation directing the Secretary of the Army to prohibit aboveground construction in a specified area around the Mission San Antonio de Padua to maintain a viewshed buffer (**Figure 2-7**). The mission is listed on the National Register of Historic Places and is located on a private in holding adjacent to the Cantonment Area.

AT/FP Setback Requirements. Minimum AT/FP design standards for new construction have been specified by the Department of Defense (DOD) and increase the land area required for individual facilities. Design standards for new construction are contained in Unified Facilities Criteria 4-010-01, *Department of Defense Minimum Antiterrorism Standards for Buildings*, October 2003, and augmented by USAR instructions. AR 525-13, *Antiterrorism*, supplements the DOD standards and must also be consulted during the planning and design processes.

As a general practice, FHL seeks to avoid, wherever possible, any disturbance to sensitive areas, such as wetlands and floodplains. However, as future mission activities dictate, and due to the expanse of existing constrained areas on FHL, avoiding or restricting future development within this acreage might not be practical and could limit the installation's ability to successfully accomplish its missions. When these resources cannot be avoided or mitigated to a level of insignificance, coordination and necessary permitting with the appropriate regulatory agencies would be completed prior to initiating the action. All construction or other activities that would occur within areas of concern, such as ERP sites, would comply with the requirements of various local, state, and Federal policies and regulations that govern such resources.

2.1.2 Training Infrastructure Projects

This EA addresses 15 training infrastructure projects for the next 5 years to support future mission requirements and to comply with AT/FP requirements (see **Appendix A, Table A-1**). The total anticipated acreage impacted by all proposed training infrastructure projects would not exceed 325 acres. **Table 2-1** identifies projects that are believed to be representative of the types of training infrastructure upgrade projects proposed. These representative training infrastructure projects have been selected for detailed analysis in this EA because they are believed to be representative of the upper range of potential effects on the natural and man-made environment from such projects.

Table 2-1. Representative Training Infrastructure Projects

Installation Project Number	Project Identification Number and Title	FY	Land Use	Project Area (ft^2)
TBD	Schoonover TTB	2010	OS	1,916,640
TBD	Milpitas TTB	2010	OS	963,960
TBD	Heavy Equipment Operator Training Site	2010	OS	1,306,800

Schoonover TTB. The Schoonover TTB would include an Initial Staging Base (ISB) to support in- and out-processing of up to 4,000 soldiers, and would be a permanent residency for 600 soldiers. Soldiers would arrive at the TTB either by bus or aircraft at the adjacent Schoonover landing zone (LZ). Structures would be either permanent buildings or temporary tent structures with concrete or gravel pads. The TTB would be composed of Army and Air Force Exchange Service (AAFES); morale, welfare, and

recreation (MWR); gym tents; two permanent classroom tents; fuel transfer point and storage for 30,000 fuel bags; fuel point and ammunition handling area (AHA) in the TTB; a shower and latrine trailer; a tent for eating and classroom activities; a tent housing the local-area network (LAN); and a vehicle parking area. Additional components of the TTB would consist of mobile guard towers; two entry control points; and concrete pads required for mobile latrine, shower, kitchen, and laundry trailers. Water would be supplied either by a 10,000-gallon potable water container or a 10,000-square-foot (ft^2) water purification area adjacent to the reservoir. Gray and black water hookups would be connected to latrine, shower, kitchen, and laundry trailers. Electrical power and communications and data lines would be accessible through hook-up drop lines in a centralized location in the TTB. The TTB would be capable of supporting a helipad or medivac pad (FHL 2009a). Tree removal would be kept to a minimum, and a 3:1 tree replacement program is in place at FHL. A vegetated buffer would be installed between the training site and drainage. Schoonover TTB would be constructed in Training Area 16B. The location of the Schoonover TTB and environmental constraints in relation to this project are shown on **Figure 2-1.**

Milpitas TTB. FHL proposes to expand the Milpitas TTB to support 2,000 soldiers and 50 to 100 detainee role-players. **Figure 2-2** depicts the proposed location (Training Area 2) and environmental constraints in relation to the proposed Milpitas TTB. Similar to the Schoonover TTB, the Milpitas TTB would require construction of permanent buildings and temporary structures atop concrete or gravel pads. The temporary structures would include an information retrieval facility with associated holding cells and nonlethal weapon ranges, a structure housing latrines and showers, a 100-by-300-foot facility with cafeteria and classroom dual functionality, and a centralized 20-ft^2 structure to house LAN and power infrastructure. Other temporary structures would contain AAFES, MWR, a gym, a 100-by-30-foot classroom, a Mayor Cell, a Base Defense Operations Center (BDOC), virtual gaming, a 10,000-ft^2 hospital module, and a village approximately 1 mile from each TTB that is capable of supporting 15 to 25 soldiers for 2 to 3 days (FHL 2009a). Additional components of the Milpitas TTB would consist of mobile guard towers; two entry control points; and concrete pads required for mobile latrine, shower, kitchen, and laundry trailers and tents. A 2,500-ft^2 fuel transfer point would store 30,000-gallon fuel bags. Water would be supplied by a 7,000-gallon potable water container and a 10,000-ft^2 water purification area adjacent to the reservoir. Gray and black water hookups would be connected to latrine, shower, kitchen, and laundry trailers. Electrical power and communications and data lines would be accessible through hook-up drop lines in a centralized location in the TTB. Copper and fiber optics lines would be run along roads and underneath bridges to the Milpitas TTB. A well would be constructed, with electrical or solar power required to operate the pump, and a vegetated buffer would be installed between the training site and drainage.

Heavy Equipment Operator Training Site. The purpose of the 30-acre Heavy Equipment Operator Training Site would be to provide a year-round centralized training site for engineers and soldiers to operate a variety of engineering equipment. Training would consist of 11 classes with an average of 8 students (12 maximum) with two phases (Phase II and Phase III) for 2 weeks each. Phase I consists of student observation of ditching operations, loading operations, and equipment maneuver drills. Equipment proposed for Phase II training includes loaders, backhoes, and hydraulic excavators. Phase III would entail training using scrapers, bulldozers, and graders. Siting would be restricted to flat terrain that is erosion-resistant (FHL 2009b). Avoidance of trees would occur (fencing around trees could be necessary), but some trees might need to be removed. Berms would be created to protect a nearby riparian zone from runoff, and a vegetated buffer would be installed between the training site and drainage. The proposed location (Training Area 10) of the Heavy Equipment Operator Training Site and environmental constraints in relation to this project are shown on **Figure 2-3**.

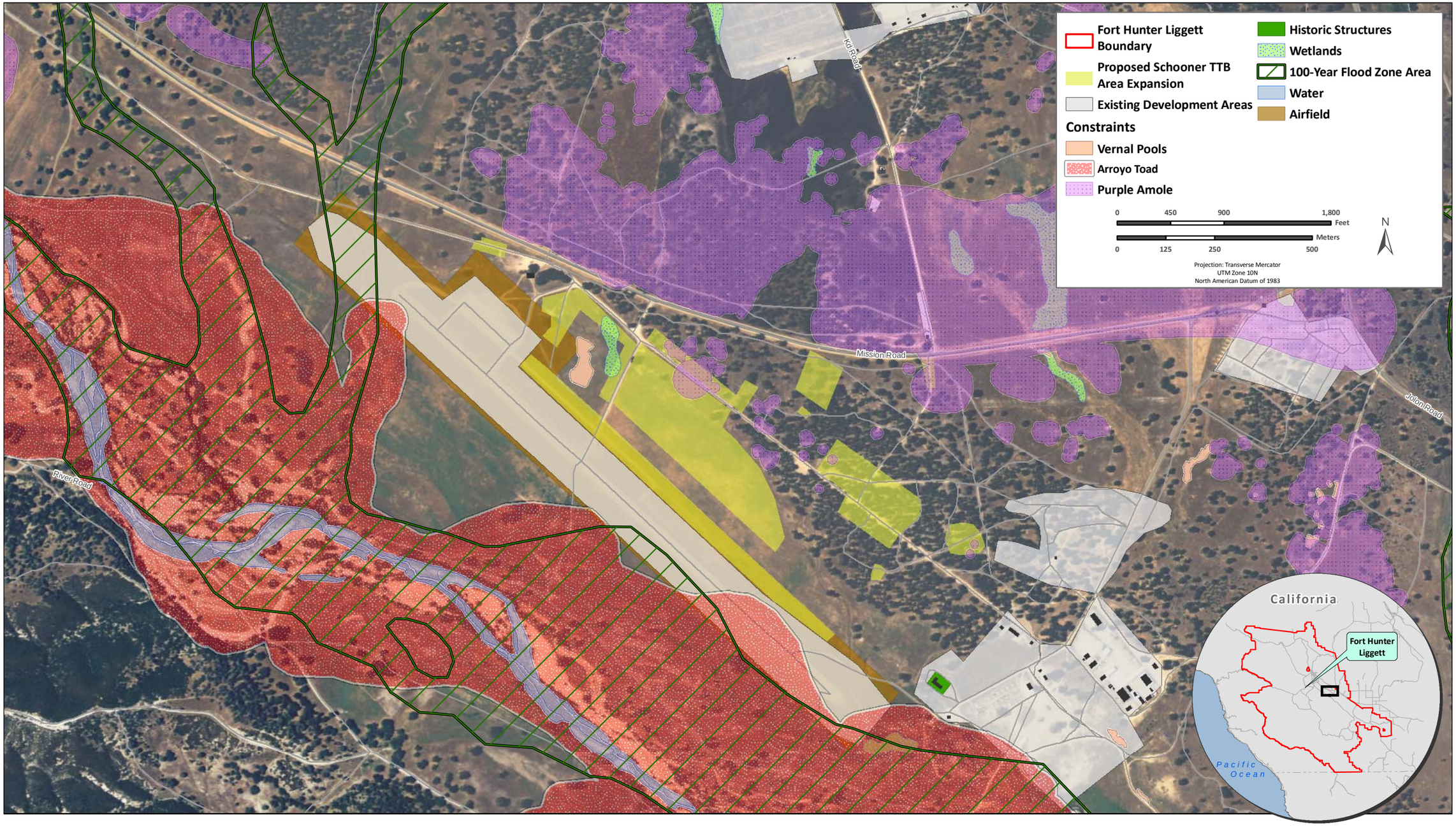

Figure 2-1. Proposed Location and Environmental Constraints for Schoonover TTB

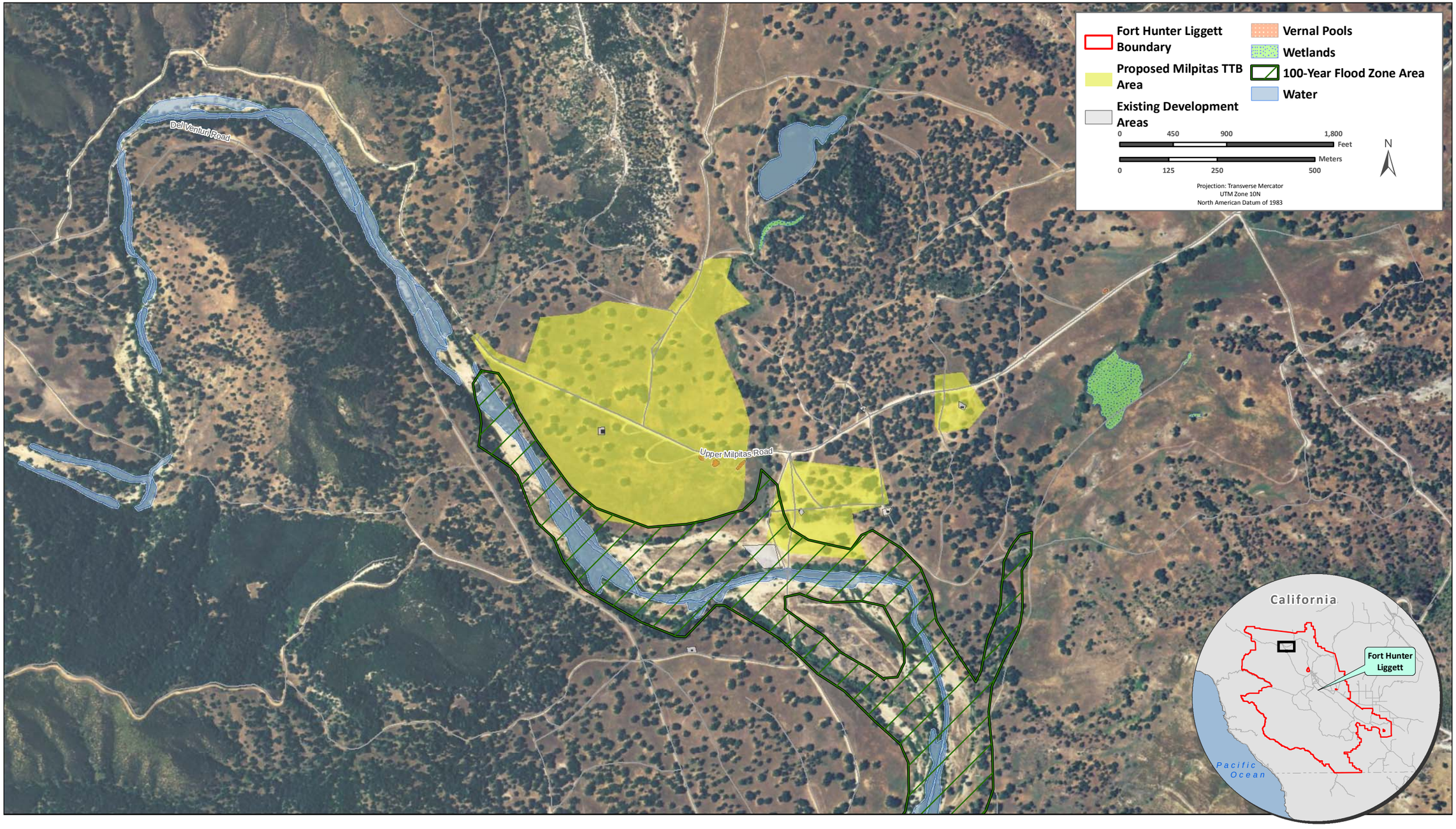

Figure 2-2. Proposed Location and Environmental Constraints for Milpitas TTB

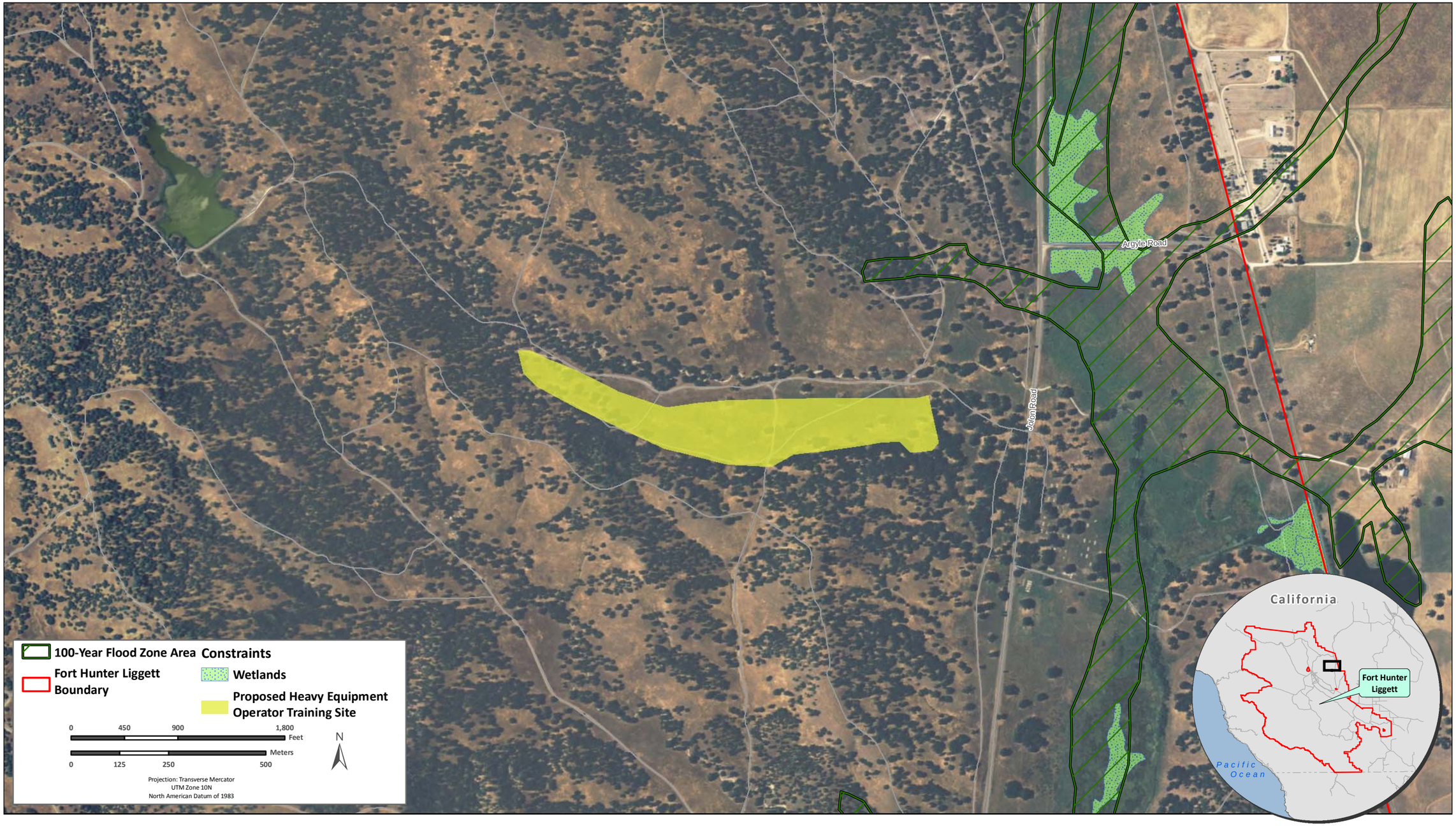

Figure 2-3. Proposed Location and Environmental Constraints for the Heavy Equipment Operator Training Site

2.1.3 Range Construction Projects

This EA addresses nine range construction projects over the next 5 years to support future mission requirements and to comply with AT/FP criteria (see **Appendix A**, **Table A-2**). The total anticipated acreage impacted by all proposed range construction projects would not exceed 240 acres. Projects within this category include primarily new facility construction and additions to existing range facilities, but also include renovations, repairs, and alterations. The construction of new facilities would be zoned in accordance with appropriate land use areas in order to continue or enhance compatibility with current land use. **Table 2-2** identifies projects that would be representative of the types of range construction projects proposed for development. These range construction projects have been selected for detailed analysis in this EA because they are believed to be representative of the upper range of potential effects that reasonably could be expected from the other projects in the range construction projects category.

Table 2-2. Representative Range Construction Projects

Installation Project Number	Project Identification Number and Title	FY	Land Use	Project Area (ft^2)
71702	Multi-Purpose Machine Gun (MPMG) Range	2012	OS	9,060,480
71701	Light Demolition Range	2011	OS	217,800
71700	Hand Grenade Familiarization Course	2011	OS	87,120

Multipurpose Machine Gun Range. FHL proposes to construct a sufficiently modernized Multipurpose Machine Gun (MPMG) Range to meet requirements for training soldiers on an array of machine guns. The proposed range would consist of seven firing lanes to be used to train and test soldiers on the skill necessary to zero weapons, and to identify, engage, and defeat stationary and moving infantry and armor targets (see **Appendix A**, **Figure A-1**). It would support familiarization and qualification firing. Additional features would include 180 stationary infantry targets, 20 moving infantry target emplacements, and 20 stationary armor targets. Typical rounds fired at the MPMG Range include the .50 caliber (12.95mm), .30 caliber (7.62mm), and the .22 caliber (5.56mm). The proposed location for the MPMG Range is in Training Area 22. The proposed location of the MPMG Range is shown on **Figure 2-4**.

Light Demolition Range. A Light Demolition Range is proposed so soldiers would be adequately trained on the employment techniques of explosives and demolitions (see **Appendix A**, **Figure A-2**). It would include safety berms along either side of demolition points, three missile-proof shelters, and a Class V issue storage bunker. A 23-by-66-foot wire obstacle and a 33-by-66-foot minefield obstacle would be developed. Mines would be buried or placed on the surface. A 33-by-66-foot concrete obstacle would be constructed with concrete cubes or tetrahedrons. Additionally, a timber-cutting site, steel-cutting chamber (bermed station for cutting steel with explosives), and road crater site would be constructed. The timber-cutting site would measure 33 by 115 feet with a concrete base. The road crater site would be refilled after each use. Mostly small charges are used, ranging from 1 to 2 pounds, with road cratering charges of 40 pounds. The proposed location for the Light Demolition Range site is in Training Area 16. The site is on the northwestern side of Hay Camp Road just north of the San Miguelito Loop. **Figure 2-5** shows the location of the proposed light demolition range.

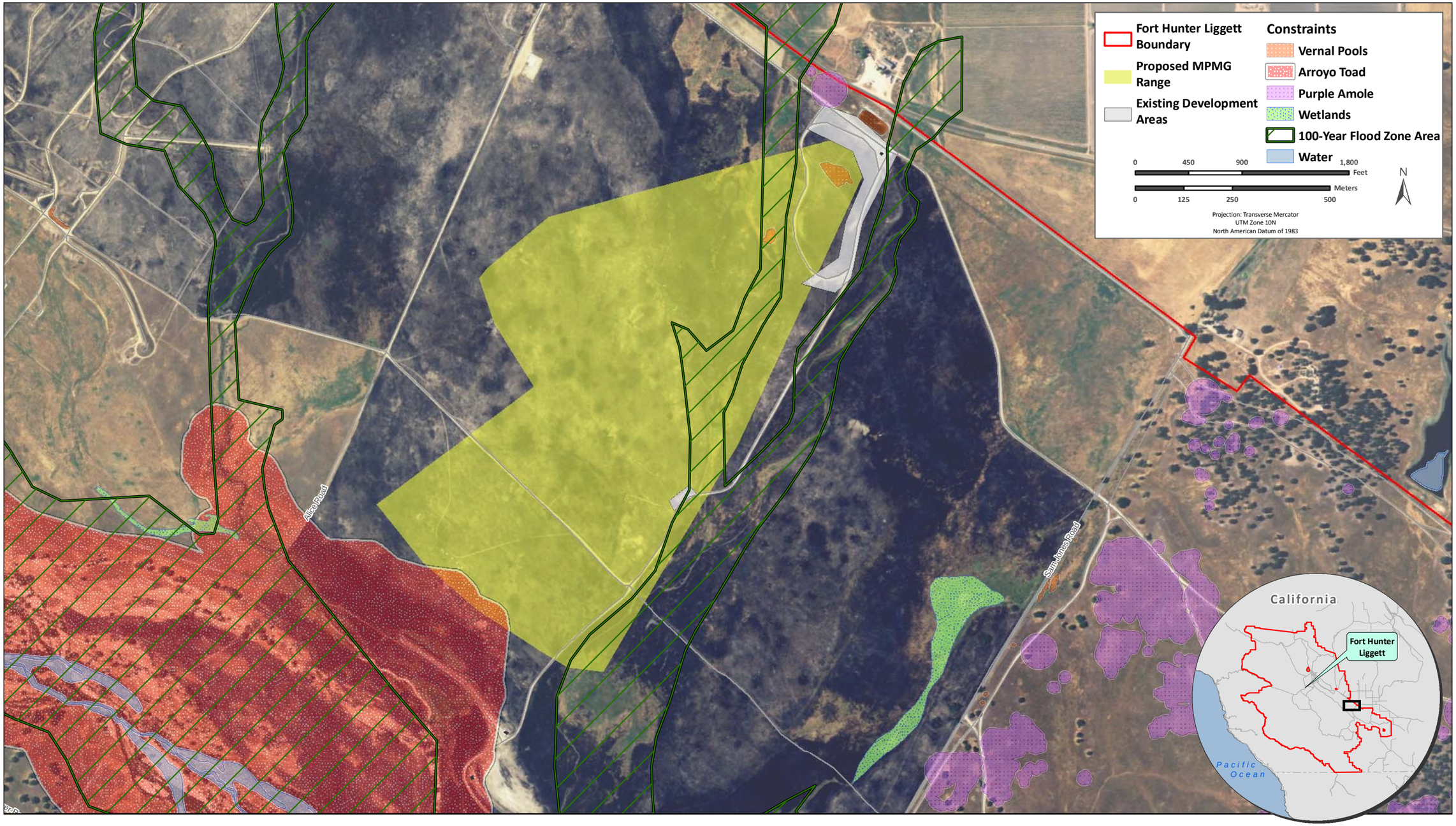

Figure 2-4. Proposed Location and Environmental Constraints for the MPMG Range Area

Figure 2-5. Proposed Locations and Environmental Constraints for Light Demolition Range

Hand Grenade Familiarization Course. Construction of a new Hand Grenade Familiarization Course would be necessary to train units and soldiers on the annual requirement to throw a live fragmentation grenade. The proposed Hand Grenade Familiarization Course would be composed of five throwing bays separated by dividers, and a steel, concrete, or wooden revetment or earthen berm 6 feet high extending 164 feet out to divide the five bays into two each (see **Appendix A**, **Figure A-3**). The live-fire hand grenade familiarization course would be constructed in Training Area 22. The location of the proposed Hand Grenade Familiarization Course is shown on **Figure 2-6**.

2.1.4 Cantonment Area Construction Projects

This EA addresses 49 cantonment area construction projects planned over the next 5 years to support future mission requirements and to comply with AT/FP criteria (see **Appendix A**, **Table A-3**). The total anticipated acreage impacted by all proposed cantonment area projects would not exceed 255 acres. Projects within this category include primarily new facility construction and additions to existing facilities, but could also include renovations, repairs, and alterations. The construction of new cantonment area facilities would be zoned in accordance with appropriate land use areas in order to continue or enhance compatibility with current land use. **Table 2-3** identifies projects that would be representative of the types of cantonment area construction projects proposed for development. These cantonment area construction projects have been selected for detailed analysis in this EA because they are believed to be representative of the upper range of potential effects that reasonably could be expected.

Table 2-3. Representative Cantonment Area Construction Projects

Installation Project Number	Project Identification Number and Title	FY	Land Use	Project Area (ft^2)
72103 (Warehouse) 72097 (Maintenance Facility) 73703 (ECS yard)	Equipment Concentration Site (Warehouse, Maintenance Facility, and ECS yard)	2011	ADM	103,700 (Warehouse) 74,688 (Maintenance Facility) 1,437,480 (ECS yard)
72098	Consolidated Vehicle Wash-Rack	2011	ADM	435,600
75510	Storm Water System Upgrade/Expansion	2010	OS	21,120 linear feet

Equipment Concentration Site. An expansion of the Equipment Concentration Site (ECS) is proposed to support an ongoing and expanded CSTC at FHL. This expansion would require the ECS to support more than 9,000 pieces of equipment. The ECS would consist of construction of a 74,688-ft^2 vehicle maintenance facility, a 1,437,480-ft^2 military equipment parking area, and a 103,700-ft^2 organizational storage warehouse. The proposed site of the ECS is in the cantonment area adjacent to existing ECS facilities. **Figure 2-7** depicts the general location of the proposed cantonment area construction projects.

Consolidated Vehicle Wash Rack. FHL proposes to construct a consolidated vehicle wash rack in the cantonment area. The vehicle wash rack would contain up to 26 stations (435,600 ft^2) to accommodate tactical wheel, track, and construction equipment. An oil/water separator (OWS), high-pressure water lines, restrooms, and overhead lighting would be installed. Concrete and asphalt driveways would accommodate track and wheel vehicles. Driveways would be lit by solar lighting. A drainage system including a water recirculation system would be constructed per environmental regulations.

Storm Water Drainage System Expansion/Upgrade. Upgrades and additions to the current storm water drainage system would occur throughout the FHL cantonment area. Drainage swales would be reinforced with rip-rap and appropriate vegetation buffers in areas prone to erosion, culverts would be increased in size to manage potential increases in flow, and detention basins and storm water oil separators installed at key locations to ensure a net zero increase in storm water discharge while maintaining and improving upon the present quality of discharged cantonment area storm water.

2.1.5 Training Requirements Associated with the Proposed Action

All projects previously described in **Sections 2.1.2**, **2.1.3**, and **2.1.4** are necessary for the anticipated increased levels of training at FHL. As identified in **Table 2-4**, training is anticipated to increase from the current annual level of approximately 750,000 man-days to a future training load of 1,500,000 man-days.

Table 2-4. Anticipated Annual Increases in Training

Year	2008	2009	2010	2011	2012 and Beyond[2]
Training Man-days	621,000	757,000[1]	962,000	1,221,000	1,500,000

Source: 1. FHL 2008b, 2. FHL 2009b

Increased levels in training can be anticipated in all functional levels of the ARFORGEN model. An additional 40 classes a year involving an additional 1,000 students would increase the throughput of the FHL TTC by 50 percent. Similar increases are anticipated for the RTC, raising RTC throughput to 800 soldiers a month with each soldier undertaking a 3-week training session. In addition to requirements for additional classroom space and associated amenities, there would be a corresponding increase in use of all existing and proposed training facilities to ensure that the qualification needs of individuals and units are met. It is expected that 500 additional full-time personnel would be required to support the increased training. The installation would experience a short-term increase in population when approximately 3,000 to 5,000 soldiers and possibly up to 7,000 soldiers visit FHL to complete required training exercises.

Brigade-level training rotations in the form of WAREXs and CSTCs would be expected to double from 757,000 to 1.5 million man-days for fiscal year (FY) 2010 and beyond. Additionally, current ongoing training, such as Operation Essayon, Platinum Wrench, and U.S. Navy Training, would be expected to be maintained at present levels with the potential for future increases as currently deployed servicemen return from duty abroad and thus add to the overall domestic training load.

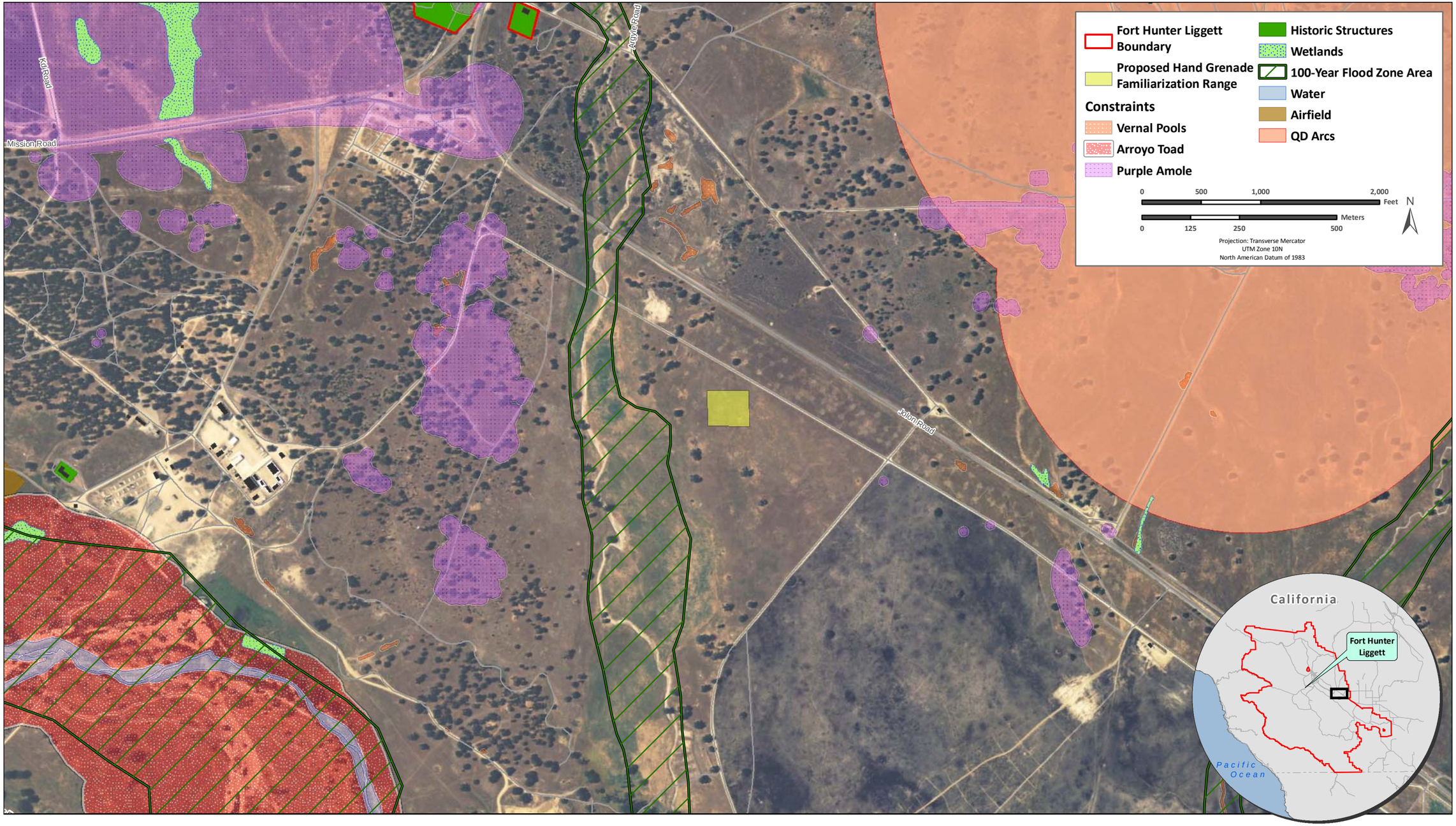

Figure 2-6. Proposed Location and Environmental Constraints for Hand Grenade Familiarization Course

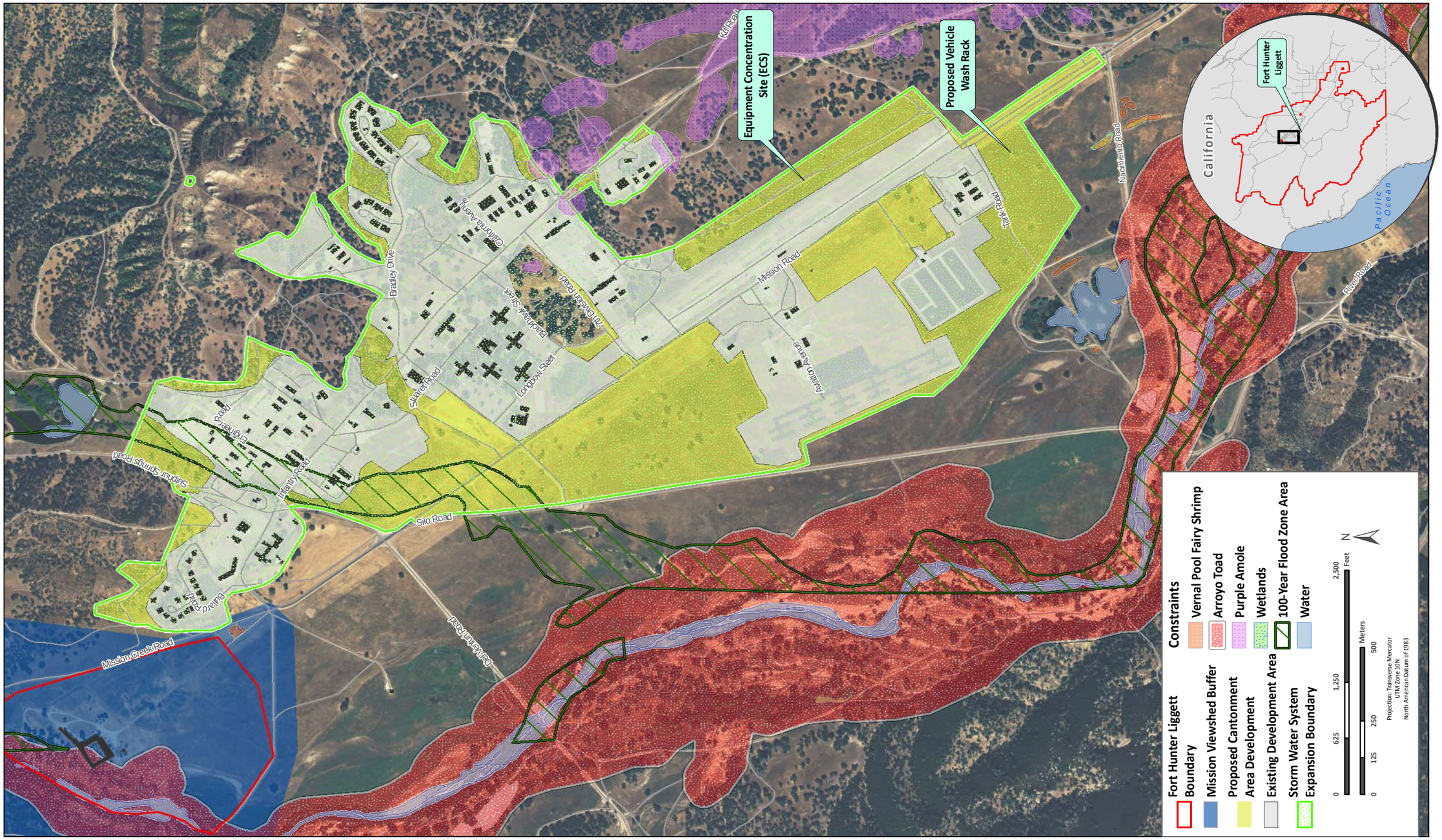

Figure 2-7. Proposed Location and Environmental Constraints for Cantonment Construction Projects

3. Alternatives to the Proposed Action

3.1 Introduction

Under NEPA, reasonable alternatives to the Proposed Action must be considered in an EA. Considering alternatives helps to avoid unnecessary impacts and allows analyses of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, an alternative must be reasonable. To be considered reasonable, an alternative must also be "ripe" for decisionmaking (i.e., any necessary preceding events having taken place), affordable, capable of implementation, and satisfactory with respect to meeting the purpose of and the need for the action. The following discussion identifies alternatives considered by the U.S. Army and identifies whether they are reasonable and, hence, subject to further detailed evaluation in this EA.

3.2 Screening Criteria and Alternatives

The following screening criteria were used to develop the Proposed Action and evaluate potential alternatives:

Ability to Perform Brigade-Level Training. Under the ARFORGEN model, soldiers will exit the Ready segment qualified in collective Brigade-level events. This requires training at an installation capable of providing ranges and rangelands of sufficient number and size to support the concurrent training of 2,500 to 5,000 soldiers.

Regional Locations. The structure of the USAR makes it preferable for training to occur on a regional basis from a logistical and cost perspective. A lack of regional facilities can also result in potential loss of valuable training time.

USAR Training Mission. To adopt the ARFORGEN model for Reserve components whereby soldiers train individually and as a unit to achieve a state of readiness within established timelines. Installations considered need to be able to accommodate USAR units on a consistent basis to meet ARFORGEN goals.

3.3 No Action Alternative

CEQ regulations require the analysis of the No Action Alternative. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential action alternatives can be evaluated.

Under the No Action Alternative, the U.S. Army would not implement the projects proposed in the installation's community of plans. In general, implementation of the No Action Alternative would require that FHL continues to operate under substandard, inefficient, and, in some cases, unsafe conditions. Under the No Action Alternative, these deficiencies would impair FHL's future ability to successfully sustain the current and future national security objectives and other mission requirements. If the No Action Alternative is chosen, future installation development projects would need to be evaluated for potential effects on an individual project basis, and the preparation of separate NEPA documents would be required for each project. The No Action Alternative will be carried for detailed analysis in this EA.

3.4 Alternatives Considered but Eliminated from Further Detailed Analysis

The U.S. Army evaluated possible alternatives to be considered for the Proposed Action. This section addresses options that were evaluated but not carried forward for detailed analysis in this EA.

3.4.1 Use of Active U.S. Army Installations

USARC considered the use of Active Army Installations to provide for the anticipated increased levels of USAR training. Most large Active Component (AC) installations have all the required infrastructure, weapons ranges, and maneuver areas to support USAR requirements. However, due to the accelerated AC timelines under ARFORGEN, the increased level of Brigade Combat Team training resulting from the Grow the Army initiative, continuing support for the Global War on Terror, the scheduling of USAR Brigade-level training at AC installations is tenuous at best; and therefore, will compromise USAR's ability to ensure training for units within established Reset/Train timeframes. For these reasons, use of AC installations was deemed unacceptable to the USAR mission and the alternative was eliminated from further detailed analysis in this EA.

3.4.2 Use of Alternative USAR Installations

USARC considered conducting training at other USAR installations, including Fort Dix in New Jersey, Fort McCoy in Wisconsin, and Camp Parks in California. However, both Fort Dix and Fort McCoy have their own missions and training purposes within USAR and are currently fully engaged in those missions. Therefore, Fort Dix and Fort McCoy would not be suitable for the increased level of training exercises proposed at FHL. Furthermore, training at these locations would not provide for regional training in the western United States. For these reasons, the use of Fort Dix and Fort McCoy was dismissed from further detailed analysis in this EA. Camp Parks is the only other USAR western region training installation of any significant size. The installation supports some 11,000 San Francisco Bay-area USAR and California National Guard soldiers from 180 units. Many of these units train at Camp Parks for 2 weeks each summer and use approximately 2,300 acres north of the main camp for field exercises and weapons training. HQUSARC has determined that although this is an invaluable USAR training facility, there are insufficient weapons ranges and maneuver areas to support Brigade-level training. For this reason, use of this installation was eliminated from further detailed analysis in this EA.

3.4.3 Acquiring Privately Owned Land Surrounding FHL

Under this alternative, FHL would purchase suitable land that is privately owned outside of the installation's present boundaries to develop facilities necessary for future mission requirements. FHL is surrounded by the Los Padres National Forest, private land, private land used for farming and grazing, and land owned by Monterey County. The DOD discourages installations from acquiring more land through purchases. The DOD is attempting to dispose of as many acres as possible of underutilized land at many installations in the United States. For these reasons, this alternative is not considered viable and was eliminated from further detailed analysis in this EA.

3.4.4 Lease Off-Installation Space for Construction Activities

USARC considered leasing space off-installation for construction activities. However, leasing of off-installation facilities is not a viable option based on force protection requirements. An enhanced-use lease (EUL) is another option to fund projects for new construction or renovation. EULs are opportunities for military services to partner with private industry by leasing underutilized assets. For

this Proposed Action, leased facilities would greatly limit the ability to meet the DOD force protection requirements, resulting in high additional costs or noncompliance with force protection requirements. This alternative was not considered viable and was eliminated from further detailed analysis in this EA.

3.5 Identification of the Preferred Alternative

The preferred alternative is the Proposed Action, as described in **Sections 2.1.2** through **2.1.5**. Upon completion of this EA, HQUSARC will determine whether the Proposed Action would result in significant impacts. If such impacts are predicted, HQUSARC would provide mitigation to reduce impacts to below the level of significance, undertake an EIS, or abandon the Proposed Action. This EA will also be used to guide the HQUSARC in implementing the Proposed Action in a manner consistent with the USAR standards for environmental stewardship.

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4. Affected Environment

This section describes the environmental and socioeconomic resources and conditions most likely to be affected by the Proposed Action and provides information to serve as a baseline from which to identify and evaluate environmental and socioeconomic consequences likely to result from implementation of the Proposed Action. Baseline conditions represent current conditions. In compliance with NEPA, CEQ guidelines, and 32 CFR Part 651, as amended, the description of the affected environment focuses on those resources and conditions potentially subject to impacts.

4.1 Airspace Management and Safety

4.1.1 Definition of the Resource

Airspace management procedures assist in preventing potential conflicts or aircraft accidents associated with aircraft using designated airspace in the United States, including restricted military airspace. Airspace management is facilitated through the use of specifically identified airspace defined vertically and horizontally in physical terms and also by duration of use.

Airspace management is defined as the coordination, integration, and regulation of the use of airspace. The FAA has overall responsibility for managing airspace through a system of flight rules and regulations, airspace management actions, and air traffic control (ATC) procedures. In addition, all military and civilian aircraft are subject to Federal Aviation Regulations (FARs).

This section of this EA addresses the rules, regulations, and procedures necessary to permit aircraft to operate safely among all other aircraft in the National Airspace System (NAS). Aircraft safety evaluation criteria include airspace operations and traffic management, as well as procedures to minimize potential damage to aircraft systems.

Airspace Management

The management of airspace is governed by Federal legislation and by military regulations and procedures. The FAA regulates military operations in the NAS through the implementation of FAA Handbook 7400.2E, *Procedures for Handling Airspace Matters*, and FAA Handbook 7610.4J, *Special Military Operations*. The objective of airspace management is to meet military training requirements through the safe and efficient use of available navigable airspace. Per AR 95-2, *Airspace, Airfields/Heliports, Flight Activities, Air Traffic Control, and Navigational Aids,* U.S. Army unit commanders would ensure that assigned airspace is used efficiently, effectively, and within national directives (U.S. Army 2008b). Chapter 3 of the FAA *Aeronautical Information Manual* defines and provides the operational requirements for each of the various types or classes of airspace (FAA 2008).

Airspace is defined as the space that lies above the land or waters of a nation and comes under its jurisdiction. Although it is generally viewed as being unlimited, airspace is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. The scheduling, or time dimension, is a very important factor in airspace management and ATC. The affected airspace environment is described in terms of its principal attributes, namely controlled and uncontrolled airspace, Special Use Airspace (SUA), en route airways, airports and airfields, and ATC.

ATC procedures provide for aircraft to be flown under instrument flight rule (IFR) and visual flight rule (VFR) conditions. VFR air traffic flies below 18,000 feet above mean sea level (MSL) using visual references such as towns, highways, and railroads as a means of navigation. VFR aircraft can also follow

Federal airways at altitudes not used by aircraft on instrument flight. VFR conditions rely heavily on "see-and-avoid" procedures that require pilots to be visually alert for and maintain safe distances from other aircraft, populated areas, obstacles, or clouds. Most other air traffic (including air passenger commercial carriers, business aircraft, and military aircraft) operate under IFR conditions that require pilots to be trained and appropriately certified in instrument navigational procedures.

Controlled Airspace. Controlled airspace is a generic term that encompasses the different classifications (Class A, B, C, D, and E) of airspace and defines dimensions within which ATC service is provided to flights (see **Figure 4-1**).

The FAA designates SUA for certain military training activities. One such airspace type is designated restricted airspace. A Restricted Area is airspace designated in FAR Part 73 within which the flight of nonparticipating aircraft, while not wholly prohibited, is subject to restriction.

Another type of SUA designated for military training activities are military operations areas (MOAs). MOAs are areas that consist of airspace of defined vertical and lateral limits established for the purpose of separating certain military training activities from IFR traffic.

Aircraft Safety

Aircraft safety is based on the physical risks associated with aircraft flight and current military operation procedures concerning aircraft safety. An Army accident is an accident that results in injury or illness to either Army or non-Army personnel, and damage to Army or non-Army property, as a result of Army operations (USACR/Safety Center undated a). U.S. Army accident rates are based on number of occurrences per 100,000 hours flown. Safe flying procedures, adherence to flight rules, and knowledge of emergency procedures form consistent and repeated aspects of training for all aircrews, including aircrews operating at FHL and other users of the airspace in the vicinity.

The U.S. Army has defined five classifications of aviation accidents and two classifications of aviation incidents (U.S. Army 2008c). Class A accidents result in total property damage costs of $1 million or more; an Army aircraft or missile is destroyed, missing, or abandoned; or an injury or occupational illness that results in a fatality or permanent total disability. Class A accidents represent the greatest property damage and injury, and will be analyzed in this EA.

Bird and wildlife strikes are an aircraft safety concern due to the potential damage that a strike might have on the aircraft or injury to aircrews. As required by AR 95-2, all personnel performing daily airfield inspections/checks shall inspect for obstacles, including birds and animals, and therefore, must be trained in bird/animal watch conditions, attractants, and control measures (U.S. Army 2008b), as outlined in FAA Advisory Circular 150/5200-33B, *Hazardous Wildlife Attractants On or Near Airports* (FAA 2007).

The FAA, USAF, U.S. Army, USEPA, USFWS, and the U.S. Department of Agriculture signed a Memorandum of Agreement in July 2003 to acknowledge their respective missions in protecting aviation from wildlife hazards. Through the Agreement, the agencies established procedures necessary to coordinate their missions to address more effectively existing and future environmental conditions contributing to collisions between wildlife and aircraft (wildlife strikes) throughout the United States (FAA 2003).

Nighttime flying operations are a safety concern due to decreased visibility; however, the same safe flying procedures, adherence to flight rules, and knowledge of emergency procedures that form consistent and repeated aspects of training for all aircrews, including FHL pilots and other users of the airspace within the vicinity of the installation, also apply to nighttime flying operations.

4.1.2 Existing Conditions

Airspace Management

The locations of the airspace analyzed in this EA are shown on **Figure 4-1**. As indicated on **Figure 4-1**, many of the airspace areas overlap. FHL is divided into 29 designated training areas in which tactical training may be conducted. Other aviation facilities on the installation include Tusi Army Heliport (AHP), Schoonover runway, five LZs, and more than 20 DZs as discussed below and shown on **Figure 4-1**.

FHL Airspace Procedures

Per Fort Hunter Liggett Regulation (FHLR) 350-2, all aviators flying at FHL receive an aviation briefing prior to operating in FHL training areas and airspace. This briefing advises pilots of live-fire exercises, no-fly areas, open or closed training areas, and other flight hazards. This briefing is automatically provided to aircraft doing an initial entry into FHL airspace (USDOT 2009).

Per FHLR 350-2 training area airspace and usage procedures, aviation units and training aircraft must coordinate the use of specific training areas before flying into the installation. Entry via a published access route directly to Tusi AHP or exit via the same route requires a current training activities briefing before entering FHL airspace. Tusi Advisory (the call sign for the aviation operations command and control station at FHL) transmits this briefing while approaching aircraft are still outside FHL airspace. Units authorized surface rights to a training area have control of the airspace from ground level up to and including 300 feet AGL. No other aircraft would be allowed to enter that training area airspace without written permission from the controlling unit.

During periods when high-performance (speeds in excess of 250 knots) aircraft are operating at FHL, coordinating altitudes would be established and announced by Notice to Airmen (NOTAM) or an aviation procedures guide published by the controlling ATC activity.

MOAs

Seven MOAs, which include Hunter High, Hunter Low A, Hunter Low B, Hunter Low C, Hunter Low D, Hunter Low E, and Roberts, are in the vicinity of FHL. Five MOAs surround R-2513, the primary flying area for FHL: Hunter Low A through Hunter Low E. Flights within these MOAs are scheduled by the Commander, Strike Fighter Wing U.S. Pacific Fleet, Naval Air Station Lemoore, California (USDOT 2009). Scheduling must be completed at least 4 hours before use (FHL 2006a).

Although these MOAs do not impose any flight restrictions or communications requirements with Tusi Advisory, they still pose a hazard for helicopter and fixed-wing aircraft entering and exiting FHL airspace (FHL 2006a). Aircraft operating at air speeds in excess of 250 knots primarily use these MOAs. Notification of active use in these MOAs is provided to FHL pilots via their aviation briefing and a NOTAM (FHL 2006a).

Controlled Airspace

At FHL, airspace is classified as Class E. Class E airspace can be described as general controlled airspace. It includes designated Federal airways consisting of the high-altitude (J or “Jet” Route) system and low-altitude (V or “Victor” Route) system. Federal airways have a width of 4 statute miles on either side of the airway centerline and can be structured between the altitudes of 700 feet AGL and 18,000 feet above MSL. The majority of Class E airspace is where more stringent airspace control has not been established. .

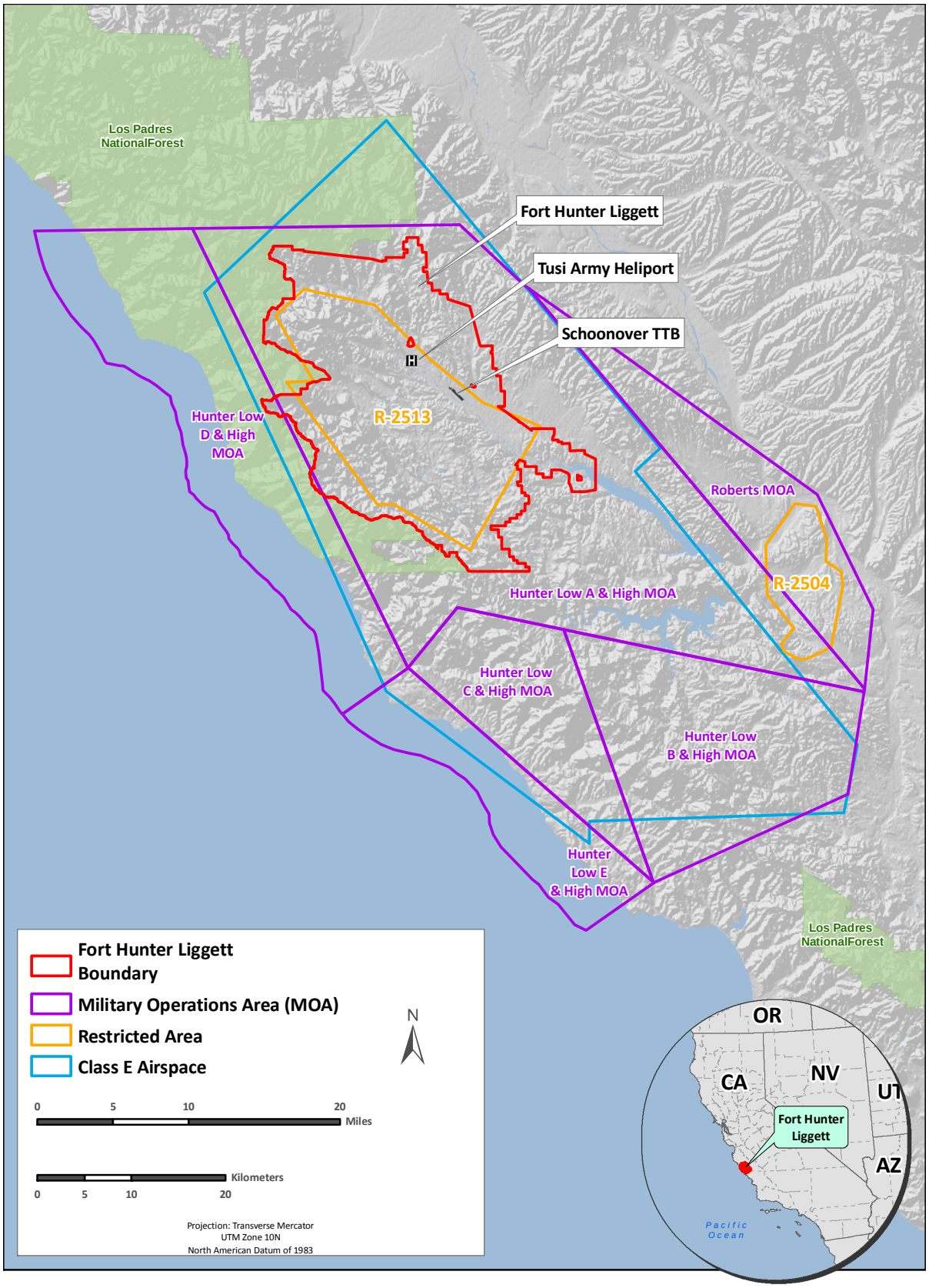

Figure 4-1. Airspace Areas in the Vicinity of FHL

Restricted area R-2513 is almost completely within the FHL boundary (see **Figure 4-1**) and is the primary airspace used by FHL personnel. Restricted airspaces are needed when the designated airspace can contain hazardous military activities including live firing of weapons, ordnance delivery, or aircraft testing. R-2513 has specific hours of operations, and users must have permission from the controlling agency before flight through the defined areas. R-2513 includes the airspace from the surface up to and including 24,000 feet above MSL.

Flight Corridors

Five helicopter flight corridors have been established to ensure that aircraft are safely routed when approaching or departing FHL. These corridors are generally in the northeastern portion of the installation, and include Northwest Pass, Bradley Pass, Jolon Pass, San Antonio Pass, and Venturi Pass. These corridors are the only routes authorized for entering and exiting FHL. Aircraft not flying directly to Tusi AHP can transition from these routes to a specific training area once the aircraft is within the installation boundary.

Tusi AHP

Tusi AHP, a private use heliport, is within the northeastern portion of the installation as shown on **Figure 4-1**. Tusi AHP consists of 36 prepared parking pads (FHL 2006a) and a 570-foot-by-50-foot lighted runway (AirNav 2009).

Schoonover Runway

Schoonover tactical assault strip (hereafter referred to as Schoonover runway) is an unimproved (compacted dirt/rock) runway measuring 6,300 feet (1920 meters) long by 100 feet (31 meters) wide within the eastern portion of the installation (see **Figure 4-2**). Schoonover runway is primarily used by C-130 and C-17 aircraft; however, it is also used by other transient aircraft and helicopters. Schoonover runway is used for both day and night tactical C-130 operations. When USAF aircraft are using Schoonover runway, a USAF Combat Control Team operates a tactical control tower and an Airport Traffic Area in coordination with Tusi Advisory (FHL 2006a).

Schoonover runway is defined as an LZ by United Facilities Code (UFC) 3-260-01. An LZ consists of a runway, a runway and taxiway, or other aircraft operational surfaces. It is a prepared or semi-prepared (unpaved) runway used to conduct operations in an airfield environment similar to forward operating locations. Schoonover runway is an Army semi-prepared (unpaved) LZ as defined by UFC 3-260-01, *Airfield and Heliport Planning and Design* (U.S. Army 2008b), and those criteria are discussed in this section.

Per UFC 3-260-01, LZs for C-130 and C-17 aircraft are special use runways for war-fighting or contingency response. DOD analysis has determined that the areas immediately beyond the ends of runways and along the approach and departure flight paths have significant potential for aircraft accidents. These zones for Schoonover runway are discussed in the following paragraphs; the land use guidelines for these zones are discussed in **Section 4.3.2**.

Clear Zone (CZ). The CZ, the area closest to the runway end, is the most hazardous for relative potential for aircraft accidents. A CZ is a surface on the ground or water, beginning at the runway threshold and symmetrical about the extended runway centerline, which is graded to protect aircraft operations. The CZ at Schoonover runway is a trapezoidal shape, with a width of 320 feet (98 meters) at the runway end and flaring uniformly to a width of 500 feet (153 meters), and is 500 feet (153 meters) long (DOD 2008).

Accident Potential Zone (APZ). The APZ is the land use control area beyond the CZ of an LZ that possesses a significant potential for accidents; therefore, land use is a concern. Schoonover runway is considered part of a training environment; therefore it is not considered to be a built-up area. Built-up and occupied locations are defined as locations where occupied buildings/facilities exist around the potential LZ site that are not related to the LZ (DOD 2008). Therefore, the unoccupied area APZ width provided in UFC 3-260-01 would apply to Schoonover runway. The APZ at Schoonover runway is 500 feet (153 meters) wide and 2,500 feet (762 meters) long.

Exclusion Area. An exclusion area is required for all paved and semi-prepared (unpaved) LZs (DOD 2008). The purpose of the exclusion area is to restrict the development of facilities around the LZ. Only features required to operate the LZ are permissible in the exclusion area. Security forces, roads, parking lots, storage areas, and similar structures are excluded from this area. The exclusion area is centered on the runway, and extends the length of the runway plus the CZ at each end. As previously discussed, Schoonover runway is not considered a built-up area; therefore, the unoccupied area exclusion area width would apply. The exclusion area at Schoonover runway is 700 feet (214 meters) wide, and 5,600 feet (1,707 meters) long (the length of the runway [5,100 feet] plus the length of the CZ [500 feet]).

Imaginary Surfaces. Imaginary surfaces are surfaces in space that are established around an LZ that are designed to define the protected airspace around the runway. The imaginary surfaces for LZs are the primary surface and approach-departure clearance surface. The primary surface is symmetrically centered on the LZ and includes the length of the CZ. The primary surface at Schoonover runway is 180 feet (55 meters) wide, and 6,100 feet (1,859 meters) long (the length of the runway [5,100 feet] plus 1,000 feet). The approach-departure clearance surface is trapezoidal in shape and begins 500 feet (153 meters) from the runway end, is 500 feet (153 meters) wide at the inner edge, and flares uniformly to a width of 2,500 feet (762 meters) at a distance of 10,500 feet (3,200 meters).

Other Landing Zones

In addition to Schoonover runway, there are five other tactical LZs for helicopters (i.e., Jackhammer, Jolon, Milpitas, Tule, and El Piojo) as shown on **Figure 4-2**. These LZs were, at one time, old tactical runways used by fixed-wing aircraft. Since these LZs are for helicopters, the C-130 and C-17 aircraft CZs, APZs, and imaginary surfaces described above for Schoonover runway would not apply. Commanders responsible for the LZ determine their own traffic patterns, altitudes, and reporting procedures within the scope of FHLR 350-2 (FHL 2006a).

Drop Zones

There are more than 20 DZs suitable for airborne personnel at FHL when the using agency is utilizing USAF platforms (see **Figure 4-3**). The proposed DZ locations are approved by Range Control no later than 24 hours before drop time.

The DZ staff is required to maintain radio communication with Range Control, and all other unit safety Standard Operating Procedures (SOPs) are in effect as the DZ Officer-In-Charge deems necessary (FHL 2006a).

Aircraft Operations

Multiple aircraft types frequent R-2513, including A-10, C-17, C-130, F-16, and F-18 aircraft; UH-1, CH-46, CH-47, CH-53, OH-58, and UH-60 helicopters; and unmanned aerial vehicles (UAVs) (U.S. Army 2009a).

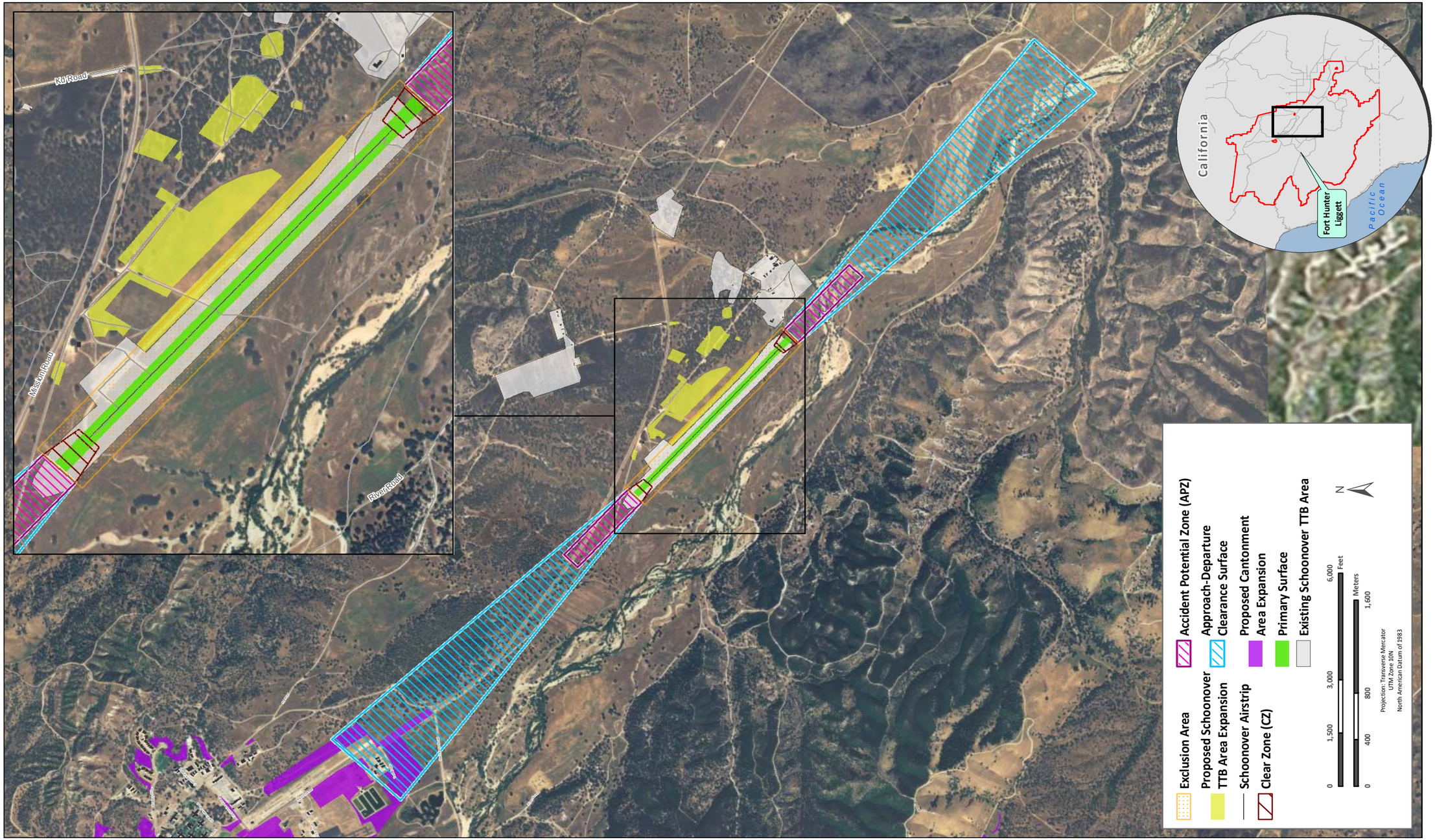

Figure 4-2. Aviation Facilities at FHL

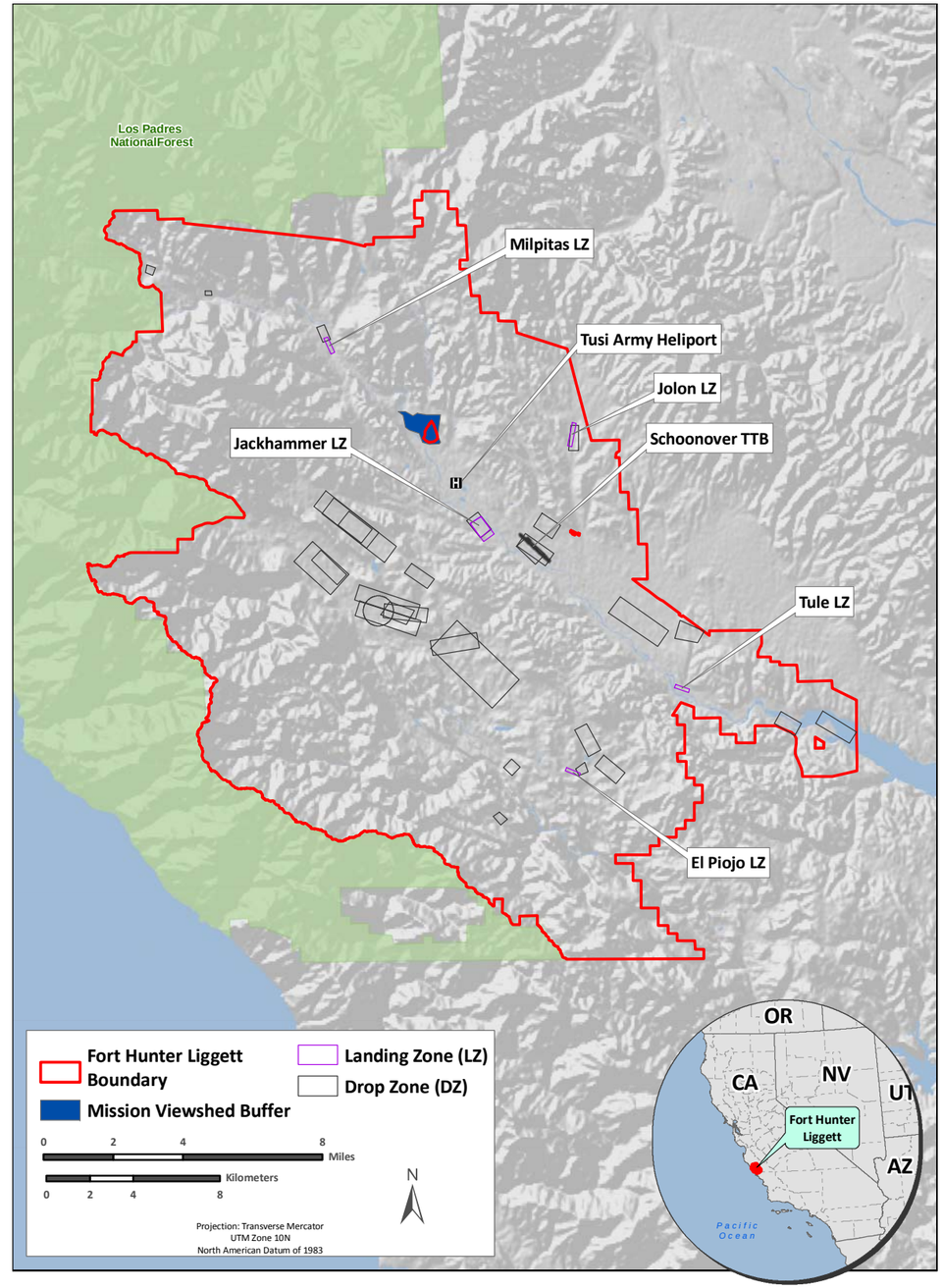

Figure 4-3. Drop Zones at FHL

In FY 2008, 1,349 sorties were conducted in R-2513 (U.S. Army 2009a). A sortie is the entire flight path of a military aircraft that includes the arrival, departure, and any closed-pattern activities. This annual utilization is for all the military units accessing R-2513, not just flights conducted by FHL pilots. An operation is defined as a single aircraft movement, such as an arrival or departure. A closed pattern accounts for two operations, consisting of an arrival and a departure. Pilots commonly use closed patterns to practice takeoffs and landings, and closed patterns usually remain close the airfield. Flights at Schoonover runway are discussed in terms of operations in this EA.

Although operations occur at the DZs and LZs throughout FHL, these flights are sporadic and are confined to the airspace within the installation boundary. The Proposed Action includes a doubling in annual operations at Schoonover runway only (see **Section 4.1.3.2**), therefore only the baseline annual operations for Schoonover runway are discussed in detail in this section. It was estimated that approximately 500 operations per year are conducted at Schoonover runway. It was estimated that at Schoonover runway, the majority (approximately 49 percent) of the operations are conducted by C-130 aircraft, followed by helicopters (34 percent), C-17 aircraft (approximately 15 percent), and C-12 aircraft (approximately 2 percent). It was estimated that approximately 55 percent of aircraft and helicopter operations at Schoonover runway are conducted during daytime hours (7:00 a.m. to 7:00 p.m.), and approximately 45 percent are conducted during nighttime hours (10:00 p.m. to 7:00 a.m.). It was estimated that each operation at Schoonover runway lasts for approximately 45 minutes (Zippwald 2009), for a total of 375 hours of flying time per year.

4.1.2.1 Aircraft Safety

Aircraft safety associated with the airspace analyzed in this EA includes the following four key concerns: aircraft accidents, avoidance areas, aircraft-wildlife strikes, and nighttime flying.

Accidents. U.S. Army accident investigation and reporting procedures are provided in AR 385-10, *The Army Safety Program* (U.S. Army 2008c). Current procedures for conducting accident investigations are also provided in Department of the Army Pamphlet (DA PAM) 385-40, *Army Accident Investigations and Reporting* (U.S. Army 2009b). The U.S. Army Aviation Accident Prevention Program is outlined in AR 385-95 (U.S. Army 1999). The safety and accident program requirements provided in AR 385-95 include operational hazard reporting, pre-accident planning, personnel protection guidelines, and aviation maintenance procedures. At FHL, the Aviation Officer is responsible for the management, direction, and supervision of aviation operations at the installation; formulating and maintaining the FHL Aviation Pre-Accident Plan (a stand-alone SOP); maintaining the FHL aviation SOPs; implementing the Aviation Safety Program; and implementing the foreign object and debris control program (FHL 2006a). At a minimum, the FHL Aviation Safety Program includes current safety management techniques, the Aviation Accident Prevention Plan, the hazard inventory log, and the Comprehensive Hazard Identification Program. FHLR 350-2 also includes helicopter safety procedures (FHL 2006a).

The number of U.S. Army-wide Class A flight aviation accidents and the flight accident rate per 100,000 flying hours is provided in **Table 4-1**. As shown, the total number of accidents and the accident rate has decreased over the past 3 years (USACR/Safety Center 2009).

Since C-130 and C-17 aircraft use Schoonover runway, USAF accident data for these aircraft were used. The number of USAF-wide Class A mishaps, the Class A mishap rate per 100,000 flying hours, and the annual flying hours for both aircraft types are provided in **Table 4-2**. As shown, on average, less than two Class A mishaps per year have occurred for the C-130 and C-17 aircraft (AFSC 2007a and AFSC 2007b).

Table 4-1. U.S. Army-Wide Aviation Flight Accident Data

Year	Number of Class A Accidents	Class A Accident Rate per 100,000 Flying Hours
FY 2006	18	1.65
FY 2007	25	2.73
FY 2008	15	1.31
FY 2009	21	1.85
3-Year Average	19	1.90

Source: USACR/Safety Center 2009
Note: Accident rates are rounded.

Table 4-2. USAF Class A Accident Data for the C-130 and C-17 Aircraft

Year	Number of Class A Accidents	Class A Accident Rate per 100,000 Flying Hours	Annual Flying Hours
C-130 Aircraft			
FY 2004	1	0.31	333,250
FY 2005	2	0.66	303,138
FY 2006	0	0.00	280,668
FY 2007	0	0.00	268,546
10-year average (1997–2007)	**0.9**	**0.31**	**293,753**
C-17 Aircraft			
FY 2004	3	1.92	156,297
FY 2005	6	3.80	889,314
FY 2006	2	1.26	158,855
FY 2007	2	1.13	177,297
10-year average (1997–2007)	**1.6**	**1.59**	**100,790**

Source: AFSC 2007a and AFSC 2007b
Note: Annual flying hours are rounded.

Avoidance Areas. While the Class E airspace and MOAs surrounding FHL and R-2513 do not include any FAA-established exclusion areas (USDOT 2009), per FHLR 350-2 pilots would plan and conduct their flights so that unnecessary and undue disturbance to either the civilian or military communities caused by aircraft noise and operation would be avoided (FHL 2006a). Pilots may deviate from the following restrictions if weather or in-flight emergency conditions so dictate. Avoidance areas include Bradley Pass, Mission San Antonio, Town of Jolon, FHL Cantonment Housing area, vicinity of Ostrich/African Geese Ranch, and general restrictions related to overflights over recreation activities at the San Antonio and Nacimiento Reservoirs. Seasonal avoidance is established based on environmental concerns.

Aircraft-Wildlife Strikes. There is always a possibility of bird and wildlife strikes whenever aircraft operate, especially when operating in close proximity to the ground. Aircraft-wildlife strike issues for FHL as they relate to biological resources are discussed in **Section 4.7.2**.

Nighttime Flying. Although nighttime operations occur at the DZs and LZs at FHL, these flights are sporadic and are confined to the airspace within the installation boundary. The Proposed Action includes an increase in annual operations at Schoonover runway only (see **Section 4.1**), therefore only the baseline annual nighttime operations for Schoonover runway are discussed in this section. As discussed in **Section 4.1**, it was estimated that approximately 55 percent of aircraft and helicopter operations at Schoonover runway are conducted during daytime hours (7:00 a.m. to 7:00 p.m.), and approximately 45 percent are conducted during nighttime hours (10:00 p.m. to 7:00 a.m.). Nighttime flying can pose an increased risk to pilots due to decreased visibility; however as discussed in **Section 4.1**, FAR Part 91 states that an aircraft cannot be operated from sunset to sunrise unless it has lighted position, aviation, and landing lights. FAR Part 91 also includes basic VFR weather minimums that state that no aircraft may be operated under VFR when the flight visibility is less than 3 miles. FHL has established Night Vision Device (NVD) flight paths where lights-off operations can be conducted. NVD operations are only conducted within the confines of R-2513 when the restricted area is active, and adherence to FHL NVD regulations is required (FHL 2006a). The safety effects from NVD use are not analyzed in this EA because the Proposed Action does not include an increase in their use.

4.2 Noise

4.2.1 Definition of the Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a rooftop. Sound is measured with instruments that record instantaneous sound levels in decibels.

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Chapter 14 of AR 200-1, *Environmental Protection and Enhancement*, implements Federal laws concerning environmental noise from Department of the Army activities (U.S. Army 2007a).

Noise Metrics. Two types of measurements are normally considered when determining noise impacts on the surrounding population: the day-night average sound level (DNL) and peak sound levels. DNL represents daily operations averaged over a prescribed time period with a 10-decibel (dB) penalty assigned to noise events occurring hours between the hours of 10 p.m. and 7 a.m. DNL is the primary descriptor for military noise (except for noise from small arms), since it represents a daily average. Single event noise levels are also used to assess the risk of noise complaints. A peak sound level is a single noise event; it is the maximum noise level that is estimated to be heard. DNL sound levels are used by the U.S. Army and U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM)

to analyze land use compatibility, while peak sound levels are used to estimate the degree to which the surrounding population is impacted by a single noise event (USACHPPM 2005).

Sound levels can be A-weighted, C-weighted, or unweighted. An A-weighted measurement depresses the noise levels in low- and high-frequency bands to approximate the range of human hearing. This noise measurement provides a good indication of the impact produced by aircraft activities. The C-weighting measurement includes a lower frequency range of sounds than the A-scale, and was used to evaluate the demolition and large arms firing at FHL. The low-frequency components of sound from high-amplitude impulsive noise cause buildings and windows to shake and rattle (vibration).

DNL is the metric recognized by the U.S. government for measuring noise and its impacts on humans. According to the USAF, FAA, and the U.S. Department of Housing and Urban Development (HUD) criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds a DNL of 75 dBA, "normally unacceptable" in regions exposed to noise between 65 dBA and 75 dBA, and "normally acceptable" in areas exposed to noise of 65 dBA or under. The Federal Interagency Committee on Noise developed land use compatibility guidelines for noise in terms of DNL sound levels (FICON 1992). For outdoor activities, the USEPA recommends a DNL sound level of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (USEPA 1974).

Noise levels vary depending on the population density and proximity to land uses such as parks, schools, or industrial facilities. As shown on **Table 4-3**, noise levels in a typical suburban residential area are at a DNL of about 55 dBA, which increases to 60 dBA for an urban residential area, and to 80 dBA in the downtown section of a city (USEPA 1974).

Table 4-3. Typical Outdoor Noise Levels

DNL (dBA)	Location
50	Residential area in a small town or quiet suburban area
55	Suburban residential area
60	Urban residential area
65	Noisy urban residential area
70	Very noisy urban residential area
80	City noise (downtown of major metropolitan area)
88	3rd floor apartment in a major city next to a freeway

Source: USEPA 1974

Studies specifically conducted to determine noise effects on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below a DNL of 65 dBA (FICON 1992).

The following paragraphs describe the metrics that were used to assess noise level from aircraft operations, small arms weapons fire, and large arms weapons fire and demolition at FHL.

Construction Sound Levels. Clearing and grading activities and building construction can cause an increase in sound that is well above the ambient level. **Table 4-4** lists sound levels associated with common types of construction equipment that could be used under the Proposed Action. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area.

Table 4-4. Predicted Noise Levels for Construction Equipment

Construction Category and Equipment	Predicted Noise Level at 50 feet (dBA)
Clearing and Grading	
Bulldozer	80
Grader	80–93
Truck	83–94
Roller	73–75
Excavation	
Backhoe	72–93
Jackhammer	81–98
Building Construction	
Concrete mixer	74–88
Welding generator	71–82
Pile driver	91–105
Crane	75–87
Paver	86–88

Source: USEPA 1971

Aircraft Noise. Noise from aircraft operations is assessed using a daily average metric and a single event metric. For the daily average metric the Community Noise Equivalent Level (CNEL), which is similar to DNL, is used in the State of California. CNEL measures the A-weighted average of sound levels gathered throughout a 24-hour period. However, in addition to the 10-dB penalty assigned to events that occur between the hours of 10 p.m. and 7 a.m., there is a 5-dB penalty assigned to events that occur between the hours of 7 p.m. and 10 p.m. (Casella USA 2009). The additional penalty takes into account that community members are normally more sensitive to noise during evening hours than during the daytime.

Single sound events for aircraft noise are measured using the Sound Exposure Level (SEL) metric. SEL is a measure of the total sound exposure of an event compressed into a 1-second time interval. The SEL metric represents the sound of an aircraft flyover. CNEL and SEL are A-weighted.

Small Arms Weapons Noise. Noise from small arms ranges is assessed using a single event metric. For this type of analysis, the peak sound pressure level (PK15[met]) is used in accordance with AR 200-1 (U.S. Army 2007a). PK15(met) accounts for the statistical variation in received single event peak noise levels due to weather. If there are multiple weapon types fired from one location, or multiple firing locations, the single event level used should be the loudest noise level that occurs at each receiver location. PK15(met) does not take the duration or the number of events into consideration. PK15(met) is measured in unweighted decibels (dBP).

Large Arms Weapons and Demolition Noise. Noise from large arms and demolition activities is assessed using DNL and PK15(met) per AR 200-1. Large arms and demolition weapons generate impulsive noise and are therefore assessed using C-weighted decibels (dBC).

Noise Zones. Noise exposure levels are depicted visually for analytical purposes as noise contours that connect points of equal value. These noise contours are overlaid on a map of an airfield or range vicinity. The area encompassed by a noise contour is a noise exposure zone, also referred to as a "noise zone." Under U.S. Army regulations, there are four noise zones, which include the land use planning zone (LUPZ). The impact of the noise exposure levels from aircraft operations, weapons firing, and other military activities at specific sites are analyzed using noise zones. **Table 4-5** shows the noise limits within the noise zones for various activities.

Table 4-5. Noise Limits for Noise Zones

Noise Zone	Aviation DNL Noise Limit in dBA	Large Arms and Demolition DNL Noise Limit in dBC	Small Arms PK15(met) Noise Limit in dBP
LUPZ	60–65	57–62	N/A
Noise Zone I	< 65	< 62	< 87
Noise Zone II	65–75	62–70	87–104
Noise Zone III	> 75	> 70	> 104

Source: U.S. Army 2007a

LUPZ. The LUPZ is used to better predict noise impacts when levels of operations at airfields or large caliber weapons ranges are above average. This zone can provide the installation with an adequate buffer for land use planning and can reduce conflicts between the installation's noise-producing activities and the civilian community. This area is acceptable for noise-sensitive land uses.

Noise Zone I. Noise Zone I includes all areas around a noise source in which the DNL is less than 65 dBA for aircraft activity, less than 62 dBC for large arms activity, and less than PK15(met) 87 dBP for small arms weapons. This area is usually acceptable for all types of land use activities.

Noise Zone II. Noise Zone II consists of an area where the DNL is between 65 and 75 dBA for aircraft activity, between 62 and 70 dBC for large arms weapons, or between PK15(met) 87 and 104 dBP for small arms weapons. Land within Noise Zone II should normally be limited to activities such as industrial, manufacturing, transportation, and resource production. However, if the community determines that land in Noise Zone II must be used for residential purposes, then noise level reduction features of 25 to 30 dB should be incorporated into the design and construction of new buildings.

Noise Zone III. Noise Zone III consists of the area around the noise source where the DNL is greater than 75 dBA for aircraft activity, greater than 70 dBC for large arms weapons, and greater than PK15(met) 104 dBP for small arms weapons. The noise levels within Noise Zone III are considered so severe that noise-sensitive land uses should not be considered therein.

As previously discussed, large arms and demolition activities generate impulsive noise. Peak sound levels from these activities are assessed using the guidelines shown in **Table 4-6**.

Table 4-6. Impulse Noise Guidelines for Peak Sound Levels

Large Arms and Demolition PK15(met) Noise Limit in dBP	Risk of Complaints
< 115	Low
115–130	Medium
130–140	High
> 140	Risk of physiological damage to unprotected human ears and structural damage claims.

Source: U.S. Army 2007a

4.2.2 Existing Conditions

A wide variety of air and ground military training occurs within the installation and includes activities at firing ranges, convoy live-fire areas, DZs, a heliport, various LZs for helicopters, and a runway that is constructed of compacted fill. The Multi-Purpose Range Complex supports live-fire training for main battle tanks; Bradley Infantry Fighting Vehicles; the tube-launched, optical-tracked, wire-guided missile; and helicopter aerial gunnery. Personnel at FHL also detonate explosive charges for training and Explosive Ordnance Disposal (EOD). Current training activities at the installation make up the majority of the noise in the ambient acoustical environment in this region. Agricultural activities contribute slightly to the ambient acoustical environment in the areas east of FHL. Vehicle noise likely comes from Jolon Road, which is the major transportation route in the vicinity of the installation. Land to the west and south of FHL is mountainous and rural; consequently, land use in these regions does not contribute significantly to the ambient acoustical environment (see **Section 4.3.2** for land use).

Aircraft Operations at Schoonover Airfield

To estimate the current noise impacts from aircraft and helicopters that operate out of Schoonover airfield, data were gathered that included where the aircraft fly, how they fly, and how often. Military flying at Schoonover airfield is counted in terms of operations.

Aircraft operating at Schoonover airfield use Runway 12 approximately 20 percent of the time (i.e., they depart to the south and arrive from the north) and Runway 30 approximately 80 percent of the time (i.e., they depart to the north and arrive from the south). The runway at Schoonover Airfield is shown in **Figure 4-2**.

Flight patterns represent the way aircraft arrive, depart, and perform closed-pattern operations. Aircraft arrive to and depart from Runway 12 and Runway 30 mainly from the south, the northwest, and the northeast. Aircraft arriving or departing south generally fly from the region where San Antonio Lake is located. Aircraft arriving or departing north of the airfield need to avoid Tusi Heliport, which is approximately 2 miles from the airfield and Mission San Antonio de Padua, which is approximately 3.5 miles west. There is a 1-mile no-fly buffer around Mission San Antonio de Padua. Restrictions also exist at the boundary of FHL. When entering the installation, aircraft must fly at least 2,500 feet above MSL and 3,000 feet above MSL when exiting the installation. These flight restrictions were designed to minimize noise exposure, to the greatest extent possible, to populations within the Mission San Antonio de Padua property and to populated areas outside of FHL.

The total number of operations at Schoonover airfield was estimated to be approximately 500 annual operations (FHL 2009d). **Table 4-7** shows a representative sample of transient aircraft that visited Schoonover airfield in 2009. As shown, the majority of the aircraft operating out of the Schoonover Airfield consist of C-130s, with C-17 aircraft accounting for approximately 15 percent of the total number of operations. In addition, numerous helicopters use the airstrip. The C-130 was the only aircraft modeled with closed-pattern operations.

Table 4-7. Estimated Aircraft Fleet Mix at Schoonover Airfield

Aircraft	Percentage of Operations Performed
C-130	49%
C-17	15%
CH-46	13%
UH-1	11%
CH-53	10%
C-12	2%
Total	**100%**

As previously discussed, in the State of California aircraft noise is assessed using the CNEL noise metric. Three time periods are assessed under the CNEL metric: daytime (7 a.m. to 7 p.m.), evening (7 p.m. to 10 p.m.), and nighttime (10 p.m. to 7 a.m.). As shown on **Table 4-8**, it was estimated that approximately 52 percent of aircraft operations at Schoonover Airfield occur during the daytime, 39 percent during the evening, and 9 percent at night. Aircraft from the estimated fleet mix include the C-130, C-17, and C-12. It was estimated that helicopters arrive and depart during the daytime approximately 57 percent of the time and during the nighttime 43 percent of the time. Helicopters from the estimated fleet mix include CH-46, UH-1, and CH-53.

Table 4-8. Estimated Aircraft and Helicopter Operational Time Periods at Schoonover Airfield

Time Period	Aircraft	Helicopters
Day (7 a.m. to 7 p.m.)	52%	57%
Evening (7 p.m. to 10 p.m.)	39%	0%
Night (10 p.m. to 7 a.m.)	9%	43%
Total	**100%**	**100%**

Noise zones for the baseline scenario at Schoonover Airfield were estimated based on the data discussed in the previous paragraphs. **Table 4-9** summarizes the number of acres affected by specific noise levels in each noise zone under the Baseline Scenario. The acreage within the CNEL noise zones from aircraft operations only includes land immediately adjacent to the runway at the Schoonover airfield (see **Figure 4-2**) and consists entirely of installation property. No facilities at Schoonover airfield are within the noise zones.

Table 4-9. Baseline Scenario CNEL Noise Zones at Schoonover Airfield

CNEL Noise Zones	Baseline Scenario (acres)
LUPZ: 60–64 dBA	63
Noise Zone I: 65–69 dBA	8
Noise Zone II: 70–74 dBA	4
Noise Zone III: 75–79 dBA	0
Total	**75**

Helicopter Operations

The average DNL from helicopter training activities is negligible because of altitude, but single event noise levels can cause annoyance. **Table 4-10** illustrates the SEL values at varying heights that are typically heard from UH-N and CH-53 helicopters. Off-installation populations near the boundary of FHL are most likely to experience noise levels from helicopters when they are flying at 1,500 AGL, which, as shown in **Table 4-10**, is in the range of 89 to 91 dBA from UH-1N and CH-53 helicopters. However, residents at higher elevations can sometimes experience loud overflights. Noise complaints are most likely to occur from residences in or adjacent to the Bradley Pass because the houses are near the flight corridor.

Table 4-10. Helicopter SEL Values

Altitude	UH-1N (SEL)	CH-53 (SEL)
100 AGL	106 dBA	110 dBA
200 AGL	102 dBA	105 dBA
500 AGL	96 dBA	99 dBA
1,500 AGL	89 dBA	91 dBA

Note: Noise values are estimated with the receiver directly underneath the helicopter.
Key: AGL = above ground level

FHL has established noise abatement and mitigation measures to lessen noise on civilian or military communities. Some of these measures include pilots navigating through Bradley Pass must maintain at least 2,500 feet MSL, no flying within a 1,000-foot horizontal and vertical radius of Mission San Antonio, no overflights below 1,000 feet AGL above the Town of Jolon, and no overflights below 1,000 feet AGL over the cantonment area (FHL 2006a).

4.3 Land Use

4.3.1 Definition of the Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. U.S. Army installation land use planning commonly uses 12 general land use classifications (airfield, maintenance, industrial, supply/storage, administration, training/ranges, unaccompanied personnel housing, family housing, community, medical, outdoor recreation, and open space). These U.S. Army land use designations roughly parallel those employed by municipalities in the civilian sector (Canter et al. 2007).

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Tools supporting land use planning include written master plans/management plans and zoning regulations. Except for economic growth considerations, these concepts apply to U.S. Army land use planning whose purpose is to identify the principal kinds of facilities and activities to be found in particular areas on installations (Canter et al. 2007).

In appropriate cases, the location and extent of a proposed action needs to be evaluated for its potential effects on a project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence."

In the context of aircraft operations, land use compatibility is also described in terms of safety and clearance zones as well as noise levels. Land use in the CZs, APZs, and exclusion areas are restricted due to aircraft operations. **Section 4.1** provides additional information on safety and clearance zones from an airspace management and aircraft safety perspective. **Section 4.2** describes noise levels associated with aircraft operations.

4.3.2 Existing Conditions

Surrounding Land Use. FHL is in Monterey County in west-central California, approximately 70 miles southeast of the city of Monterey, approximately 25 miles southwest of King City, and approximately 12 miles west of Lockwood (see **Figure 1-1**). The land surrounding FHL consists of Los Padres National Forest, which is adjacent to the installation to the north and west and includes portions of the Ventana and Silver Peak Wilderness areas, smaller areas of private land, private lands used for grazing and farming, and some Monterey County lands to the east and south. FHL coordinates with the U.S. Forest Service on a case-by-case basis for land utilization on Los Padres National Forest.

Land uses on the west, north, and east sides of FHL are regulated by Monterey County, while land uses to the south are regulated by San Luis Obispo County. Agricultural zoning or other low-density uses are the primary land use designations for the areas surrounding the installation (FHL 2004a, FHL 2006b). Monterey County classified FHL as "Public/Quasi-Public" land use (Monterey County 1987). The eastern portion of FHL and adjacent land outside of the installation has been proposed to be designated as the Jolon Road Segment of the Agriculture and Winery Corridor by Monterey County. This designation establishes guidelines and standards for the development of wineries and wine industry-related uses within the designated corridor, and enhances marketing opportunities of these areas (Monterey County 2007a).

On-Installation Land Use. FHL consists of approximately 162,000 acres with 160,800 acres of training and maneuver lands subdivided into 29 Training Areas. The main Light Maneuver Corridor is on the west-southwestern part of the installation and there is a smaller corridor on the north-northeastern side of FHL. The main Heavy Maneuver Corridor runs north-south through the center of FHL and there is a smaller corridor in the northwest (FHL undated). FHL land use categories consist of administration, airfield, training (classroom), training (outdoor), community services/facilities, family housing, unaccompanied housing, maintenance, supply/logistics, medical, utility, and outdoor recreation/open space (FHL 2007a). At this time, there are no plans for Land Expansion or Army Compatible Use Buffers (FHL undated).

All land at FHL, except for the cantonment area and Mission San Antonio de Padua is considered part of a training area. FHL contains 34 training areas. Twenty-one of the training areas are designated for light forces maneuver training, and the remaining 13 training areas are capable of supporting heavy forces maneuver training. The Multi-Purpose Range Complex supports up to Tank/Bradley-level training. The

Stony Valley area allows units to design their own live-fire scenarios. As for maneuver training, Training Areas 12, 15, and 20 are suited for Mechanized Combat Operations and Lane Training (FHL 2007b).

FHL also has several aviation training areas, including Tusi AHP, Schoonover runway, and several LZs and DZs (see **Figures 4-2** and **4-3**). Tusi AHP has 36 parking pads and a 570-foot-long, 50-foot-wide, lighted runway in the southwestern portion of the cantonment area (FHL 2004a, FHL 2007a). Schoonover runway is approximately 1.5 miles southeast of the cantonment area. Jolon, El Piojo, Tule, Jackhammer, and Milpitas are tactical LZs for helicopters, which also serve as personnel and equipment DZs (FHL 2009d). FHL includes more than 20 DZs that are capable of battalion-sized mass attacks. In addition, the Medivac Airfield, a small landing pad for helicopters, is in the west-central portion of the cantonment area (FHL 2004a).

The cantonment area is in the east-central portion of the installation and occupies just over 1,000 acres. There are multiple land uses present in the cantonment area including mission-related uses and support functions. There are several family housing areas currently used to support full-time residents of the installation, and to provide lodging for short-term residents in the form of transient training barracks and senior enlisted and officers' quarters (FHL 2007a). Nacimiento-Fergusson Road bisects the installation connecting Highway 1 to Jolon Road.

Schoonover Airfield and Tusi AHP present notable constraints to land use development (FHL 2007a). No development should occur within operational surfaces, including the runway, taxiway, and apron clearances of these aviation facilities. Only structures or features that are inherently functional to aircraft operations and maintenance (e.g., operational surfaces such as taxiways and aprons, navigational aids (NAVAIDs), aircraft and support equipment, and cargo loading and unloading areas and equipment) are permissible within exclusion areas. Security forces, roads, parking lots, and storage areas are excluded from exclusion areas (DOD 2008). **Figure 4-2** identifies the areas at Schoonover runway that are constrained for development.

4.4 Air Quality

4.4.1 Definition of the Resource

The air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm), micrograms per cubic meter ($\mu g/m^3$), or milligrams per cubic meter (mg/m^3).

The Clean Air Act (CAA) directed USEPA to develop National Ambient Air Quality Standards (NAAQS) for pollutants that have been determined to affect human health and the environment. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM_{10}] and particulates equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb). The primary NAAQS are ambient air quality standards to protect the public health; secondary NAAQS specify levels of air quality to protect the public welfare such as effects on vegetation, crops, wildlife, economic values, and visibility. The CAA also gives the authority to states to establish air quality rules and regulations. The State of California has adopted the NAAQS and promulgated additional California Ambient Air Quality Standards (CAAQS) for criteria pollutants. The CAAQS are more stringent than the Federal primary standards.

The USEPA designates any area that does not meet the national primary or secondary ambient air quality standard for a criteria pollutant as a nonattainment area. For O_3, each designated nonattainment area is classified as marginal, moderate, serious, severe, or extreme, based on ambient O_3 concentrations. **Table 4-11** presents the USEPA NAAQS and CAAQS.

Table 4-11. National and State Ambient Air Quality Standards

Pollutant	Averaging Time	Standard Value		Federal Standard Type
		Federal	State	
CO	8-hour [a]	9 ppm (10 mg/m^3)	Same	Primary
	1-hour [a]	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)	Primary
NO_2	Annual Arithmetic Mean	0.053 ppm (100 µg/m^3)	0.030 ppm (57 µg/m^3)	Primary and Secondary
	1-hour	--	0.18 ppm (339 µg/m^3)	None
O_3	8-hour [b]	0.075 ppm (147 µg/m^3)	0.070 ppm (137 µg/m^3)	Primary and Secondary
	1-hour [c]	--	0.09 ppm (180 µg/m^3)	Primary and Secondary
Pb	Quarterly average	1.5 µg/m^3	--	Primary and Secondary
	30-Day	--	1.5 µg/m^3	
PM_{10}	Annual Arithmetic Mean	--	20 µg/m^3	
	24-hour	150 µg/m^3 [d]	50 µg/m^3	Primary and Secondary
$PM_{2.5}$	Annual Arithmetic Mean [e]	15 µg/m^3	12 µg/m^3	Primary and Secondary
	24-hour [f]	35 µg/m^3	Same	Primary and Secondary
SO_2	Annual Arithmetic Mean	0.030 ppm	--	Primary
	24-hour [a]	0.14 ppm	0.04 ppm	Primary
	3-hour [a]	0.5 ppm (1,300 µg/m^3)	--	Secondary
	1-hour	--	0.25 ppm--	None
Visibility Reducing Particles	8-hour	0.23 per km[g]	--	None
Sulfates	24-hour	25 µg/m^3	--	None
Hydrogen Sulfide	1-hour	0.03 ppm	--	None
Vinyl Chloride	24-hour	0.01 ppm	--	None

Sources: USEPA 2008a and CARB 2008

Notes: Parenthetical values are approximate equivalent concentrations.

ppm = parts per million; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter; km = kilometer

a. Not to be exceeded more than once per year.

b. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. This standard is effective on May 27, 2008, and replaces the 1997 8-hour ozone standard of 0.08 ppm. However, the 1997 standard and its implementing rules remain in effect while USEPA undergoes rulemaking to transition to the 2008 standard.

c. As of June 15, 2005, USEPA revoked the Federal 1-hour ozone standard in all areas except the 14 8-hour ozone nonattainment Early Action Compact Areas.

d. Not to be exceeded more than once per year on average over 3 years.

e. To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.

f. To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3. This standard is effective December 17, 2006.

g. Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more due to particles when relative humidity is < 70 percent.

USEPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. All areas within each AQCR are therefore designated as either "attainment," "nonattainment," "maintenance," or "unclassified" for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS, nonattainment indicates that criteria pollutant levels exceed NAAQS, maintenance indicates that an area was previously designated nonattainment but is now attainment, and unclassified means that there is not enough information to appropriately classify an AQCR, so the area is considered attainment. USEPA has delegated the authority for ensuring compliance with the NAAQS to the California Air Resources Board (CARB). CARB has delegated responsibility for implementation of the Federal CAA and California CAA to local air pollution control agencies. In accordance with the CAA, each state must develop a State Implementation Plan (SIP), which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be adverse if (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)].

In addition to NAAQS, the USEPA issued a proposed rule for mandatory greenhouse gas (GHG) reporting from large GHG emissions sources in the United States on 10 March 2009. The proposed rule was published in the *Federal Register* on April 10, 2009. The purpose of the rule is to collect comprehensive and accurate data on carbon dioxide (CO_2) and other GHG emissions that can be used to inform future policy decisions. The proposed rule would require reporting of GHGs including CO_2. Although GHGs are not currently regulated under the CAA, the USEPA has clearly indicated that GHG emissions and climate change are issues that need to be considered in future planning. GHGs are produced by the burning of fossil fuels and through industrial and biological processes.

4.4.2 Existing Conditions

FHL is in Monterey County, which is within the North Central Coast Intrastate (NCCI) AQCR. The Proposed Action is in the Monterey Bay Unified Air Pollution Control District (MBUAPCD) and is subject to rules and regulations developed by the MBUAPCD. The air quality in the NCCI AQCR has been characterized by the USEPA as unclassified/attainment for all criteria pollutants (USEPA 2008b). However, CARB has designated the NCCI AQCR as a nonattainment area for O_3 and PM_{10} (CARB 2007).

4.5 Geological Resources

4.5.1 Definition of the Resource

Geological resources consist of this Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology.

Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. To be considered a farmland soil of statewide importance, the soil must be land other than prime farmland that has a combination of physical and chemical characteristics for the production of crops. The soil must have been used for the production of irrigated crops at some time during the 4 years prior to the mapping date (CDC undated). The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses.

The implementing procedures of the FPPA and Natural Resources Conservation Service (NRCS) require Federal agencies to evaluate the adverse effects (direct and indirect) of their activities on prime and unique farmland, as well as farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects.

4.5.2 Existing Conditions

Regional Geology. FHL is situated between the northwest-trending Santa Lucia Range to the southwest and the Gabilan Range to the northeast in the Coast Ranges geologic province. The regional geology is composed of three groups of rocks all dating prior to the Quaternary period (2.6 million years ago to the present). These include the Salinian Block, the Franciscan Complex, and sediments deposited in marine and nonmarine basins. The Salinian Block is composed of crystalline intrusive rocks and metamorphic rocks, ranging in age from the Mesozoic Era (248 to 65 million years ago) to the Precambrian Eon (4.5 billion to 543 million years ago). The Franciscan complex formed during the Mesozoic Era along a subduction zone, with associated ophiolitic rocks, greywacke, chert, greenstone, peridotite, and serpentinite. These rocks have undergone multiple metamorphic episodes resulting in the folding and faulting of beds. The Franciscan complex underlies the southwestern corner of FHL along the Santa Lucia Range. Sedimentary rocks overlying the Franciscan complex are composed of sandstone, shale, and conglomerates and underlie the eastern two-thirds of the installation (NPS 2007).

Topography. FHL is midway between the Pacific Ocean and the Salinas Valley, with elevations ranging from approximately 3,740 feet above MSL at Alder Peak to the west to approximately 760 feet above MSL towards the upper end of the San Antonio Reservoir (FHL 2004a). Land surrounding the installation consists of heavily dissected rolling hills separating two valleys. The western boundary of the installation is formed by the Santa Lucia Range, which rises steeply out of the Pacific Ocean approximately 5 miles west of the installation's western boundary (CPSU 2003). The eastern three-quarters of the installation has low hills and flat to rolling river valleys. A wide variety of soil types reflect the diversity of the installation's topography, although loamy types are most common.

Soils. More than 130 soil series and 57 soil associations are mapped at FHL, consistent with the geologic and topographic variety found in the region (NPS 2007). The steep highlands in the west are composed of shallow soils indicative of the underlying parent material. Soils in the eastern and central portion of

the installation consist of alluvial terrace soils derived from marine sedimentary rocks. In the southwestern corner of the installation, serpentinite composes an integral component of the soils and the flora present in the area consists of species adapted to the low mineral content of these soils. This is discussed further in **Section 4.7.2**, Vegetation.

The proposed representative training infrastructure projects would be underlain by loams and sands. At the site of the proposed Schoonover TTB, 7 soil units are mapped. These soils are classified as well-drained with slopes ranging between 0 and 9 percent. The primary soil series mapped at the site of the proposed Schoonover TTB is the Arroyo Seco gravelly sandy loam, which is located throughout the site. At the site of the proposed Milpitas TTB, 8 soil units are mapped. These include loams and sands, and range from well-drained to excessively drained. The primary soil mapping units at the site of the proposed Milpitas TTB are the Chualar loam and Gorgonio sandy loam, located in the center of the site. Slopes at Milpitas range from 0 to 50 percent. The Santa Lucia clay, located in the northern portion of the site, has slopes up to 50 percent. At the Heavy Equipment Operator Training Site, three soil units are mapped and are classified as loams, with slopes ranging from 0 to 9 percent. The primary soil mapped is the Rincon clay loam, which is mapped as less than 73 percent of the site. **Table 4-12** shows characteristics of the soils mapped at the representative project sites.

The proposed representative range construction projects are mapped as being underlain by 12 soil units. Five soil units composed of loam are mapped at the site of the proposed MPMG Range, with slopes ranging from 2 to 30 percent. The MPMG Range is primarily underlain by the Lockwood shaly loam (2 to 9 percent slope) and the Placentia sandy loam. Soils at the MPMG Range are moderately well- to well-drained. Six soil units are mapped at the site of the proposed Light Demolition Range, and are composed of silty clays and loams. Slopes in this area range from 2 to 30 percent, and drainage ranges from moderately well- to well-drained. Only one soil unit, the Arroyo seco gravelly sandy loam (0 to 2 percent slopes) is mapped at the site of the proposed Hand Grenade Familiarization Course. This soil is classified as well-drained. Of the soils mapped at the sites of the proposed representative range projects, three are considered farmland soils of statewide importance, and two would be prime farmland soils if irrigated.

The proposed cantonment area projects are mapped as being underlain by 15 soil mapping units. Two soil units are mapped at the proposed site of the ECS, with slopes ranging from 2 to 30 percent. These soils are moderate- to well-drained with slopes ranging from 2 to 30 percent. The proposed Consolidated Vehicle Wash Rack would be underlain by one soil unit, the Arroyo seco gravelly sandy loam (2 to 5 percent slopes). This is a well-drained soil. All 15 soil units are mapped along the perimeter of the cantonment area where the Storm Water System Upgrade/Expansion would be constructed. Soils have slopes ranging from 0 to 50 percent, and are moderately well- to well-drained. Of the 16 mapping units within the cantonment area, 6 are classified as prime farmland soil if irrigated and 2 are considered farmland soils of statewide importance.

However, none of the soils mapped at FHL would qualify as farmland of statewide importance as none have been used for agricultural purposes in the 4 years from the 2008 mapping date (CDC 2008). The soils classified as farmland soils if irrigated are not currently irrigated, and would not be irrigated under the Proposed Action and, therefore, would not be considered prime farmland soils as defined by the FPPA.

Geologic Hazards. Numerous faults underlie FHL, including the Jolon and Nacimiento faults, and several smaller faults. These faults trend subparallel to the San Andreas Fault. In addition, the Riconda Fault and the Nacimiento Fault control the geomorphology and hydrology of the installation, specifically the northwestern trend of the San Antonio River and the Nacimiento River (see **Section 4.6.2** for a discussion on surface water).

Table 4-12. Characteristics of Soils Mapped at Representative Projects Sites

Mapping Unit	Texture	Percent Slope	Location	Farmland
Arroyo Seco	Gravelly sandy loam	0 to 2	S, G, SW	I
Arroyo Seco	Gravelly sandy loam	2 to 5	S, M, SW, VW, ECS	I
Arroyo Seco	Gravelly sandy loam	5 to 9	SW	I
Badland	Weathered bedrock	--	SW	N
Chamise	Shaly loam	15 to 30	ECS, SW	N
Chualar	Loam	0 to 2	S, SW	I
Chualar	Loam	2 to 5	M, SW	I
Cropley	Silty clay	2 to 9	D	I
Diablo	Clay	9 to 15	D	St
Elder	Loam	0 to 2	S	I
Elder	Very fine sandy loam	2 to 9	SW	I
Fluvents	Stony	0 to 15	M	N
Gazos	Silt loam	30 to 50	SW	N
Gorgonio	Sandy loam	0 to 5	M	I
Lockwood	Loam	0 to 2	E	I
Lockwood	Shaly loam	2 to 9	MG, E, SW	St
Lockwood	Shaly loam	9 to 15	MG	N
Los Osos	Clay loam	30 to 50	SW	N
Nacimiento	Silty clay loam	9 to 15	D	N
Nacimiento	Silty clay loam	15 to 30	D	N
Pfeiffer	Fine sandy loam	2 to 9	M	I
Placentia-Arbuckle complex	Loam	15 to 30	MG	N
Placentia	Sandy loam	2 to 9	S, MG, SW	St
Rincon	Clay loam	0 to 2	E	I
Rincon	Clay loam	2 to 9	D	I
Salinas	Loam	0 to 2	S	I
San Andreas	Fine sandy loam	15 to 30	SW	N
Santa Lucia	Shaly clay loam	15to 30	MG	N
Santa Lucia	Shaly clay loam	30 to 50	M	N
Santa Ynez	Fine sandy loam	2 to 9	D	St
Tujunga	Fine sand	0 to 5	M	St
Xerorthents	Dissected	50 to 65	SW	N
Xerorthents	Sandy	9 to 50	S, M, SW	N

Source: NRCS 2009

Key:

S = Schoonover TTB
M = Milpitas TTB
HE = Heavy Equipment Operator Training Site
MG = MPMG Range
D = Light Demolition Range
G = Hand Grenade Familiarization Course
ECS 1= Equipment Concentration Site in Cantonment
VW = Vehicle Wash Rack
SW = Storm Water System Upgrade.
St = farmland soil of statewide importance
I = farmland soil if irrigated
N = not prime farmland soil

The U.S. Geological Survey (USGS) has produced seismic hazard maps based on current information about the rate at which earthquakes occur in different areas and on how far strong shaking extends from quake sources. The hazard maps show the levels of horizontal shaking that have a 2 in 100 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of the force of gravity (percent g) and is proportional to the hazard faced by a particular type of building. In general, little or no damage is expected at values less than 10 percent g, moderate damage at 10 to 20 percent g, and major damage at values greater than 20 percent g. The proposed site is in an area with a 32 to 48 percent g interval (USGS 2008). Thus, major damage to buildings could occur as a result of seismic activity.

Most of FHL is classified as having a moderate to high erosion hazard due to the topography, soils, past grazing practices, borrow excavations, and military training activities. Erosion hazards are heightened as topographic gradient increases (NPS 2007).

4.6 Water Resources

4.6.1 Definition of the Resource

Hydrology consists of the redistribution of water through the processes of evapotranspiration, surface runoff, and subsurface flow. Hydrology results primarily from temperature and total precipitation that determine evapotranspiration rates, topography which determines rate and direction of surface flow, and soil and geologic properties that determine rate of subsurface flow and recharge to the groundwater reservoir. Groundwater consists of subsurface hydrologic resources. It is an essential resource that functions to recharge surface water and is used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale.

Waters of the United States are defined within the Clean Water Act (CWA), as amended, and jurisdiction is addressed by the USEPA and the U.S. Army Corps of Engineers (USACE). These agencies assert jurisdiction over (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) nonnavigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-around or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly abut such tributaries. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into waters of the United States including wetlands. Encroachment into waters of the United States and wetlands requires a permit from the state and the Federal government. **Section 4.7.2** provides a discussion of wetlands occurring within the action areas and adjacent wetlands that might be affected by the actions being considered. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards, established by the CWA, occur. The CWA requires that states establish a Section 303(d) list to identify impaired waters and establish Total Maximum Daily Loads (TMDLs) for the source(s) causing the impairment. A TMDL is the maximum amount of a substance that can be assimilated by a water body without causing impairment.

The USEPA issued a Final Rule for the CWA concerning technology-based Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development point source category. All NPDES stormwater permits issued by the USEPA or states must incorporate requirements established in the Final Rule. This Rule is effective 1 February 2010, and will be phased in over four

years. All new construction sites are required to meet the non-numeric effluent limitations and design, install, and maintain effective erosion and sedimentation controls, including the following:

- Control stormwater volume and velocity to minimize erosion
- Minimize the amount of soil exposed during construction activities
- Minimize the disturbance of steep slopes
- Minimize sediment discharges from the site
- Provide and maintain natural buffers around surface waters
- Minimize soil compaction and preserve topsoil where feasible.

In addition, construction site owners and operators that disturb one or more acres of land are required to use BMPs to ensure that soil disturbed during construction activities does not pollute nearby water bodies. Effective 1 August 2011, construction activities disturbing a total of 20 or more acres must comply with the numeric effluent limitation for turbidity in addition to the non-numeric effluent limitations. The maximum daily turbidity limitation is 280 nephelometric turbidity units (ntu). On 2 February 2014, construction site owners and operators that disturb 10 or more acres of land are required to monitor discharges to ensure compliance with effluent limitations as specified by the permitting authority. The USEPA's limitations are based on its assessment of what specific technologies can reliably achieve. Permittees can select management practices or technologies that are best suited for site-specific conditions.

Construction activities such as clearing, grading, trenching, and excavating disturb soils and sediment. If not managed properly, disturbed soils and sediments can easily be washed into nearby water bodies during storm events, where water quality is reduced. Section 438 of the Energy Independence and Security Act (EISA) (42 U.S.C. Section 17094) establishes into law new stormwater design requirements for Federal construction projects that disturb a footprint greater than 5,000 square feet of land. The project footprint consists of all horizontal hard surfaces and disturbed areas associated with the project development, including both building area and pavements such as roads, parking lots, and sidewalks. Note that these requirements do not apply to resurfacing of existing pavements. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology will be modeled or calculated using recognized tools and must include site-specific factors such as soil type, ground cover, and ground slope. Site design will incorporate stormwater retention and reuse technologies such as bioretention areas, permeable pavements, cisterns/recycling, and green roofs to the maximum extent technically feasible. Post-construction analyses will be conducted to evaluate the effectiveness of the as-built storm water reduction features. As stated in a DOD memorandum dated 19 January 2010, these regulations will be incorporated into applicable DOD UFC within 6 months (DOD 2010). Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*.

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. The living and nonliving parts of natural floodplains interact with each other to create dynamic systems in which each component helps to maintain the characteristics of the environment that supports it. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and a diversity of plants and animals. Floodplains provide a broad area to spread out and temporarily store floodwaters. This reduces flood peaks and velocities and the potential for erosion. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body (FEMA 1986).

Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year. Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, Floodplain Management, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of FEMA Flood Insurance Rate Maps (FIRMs), which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative.

4.6.2 Existing Conditions

Groundwater. Two aquifers underlie FHL, flowing to the southeast following the geologic structure of the Coast Ranges. Groundwater occurs in confined and unconfined conditions, due to fracturing or presence of impermeable sediments. The Jolon Fault separates the Jolon-Lockwood groundwater basin to the east from the Mission-San Antonio Basin to the west and prevents mixing of the two basins (FHL 2006c). Groundwater for domestic consumption is derived from three wells tapped into the Jolon-Lockwood Basin and the Mission-San Antonio Basin. Well water consumption averages about 300 to 350 acre/feet per year, with well yields varying based on the seasonality, degree of weathering, spacing, and abundance of fractures, and lithology of the aquifer (Jones & Stokes Associates, Inc. 1995).

Two large groundwater contaminant plumes associated with Buildings 194 and 258 are present in the Cantonment area. FHL, the USACE, and the California Regional Water Quality Control Board are in the process of characterizing and remediating the groundwater plumes. Site conditions associated with these groundwater plumes suggest a potentially significant risk of VOC buildup beneath and within adjacent structures. This buildup could create an explosive risk and an inhalation hazard to building occupants. Current data indicate that proposed structures located southwest of the intersection of 7th Division Road and Mission Road, downgradient of the Building 258 plume, could be at the greatest risk (CRWQCB 2010).

Surface Water. FHL is within the Salinas River watershed, which covers 4,600 square miles, with tributaries including the Arroyo Seco, Nacimiento, San Antonio, and Estrella Rivers (USACE 1987). The two major watercourses flowing through FHL are the San Antonio River and the Nacimiento River. The two rivers are linear subparallel drainages that flow approximately 5 miles apart from the northwest to the southeast. The San Antonio River watershed on FHL includes all or major portions of the cantonment area and the eastern half of the installation. The headwaters for the San Antonio River are in the Cone and Junipero Serra Peaks. The river runs 25 miles through FHL (NPS 2007). The headwaters for the Nacimiento River are in the Santa Lucia Range, south of Cone Peak. The river flows along the western installation boundary for approximately 15 miles. Water discharges through the man-made Lake Nacimiento and San Antonio Reservoir to the Salinas Valley Basin. Both rivers drain into the northwest-flowing Salinas River, which empties into Monterey Bay. FHL flow regimes are seasonal; the upper San Antonio River is fed by springs, while the lower portion has an intermittent flow. Much of the Nacimiento River is dry during summer months. Water resources at FHL are depicted in **Figure 4-4**.

Both rivers are dammed to the southeast of FHL. San Antonio River dam is 10 miles downstream from FHL and Nacimiento-Ferguson dam is 10 to 13 miles downstream. The San Antonio Reservoir is at the

lowest elevation of the installation at 800 feet above MSL in the southeastern corner of the installation. The Nacimiento Reservoir is several miles south of the installation. The reservoirs are used for irrigation, flood control, and recreation. Siltation from FHL could pose a problem to the reservoirs. Numerous creeks exist on FHL, as well as the Lake San Antonio shoreline and 14 impoundments that provide aquatic and riparian habitat. These impoundments are located throughout FHL in both watersheds.

At the site of the proposed Schoonover TTB, the closest water body is the San Antonio River, which wraps around the runway to the southwest, and there is a drainage that crosses the proposed area flowing from north of Mission Road to the southeastern end of Schoonover Airfield where it flows into a sandy floodplain of the San Antonio River. At the site of the proposed Milpitas TTB, the San Antonio River runs along the southwestern corner of the site, and a tributary meanders from the northwest to the southeast.

The cantonment area, which would support the proposed ECS, Consolidated Vehicle Wash Rack, and the Storm Water Drainage System Upgrade/Expansion, is bordered by the San Antonio River to the west and an intermittent stream cuts through the northernmost portion of the site. One reservoir is to the north and one is to the south. At the Heavy Equipment Operator Training Site, an intermittent creek runs to the north. Two intermittent creeks traverse to the east and through the northern end of the MPMG Range.

The Jolon Creek runs to the east of the Hand Grenade Familiarization Course, and no water bodies are within close proximity to the Light Demolition Range.

Floodplains. Floodplains at FHL occur adjacent to rivers and major creeks. The April 2, 2009, FEMA FIRM Panel No. 06053C1575G for Monterey County, California, contains flood potential information for the proposed Schoonover TTB, Light Demolition Range, Hand Grenade Familiarization Course, and the MPMG Range. The proposed Schoonover TTB is within Zone X (minimal flooding), but the southwestern and northwestern portions of the site are adjacent to Zone A, which indicates that no base flood elevations have been determined. However, Zone A surrounds streams and rivers and is likely to flood occasionally with prolonged or sufficient precipitation. The Light Demolition Range and Hand Grenade Familiarization Course are both in Zone X (FEMA 2009a). Most of the MPMG Range is within Zone X; however, a floodplain is mapped through the middle of the site and is classified as Zone A. To the immediate east of the site is also rated Zone A. According to the April 2, 2009, FEMA FIRM Panel No. 06053C1300G for Monterey County, California, the proposed site of the Milpitas TTB is classified as Zone X, indicating it is an area that is subject to minimal flooding (FEMA 2009b). The April 2, 2009, FEMA FIRM Panel No 06053C1325G for Monterey County, California, covers the northern portion of the cantonment area and the Heavy Equipment Operator Training Site. The northern portion of the cantonment area is primarily in Zone X, but is cut by a small section classified as Zone A, which corresponds to the Sulphur Spring Canyon Creek (FEMA 2009c). The Heavy Equipment Operator Training Site is in Zone X. The April 2, 2009, FEMA FIRM Panel No. 06053C1575G classifies the southern portion of the cantonment area as within Zone X. However, areas surrounding the San Antonio River to the south and west of the site are Zone A (FEMA 2009a).

4.7 Biological Resources

This section describes the existing conditions of biological resources potentially affected by the Proposed Action and the No Action Alternative. It provides a description of the vegetation, wetlands, wildlife, and habitats anticipated to occur in the installation development and training areas. Species addressed in this section include those which are not listed as threatened or endangered by the Federal government or a California agency. Federal and state threatened and endangered species are addressed in **Section 4.8**.

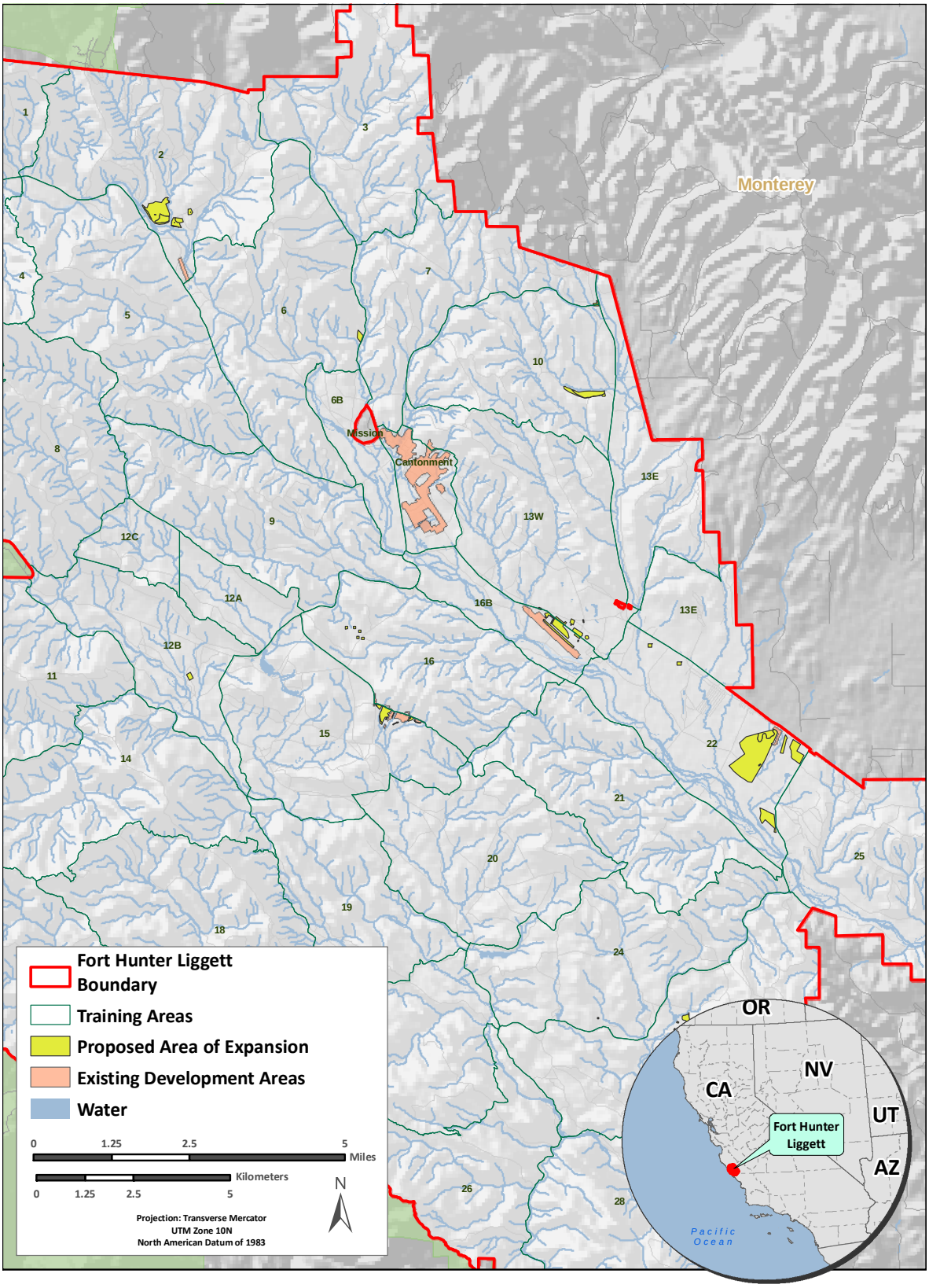

Figure 4-4. Water Resources at FHL

4.7.1 Definition of the Resource

Biological resources consist of plants, animals, and their habitats. The diversity of vegetation and the resulting habitats on FHL support a variety of animal species. Wildlife, vegetation, and wetland resources provide aesthetic, recreational, and socioeconomic benefits to society.

Wetlands. Wetlands are habitats that are periodically inundated with water. Plant and animal species occur there that require more water or moisture than in the surrounding upland areas. Wetlands are protected as a subset of "the waters of the United States" under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands).

Wetlands provide an important function in recharging aquifers and buffering streams by filtering sediment and nutrients. Wetlands have been defined by agencies responsible for their management. The term "wetland" used herein, is defined using USACE conventions. The USACE has jurisdiction to protect wetlands under Section 404 of the CWA as defined as areas inundated or saturated by surface or groundwater sufficient to support vegetation that is adapted to life in saturated soil conditions (USEPA 1987).

EO 11990, *Protection of Wetlands* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

There are both jurisdictional and nonjurisdictional wetlands. Jurisdictional wetlands are special aquatic sites that have a hydrological connection to jurisdictional waters of the United States. All jurisdictional waters of the United States are regulated by the USACE, under the oversight of the USEPA or state equivalents (e.g., Water Quality Control Board in California). Typically only the placement of fill into jurisdictional wetlands is regulated. Fill can be defined as nearly anything being placed into a wetland on a long-term basis. Unregulated wetlands are those that do not have a hydrologic connection to jurisdictional waters of the United States. Such wetlands might still be occupied by endangered species and regulated by the USFWS.

Many states have local regulations governing wetlands and their transition areas. These regulations do not apply to military installations. However, in some states such as California, the USEPA review of wetland permits has been delegated to a state agency (Water Quality Control Board) and could require additional measures for permit certification.

Any proposed installation development and training activities that involve excavating, digging, or dumping in a drainage, wetland, vernal pool, or pond could be regulated and a permit could be required depending on the nature and location of the activity. Impacts from the expected activities, such as increased bivouacking and vehicle and foot traffic, potentially degrade habitat quality and could affect endangered species or other species that occur in wetlands, but do not require a USACE permit.

Migratory Birds. The Migratory Bird Treaty Act of 1918 (MBTA) protects migratory birds and implements the United States' commitment to international conventions for the protection of migratory birds. MBTA is the domestic law that governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent overutilization. The USAR is subject to the provisions of the MBTA, statutory and regulatory requirements associated with the Migratory Bird

Permits, Take of Migratory Birds by the Armed Forces (DOD/MBTA rule; 72 Federal Register [FR] 8931), and the Memorandum of Understanding (MOU) between DOD and the USFWS to Promote the Conservation of Migratory Birds (71 FR 51580) in protecting migratory birds.

EO 13186, Conservation of Migratory Birds (10 January 2001), created strategies for the conservation of migratory birds. The 2003 National Defense Authorization Act authorized the USFWS to develop regulations to address situations where DOD would be exempt during military readiness training activities from rules prohibiting the incidental taking of migratory birds. If the DOD determines that a proposed or ongoing military readiness activity could result in a significant adverse effect on a population of a migratory bird species, then coordination must occur with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate such potential adverse effects (see 72 FR 8931).

4.7.2 Existing Conditions

FHL contains a variety of soil and geological types, resulting in a diverse vegetative composition of more than 1,000 species of vascular plant (NPS 2007). The western side of the installation is dominated by steep hillsides covered with chaparral, scrub, and live-oak forests (42 percent of the total area). The hills are intersected by flat rolling river valleys and grasslands, oak savannas, and oak woodlands (55 percent of total area) (FHL 2009e). The varied plant composition combined with the relatively undeveloped nature of FHL is reflected in a richness of animal species. More than 300 animal species have been described for FHL, including 223 bird species (NPS 2007). Additionally, jurisdictional and nonjurisdictional wetlands exist at FHL and are either ephemeral or perennial. Vernal pools, which are seasonally filled pools that could contain sensitive species, occur in limited environmental settings and are sensitive to development, erosion, compaction, fill, and other disturbances.

Vegetation. Plant communities at FHL include chaparral, oak woodlands and savannas, grasslands, riparian areas, and seasonal and perennial wetlands. A summary of habitat types and approximate acreage are included in **Table 4-13**. Rare vegetation communities occurring on FHL as described by the California Natural Diversity Data Base (CNDDB) include sycamore alluvial woodland, valley needlegrass grassland, and valley oak woodlands (CDFG 2009).

Table 4-13. Habitats at FHL

Habitat Type	Acres (thousands)	Percent of Total
Mixed and Chamise Chaparral	64.0	39.5
Oak and Foothill Woodlands and Forests	54.3	33.5
Oak Savannas	20.5	12.7
Grasslands	16.0	9.9
Riparian Areas	4.7	2.9
Ponds and Wetlands*	0.8	0.5[1]
Developed Areas – Urban (Cantonment Area)	0.6	0.4
Developed Areas - Range	0.8	0.5
Unassigned	0.2	0.1
Total	**161.9**	**100**

Source: FHL 2009b

Note: *Range development areas in Training Area 22 contain 56 acres of vernal swales and wet meadows that remain functional but have been affected by past range and road construction

Oak communities (woodlands, forests, and savannas) are the most widespread vegetation type on FHL, covering an estimated 46 percent of the installation (FHL 2004a). Blue oak (*Quercus douglassi*) communities are the most prevalent of the oak communities, covering 36 percent of FHL. Blue oak can be found in pure stand woodlands to foothill woodlands where they mix with other oak species and foothill pines, or in more open blue oak savannas with a grassland understory. Valley oak (*Q. lobata*) communities are the next most common oak community, covering an estimated 10 percent of FHL. Valley oaks are the largest of the California oak species and are frequently found growing in deep alluvial soils of valley bottoms, forming savannas with a grassland understory. Valley oak woodlands are rare on FHL and are considered a rare vegetation community by the CNDDB (CDFG 2009). Live oak communities, consisting of coast live oak (*Q. agrifolia* var. *agrifolia*), inland live oak (*Q. wislizeni* var. *wislizeni*), and canyon live oak (*Q. chrysolepis*), cover approximately 3 percent of FHL.

Blue oak woodland is present at the proposed Schoonover TTB, Milpitas TTB, Heavy Equipment Operator Training Site, and in the cantonment area. There is also a small area classified as blue oak savanna in the proposed Light Demolition Range. Valley oak woodland is adjacent to the Heavy Equipment Training Site, with scattered valley oaks within the site. Valley oak woodland is present at the proposed Milpitas TTB, Schoonover TTB, and in the cantonment area. Valley oak savanna is present at the proposed Milpitas TTB, Light Demolition Range, and cantonment area.

The two most widespread chaparral types on FHL are mixed chaparral and chamise chaparral. Typical woody chaparral species on FHL include several species of oak, ceanothus, and manzanita; and additional species such as toyon (*Heteromeles arbutifolia*), black sage (*Salvia mellifera*), mountain mahogany (*Cercocarpus betuloides*), and others. Mixed chaparral is typified by a codominance of several of these chaparral species, while chamise chaparral (chamisal) is dominated by chamise (*Adenostoma fasciculatum*). Chaparral covers 39 percent of FHL and is more abundant in the Nacimiento River watershed. On FHL, chaparral is generally found on south-facing slopes and is the dominant vegetation type along the western mountain areas and the ridges and slopes between the San Antonio and Nacimiento watersheds (FHL 2004a). There are small areas of chaparral in the Milpitas TTB vicinity and in the cantonment area.

Approximately 10 percent of FHL is covered by grasslands. Grasslands are typically found on open, level, or moderately sloped areas. Historic species composition of grasslands on FHL is not known; however today, native grasslands are found on rocky hillsides or unusual soil types (FHL 2004a). FHL grasslands are dominated by nonnative grasses that thrive in California's Mediterranean climate and are more resilient to the heavy browsing pressure caused by domestic livestock. Native grasslands are estimated to compose approximately 2 to 5 percent of existing grasslands on FHL and include native species such as *Nassella pulchra*, *Nassella cernua*, *Deschampsia danthonioides*, *Melica imperfect,* and *Poa secunda*. Nonnative grasslands are dominated by *Bromus hordeaceous*, and include other species such as *Bromus diandrus*, *Bromus madritensis,* and two species of wild oat (*Avena* spp.). Yellow star-thistle (*Centaurea solstitialis*), a noxious exotic forb, is also found in nonnative grasslands and has spread to an estimated 20,015 acres of FHL (U.S. Army 2009c). FHL actively controls this species with an aggressive yellow star-thistle control program.

Grasslands are found within and adjacent to Schoonover TTB, Milpitas TTB, MPMG Range, Hand Grenade Familiarization Course, Heavy Equipment Operator Training Site, and in the cantonment area. Grasslands in the Proposed Action areas are primarily nonnative annual grasses with potential for native bunch grasses to occur. At the proposed Milpitas TTB and Schoonover TTB there are limited areas of scattered native bunch grasses. Bunch grasses are generally absent where historic irrigated cultivation occurred (Clark 2009a). The proposed area at Schoonover TTB was historically intensively used for training during the 1950s and 1960s. Soil compaction and erosion from past events is evident, with the most intensively used areas being in formerly cultivated grassland flats between oak woodlands in the northeast and the Schoonover Airfield to the southwest.

Riparian communities on FHL consist of alluvial woodlands composed of sycamore (*Platanus racemosa*), cottonwood (*Populus fremontii*), and willow (*Salix* sp.) found along rivers and streams. Riparian communities cover an estimated 3 percent of FHL. Sycamore alluvial woodlands are considered a rare vegetation type by the CNDDB (CDFG 2009). The San Antonio watershed contains a greater amount of riparian habitat than the Nacimiento watershed (FHL 2004a). The Nacimiento watershed riparian corridors contain roughly equal coverage of mixed riparian woodland (44 percent) and sycamore alluvial woodland (43 percent). Common riparian species in addition to those listed above include mule fat (*Baccharis salicifolia*); willow species (*Salix laevigata*, *S. lasiolepis*, *S. goodingii*, and *S. exigua*); and herbaceous understory species including rushes (*Juncus* spp.), spikerushes (*Eleocharis* spp.), sedges (*Carex* spp.), and nut sedges (*Cyperus* spp.).

A mixed riparian community is found along the upper San Antonio River in the proposed Milpitas TTB. There is also an area classified as willow riparian within the cantonment area. No riparian communities are found in the other representative proposed project areas.

Wetlands. There are 146.3 acres of existing wetlands documented on FHL. Wetlands on FHL are recognized by their relatively shallow, slow-moving or stationary water, or wet to moist soils with hydrophytic plants, generally found in landscape depressions. There are both jurisdictional and nonjurisdictional wetlands at FHL. Two rivers, the San Antonio and Nacimiento, and a network of tributaries throughout their respective watersheds, compose the majority of the jurisdictional waters on the installation. USACE jurisdictional drainages (waters of the United States) are found scattered throughout FHL including on all the existing and proposed TTB sites at FHL. Isolated wetlands that have no hydrological connection to a river occur on the installation. Wetlands that are considered isolated are generally not jurisdictional. However, if the isolated wetland supports threatened or endangered species it can be regulated by the USFWS. Training and construction activities would need to avoid placing any fill material or pollutants into wetlands or drainages.

Wetlands on FHL fall into two broad categories, ephemeral wetlands and perennial wetlands. Ephemeral wetlands have two phases, a wet season phase which is dependent on fall and winter rains to fill pools and depressions, and a dry season phase brought about by a lack of rain in the summer. On FHL, ephemeral wetlands include vernal pools, wet meadows, and vernal swales. Perennial wetlands maintain some level of saturation throughout the year. Perennial wetlands on FHL include streams, reservoirs/lakes, and freshwater marshes. Most of the wetlands on FHL are associated with the two watersheds, but at least some small wetland sites are found in most Training Areas (FHL 2004a). Vernal pools are a special category of wetlands. These seasonal pools are difficult to detect because of their often small size and seasonal inundation, but they are producers of zooplankton, phytoplankton, and macroinvertebrates. The federally threatened vernal pool fairy shrimp (*Branchinecta lynchi*) was found in 65 vernal and seasonal pools on FHL in 2000 (FHL 2004a).

Within the representative proposed project areas, vernal pools occur in the Milpitas TTB, vernal pools and vernal swales occur in the cantonment area, and wet meadows and vernal pools occupied with vernal pool fairy shrimp occur in the MPMG Range.

Wildlife Resources. Migratory birds are present in the Proposed Action areas, with nesting populations present in late spring and summer, overwintering populations in the late fall and winter, and migrating populations transiting the region in between those periods. Birds frequently observed in the Proposed Action areas include the western meadow lark (*Sturnella neglecta*), horned lark (*Eromophila alpestri*), California quail (*Callipepa californica*), mourning dove (*Zenaida macroura*), turkey vulture (*Cathartes aura*), Cooper's hawk (*Accipiter cooperii*), and red-tailed hawk (*Buteo jamaicensis*) (FHL 2004a, U.S. Army 2005).

Mammal species expected to be found in or near the Proposed Action areas include the California ground squirrel (*Spermophilus beecheyi*), tule elk (*Cervus canadensis nannodes*), California black-tailed deer (*Odocoileus hemionus californicus*), American badger (*Taxidea taxis*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), deer mouse (*Peromyscus maniculatus*), pocket mouse (*Perognathus californicus*), and kangaroo rat (*Dipodomys* spp.).

4.8 Threatened and Endangered Species

4.8.1 Definition of the Resource

The ESA of 1973 established a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charged Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a threatened and endangered species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the USFWS maintains the endangered species list. States might also have their own laws for protecting plants and animals they consider threatened or endangered. This section describes the affected environment and environmental consequences to threatened and endangered species potentially affected by implementation of the Proposed Action or No Action Alternative.

Federal endangered species are those identified by the USFWS as being in danger of extinction throughout all or a significant portion of their range. Federal threatened species are those identified by USFWS as likely to become endangered in the near future. State-listed species are those identified as threatened or endangered by the State of California.

4.8.2 Existing Conditions

Species listed as threatened or endangered under the ESA (Federal-listed species) and state-listed species that have potential to be affected by implementation of the Proposed Action are discussed in this section. This section presents those Federal- and state-listed species that have the potential to inhabit FHL and provides an overview of the plans and procedures for managing these species according to their established conservation program. **Table 4-14** provides a listing of the Federal-listed threatened and endangered species for FHL.

This analysis is based on a review of the installation Integrated Natural Resources Management Plan (INRMP), CNDDB, FHL environmental documents, and other available data. The INRMP for FHL outlines management actions taken to conserve natural resources for military training and ecosystem integrity. Management actions can include restoration efforts in degraded sites; control of noxious weeds; monitoring for presence, absence, or population trends of a resource; and implementation of land use regulations (FHL 2004a). Information from these management activities is used to assess potential effects of development, maintenance, and training activities.

Federal Threatened or Endangered Species

There are four species federally listed as endangered and four species federally listed as threatened that have the potential to occur within or near FHL, including the San Joaquin kit fox (*Vulpes macrotis mutica*), endangered; least Bell's vireo (*Vireo bellii pusillus*), endangered; California condor

Table 4-14. Federal Threatened and Endangered Species Potentially Occurring at FHL

Scientific Name	Common Name	Federal Status	State Status
Ambystoma californiense	California tiger salamander	T	
Branchinecta lynchi	Vernal pool fairy shrimp	T	
Bufo californicus	Arroyo toad	E	
Chlorogalum purpureum var. *purpureum*	Purple amole	T	CEQA
Gymnogyps californianus	California condor	E	E
Rana aurora draytoni	California red-legged frog*	T	
Vireo bellii pusillus	Least Bell's vireo	E	E
Vulpes macrotis mutica	San Joaquin kit fox	E	T

Source: NPS 2007, Clark 2009b
Note: * Documented in historical records
Key:
E = Endangered; T = Threatened; CEQA = Meet the criteria for listing as described in Section 15380 of the CEQA Guidelines.

(*Gymnogyps californianus*), endangered; arroyo toad (*Bufo californicus*), endangered; California red-legged frog (*Rana aurora draytoni*), threatened; California tiger salamander (*Ambystoma californiense*), threatened; vernal pool fairy shrimp (*Branchinecta lynchi*), threatened; and purple amole (*Chlorogalum purpureum* var. *purpureum*), threatened. Two "delisted species," the peregrine falcon and the bald eagle, were previously listed under the ESA but have recovered to the point that they no longer require protection under the ESA. The bald eagle remains protected under the Bald and Golden Eagle Protection Act.

San Joaquin Kit Fox. The San Joaquin kit fox (kit fox) is the smallest of North American canids and is approximately 12 inches shoulder height with a slim body, long legs, large ears, and a black-tipped bushy tail. Kit fox can be found along the California Central Valley floor and valleys in the interior coastal ranges. They use underground den sites throughout the year, changing den sites frequently. Den sites are located on hillsides, and dug in sandy loam. The California ground squirrel (*Spermophilus beecheyi*) is an important prey species for kit fox on FHL. Coyotes are an important predator of kit fox on FHL. Additional causes of mortality include shooting; trapping; poisoning; electrocution; road kills; suffocation; and habitat loss, degradation, and fragmentation caused by agricultural, industrial, and urban development in the San Joaquin Valley (USFWS 1998).

Surveys for kit fox continue annually in suitable habitat, with the most recent sightings in 2000 when two individuals were sighted separately on the same night near Training Area 22 (FHL 2009b). Prior to that, isolated adults were seen in 1995 in both the San Antonio and Nacimiento valleys, and from 1970 to 1990 there were infrequent dens documented with kit foxes and pups in the San Antonio Valley on FHL (FHL 2009e). Suitable foraging and den sites for the kit fox might occur in the Live-Fire Ranges of Training Area 22 (MPMG Range Area and Hand Grenade Familiarization Course), and the proposed Schoonover TTB (U.S. Army 2005, NPS 2007, FHL 2009b). Potential habitat for kit fox can be found in the San Antonio River Valley (Training Areas 7, 9, 10, 22, and 25), which includes the Heavy Equipment Operator Training Site, the cantonment area, and in the Nacimiento River Valley (Training Areas 12, 15, 16, 19, 20, 21, 24, and 27), which includes the Light Demolition Range (FHL 2004a).

Purple Amole. The purple amole is a bulbous perennial of the Lily family (Liliaceae). Individual plants have a basal rosette of 3 to 7 narrow-spreading linear leaves, slightly keeled with variably wavy margins. A central-branched inflorescence is produced up to 16 inches in height, with 7 to 30 dark blue to deep

purple flowers with yellow anthers that bloom May through June. The first record of purple amole was near Jolon in 1893. There are approximately 220 acres of purple amole at Camp Roberts and about 850 acres of fragmented groups of plants at FHL (FHL 2004a, Wilken 2007). Purple amole populations are threatened due to habitat loss, fragmentation, and alteration; removal of plants for military construction and training; exclusion by nonnative annual grasses; and potentially by the alteration of fire cycles due to military training (USFWS 2000).

On FHL, purple amole occurs primarily in the San Antonio Valley in portions of the cantonment area and Training Areas 13, 16B, 22, and 25, with an additional small site in Training Area 24 in the Nacimiento Valley (FHL 2009e). Several populations of purple amole and potential purple amole habitat occur south of Mission Road within the proposed Schoonover TTB. The Hand Grenade Familiarization Course and MPMG Range are adjacent to purple amole (FHL 2009b).

Arroyo Toad. The arroyo toad is a medium-sized species that inhabits seasonal pools and streams where water levels fluctuate and natural disturbance is common during flooding events (FHL 2004a, NPS 2007). These flooding events are essential to remove vegetation, maintain sandy stream terraces, and create suitable pools. Primary threats to this species include habitat loss due to urbanization, agriculture, and dam construction. Additional threats include water management and diversion activities; road construction, maintenance, and use; predation by exotic species; loss of habitat to exotic plants; livestock grazing; mining; and recreational activities.

Arroyo toads breed, forage, and aestivate in sandy soils southwest of the proposed Schoonover TTB along the San Antonio River, and can forage in the sandy and nonsandy uplands in the project area (U.S. Army 2005). Surveys are conducted annually and toads continue to be found in suitable habitat along the San Antonio River with minor and expected annual changes in abundance and distribution (FHL 2009b). Arroyo toads can disperse into adjacent sandy or nonsandy upland areas as far as 1.2 miles away from breeding sites or water, which include the entire proposed Schoonover TTB (U.S. Army 2005). Arroyo toad habitat occurs outside of the cantonment area to the west and south. Additionally, cantonment area storm water runoff drains to the San Antonio River and arroyo toad habitat. The Hand Grenade Familiarization Course and MPMG range is adjacent to arroyo toad habitat (FHL 2009b).

Vernal Pool Fairy Shrimp. The vernal pool fairy shrimp inhabits vernal pools and ephemeral ponds in the Central Valley, coast ranges, and a few additional locations. Vernal pools and ephemeral ponds have two distinct phases, a wet phase when they are inundated by water from fall and winter rains, and a dry season where the lack of rain in the summer allows the pool to dry up. With the onset of the fall and winter rains and the pooling of water in ponds and depressions, vernal pool fairy shrimp eggs, or cysts, hatch. Vernal pool fairy shrimp are sensitive to changes in salinity, conductivity, dissolved solids, and pH levels and seasonal changes such as duration of pool inundation. They feed on algae, bacteria, protozoa, rotifers, and detritus. As they mature, females produce cysts which are dropped to the muddy bottom of the pool or are settled to the bottom of the pool in the adult's brood sac when the adult dies. The cysts are able to withstand extremes of heat and cold and extended desiccation for many years, allowing them to survive periodic droughts until the pools fill once again. Not all cysts from the previous year would hatch during the next time the pool is inundated, which creates a cyst bank within the soil of the pond. FHL conducted USFWS protocol surveys of 308 vernal pools and ephemeral ponds in the winters of 1995 and 2000. Of the 308 vernal pools and ephemeral ponds, 75 were found to contain vernal pool fairy shrimp (FHL 2004a). An additional occupied pool was discovered in 2008 (FHL 2009b). Vernal pools with vernal pool fairy shrimp occur in lowlands of the San Antonio Valley in the cantonment area and Training Areas 13, 16B, 20, 22, and 25, and in one pool in Training Area 20 in the Nacimiento Valley (FHL 2009e). There are degraded pools in the disturbed bivouac site east of the proposed Schoonover TTB.

Least Bell's Vireo. The least Bell's vireo is a small, gray and white songbird that lives in thick willow habitat with a mix of taller trees and short thick shrubs. The least Bell's vireo was once abundant in the Central Valley; however, populations have declined significantly due to loss and degradation of riparian habitat and the expansion of the range of the nest parasitizing brown-headed cowbird (*Molothrus ater*). There are no historic documented occurrences of the least Bell's vireo nesting on FHL; however, one least Bell's vireo was sighted on FHL in 1988. In recent years they have expanded into their former range in counties north and south of FHL and are likely to nest at the installation (FHL 2009e). However, least Bell's vireo has not been detected during surveys on the installation (FHL 2004a, U.S. Army 2005, FHL 2009b). Suitable breeding habitat for the least Bell's vireo occurs in riparian habitat along Mission Creek, the San Antonio River, Nacimiento River, and other scattered drainages on FHL. Breeding populations of least Bell's vireo are also known to occur east of FHL, along the Salinas River (FHL 2004a).

California Condor. The California condor is the largest bird in North America, weighing approximately 22 pounds, with a wing span of approximately 9.5 feet. Historically, California condors ranged along the West Coast from British Columbia, Canada, to Baja, Mexico, feeding on a diet consisting primarily of carrion (dead and putrefying flesh). California condors roost and nest in tall trees and cliffs located in remote areas. Causes of mortality include lead poisoning, shooting, egg collection, live capture, powerline-related deaths, oil sump drowning, and eggshell thinning due to dichlorodiphenyltrichloroethane (DDT). California condor numbers declined to 14 individuals in 1987. These last remaining 14 individuals were captured in order to begin a captive breeding population. The reintroduction of captive bred individuals into the wild began in 1992 and continues to increase population numbers today (FHL 2004a). Rocky outcrops in the Nacimiento River valley provide suitable foraging habitat for California condors (NPS 2007). In May 2002, one California condor was observed foraging on an elk killed by a mountain lion in Training Area 20 on FHL (U.S. Army 2005, FHL 2004a).

Releases of captive young California condors continue in Los Padres National Forest to the north and Pinnacles National Monument to the northeast of FHL. No nesting habitat is known on the installation, but the area continues to provide suitable foraging areas with a forage base of carcasses from deer, elk, coyote, and other medium to large animals (FHL 2009b).

California Red-legged Frog. The California red-legged frog breeds in streams, deep pools, backwaters within streams and creeks, ponds, marshes, sag ponds, dune ponds, and lagoons with deep, slow-moving water with or without dense vegetation. The range of the California red-legged frog has diminished by 70 percent due to habitat loss and alteration. Additional causes of mortality are due to predation by the bullfrog (*Rana catesbeiana*) and native predators. Occurrences of the California red-legged frog have been reported in the Nacimiento River Valley in 1948; however, surveys conducted of the California red-legged frog since 1948 have not detected them on the installation (FHL 2004a, U.S. Army 2005, FHL 2009b). Potential habitat for this species exists along the San Antonio and Nacimiento Rivers (FHL 2004a).

California Tiger Salamander. The California tiger salamander inhabits vernal and seasonal pools in grassland, oak savanna, and coastal scrub communities. California tiger salamanders spend much of their lives beneath the ground in active or inactive small mammal burrows. They come out of the burrows on humid or rainy nights to feed and migrate to breeding ponds. A healthy population of burrowing mammals near seasonal pools is required for a healthy population of California tiger salamanders. Populations of California tiger salamander have declined due to habitat degradation and loss caused by urban and agricultural development (USFWS 2008). California tiger salamanders on FHL are considered hybrids, or a combination of the native California tiger salamander and the nonnative Eastern tiger salamander (*Ambystoma tigrinum*) (U.S. Army 2005, FHL 2004a). Hybrid California tiger salamanders are widespread on FHL and occur in at least six locations on the installation (FHL 2004a).

Species Protected By Other Federal Laws or State-Threatened or Endangered

There are three species listed as state-threatened and one listed as state-endangered that have the potential to occur on or near FHL: Santa Lucia mint (*Pogogyne clareana*), endangered; bald eagle (*Haliaeetus leucocephalus*), threatened; Swainson's hawk (*Buteo swainsoni*), threatened; and bank swallow (*Riparia riparia*), threatened. There are 32 "species of special concern," which are species, subspecies, or distinct populations native to California that are of conservation concern. There are two "candidate species," or species that the California Fish and Game Commission has recognized as being under review by the department for addition to the state list as either endangered, threatened, or a species of special concern. State requirements for mitigation of effects on special status species are not applicable on Federal lands. However, documentation of potential effects for these species is required under NEPA. **Table 4-15** lists the special status species for California.

Bald Eagle. All populations of bald eagle in the lower 48 states were once listed as endangered under the ESA. In 2007, bald eagles were determined to be recovered to the extent that the species could be removed from the Endangered Species List under the ESA. The bald eagle continues to be a state-listed threatened and endangered species in some states and is protected by the Bald and Golden Eagle Protection Act. On FHL, bald eagles use the San Antonio reservoir, San Antonio River, and Nacimiento River for foraging, nesting, and overwintering habitat (FHL 2004a). Bald eagle surveys continue on FHL annually. FHL supports two bald eagle nesting pairs, and two additional resident bald eagles (FHL 2009b, FHL 2009e). The eagles forage at or near the proposed Schoonover TTB in the vicinity of the San Antonio River. In 2002, 2003, and 2005, a pair successfully nested near the San Antonio River approximately 1.9 miles southeast of the Schoonover Airfield (U.S. Army 2005). The San Antonio River bald eagle nest is southwest of the proposed MPMG Range site.

Santa Lucia Mint. Santa Lucia mint is a small, annual plant that grows erect to a height of approximately 8.6 inches and flowers May through July. It is only known to occur on the banks of moist streams and seasonal pools in the Los Bueyes and Los Burros watersheds on FHL (FHL 2009e). The Santa Lucia mint grows in dense patches from the water line out to the dry soil margin (FHL 2004a).

Caper-fruited tropidocarpum. *Tropidocarpum capparideum* is a very small member of the mustard family. This species was presumed extinct since the 1950s until found on FHL after yellow star-thistle control efforts were conducted. It is known to occur in patches as well as scattered isolated plants in Training Areas 20, 22, 24, and 27 (FHL 2009e). Areas with known populations are marked for avoidance during military training (Clark 2009b). Caper-fruited tropidocarpum also occurs in large dense patches at and near the proposed MPMG Range in Training Area 22 and could be affected by the Proposed Action.

Swainson's Hawk. More than 85 percent of Swainson's hawk habitat in the Central Valley is in riparian systems adjacent to suitable foraging habitats. The Swainson's hawk was California state-listed as threatened in 1983 and also is protected under the MBTA. The USFWS has designated the Swainson's hawk as Not Listed (Resolved Taxon) in its entire range (FHL 2007c). There are no known nesting sites for Swainson's Hawk at FHL.

Bank Swallow. A neotropical migrant found primarily in riparian and other lowland habitats, the bank swallow arrives in California from South America in early March and migrates to the tropics in July and August. This species nests in colonies and creates nests by burrowing into vertical banks consisting of fine-grained soils. Bank swallows are not listed under the ESA, but is a species covered by the MBTA (FHL 2007c). There are no known nesting sites for bank swallows on FHL.

Table 4-15. State Special Status Species

Scientific Name	Common Name	State Status
Plants		
Abies bracteata	Bristle cone fir	CEQA
Aristocapsa insignis	Indian Valley spineflower	CEQA
Baccharis plummerae ssp. *glabrata*	San Simeon baccharis	CEQA
Calochortus weedii var. *vestus*	Late-flowering mariposa lily	CEQA
Calycadenia micrantha	Small flowered calycadenia	CEQA-eligible
Calycadenia truncata ssp. microcephala	Snow Mountain calycadenia	CEQA
Calycadenia villosa	Dwarf calycadenia	CEQA
Camissonia hardhamiae	Hardham's evening-primrose	CEQA
Castilleja densiflora ssp. *obispoensis*	Obispo Indian paintbrush	CEQA
Caulanthus coulteri var. *lemmonii*	Lemmon's jewelflower	CEQA
Chlorogalum purpureum var. *purpureum*	Purple amole	CEQA
Chorizanthe rectispina	One-awned spineflower	CEQA
Clarkia jolonensis	Jolon clarkia	CEQA
Collinsia antonina	San Antonio collinsia	CEQA
Delphinium umbraculorum	Umbrella larkspur[2]	CEQA
Didymodon norrissi	Norris' beard moss	CEQA-eligible
Eriastrum luteum	Yellow-flowered eriastrum	CEQA
Fritillaria viridea	San Benito fritillary	CEQA
Galium californicum ssp. *luciense*	Cone Peak bedstraw	CEQA
Galium hardhamiae	Hardham's bedstraw	CEQA
Juglans hindsii	Northern California black walnut	CEQA-eligible
Layia heterotricha	Pale-yellow layia	CEQA
Malacothamnus davidsonii	Davidson's bushmallow	CEQA
Malacothamnus palmeri var. *involucratus*	Palmer's bushmallow	CEQA-eligible
Monardella palmeri	Palmer's monardella	CEQA
Navarretia nigelliformis ssp. *radians*	Shining navarretia	CEQA
Navarretia prostrate	Prostrate navarretia	CEQA
Pentachaeta exilis ssp. *aeolica*	Slender pentachaeta	CEQA
Plagiobothrys uncinatus	Hooked popcorn-flower	CEQA
Pogogyne clareana	Santa Lucia mint	E
Senecio aphanactis	Rayless ragwort	CEQA
Sidalcea hickmanii ssp. hickmanii	Hickman's checkerbloom	CEQA
Streptanthus albidus ssp. *peramoenus*	Most beautiful jewel-flower	CEQA
Streptanthus morrisonii	Morrison's jewel flower	CEQA
Triteleia ixioides ssp. *cookii*	Cook's triteleia	CEQA
Tropidocarpum capparideum	Caper-fruited tropidocarpum	CEQA

Scientific Name	Common Name	State Status
Fish		
Lavinia symmetricus subditus	Monterey roach	SSC
Amphibians		
Rana boylei	Foothill yellow-legged frog	SSC
Scaphiopus hammondii	Western spadefoot toad	SSC
Taricha torosa torosa	Coast range newt	CEQA-eligible
Reptiles		
Clemmys marmorata pallida	Western pond turtle	SSC
Phrynosoma coronatum frontale	Coast horned lizard	SSC
Birds		
Accipiter cooperi	Cooper's hawk	SSC
Accipiter striatus	Sharp-shinned hawk[1]	SSC
Aechmophorus occidentalis	Western grebe[1]	C
Agelaius tricolor	Tricolored blackbird[2]	SSC
Aquila chrysaetos	Golden eagle[1]	SSC
Asio flammeus	Short-eared owl	SSC
Asio otus	Long-eared owl[1]	SSC
Athene cunicularia	Burrowing owl	SSC
Buteo regalis	Ferruginous hawk	SSC
Butteo swainsoni	Swainson's hawk	T
Circus cyaneus	Northern harrier[1]	SSC
Cypseloides niger	Black swift	SSC
Dendroica petechia brewsteri	Yellow warbler[1]	SSC
Elanus leucurus	White-tailed kite	Protected
Eremophila alpestris actia	California horned lark	SSC
Falco columbarius	Merlin	SSC
Falco mexicanus	Prairie falcon[1]	SSC
Falco peregrines	Peregrine falcon	Delisted
Gymnogyps californianus	California condor	E
Haliaeetus leucocephalus	Bald eagle	E
Icteria virens	Yellow-breasted chat[1]	SSC
Lanius ludovicianus	Loggerhead shrike	SSC
Larus californicus	California gull	SSC
Pandion haliaetus	Osprey	SSC
Pelecanus erythrorhynchos	American white pelican	SSC
Phalacrocorax auritus	Double-crested cormorant	SSC
Progne subis	Purple martin[1]	SSC
Riparia riparia	Bank swallow	T
Strix occidentalis occidentalis	California spotted owl	SSC
Vireo bellii pusillus	Least Bell's vireo	E

Scientific Name	Common Name	State Status
Mammals		
Antrozous pallidus	Pallid bat	C
Bassariscus astutus	Ring-tailed cat	Protected
Cervus canadensis nannodes	Tule elk	Protected
Corynorhinus townsendii pallescens	Pale big-eared bat	SSC
Felis concolor	Mountain lion	Protected
Neotoma fuscipes luciana	Monterey dusky-footed woodrat	SSC
Perognathus inornatus psammophilus	Salinas pocket mouse	SSC
Sorex ornatus salaries	Monterey Ornate Shrew	SSC
Taxidea taxus	American badger	SSC
Vulpes macrotis mutica	San Joaquin kit fox	T

Source: NPS 2007, Clark 2009a

Notes:

1. Present during breeding season
2. On or very near FHL.

Key:

E = Endangered

T = Threatened

C = Candidate Species

CEQA = Meet the criteria for listing as described in Section 15380 of the CEQA Guidelines

CEQA-eligible = Species that are eligible for, but not yet listed by the state as threatened or endangered. These species are given the same protection as those species officially listed by state or Federal governments.

SSC = Species of Special Concern is a species, subspecies, or distinct population native to California which is of conservation concern.

Protected = Fully protected species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation.

4.9 Cultural Resources

4.9.1 Definition of the Resource

"Cultural resources" is an umbrella term for many heritage-related resources defined in several Federal laws and executive orders. These include the NHPA (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the NAGPRA (1990).

The NHPA focuses on cultural resources such as prehistoric and historic sites, buildings and structures, districts, or other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or other reason. Such resources might provide insight into the cultural practices of previous civilizations or they might retain cultural and religious significance to modern groups. Resources judged important under criteria established in the NHPA are considered eligible for listing in the NRHP. These are termed "historic properties" and are protected under the NHPA. NAGPRA requires consultation with culturally affiliated Native American tribes for the disposition of Native American human remains, burial goods, and cultural items recovered from federally owned or controlled lands.

Typically, cultural resources are subdivided into archaeological sites (prehistoric or historic sites containing physical evidence of human activity but no structures remain standing); architectural sites (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance); and sites of traditional, religious, or cultural significance to Native American tribes.

Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., projectile points and bottles). *Architectural resources* include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to warrant consideration for the NRHP. More recent structures, such as Cold War-era resources, might warrant protection if they are of exceptional importance or if they have the potential to gain significance in the future. *Resources of traditional, religious, or cultural significance to Native American tribes* can include archaeological resources, sacred sites, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans consider essential for the preservation of traditional culture.

The EA process requires assessment of the potential effect of a Federal action on cultural resources. In addition, under Section 106 of the NHPA, Federal agencies must take into account the effect of their undertakings on historic properties and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. Under this process, the Federal agency evaluates the NRHP eligibility of resources within the proposed undertaking's Area of Potential Effect (APE) and assesses the possible effects of the proposed undertaking on historic resources in consultation with the SHPO and other parties. The APE is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." Under Section 110 of the NHPA, Federal agencies are required to establish programs to inventory and nominate cultural resources under their purview to the NRHP.

4.9.2 Existing Conditions

FHL is situated approximately 25 miles southwest of King City and approximately 86 miles south of old Fort Ord, California. The installation was established in 1940 in anticipation of training soldiers for combat in the European theater of operations during World War II. The area chosen for the training site consisted of more than 200,000 acres of local ranch lands between the Salinas River valley divide and the Pacific Ocean. The terrain varied from level valleys bordered by gentle hills to steep, rugged mountains and has since provided opportunities for realistic training and defense technology testing. FHL was a subinstallation of Fort Ord until November 1993 when the installation came under USARC. A detailed prehistoric and historic chronology of the area is provided in the 2008 ICRMP: Historic Properties Component (FHL 2008c).

To date, more than 100 cultural resources studies in history, archaeology, architectural history, and ethnography have been conducted at FHL. Approximately 33 percent of the installation has been inventoried for cultural resources. The extent of this coverage includes areas subject to regular installation activity and many areas with a high probability for containing cultural resources. The results of these studies provide the framework for understanding the cultural and historical development at the installation and the surrounding region. Currently, there are six properties within the APE that are listed on the NRHP. Three sites are entirely under the jurisdiction of the U.S. Army. These are La Cueva Pintada (CA-MNT-256), The Jose Maria Gil Family Adobe and Cemetery (CA-MNT-963H), and The Milpitas Ranch House, aka Hacienda, (CA-MNT-940H). Two sites are buildings that belong to the County of Monterey, but are located on FHL lands. These are the Dutton Hotel (CA-MNT-693H), and the Tidball Store (CA-MNT-794H). The sixth site is The Mission San Antonio de Padua (CA-MNT-100H) and is located on a private in holding adjacent to the Cantonment area.

Archaeological Resources. The earliest human occupation at FHL is estimated at about 8,000 BC. Archaeological evidence indicates land use of the region ranging from hunting camps and isolated finds to milling stations and prehistoric villages. Spanning more than 10,000 years, the prehistoric period indicates a long history of adaptive shifts in population, subsistence, and social organization. The prehistoric period is sub-divided into six broad periods: The Paleoindian (prior to 6,500 BC), The Millingstone (6,500 to 3,500 BC), The Early Period (3,500 to 600 BP), the Middle Period (600 BC to AD 1000), the Middle/Late Transition (AD 1000 to 1250), and the Late Period (AD 1250 to 1800). At the time of initial occupation by Europeans in 1769, the Salinan cultural group occupied almost 3,000 square miles in the area. They practiced seasonal hunting and gathering, and had established extensive trade networks with neighboring groups in the region. There were at least 20 Salinan villages recorded throughout the territory.

Mission/Hispanic Period (1769 to 1850). The first documented contact between Salinan and Europeans was in 1769, when the expedition led by Gaspar de Portola passed through the area. In 1771, a party led by Father Junipero Serra arrived in the San Antonio River Valley to found Mission San Antonio de Padua, the third of the Spanish missions in California. During the next several decades, local Native American populations were drawn into the mission establishment to serve as agricultural laborers on mission lands and outlying ranches.

Secularization was decreed by the newly independent Mexican government. Mission San Antonio holdings were divided into at least ten land grants, including four within present-day FHL (Milpitas, San Miguelito de Trinidad, El Piojo, and Los Ojitos). Many of the disenfranchised Indians remained in the area, working as laborers on cattle ranches and establishing small settlements.

Settlement Period (1850 to 1880). Following admission of California into the United States, many Mexican land grants eventually passed into the hands of American settlers. The four land grants composing most of FHL were sold to Americans by 1873. Gold was first reported in the region in 1850, leading to the establishment of Jolon as a supply center for nearby claims.

Consolidation (1880 to 1940). By 1880, large ranch holdings were consolidated along the approximate lines of the original land grants. In the mid-1920s, William Randolph Hearst began the largest consolidation of land since the establishment of Mission San Antonio by purchasing intact the former El Piojo, San Miguelito, Los Ojitos, and Milpitas land grants as well as other smaller holdings. These holdings were operated under the Piedmont Land and Cattle Company until financial stresses forced Hearst to sell the properties.

Hunter Liggett (1940 to present). In 1940, the U.S. Army began acquiring Hearst's holdings and created the Hunter Liggett Military Reservation (MR). Hunter Liggett MR began operations under the command of Camp Roberts to train soldiers during World War II. In 1953, command was transferred to Fort Ord, and in 1975, the post was upgraded to FHL.

Most of the cultural resources identified at FHL are archaeological sites representing the remains of prehistoric villages, hunting camps, and food-processing stations. There are 798 recorded archaeological sites, and 83 of those sites contain historic components. Additionally, there are 87 architectural resources that are more than 50 years old. Currently, there are six properties within the APE that are listed on the NRHP. Three sites are entirely under the jurisdiction of the U.S. Army. These are La Cueva Pintada (CA-MNT-256), The Jose Maria Gil Family Adobe and Cemetery (CA-MNT-963H), and The Milpitas Ranch House, aka Hacienda (CA-MNT-940H). Two sites are buildings that belong to the County of Monterey, but are located on FHL. These are the Dutton Hotel (CA-MNT-693H), and the Tidball Store (CA-MNT-794H). The sixth site is The Mission San Antonio de Padua (CA-MNT-100H) and is located on a private land in holding adjacent to the cantonment area.

Archaeological Resources. While only a third of the lands under FHL's jurisdiction have been inventoried for cultural resources, 798 archaeological sites have been documented. Of these, 715 contain prehistoric cultural components, 83 contain historic cultural components, and 37 contain both historic and prehistoric components. Prehistoric site types include the remains of villages, bedrock milling sites, task-specific sites, rock shelters, rock art sites, chert quarries, and sparse lithic scatters. Historic site types include communities, ranches, mines, military sites, structural remains including those manufactured from adobe, refuse scatters, water management sites, privies, linear features, exotic vegetation, roads, trails, cemeteries, settings, and small-scale landscapes.

Architectural Resources. Currently, there are 87 structures more than 50 years old under U.S. Army management at FHL. In addition, there are two historic buildings located on U.S. Army property, but owned by the County of Monterey, and are considered in this EA (The Tidball Store and the Dutton Hotel). Finally, the historic Mission San Antonio is also within the APE. The largest concentration of structures occurs within the cantonment area. Architectural resources include ranch buildings, military sites, water management infrastructure, bridges, and cemeteries.

Resources of Traditional, Religious, or Cultural Significance to Native American Tribes. One property of cultural significance is currently listed on the NRHP, La Cueva Pintada (CA-MNT-256). More than 100 other archaeological sites might meet the criteria as defined by NHPA for properties of traditional religious and cultural importance upon completion of formal evaluation. In general, these are sites that consist of rock shelters, cupules, pictographs, traditional gathering locations, ceremonial landscapes, and burial grounds.

4.10 Socioeconomics and Environmental Justice

4.10.1 Definition of the Resource

Socioeconomics. Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly characteristics of population and economic activity. Regional birth and death rates and immigration and emigration affect population levels. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Changes in these two fundamental socioeconomic indicators are typically accompanied by changes in other components, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permit characterization of baseline conditions in the context of regional, state, and national trends.

Data in three areas provide key insights into socioeconomic conditions that might be affected by a proposed action. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the "before" and "after" effects of any jobs created or lost as a result of a proposed action. Data on industrial or commercial growth or growth in other sectors provide baseline and trend line information about the economic health of a region. In appropriate cases, data on an installation's expenditures in the regional economy help to identify the relative importance of an installation in terms of its purchasing power and jobs base.

Demographics identify the population levels and changes in population levels of a region. Demographics data might also be obtained to identify a region's characteristics in terms of race, ethnicity, poverty status, educational attainment level, and other broad indicators.

Socioeconomic data shown in this section are presented at state, county, and local levels to characterize baseline socioeconomic conditions in the context of regional and state trends. Data have been collected from previously published documents issued by Federal, state, and local agencies.

The geographical area in which a majority of the socioeconomic effects of the Proposed Action and alternatives would occur is defined as the Region of Influence (ROI). The ROI is considered a primary effect area because it receives direct and indirect economic benefits from installation operations due to residency distribution of employees, commuting distances and times, and the location of businesses providing goods and services to installation personnel and their dependents. Other criteria include regional economic activity, population, housing, and schools.

Environmental Justice. While there are no Federal regulations on socioeconomics, there is one EO that pertains to environmental justice issues. On February 11, 1994, President Clinton issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was created to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal, and local programs and policies.

Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action. Such information aids in evaluating whether a proposed action would render vulnerable any of the groups targeted for protection in the EO. In addition, the U.S. Army has issued guidance on environmental justice analysis in determining the environmental effect on populations in the vicinity of a proposed action (Canter et al. 2007).

The environmental justice ROI is considered to have a disproportionately high percentage of low-income or minority residents if the percentage of persons characterized as a low-income or minority population within the ROI is either greater than 50 percent, or is disproportionately higher than either encompassing county.

For purposes of this EA, minority and low-income populations are defined as follows:

1. Minority Population: Black or African Americans; American Indians and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; and some other race. The U.S. Census Bureau considers race and Hispanic origin (ethnicity) as two separate concepts and these data are recorded separately. For the purposes of this analysis, the total minority population would include racial minority populations and Hispanic or Latino populations within the ROI.
2. Low-income Population: Persons living below the poverty level, according to income data collected in the 2000 U.S. Census.

4.10.2 Existing Conditions

Socioeconomics. FHL encompasses approximately 162,000 acres in an unincorporated portion of southern Monterey County, California, on the boundary with San Luis Obispo County to the south. The average daily supported population during FY 2008 was approximately 1,700 active-duty, guardsmen and reserves, military dependents, civilians, and contractors (FHL 2008d).

For the purposes of this EA, census tracts adjacent to the Proposed Action, including the two largest cities in these areas (King City in Monterey County and Paso Robles[1] in San Luis Obispo County), were determined to be the socioeconomic ROI. The census tracts evaluated and included in the ROI include tracts 113.01, 113.02, and 114 in Monterey County, and tracts 100, 101, 102.01, 102.02, and 102.03 in San Luis Obispo County. Population and employment data relevant to the ROI, Monterey and San Luis Obispo counties, and the State of California are provided in **Tables 4-16** and **4-17**.

Table 4-16. Population Statistics for the ROI, Monterey County, San Luis Obispo County, and the State of California

	Total Population (2000 Census)	Total Population (2008 Estimate)	Percent Change
State of California	33,871,648	36,756,666	8.5
Monterey County	401,762	408,238	1.6
King City	11,094	11,627	4.8
San Luis Obispo County	246,681	265,297	7.5
Paso Robles	24,297	28,715	18.2
ROI *	50,734	NA	NA

Sources: U.S. Census Bureau 2001a, U.S. Census Bureau 2008a
Note: * Population estimates are not available for census tracts.

The U.S. Census Bureau estimated that Monterey and San Luis Obispo counties had total populations of 408,238 and 265,297, respectively, in 2008, which represent increases of 1.6 percent and 7.5 percent over the 2000 populations (see **Table 4-16**). Between 2000 and 2008, King City's population grew at a larger rate than Monterey County (4.8 percent vs. 1.6 percent). Similarly, the population growth rate of Paso Robles experienced a much larger increase than San Luis Obispo County (18.2 percent vs. 7.5 percent). In 2008, King City residents made up approximately 2.8 percent of Monterey County's population, and the residents of Paso Robles were approximately 10.8 percent of San Luis Obispo's population (U.S. Census Bureau 2008a).

The 2000 U.S. Census indicated that the available labor force (total population 16 years and older) in Monterey and San Luis Obispo counties was 299,915 and 200,572 persons, respectively. Approximately 61.6 percent of the persons in the available labor force in Monterey County and 58.3 percent of the persons in the available labor force in San Luis Obispo County were actually in the labor force. The labor forces in Monterey and San Luis Obispo counties consisted primarily of civilians with only 2.8 percent and 0.2 percent, respectively, in the armed forces (see **Table 4-17**) (U.S. Census Bureau 2001b).

There were an estimated 139,349 housing units in Monterey County in 2007; 13,339 of these units were vacant representing a 9.6 percent vacancy rate. San Luis Obispo County had a slightly lower number of total housing units (i.e., 104,382) than Monterey County, but had a similar vacancy rate of 9.8 percent (i.e., 11,382 vacant units). In Monterey County, renters and owners each represented approximately half of the occupied housing units; 61,203 were occupied by renters and 64,807 were occupied by owners. The homeowner and renter vacancy rates were roughly equal at 2.2 percent and 3.8 percent, respectively. The occupied housing units in San Luis Obispo County included 57.4 percent occupied by owners (59,915 units) and 42.6 percent occupied by renters (44,467 units). The homeowner and renter vacancy rates were roughly equal at 1.1 percent and 2.0 percent, respectively (U.S. Census Bureau 2008b). Housing estimates are not available at the census tract level; therefore, 2007 data are not available for the ROI. However, the 2000 U.S. Census indicated that the ROI had 18,885 housing units of which 2,120 were vacant representing an 11.2 percent vacancy rate (U.S. Census Bureau 2001c).

[1] The official full name of the City of Paso Robles is El Paso de Robles.

Table 4-17. Percentage of Employment Types in the ROI, Monterey County, San Luis Obispo County, and the State of California (2000 [1])

Employment Types	ROI	Monterey County	San Luis Obispo County	State of California
Employed Persons in the Armed Forces (in the Labor Force [2] 16 years and over)	**0.6**	**2.8**	**0.2**	**0.9**
Employed Persons in the Civilian Labor Force 16 years and over (by Industry)				
Agriculture, forestry, fishing and hunting, and mining	15.7	12.4	3.8	1.9
Construction	8.4	6.4	7.9	6.2
Manufacturing	10.9	5.7	7.1	13.1
Wholesale Trade	2.7	6.0	2.5	4.1
Retail Trade	10.5	11.2	12.4	11.2
Transportation and warehousing, and utilities	3.8	3.3	4.5	4.7
Information	1.5	2.3	2.7	3.9
Finance, insurance, real estate and rental and leasing	3.7	4.9	5.1	6.9
Professional, scientific, management, administrative, and waste management services	6.0	8.9	9.4	11.6
Educational, health and social services	16.1	18.2	21.8	18.5
Arts, entertainment, recreation, accommodation and food services	7.9	10.3	11.4	8.2
Other services (except public administration)	4.9	4.9	5.4	5.2
Public Administration	7.7	5.5	6.2	4.5

Source: U.S. Census Bureau 2001b

Notes:

1. The 2000 U.S. Census data are the most recent employment data for the ROI.
2. Labor force includes persons that are employed or unemployed civilians and members of the armed forces.

On FHL numerous recreational facilities exist, including a soccer field, swimming pool, tennis courts, theater, bowling center, a football and baseball field (joint use), basketball, volleyball, and racquetball courts, physical fitness center, and a recreation center. Also, near the entrance to FHL there is a primitive campground. In addition to the recreational facilities located at FHL the training grounds when inactive are used for hunting and fishing. The fishing and hunting program that exists at FHL allows nonmilitary and military hunters and fishers to utilize the training facilities. A system is in place to make certain hunting and fishing activities do not interrupt training activities which includes obtaining an FHL hunting or fishing permit, registering with the Wildlife Check Station prior to beginning a hunt, having a valid California Department of Fish and Game hunting or fishing license, and publishing the available hours and training areas that are available each weekend for hunting and fishing.

Environmental Justice. The area around FHL is rural and does not contain any substantial communities. The closest cities are King City in Monterey County (approximately 25 miles northeast of the installation) and Paso Robles in San Luis Obispo County (approximately 40 miles southeast of the installation). Lockwood is closer to FHL; however, it is a small unincorporated community (rural center) and is not a Census Designated Place, so there is no specific demographic information for this community. Therefore,

for the purposes of the environmental justice analysis for this EA, the residents of the eight census tracts composing the socioeconomic ROI also made up the environmental justice ROI. Census tracts are designed to be relatively homogenous units with respect to population characteristics, economic status, and living conditions at the time of establishment.

Based on 2000 U.S. Census data, less than 50 percent of the ROI population was within a racial minority (race other than white alone), were of Hispanic or Latino origin, and were low-income (below 1999 poverty thresholds) (see **Table 4-18**). When compared to San Luis Obispo County, the ROI had a higher percentage of residents reporting to be of a racial minority (30.7 percent vs. 15.4 percent) and of Hispanic or Latino origins (38.3 percent vs. 16.3 percent), but lower percentages than Monterey County. The ROI has a greater percentage of residents living in poverty than do both Monterey and San Luis Obispo counties (15.3 percent vs. 13.5 percent and 12.8 percent, respectively), although not of a disproportionate level. The ROI has a lower percentage of residents reporting to be of a racial minority (30.7 percent vs. 40.5 percent) than the State of California, but a higher percentage of residents below the poverty level (15.3 percent vs. 14.2 percent) and of Hispanic or Latino origin (38.3 percent vs. 32.4 percent) (U.S. Census Bureau 2001b).

4.11 Infrastructure

4.11.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure information provided below was primarily obtained from the *Fort Hunter Liggett, California Infrastructure Capacity Analysis* (USACE 2007) and provides a brief overview of each infrastructure component and comments on its existing general condition. The infrastructure components to be discussed in this section include utilities (electrical and alternative power, propane, liquid fuel, water supply, sanitary sewage, storm water, and communications) and solid waste management.

Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs. Alternative means of waste disposal might involve waste-to-energy programs or incineration. In some localities, landfills are designed specifically for, and limited to, disposal of construction and demolition debris. Recycling programs for various waste categories (e.g., glass, metals, papers, asphalt, and concrete) reduce reliance on landfills for disposal.

4.11.2 Existing Conditions

Electrical Systems. Electrical power is provided to FHL by Pacific Gas and Electric (PG&E). PG&E owns and operates the overhead electrical distribution system that feeds the cantonment area up to a demarcation point near the intersection of Mission and Sulfur Springs Roads. From the demarcation point, the Directorate of Public Works personnel for FHL operate and maintain the overhead and underground primary and secondary distribution lines that branch out to serve the buildings of the cantonment area. A single 12.47-kilovolt, 3 phase distribution circuit that is rated at 5.6 million-volt amperes (MVA) feeds electricity from the Jolon Substation outside of the installation to the cantonment area for approximately 7 miles. Because this circuit also supplies electricity to other customers, FHL's electrical capacity is limited to 4 MVA. Current peak electrical demand for the cantonment area is approximately 2.8 MVA, which is approximately 70 percent of available capacity (USACE 2007).

Table 4-18. Minority and Low-Income Data in the ROI, Monterey County, San Luis Obispo County, and the State of California (2000 [1])

	ROI	Monterey County	San Luis Obispo County	State of California
Total Population	**50,734**	**401,762**	**246,681**	**33,871,648**
Percent Male	51.4	51.8	51.4	49.8
Percent Female	48.2	48.2	48.6	50.2
Percent Under 5 Years	7.6	7.8	5.0	7.3
Percent Over 65 Years	11.4	10.0	14.5	10.6
Percent White	69.3	55.9	84.6	59.5
Percent Black or African American	2.0	3.7	2.0	6.7
Percent American Indian Alaska Native	1.4	1.0	0.9	1.0
Percent Asian	1.6	6.0	2.7	10.9
Percent Native Hawaiian and Other Pacific Islander	0.1	0.4	0.1	0.3
Percent Some Other Race	21.6	27.8	6.2	16.8
Percent Reporting 2 or more races	4.0	5.0	3.4	4.7
Percent Hispanic or Latino [2]	38.3	46.8	16.3	32.4
Percent Below Poverty [3]	15.3	13.5	12.8	14.2
Per Capita Income	$17,570 [4]	$20,165	$21,864	$22,711
Median Household Income	$39,945 [4]	$48,305	42,428	$47,493

Source: U.S. Census Bureau 2001b

Notes:

1. The 2000 U.S. Census data are the most recent social and economic data for the ROI.
2. Persons of Hispanic or Latino origin can be of any race, and thus are also included in applicable race categories.
3. Based on 1999 poverty thresholds.
4. Per Capita Income and Median Household Income for the ROI consist of the average of all census tracts included in the ROI.

Propane Systems. FHL does not have a centralized gas distribution system. Gas service is provided to the majority of buildings on the installation by aboveground propane storage tanks outside of each structure. In heavily developed areas such as the family housing area, larger propane storage tanks with localized distribution networks provide propane service to as many as 18 buildings each. FHL has 68 propane storage tanks, which range in size from 300 to 9,000 gallons. Northern Energy supplies propane to all of the propane storage tanks on the installation and owns 42 of these 68 storage tanks. The remaining storage tanks, which include all storage tanks over 1,000 gallons in capacity, as well as any distribution piping, is owned by the Federal government. Annual average propane demand at FHL is approximately 275,000 gallons, and during peak heating season some propane storage tanks need to be refilled as often as twice per week. Northern Energy has always met the installation's propane demand without service interruptions (USACE 2007).

Liquid Fuel. JP-8 (jet fuel) is the primary fuel source for the five boilers that serve the barracks buildings. The JP-8 is stored in storage tanks that are approximately 1,000 gallons in size. Each JP-8 storage tank is filled by pumper trucks using fuel purchased by FHL for use in military vehicles and training applications. Annual average JP-8 demand at FHL for heating (excluding other applications) is approximately 75,000 gallons (USACE 2007). Other liquid fuels, including diesel and gasoline, are used at the installation to power military vehicles and equipment.

Water Supply Systems. Potable water is supplied to the cantonment area by three groundwater wells that have a collective water-pumping maximum of 1.872 million gallons per day (MGD). Two of these groundwater wells (identified as P382 and P383) are approximately 7 miles from the cantonment area and serve as the primary potable water sources at the installation. The third well (identified as P236) is used only as a back-up for the other two groundwater wells. An additional groundwater well is proposed to be placed between wells P382 and P383 in the future (USACE 2007).

Water at FHL is treated at the wellhead with chlorine and a corrosion inhibitor. As such, the installation meets or exceeds Federal and state water quality standards (FHL 2006c). Water is pumped into two aboveground storage tanks that have the capacity to hold either 1,000,000 or 200,000 gallons of water each. A total of 14 miles of water service piping, which ranges in diameter from ¾ to 12 inches, is used to transport water to and throughout the cantonment area. Current water demand is approximately 0.23 MGD or 12.3 percent of the collective water pumping capacity of the three groundwater wells (USACE 2007).

Sanitary Sewer/Wastewater Systems. Within the cantonment area, the sanitary sewer/wastewater system consists of approximately 8 miles of polyvinyl chloride and vitrified clay pipes, gravity sanitary sewer mains, and a wastewater treatment plant. The wastewater treatment plant is considered a secondary treatment facility, which uses aerated lagoons and settling basins to treat wastewater. Liquid wastewater is allowed to evaporate from the settling basins during low flow periods or is pumped onto a secure spray field for evapotranspiration during periods of increased flow. Solids in the wastewater are allowed to settle in the settling basins and are dredged away as necessary. Dredging was last conducted in 1995. Oil/water separators and grease traps pretreat greases and oils before they enter the wastewater collection system. The wastewater system is designed to handle an average of 1.0 MGD of flow. The average flow is approximately 0.15 MGD or 15 percent of the treatment system's capacity (USACE 2007). Outside of the cantonment area, sanitary sewer service is not present. All wastewater generated in these areas must be either transported to and discharged at appropriate locations within the cantonment area or discharged into onsite septic systems.

Storm Water Systems. The two major watercourses flowing through the installation are the San Antonio River and the Nacimiento River, both of which flow southeast into the Salinas River. In less developed portions of FHL, man-made storm water handling systems are not present, and storm water drains by sheet flow to various natural drainage ways. In the cantonment area, storm water is collected and transported by an extensive man-made storm water drainage network that transports storm water to the San Antonio River. The storm water drainage system consists of approximately 4,000 linear feet of channels and approximately 20 inlets with catch basins, which are owned and maintained by FHL. In general, the storm water drainage system is adequate to serve the needs of the installation; however, approximately once every 10 years, flooding occurs just inside the cantonment area near a location known as "Check Point Charlie" (USACE 2007). Additionally some drainage swales are prone to erosion.

Communications. Telephone and data transmission service is provided to FHL by SBC/AT&T Communications via an underground cable, which extends from outside of the installation to the Directorate of Information Management building via the installation's main gate at Jolon Road. A series

of underground telephone and data transmission cables connect from the main service line to the buildings at FHL (FHL 2006b).

Solid Waste Management. Solid waste generated at FHL is collected on a weekly and biweekly basis by contractors. Solid waste is accumulated at the FHL Solid Waste Transfer Facility on Nacimiento-Fergusson Road or in containers located throughout the cantonment area and in training areas as required. Materials that can be recycled are removed, and any remaining wastes are sent to the Johnson Canyon Landfill. The Johnson Canyon Landfill has permitting capacity to handle 9,000 tons of waste per day (108,000 tons annually) (and is expected to reach capacity in 2043 (SVSWA 2000). FHL currently generates approximately 19.6 tons of waste per month (235.20 tons annually), which is about 0.2 percent of the landfill's daily capacity (FHL 2007e).

4.12 Traffic and Transportation Systems

4.12.1 Definition of the Resource

The transportation resource is defined as the system of roadways and highways that are in the vicinity of the proposed site and could reasonably be expected to be potentially affected by the Proposed Action.

4.12.2 Existing Conditions

Access Roads. The major regional travel routes to FHL are U.S. Highway 101 and Highway 1. Primary access for virtually all traffic to the installation is via Jolon Road, a public roadway connecting with U.S. Highway 101 near King City and again at Bradley. Jolon Road is also a route for campers and boaters to reach the recreational areas on the San Antonio Reservoir, southeast of FHL. This traffic is heaviest on Fridays and Sundays, and particularly during summer months (FHL 2007f). Access roads to FHL are shown on **Figure 4-5**.

Secondary access to the installation is provided by Nacimiento-Ferguson Road, originating at Highway 1 near the town of Lucia, west of FHL (FHL 2007d). It is the only east-west connection between the central valley and the Pacific Coast between Monterey (to the north) and Paso Robles (to the south). The western entrance to the installation at Nacimiento-Ferguson Road experiences very little traffic. While it is the only access to the Pacific Coast, it is a low-volume road because of dangerous conditions (e.g., narrow road, sharp turns and switchbacks, and few guardrails) (Booz Allen 2006). Interlake Road enters the southeastern portion of the installation and intersects Jolon Road approximately 5.7 miles southeast of the installation's main gate. The northwestern portion of the installation can be accessed via Del Venturi Road, which also provides public access to the Los Padres National Forest, wilderness areas, and to a small number of private holdings northwest of the installation (FHL 2006b).

Open public access to the installation is generally permitted on Nacimiento-Ferguson, and Del Venturi, Roads. Monterey County maintains Jolon and Interlake roads and access to those roads is not controlled by the installation. All other roads are closed to public access without a permit issued by Range Control. Sources of civilian traffic (i.e., people not associated with the Army) include San Antonio Mission (historic church and regular worship services), public hunting and fishing, entertainment facilities (bowling alley and movie theater), and construction contractors (Booz Allen 2006). On-installation residents travel to the local communities of King City or Paso Robles for entertainment, dining, or shopping. King City is approximately 25 miles west from the FHL cantonment area; Paso Robles is approximately 40 miles to the south (Booz Allen 2006).

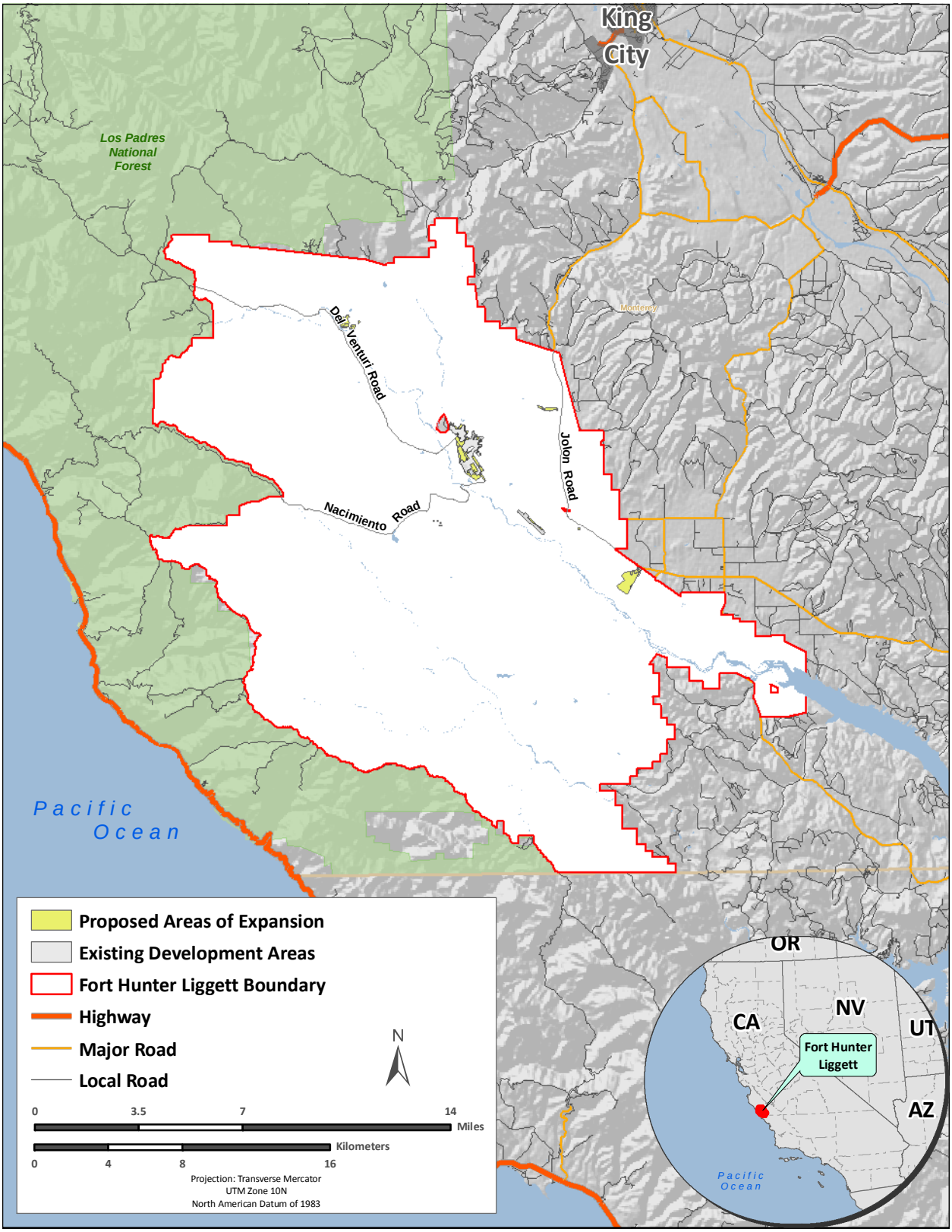

Figure 4-5. Access Roads at Fort Hunter Liggett

Level of service (LOS) is a qualitative measure of operating conditions within a traffic stream and their perception by motorists and passengers. LOS designations are used to describe the operating characteristics of the road network in terms of the level of congestion or delay experienced by traffic. Individual LOSs are designated by letters "A" for most favorable to "F" for least favorable, with each representing a range of conditions. LOS C is the standard for all local county roads in Monterey County, with the exception of those that serve community areas, in which an LOS D standard is allowed. LOS on local roads and highways in Monterey County is LOS B or better with the exception of Jolon Road several miles north of FHL between Pine Canyon (south of King City) and Highway 101, which is LOS C and is projected to achieve LOS E without local improvements (Monterey County 2005a, Monterey County 2007b, FHL 2006b). The portion of Jolon Road with the LOS C rating is approximately 15 miles north on Jolon Road from the cantonment area on FHL. The portion of Jolon Road within and near FHL is above the standard LOS.

Access Control Points. The installation's main gate is located on Jolon Road.

Installation Roadways. The FHL cantonment area is primarily accessed by Mission Road, which serves as an artery from the main gate into the installation (USACE 2007). Infantry Road forms the interior spine of the main cantonment area, serving as a collector street with side roads extending into the developed areas. Primary roads connecting to developed areas are paved, two-lane roadways. Unpaved roads and trails extend from developed areas into the field Training Areas (FHL 2007a). Virtually all of the roads in the FHL Training Areas are unimproved roads. Roadways on FHL have few driving constraints with a low volume of traffic and a controlled environment (FHL 2007e). The existing cantonment area roads are in good condition and adequately support current traffic loads, missions, and mission-support requirements; however, continued maintenance is required to avoid deterioration. Upgrades would be required as the mission and traffic loads increase (FHL 2007a).

4.13 Hazardous Materials and Waste

4.13.1 Definition of the Resource

Hazardous materials are defined by 49 CFR 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR Part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 U.S.C. 6903(5), as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may a) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

Special hazardous substances are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing

material (ACM), Polychlorinated biphenyls (PCBs) and lead-based paint (LBP). The USEPA is given authority to regulate these special hazard substances by the Toxic Substances Control Act (TSCA) Title 15 U.S.C. Chapter 53. TSCA Subchapter I identifies PCBs, Subchapter II ACMs and Subchapter IV LBP. USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR Part 763 with additional regulation concerning emissions (40 CFR Part 61). Whether from lead abatement or other activities, depending on the quantity or concentration the disposal of the LBP waste is potentially regulated by the RCRA at 40 CFR Part 260. The disposal of PCBs is addressed in 40 CFR Parts 750 and 761. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

DOD has developed ERP, which is intended to facilitate thorough investigation and cleanup of contaminated sites on military installations. Through the ERP, DOD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contaminant plume has been completed).

The U.S. Army has AR 200-1, *Environmental Protection and Enhancement*, which incorporates by reference the requirements of all Federal regulations, and other Army and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards. Evaluation would extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of the Proposed Action.

4.13.2 Existing Conditions

Pollution Prevention. FHL maintains a Pollution Prevention Plan. Objectives of this plan are to reduce or eliminate the effect that any U.S. Army operation or activity might have on the environment through the reduction or elimination of wastes, more efficient use of raw materials or energy, and reduced emissions of toxic materials (FHL 2000). FHL has developed several plans that enable it to identify strategies and meet the goals of pollution prevention. These plans include the following:

1. Pollution Prevention Plan (P2 Plan)
2. SPCC Plan
3. Business Response and Installation Spill Contingency Plan
4. Storm Water Management Plan
5. Hazardous Waste Minimization Plan
6. Hazardous Waste Management Plan.

Additionally, DOD agencies pursue maintenance procedures and materials that generate fewer wastes and are less hazardous. In accordance with DOD policy as directed by EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, new buildings should comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings set forth in the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding* (2006). The DOD incorporates sustainable building practices when they are environmentally, economically, and fiscally sound.

Hazardous Materials and Petroleum Products. AR 200-1, *Environmental Protection and Enhancement* identifies the requirements for managing hazardous materials on U.S. Army facilities, including guidance for the proper use, generation, transportation, storage, and handling of hazardous materials and petroleum

products. As part of the Pollution Prevention Management Plan, FHL has established the Pollution Prevention Program Team; a collaborative team composed of individuals from Department of Logistics (DOL), Department of Public Works (DPW), and the Installation Commander (FHL 2000).

Hazardous and Petroleum Wastes. FHL maintains a Hazardous Waste Management Plan, as directed by AR 200-1. This plan prescribes the roles and responsibilities of all members of FHL with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for hazardous waste management.

FHL is a large-quantity hazardous waste generator (Handler Identification CA8210020436). The installation has a RCRA Hazardous Waste Storage permit, which was renewed in 2008 and is renewed annually (USEPA 2009a). The permit authorizes storage of hazardous waste in containers at Building 188. All hazardous waste is processed through the servicing Defense Re-utilization and Marketing Office, then recycled or transported off installation to a hazardous waste disposal facility (FHL 2001).

Environmental Restoration Program. The Defense Environmental Restoration Program (DERP) was formally established by Congress in 1986 to provide for the cleanup of DOD sites. The ERP and the Military Munitions Response Program (MMRP) are components of the DERP. The DERP requires each DOD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The MMRP addresses nonoperational range lands that are suspected or known to contain unexploded ordnance (UXO), discarded military munitions, or munitions constituent contamination.

The FHL Installation Action Plan outlines the clean-up program for FHL. It identifies 34 ERP sites (2 active ERP sites and 32 response complete sites) and 12 MMRP sites (7 active MMRP sites and 5 response complete sites) within FHL. The 46 sites identified in the Installation Action Plan at FHL consist of old landfills, fire training areas, past equipment maintenance activities, and bulk fuel storage areas. Contamination in the form of elevated levels of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons, metals, and pesticides are found in soil, sediments, and groundwater at many of these sites. The contaminants of concern that have been identified in groundwater are fuels, oils, and lubricants (FHL 2008e).

Through the Environmental Restoration Account, strategies have been developed for all sites to ensure cleanup as expeditiously as possible. The ERP sites are at various stages in the clean-up process, with some moving to completion, some in the active clean-up phase, and others still under investigation.

Asbestos-Containing Material. Asbestos is regulated by USEPA under the CAA; TSCA; and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). USEPA has established that any material containing more than 1 percent asbestos by weight is considered an ACM. Friable ACM is any material containing more than 1 percent asbestos, and that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM is any ACM that does not meet the criteria for friable ACM.

ACM at U.S. Army facilities is regulated by AR 200-1 and AR 420-70, *Buildings and Structures*. AR 200-1 contains the environmental policy for the U.S. Army's Asbestos Management Program. AR 420-70 contains the facilities engineering policy for the U.S. Army's Asbestos Management Program. It consists of requirements for facility surveys, monitoring, training, and facility disposition. AR 420-70 excludes ACM from all procurements and uses where asbestos-free substitute materials exist.

The U.S. Army Corps of Engineers conducted a survey of the existing nonpriority buildings at FHL in October 1990. The survey identified 16 buildings with ACM above 1 percent. Since the survey was conducted, five buildings (Buildings 111, 161, 163, 169, and 804) have been demolished. According to the *Real Property Master Plan* one of the buildings (Building 119) identified with ACM is condemned and scheduled for demolition. Two buildings (Buildings 124 and 360), are under administrative control to prevent use of the buildings. Eight buildings (Building 120, 131, 149, 162, 295, 323, 325, and 640) have been remediated and remain in use (USACE 1991).

Lead-Based Paint. The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X) regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards. FHL manages LBP on the installation through the surveying and removal of LBP as needed. The purpose of the management strategy is for identification, risk assessment, worker safety, worker training and certification, community outreach and education, and childhood lead poisoning prevention; and to evaluate, manage, and abate LBP hazards in accordance with AR 420-70.

Polychlorinated Biphenyls. PCBs are a group of chemical mixtures used as insulators in electrical equipment such as transformers and fluorescent light ballasts. Federal regulations govern items containing 50 to 499 ppm PCBs. Chemicals classified as PCBs were widely manufactured and used in the United States throughout the 1950s and 1960s. PCB-containing oil is typically found in older electrical transformers and light fixtures (ballasts). Transformers containing greater than 500 ppm PCBs, between 50 and 500 ppm PCBs, and less than 50 ppm PCB are considered PCB, PCB-contaminated, and non-PCB, respectively.

AR 200-1 states that U.S. Army policy is to manage PCBs in place unless operational, economic, or regulatory considerations justify removal. The use, management, disposal, and cleanup of PCBs at U.S. Army installations must comply with 40 CFR Part 761.

Transformers at FHL are reportedly manufacturer-certified as PCB-free or have been tested to determine the PCB content. All transformers known to have PCBs have been removed from the installation (Houston 2009).

Pesticides. AR 200-5, Pest Management, promulgates policies, responsibilities, and procedures to implement the U.S. Army Pest Management Program. Pest management practices at FHL are covered in the *Integrated Pesticide Management Plan.* FHL is currently utilizing an integrated pest management approach to pest control to minimize the types and quantities of pesticides used at the installation. Least-toxic chemical controls are used, where appropriate (FHL 1998).

The application of pesticides, herbicides, and fertilizers varies across the installation, but focuses on two major areas: 160 acres of "improved" grounds mostly within the cantonment area, and disease vector control throughout the entire installation. Pesticide management is currently handled from Building 153, the Entomology Facility (FHL 2007a).

Pesticide and herbicide application at FHL is conducted by Pest Management Personnel. The Pest Management Coordinator in conjunction with the FHL DPW oversee the implementation of the *Integrated Pest Management Plan* and follow a general policy of evaluating the need for chemical application prior to spraying (FHL 1998).

Radon. Radon is a naturally occurring radioactive gas found in soils and rocks. It comes from the natural breakdown or decay of uranium. Radon has the tendency to accumulate in enclosed spaces that are usually below ground and poorly ventilated (e.g., basements). Radon is an odorless, colorless gas that has

been determined to increase the risk of developing lung cancer. In general, the risk increases as the level of radon and length of exposure increase.

USEPA has established a guidance radon level of 4 picocuries per liter (pCi/L) in indoor air for residences; however, there have been no standards established for commercial structures. Radon gas accumulation greater than 4 pCi/L is considered to represent a health risk to occupants.

Monterey County has a Zone 2 listing for radon. In Zone 2 areas, 99 percent of living areas and 92 percent of basements are between 2 and 4 pCi/L, which is below the USEPA radon guideline (USEPA 2009b).

4.14 Health and Safety

4.14.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses workers' health and safety during demolition activities and facilities construction, and public safety during demolition and construction activities and during subsequent operations of those facilities.

Construction site safety requires adherence to regulatory requirements imposed for the benefit of employees. It includes implementation of engineering and administrative practices that aim to reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DOD and U.S. Army regulations designed to comply with standards issued by the Federal Occupational Safety and Health Administration (OSHA), USEPA, and state occupational safety and health agencies. These standards specify health and safety requirements, the amount and type of training required for industrial workers, the use of personal protective equipment (PPE), administrative controls, engineering controls, and permissible exposure limits for workplace stressors.

Various stressors in the environment can adversely affect human health and safety. Identification and control or elimination of these stressors can reduce risks to health and safety to acceptable levels.

Physical stressors. Physical hazards in the environment can cause injury, temporary or permanent disability, disease, or death. These stressors encompass a wide range of factors, such as dust, humidity, temperature, noise, and radiation.

Behavioral stressors. Behavioral stressors include the effects of military activities on (1) psychological characteristics such as emotion, motivation, the learning process, and general behavior; and (2) psychological needs such as freedom, space, privacy, and societal acceptance. Behavioral stressors can cause mental effects ranging from direct physical damage to the brain tissue to temporary irritability.

Psychological stressors. Some chemical and physical elements and situations can cause mental tension and strain. These psychological stressors are closely related to behavioral stressors. Psychological stressors can be physical in nature, such as traffic congestion, excessive noise, air pollution, or inadequate working and living facilities, or they can be emotional in nature, such as the effects of discrimination or sexual harassment.

Chemical stressors. Several chemical substances have the potential to produce undesired or toxic health effects. Some chemicals act locally and some act systemically (requiring absorption into the blood stream). Chemical stressors can also be transmitted by air; by ground water or surface water used for drinking, irrigation, or recreation; or by direct contact.

Endocrine disrupters. A relatively new but increasingly important health concern is "endocrine disrupters" (EDs). EDs are generally caused by synthetic chemicals (e.g., pesticides), which, when absorbed into the body, can cause hormonal disruption. Limiting the presence of EDs should, therefore, be included in planning for facilities, systems, and equipment associated with the transforming force (ARNG 2006).

Health and safety hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Hazards include transportation, maintenance and repair activities, and the creation of noisy environments or a potential fire hazard. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments due to noise or fire hazards for nearby populations. Noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

4.14.2 Existing Conditions

Contractor Safety. All contractors performing construction activities are responsible for following Federal and California OSHA regulations, and are required to conduct construction activities in a manner that does not increase risk to workers or the public. California is one of several states that administer their own occupational safety and health (OSH) program according to the provisions of the Federal Occupational Safety and Health Act of 1970, which permits a state to administer its own OSH program if it meets all of the Federal requirements regarding the program's structure and operations. The California Occupational Safety and Health Act of 1973 revised worker safety and health laws and created a comprehensive state OSH program in lieu of Federal preemption. The purpose of the Act is to ensure safe and healthful working conditions for all California workers (California DIR 2002).

OSH programs address exposure to hazardous and toxic substances, safety hazards, use of PPE, and use and availability of Material Safety Data Sheets (MSDS). Occupational health and safety is the responsibility of each employer, as applicable. Employer responsibilities are to review potentially hazardous workplaces; monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous substances), physical (e.g., noise propagation, falls), and biological (e.g., infectious waste, wildlife, poisonous plants) agents; recommend and evaluate controls (e.g., administrative, engineering, PPE) to ensure personnel are properly protected or unexposed; and ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to the use of respiratory protection, engaged in hazardous waste work, or other work requiring medical monitoring.

Military Personnel Safety. Each branch of the military has its own policies and regulations that act to protect its workers, despite their work location. The Assistant Secretary of the Army for Installations and Environment has overall responsibility for the Army's Human Health and Safety programs. Two Army regulations govern these programs:

AR 385-10, *Army Safety Program*, prescribes Department of the Army policy, responsibilities, and procedures to protect and preserve Army personnel and property against accidental loss. It provides for public safety incident to Army operations and activities and safe and healthful workplaces, procedures, and equipment. This regulation ensures statutory and regulatory compliance with the Occupational Safety and Health Act of 1970 as implemented by EO 12196. This regulation applies to the active Army, the Army National Guard, the Army Reserve, and Army civilian employees. During mobilization, sections and policies contained in this regulation may be modified by the proponent.

AR 40-5, *Preventive Medicine*, is a consolidation of several regulations that cover the Army's preventive medicine program. It establishes the practical measures for the preservation and promotion of health and the prevention of disease and injury. This regulation implements EO 12196 and DOD Instructions 6050.5, 6055.1, 6055.5, and 6055.12. This regulation applies to all facilities controlled by the Army and to all elements of the Army. This includes military personnel on active duty, Army Reserve or National Guard personnel on active duty or in drill status, Military Academy cadets, U.S. Army Reserve Officer Training Corps cadets when engaged in directed training activities, foreign national military personnel assigned to Army components, and civilian personnel and nonappropriated fund employees who are employed by the U.S. Army on a worldwide basis.

Public Safety. The FHL Directorate of Emergency Services (DES) provides for the protection, welfare, and safety of the installation community. This includes all first responders to emergency situations, as well as emergency response planning and community education through the dissemination of public safety information. The DES includes the Police/Provost Marshal Division, which provides law enforcement services, and the Fire Protection and Prevention Division, which includes the fire department and emergency medical services (FHL 2009f). The fire department is responsible for fire suppression, structural fire protection, hazardous substances spill response, control of wildland fires, and conducting prescribed fires (FHL 2004a). The police force consists of Federal civilian officers that serve FHL and Camp Roberts California National Guard Installation. Duties of the police force include crime prevention, traffic control, criminal investigations, community service, hunting, and fishing enforcement, and the protection of archaeological sites and artifacts (FHL 2009g).

The closest available military medical clinic is the FHL medical clinic on the installation; however, it can only handle minor emergencies and sick calls. The closest fully staffed military medical clinic is Presidio of Monterey. For all other emergencies, FHL fire department operates a ground ambulance and paramedic support to either Mee Memorial Hospital in King City or Twin Cities Hospital in Templeton. Medivac support is provided year round through CALSTAR, a private sector air ambulance company, or during peak training season support is available thru Camp Roberts, when operating. Occasionally the California Highway Patrol can also provide medivac capabilities (FHL 2006a).

Explosives and Munitions Safety. The Historical Records Review (HRR) identified a former Artillery Range with 28 associated ranges that encompassed approximately 6,896 acres of the central portion of the installation, including the cantonment area. A 311-acre Area of Concern (AOC) consisting of properties known to contain historical range areas or surface danger zones was identified. The ranges were active from the inception of FHL to present day. Munitions use within the Artillery Range included various types of small arms fires (up to 7.62 millimeters [mm] and .50 caliber), grenade fire (practice and live), rocket fire (practice and live), practice bombs (up to 150 pounds [lbs]), and large artillery fire (possibly up to 155 mm) (USACE 2008).

Fire Safety. Wildfires on FHL are a concern because fires can threaten military equipment, structures, cause injury to personnel, or result in the loss of life. In addition, wildfires can render training areas unsuitable for military training through the loss of cover or by soil erosion. The resulting fire suppression activities can also disrupt training and cause unnecessary costs to the U.S. Army. During 2008, a total of 4,860 acres of control or prescribed burns and 12,736 acres of wildfires were mapped and evaluated. A majority of the wildfires occurred in the northern portion of the installation (Training Areas 1 and 2), but others occurred in Training Areas 8, 12B, 13W, 16, 22 (FHL 2009h).

Fire management is the responsibility of the FHL fire department. FHL has mutual aid agreements with the U.S. Forest Service, Monterey County, and California Department of Forestry in the event of wildfire (FHL 2004a). While development of a FHL Fire Management Plan is ongoing, historically the

installation's fire management strategy has included a policy of suppressing and preventing wildfires that included prescribed burns.

Prescribed burning is a management tool used to reduce the number, severity, and intensity of wildfires. Much of the installation is susceptible to wildfires during dry periods, typically after winter-spring rains until autumn rains occur (May through October-November). Therefore, knowing that certain military activities would start fires during the dry season, prescribed burns are conducted in spring and early summer to reduce fuel loads in areas where later season wildfires could occur due to military training. In addition, if fire danger is high based on weather conditions, Range Control is notified to warn military units in the field and, if needed, to restrict certain types of military training such as pyrotechnic activities, live-fire, and high explosive use. Most wildfires at FHL are caused by pyrotechnic devices and tracer ammunition used during training exercises (FHL 2004a). There is no anticipated increase in the current prescribed burn schedule as a result of implementing the Proposed Action.

As per FHL Regulation 350-2, *Training at FHL*, provisions to prevent wildfires while training on the installation ranges include the following:

- No restrictions on pyrotechnics in Training Areas 12, 15, 20, 21, 22, and 24; significant restrictions in other areas
- Immediate actions to suppress fires by the units which started them
- Immediate reporting of fires
- Provisions for the Directorate of Fire Services to advise Range Control when to restrict the use of ammunition that may start fires
- Prohibition of open fires
- Requirements for clearing areas prior to the use of pyrotechnics (FHL 2006a).

5. Environmental Consequences

The intention of this section of the EA is to present both a general analysis of the environmental effects of installation development activities (see **Section 5.3**), as well as a summary of site-specific environmental effects of individual installation development projects (see **Section 5.4**). The general analysis identifies the general environmental effects on each resource area of the ongoing construction and infrastructure upgrade activities, with a focus on avoiding those areas that are constraints to development. However, a general analysis of potential development activities alone does not provide the framework to assess adequately the potential environmental consequences of a single proposed project. Therefore, **Section 5.4** presents a detailed analysis of the representative training infrastructure, range construction, and cantonment area construction projects introduced in **Section 2.1**, to provide a range of potential consequences that could be expected from implementing the proposed projects with the greatest potential for adverse environmental effects. The representative projects were selected for detailed analysis because they are large in scale or have a unique aspect (e.g., proposed location or operational characteristics) with the potential to result in adverse environmental effects. In addition, **Section 5.4** contains a summary in tabular form of the environmental impacts associated with all projects indentified at FHL (refer to **Appendix A**). The analysis presented in **Sections 5.3** and **5.4** provides the basis for the cumulative effects analysis in **Section 6**. The No Action Alternative is presented in **Section 5.2** before the Proposed Action in order to provide a comparison of the potential environmental consequences of implementing the Proposed Action against taking no action.

This section contains four subsections. **Section 5.1** provides a general introduction to the environmental consequences analysis, including significance criteria for each resource area. **Section 5.2** presents the No Action Alternative, which is prescribed by CEQ regulations. **Section 5.3** provides a general analysis of the environmental consequences by resource area. **Section 5.4** provides the detailed analysis of the Proposed Action, as presented in **Section 2.1**. Potential cumulative effects that could occur as a result of implementing the Proposed Action and other past, present, and reasonably foreseeable projects are in **Section 6**.

5.1 Introduction

The specific criteria for evaluating the potential environmental effects of the No Action Alternative or the Proposed Action are described in the following text, identified by resource area. The significance of an action is also measured in terms of its context and intensity. The context and intensity of potential environmental effects are described in terms of duration, whether they are direct or indirect, the magnitude of the impact, and whether they are adverse or beneficial, as summarized below:

Short-term or long-term. In general, short-term effects are those that would occur only with respect to a particular activity, for a finite period, or only during the time required for construction or installation activities. Long-term effects are those that are more likely to be persistent and chronic.

Direct or indirect. A direct effect is caused by an action and occurs around the same time at or near the location of the action. An indirect effect is caused by an action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action.

Negligible, minor, moderate, or significant. These relative terms are used to characterize the magnitude or intensity of an impact. Negligible impacts are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate effect is readily apparent. Significant effects are those that, in their context and due to their magnitude (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27) and, thus, warrant

heightened attention and examination for potential means for mitigation in order to fulfill the policies set forth in NEPA. Significance criteria by resource area are presented in the following text.

Adverse or beneficial. An adverse effect is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment.

The following text presents the criteria that would constitute a significant environmental effect resulting from implementation of the No Action Alternative (see **Section 5.2**), or the Proposed Action. The same significance criteria are also applied to potential cumulative effects (see **Section 6**) of implementing the Proposed Action in conjunction with past, present, or reasonably foreseeable future actions.

5.1.1 Airspace Management and Safety Evaluation Criteria

The significance of potential effects on airspace management or air traffic depends on the degree to which the action would affect the airspace environment. A proposed action could have a significant effect with respect to airspace management and safety if any the following were to occur:

- Major restrictions were imposed on air commerce opportunities
- Significant limitation of airspace access to a large number of users
- Require modifications to air traffic control systems.

Effects on airspace use were assessed by comparing the projected military flight operations with existing conditions and with civil aviation activities in airspace surrounding the installation. This assessment included analyzing the capability of affected airspace elements to accommodate projected military activities, and determining whether such increases would have any adverse effects on overall airspace use in the area. Also included are considerations of such factors as the interaction of the proposed use of specific airspace with adjacent controlled, uncontrolled, or other military training airspace; possible effects on other nonparticipating civil and military aircraft operations; and possible effects on civil airports that underlie or are proximate to the airspace involved in the proposal.

The flight safety issues that could result from implementation of the Proposed Action are evaluated based on the likelihood that the activity would negatively affect the safety of the public, military personnel, and property (both military and civilian). Flight safety concerns associated with the airspace analyzed in this EA include aircraft accidents, avoidance areas, aircraft-wildlife strikes, and nighttime flying.

5.1.2 Noise Evaluation Criteria

Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise effects are evaluated quantitatively and qualitatively. A proposed action could have a significant effect with respect to noise if the following were to occur:

- Noise sensitive areas experience an increase in noise at or above DNL 65 dB noise exposure when compared to the baseline levels.

5.1.3 Land Use Evaluation Criteria

The significance of potential land use effects is based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. A proposed action could have a significant effect with respect to land use if any the following were to occur:

- Be inconsistent or in noncompliance with existing land use plans or policies
- Preclude the viability of existing land use
- Preclude continued use or occupation of an area
- Be incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

5.1.4 Air Quality Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS "attainment" areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory
- Exceed any Evaluation Criteria established by a SIP or permit limitations.

Effects on air quality in NAAQS "nonattainment" areas are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP or permit limitations.

With respect to the General Conformity Rule, effects on air quality would be considered significant if the proposed Federal action would result in an increase of a nonattainment or maintenance area's emissions inventory by 10 percent or more for one or more nonattainment pollutants, or if such emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been redesignated as a maintenance area.

In addition to the *de minimis* emissions thresholds, Federal PSD regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Class I area, and emissions would cause an

increase in the concentration of any regulated pollutant in the Class I area of 1 μg/m^3 or more (40 CFR 52.21(b)(23)(iii)).

The Federal *de minimis* threshold emissions rates were established by USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to substantially affect air quality. **Table 5-1** presents these thresholds, by regulated pollutant. As shown in **Table 5-1**, *de minimis* thresholds vary depending on the severity of the nonattainment area classification.

Table 5-1. Conformity *de minimis* Emissions Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
O_3 (measured as NO_x or VOCs)	Nonattainment	Extreme Severe Serious Moderate/marginal (inside ozone transport region) All others	10 25 50 50 (VOCs)/100 (NO_x) 100
	Maintenance	Inside ozone transport region Outside ozone transport region	50 (VOCs)/100 (NO_x) 100
CO	Nonattainment/ maintenance	All	100
PM_{10}	Nonattainment/ maintenance	Serious Moderate Not Applicable	70 100 100
$PM_{2.5}$ (measured directly, as SO_2, or as NO_x)	Nonattainment/ maintenance	All	100
SO_2	Nonattainment/ maintenance	All	100
NO_x	Nonattainment/ maintenance	All	100

Source: 40 CFR 93.153

5.1.5 Geological Resources Evaluation Criteria

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering design are incorporated into project development. A proposed action could have a significant effect with respect to geological resources if any the following were to occur:

- Alteration of the lithology, stratigraphy, and geological structure that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability
- Changes to the soil composition, structure, or function within the environment.

5.1.6 Water Resources Evaluation Criteria

Evaluation criteria for effects on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action could have a significant effect with respect to water resources if any the following were to occur:

- Substantially reduce water availability or supply to existing users
- Overdraft groundwater basins
- Exceed safe annual yield of water supply sources
- Substantially affect water quality adversely
- Endanger public health by creating or worsening health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources.

The potential effect of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

5.1.7 Biological Resources Evaluation Criteria

The significance of effects on biological resources is based on the following:

- The importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource
- The proportion of the resource that would be affected relative to its occurrence in the region
- The sensitivity of the resource to proposed activities
- The duration of ecological ramifications.

Effects on biological resources would be significant if species or habitats of high concern are adversely affected over relatively large areas. Effects would also be considered significant if disturbances cause reductions in population size or distribution of a species of high concern.

Ground disturbance and noise associated with construction can directly or indirectly cause adverse effects on biological resources. Direct effects from ground disturbance are evaluated by identifying the types and locations of potential ground-disturbing activities in correlation to important biological resources. Habitat removal and damage or degradation of habitats might be adverse effects associated with ground-disturbing activities.

5.1.8 Threatened and Endangered Species Evaluation Criteria

As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions will not adversely affect the existence of any threatened or endangered species. Section 7 of the ESA establishes a consultation process with the USFWS that ends with USFWS concurrence or a

determination of the risk of jeopardy from a Federal agency project. A proposed action could have a significant effect with respect to noise if the following were to occur:

- "Taking" threatened or endangered species
- Jeopardizing threatened or endangered species habitat.

5.1.9 Cultural Resources Evaluation Criteria

Under Section 106 of the NHPA, adverse effects on historic properties can include the following:

- Physically altering, damaging, or destroying all or part of a resource
- Altering characteristics of the surrounding environment that contribute to the resource's significance
- Introducing visual or audible elements that are out of character with the property or that alter its setting
- Neglecting the resource to the extent that it deteriorates or is destroyed
- The sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

For analysis of effects of the Proposed Action on archaeological resources, the APE includes both direct impacts from ground-disturbing activity and indirect impacts resulting from undertakings outside of site locations. Impacts on cultural resources can be on buildings, sites, structures, districts, and objects eligible for or included in the NRHP; cultural items as defined in NAGPRA; archaeological resources as defined by the Archaeological Resources Protection Act of 1979 (ARPA); and archaeological artifact collections and associated records as defined by 36 CFR part 79.

Under NEPA, impacts on cultural resources are assessed as short-term or long-term; direct or indirect; and minor, moderate, or significant. Under Section 106 of the NHPA, the Proposed Action might have no effect, no adverse effect, or an adverse effect on historic properties.

5.1.10 Socioeconomics and Environmental Justice Evaluation Criteria

Construction expenditures are assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates ten employment positions might go unnoticed in an urban area, but could have considerable impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or a decrease in regional spending or earning patterns, those effects would be considered adverse. A proposed action could have a significant effect with respect to the socioeconomic conditions in the surrounding ROI if the following were to occur:

- Change the local business volume, employment, personal income, or population that exceeds the ROI's historical annual change
- Adversely affect social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates
- Disproportionately impact minority populations or low-income populations.

5.1.11 Infrastructure Evaluation Criteria

Effects on infrastructure are evaluated based on their potential for disruption or improvement of existing levels of service and additional needs for energy and water consumption, sanitary sewer and wastewater systems, and transportation patterns and circulation. Impacts might arise from physical changes to circulation, construction activities, introduction of construction-related traffic on local roads or changes in daily or peak-hour traffic volumes, and energy needs created by either direct or indirect workforce and population changes related to installation activities. An effect might be considered adverse if a proposed action exceeded capacity of a utility. A proposed action could have a significant effect with respect to infrastructure if the following were to occur:

- Exceeded capacity of a utility
- A long-term interruption of the utility
- A violation of a permit condition
- A violation of an approved plan for that utility.

5.1.12 Traffic and Transportation Systems Evaluation Criteria

Impacts on traffic are evaluated by how well existing roadways can accommodate increases in traffic. Adverse effects occur if drivers experience high delays (i.e., commensurate with an LOS rating of E or F) because arrival flow rates exceed lane capacity.

5.1.13 Hazardous Materials and Wastes Evaluation Criteria

A proposed action could have a significant effect with respect to hazardous materials and wastes if the following were to occur:

- Noncompliance with applicable Federal and state regulations as a result of the proposed action
- Disturbance or creation of contaminated sites resulting in adverse effects on human health or the environment
- Established management policies, procedures, and handling capacities could not accommodate the proposed activities, impacting fuel management.

5.1.14 Health and Safety Evaluation Criteria

Any increase in safety risks would be considered an adverse effect on safety. A proposed action could have a significant effect with respect to health and safety if the following were to occur:

- Substantially increase risks associated with the safety of construction personnel, contractors, or the local community
- Substantially hinder the ability to respond to an emergency
- Introduce a new health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place.

5.2 Environmental Consequences of the No Action Alternative

Under the No Action Alternative, FHL would not implement the projects proposed in the installation's community of plans, which would result in the continuation of existing conditions as described in **Section 4**. No direct environmental effects would be expected on airspace, the noise environment, land use, air quality, geological resources, water resources, biological resources, threatened and endangered species, cultural resources, socioeconomics and environmental justice, infrastructure, traffic and transportation systems, hazardous materials and wastes, or health and safety. It is anticipated that future development would occur under the No Action Alternative, but those development projects would be analyzed through the preparation of project-specific NEPA documentation, as appropriate.

5.3 General Environmental Consequences of the Proposed Action by Resource Area

5.3.1 Airspace Management and Safety

5.3.1.1 Airspace Management

Effects on airspace management are predicated on the extent to which the Proposed Action would affect air traffic within the Class E airspace and R-2513 area analyzed in this EA. There would be no significant, adverse effects pertaining to use of the airspace under the Proposed Action because no changes in airspace use are proposed. Implementation of the Proposed Action would not result in the need to reconfigure current military airspace, impose any major restrictions on air commerce opportunities, significantly limit airspace access to large numbers of users over current conditions, or require modifications to ATC systems.

5.3.1.2 Aircraft Operations

It is estimated that the total number of aircraft operations associated with Schoonover runway would double under the Proposed Action as compared to baseline conditions. Since it was estimated that there are approximately 500 annual operations under the baseline scenario, approximately 1,000 annual operations are estimated to occur under the Proposed Action. Integration of any new operating procedures for the aircraft associated with the Proposed Action into local operating procedures and aircraft security issues would be identified and addressed during implementation of the Proposed Action. Effects from the increase in aircraft operations as a result of the Proposed Action could be reduced by an increase in ATC personnel. No scheduling conflicts due to the proposed increase in aircraft operations would be expected.

Coordination between the services over joint use of military airspace and other training assets is an ongoing activity. Significant planning has occurred to anticipate needs, identify potential problems, and develop workable solutions for issues associated with use of these airspace and associated ATC requirements. Such planning, which would continue after implementation of the Proposed Action, should ensure that effects associated with use of airspace and airspace management requirements are negligible. No significant effects on aircraft operations would be expected.

5.3.1.3 Aircraft Safety

Aircraft Accidents. No significant effects on aircraft safety would be expected. Long-term, negligible adverse effects on aircraft safety due to the potential for aircraft accidents would be expected as a result of the Proposed Action. Implementation of the Proposed Action would increase the total number of annual

operations flown within the airspace by 100 percent from baseline annual sortie-operations. U.S. Army accident rates are based on number of occurrences per 100,000 hours flown and are not calculated by aircraft type. The USAF has data available for specific aircraft types. Consequently, data from both the U.S. Army and USAF were used to analyze aircraft safety. USAF aircraft accident rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours, and the annual flying hours for that aircraft. The accident rate could increase because pilots are flying more operations in the airspace, which would increase the estimated flying time that an aircraft would be in the airspace. **Table 5-2** provides an estimate of the potential for Class A accidents for helicopters using U.S. Army accident rates, and C-130 and C-17 aircraft using USAF accident rates, under baseline and Proposed Action conditions.

As shown, the statistical likelihood for aircraft accidents would be negligible for C-130 and C-17 aircraft and helicopters under baseline and Proposed Action conditions. Qualified pilots would be conducting the proposed aircraft operations within the airspace analyzed in this EA. Safe flying procedures, adherence to flight rules, and knowledge of emergency procedures from consistent and repeated aspects of training for all aircrews, including FHL pilots and other airspace users, would reduce the effect of the Proposed Action on aircraft safety. The continued implementation of AR 385-10, *The Army Safety Program* and AR 385-95, *Army Aviation Accident Prevention* would also reduce the potential for accidents. The aircraft and helicopter safety, accident, and incident procedures outlined in FHLR 350-2 would also continue to be applied (FHL 2006a).

Table 5-2. Potential for Helicopter and C-130 and C-17 Aircraft Accidents under Baseline and Proposed Action Conditions

Scenario	Helicopters	C-130 Aircraft	C-17 Aircraft
Accident Rate per 100,000 Flying Hours	1.90 [a]	0.31 [b]	1.59 [b]
Estimated Baseline Annual Flying Hours	125	184	58
Expected Accidents Per Year under Baseline Conditions	<0.01	<0.01	<0.01
Estimated Proposed Action Annual Flying Hours	250	368	116
Expected Accidents Per Year under Proposed Action Conditions	<0.01	<0.01	<0.01
Percent Increase in Accidents from Baseline to Proposed Action	0	0	0

Notes:

a. The helicopter accident rate is the U.S. Army 3-year average as shown in **Table 4-1**.

b. The C-130 and C-17 accident rate is the USAF 10-year average as shown in **Table 4-2**.

Avoidance Areas. No change would be expected from the continued existence of seasonal and general avoidance areas associated with the Bradley Pass, Mission San Antonio, the ammunition storage point, Town of Jolon, the cantonment area housing area, and the vicinity of the ostrich/African geese ranch. Military pilots using the airspace associated with FHL are already aware of the avoidance areas and are instructed to abide by them as provided in FHLR 350-2 (FHL 2006a).

Bird-Wildlife Aircraft Strikes. No significant effects on bird-wildlife aircraft strikes would be expected. Long-term minor adverse effects on aircraft safety would be expected to increase slightly from bird-wildlife aircraft strikes under the Proposed Action. There is always a possibility of bird and wildlife

strikes whenever aircraft operate, especially when operating in close proximity to the ground. Under the Proposed Action, the number of annual operations flown in FHL airspace would increase, which would also increase the number of hours pilots spend in the airspace. Since pilots are spending more time in the airspace, the likelihood that a bird strike could occur would also increase. As required by AR 95-2, FHL personnel would continue to inspect their aviation facilities for wildlife hazards, and would continue to implement the wildlife control measures as outlined in Advisory Circular 150/5200-33B (FAA 2007) and the *Natural Resources Land Management* manual (Departments of the Army, the Navy, and the Air Force 1982). FHL would also continue their coordination with other agencies regarding wildlife strikes per the 2003 interagency Memorandum of Agreement (FAA 2003). The continued implementation of AR 385-10, *The Army Safety Program* and AR 385-95, *Army Aviation Accident Prevention*, would also reduce the potential for accidents from bird-wildlife strikes.

Nighttime Flying. No significant effects would be expected. Long-term, negligible adverse effects on aircraft safety would be expected from the continuation of nighttime operations under the Proposed Action. As discussed previously, the same safe flying procedures, adherence to flight rules, and knowledge of emergency procedures that form consistent and repeated aspects of training for all aircrews, including FHL pilots and other users of the airspace, also apply to nighttime flying operations. The continued implementation of FAR Part 91, *General Operating and Flight Rules,* would also reduce any potential effects on flight safety from nighttime flying operations.

5.3.2 Noise

No significant effects on noise would be expected. Short- to long-term, minor, adverse effects associated with noise would be expected from implementation of the Proposed Action. Implementation of all proposed projects would be expected to result in short-term, minor, adverse effects on the noise environment from the various pieces of equipment used during demolition, construction, or infrastructure upgrade activities. The noise levels from the proposed projects would likely dominate over the other projects that are listed in **Appendix A**. Projects listed in **Appendix A** would be expected to have minor effects on the ambient noise environment include improving Sulphur Springs Road, constructing a physical fitness center, and building a playground. In addition, the projects identified in **Appendix A** would be implemented at different times and different locations over the next 5 years.

Construction Noise. Building construction, modification, and paving work can cause noise levels above ambient sound levels. A variety of sounds come from graders, pavers, trucks, welders, and other work processes. The ambient sound level of a typical urban environment is usually around 60 to 70 dBA. Noise from construction projects can cause short-term adverse effects.

Projects under the Proposed Action would require grading, paving, small facility construction, range construction, and infrastructure improvements. All of the construction projects under the Proposed Action would occur on FHL property.

Construction noise varies depending on the type of construction being done, the area that the construction would occur in, and the distance from the source. Under the Proposed Action, construction activities would occur throughout the installation including Schoonover airfield, the cantonment area, and training areas. The cantonment area contains the largest concentration of noise-sensitive receptors on-installation including schools, libraries, medical clinics, and office buildings supporting installation functions.

Construction noise would occur within the installation boundary and is not expected to exceed noise levels from typical military training events and aircraft operations. Installation personnel 300 feet away from construction sites could experience noise levels in the low 70-dBA range. Installation populations

adjacent to project sites within 50 to 100 feet could experience noise levels in the high 70- to low 80-dBA range.

Noise generation would last only for the duration of construction activities and could be reduced through the use of equipment exhaust mufflers and restriction of construction activity to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). It is not anticipated that the short-term increase in ambient noise levels from construction activities under the Proposed Action would cause significant adverse effects on the surrounding populations in Lockwood or communities adjacent to FHL.

Operational Noise. Following completion of most construction projects, the ambient noise level would return to its normal level at that project site. However, some of the proposed projects would result in long-term, minor, adverse effects on the noise environment. These include the proposed MPMG Range (Project R1), Hand Grenade Range (Project R3), asphalt plant and rock crusher (Project TI11), and rotary-wing aircraft landing pad (Project C6). The MPMG Range (Project R1) is discussed in detail in **Section 5.4.2.1**, the Hand Grenade Range (Project R3) is discussed in **Section 5.4.2.3**.

5.3.3 Land Use

No significant effects on land use would be expected under the Proposed Action. Implementation of all proposed projects identified in **Appendix A** would be expected to result in overall negligible effects on land use. However, several projects (Schoonover Airfield Taxiway [TI9], Truck Driver Training Site [TI10], Zero Ranges [R4], and M203 Grenade Launcher Range [Project R5]) would be expected to result in potential minor adverse effects. The Proposed Action would occur entirely on FHL property, and the projects associated with the Proposed Action would be sited in a manner compatible with FHL's land uses as well as surrounding off-installation land uses. The proposed projects would comply with existing land use plans and policies as identified in the *Fort Hunter Liggett Range Complex Master Plan* (FHL undated) and the *Real Property Master Plan* (FHL 2007a). Therefore, a majority of the proposed projects would result in no effects or negligible adverse effects on land use. However, long-term, minor, adverse effects could occur if the proposed Schoonover TTB facilities (Schoonover TTB, Project TI1) are sited within the exclusion area. In addition, long-term, minor, adverse effects could result from the construction and operation of some proposed projects within areas managed for the conservation of sensitive resources in which land uses are regulated. These proposed projects could be inconsistent with exiting land use policies. These two projects, the Truck Driver Training Site (Project TI10) and the M203 Grenade Launcher Range (Project R5), would be within or adjacent to Sensitive Resource Protection Area (SRPA) 2. SRPAs are areas that are actively managed with land use restrictions in order to protect and conserve sensitive natural resources. Construction and use of the Truck Driver Training Site and the M203 Grenade Launcher Range would affect the management of SRPA 2, which currently allows vehicle traffic on existing roads, maintenance of roads and facilities, emergency traffic, foot traffic, helicopter landings, and habitat improvement projects. It has been proposed that SRPAs be redesignated to Sensitive Resource Management Areas (SRMAs) in order to better accommodate their long-term management requirements. Under this proposal, SRPA 2 would be redesignated as SRMA 2 and 81 acres would be removed in order to eliminate conflicts with proposed facilities (FHL 2009b). Until this redesignation is complete, the construction and use of the Truck Driver Training Site and the M203 Grenade Launcher Range would result in long-term, minor, adverse effects on land use due to its noncompliance with SRPA management requirements.

Proposed demolition projects on FHL would remove old and outdated facilities and make land available in previously disturbed areas for proposed construction projects. Some projects identified in **Table 5-19** would remove facilities from clear zones, eliminating those land use incompatibilities. However, as shown in **Figure 4-2**, a proposed taxiway would be constructed within the Schoonover exclusion area is the proposed taxiway. The taxiway would be 4,300 feet long by 80 feet wide, and would be parallel to

Schoonover runway along the northeastern side, joining with the existing apron (FHL 2009b). Per UFC 3-260-01, taxiways are considered an operational surface required to operate the LZ, and are therefore compatible in the exclusion area.

Other cantonment area projects would introduce new land uses (several training facilities and classrooms) or the expansion or improvement of existing uses (expand/modernize housing and other community services, roadway/traffic infrastructure upgrades, and new/expanded administrative buildings) that would further the cantonment area function supporting the installation and its training mission. Construction of these projects might result in minor adverse effects related to noise issues, but these effects would be temporary.

5.3.4 Air Quality

No significant effects on air quality would be expected from implementing the Proposed Action. The Proposed Action would generate temporary construction emissions as well as long-term operational emissions. The projects associated with the Proposed Action would generate air pollutant emissions as a result of grading, filling, compacting, trenching, demolition, and general construction equipment operations, but these emissions would be temporary and would not be expected to generate any off-site effects. Long-term operational emissions from the Proposed Action would occur from increased training activities and stationary sources such as boilers and generators.

The construction projects would generate particulate emissions as fugitive dust from ground-disturbing activities (e.g., grading, demolition, soil piles) and from combustion of fuels in construction equipment. Fugitive dust emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. Fugitive dust emissions for various construction equipment were calculated using emissions factors and assumptions published in USEPA's NONROAD emissions model (USEPA 2007).

Construction operations would also result in short-term emissions of criteria pollutants as combustion products from construction equipment, as well as evaporative emissions from architectural coatings and asphalt paving operations.

Table 5-3 summarizes the estimated emissions associated with construction activities associated with the Proposed Action by calendar year and for the entire duration of the Proposed Action (2010 to 2014). Calculations supporting the results are shown in **Appendix D**. As shown in **Table 5-3**, air quality emissions from the Proposed Action would be minor and would be less than 10 percent of the emissions inventory for NCCI AQCR. Monterey County is in Federal attainment for all criteria pollutants. Therefore, a conformity determination in accordance with 40 CFR 93-153(1) is not required, as the total of direct and indirect emissions from the Proposed Action would not be regionally significant (e.g., the emissions are not greater than 10 percent of the NCCI AQCR emissions inventory).

The California Energy Commission estimates that in 2004, gross CO_2 emissions in California were 492 million metric tons of CO_2 equivalents (CEC 2006). The Proposed Action's activities at FHL would emit 7,145 metric tons of CO_2 for the duration of the Proposed Action, which is 0.001 percent of the California state CO_2 emissions (see **Appendix D**). Therefore, the Proposed Action's activities would represent a negligible contribution towards statewide GHG inventories.

Table 5-3. Expected Criteria Pollutant Emissions Resulting from Implementation of All Proposed Projects at FHL

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
All 2010 Projects	25.139	3.090	13.478	1.344	472.618	33.496
All 2011 Projects	10.630	1.656	7.311	0.491	198.953	15.867
All 2012 Projects	5.355	0.995	5.179	0.386	7.738	0.880
All 2013 Projects	5.809	1.165	5.365	0.395	27.135	2.416
All 2014 Projects	5.446	1.274	5.216	0.387	19.159	1.554
Percent of NCCI AQCR Inventory for highest year (2010)	0.082	0.011	0.010	0.016	2.550	0.646

Operational emissions associated with the Proposed Action would not be expected to result in adverse effects on air quality. No projects were identified that would cause an increase in long-term air emissions. Day-to-day operations associated with the Proposed Action would generate emissions of criteria pollutants as combustion products from the use of boilers to provide comfort heating as well as the combustion of fuel oil by emergency generators to produce electrical power. Other operational emissions would result from range and training missions, such as the operation of military equipment and aircraft. All projects that would involve new or additional stationary emissions sources would be evaluated individually and would be addressed through Federal and state permitting program requirements under New Source Review regulations (40 CFR Parts 51 and 52).

The Proposed Action would have long-term, minor, adverse effects on air quality from increasing maximum supportable training man-days at FHL from 750,000 to 1,500,000. It is estimated for 2009 that 5,000 military troops trained approximately 8 hours per day for 150 days per year (750,000 man-days). The increase in training days would also equate to a proportional increase in vehicle and equipment use. It is also assumed that the resulting increases in air emissions are directly proportional to the increase in training man-days and population at the installation. In general, construction and facility operations would produce localized, short-term elevated air pollutant concentrations that should not result in any sustained effects on regional air quality. Air emissions resulting from training would be primarily from mobile sources and be widely distributed both spatially and temporally. Given the wide distribution of emissions, it is not anticipated that regional air quality would be significantly affected. The following BMPs would be implemented to reduce effects of the Proposed Action on air quality:

- Grading would be limited to 8.2 acres per day and grading and excavation to 2.2 acres per day.
- Graded or excavated areas would have water applied at least twice daily. The frequency of watering would be based on the type of operations, soil characteristics, and wind exposure.
- Chemical soil stabilizers would be applied on roads that are unused for at least 4 consecutive days.
- Non-toxic binders would be applied to exposed areas after cut-and-fill operations, and the area would be hydro-seeded.
- Vegetation would be planted in disturbed area as soon as possible after construction activities are completed.
- Haul trucks would maintain at least 2 feet of freeboard, and all haul trucks would be covered.

Although the installation can expect increased emissions from military vehicles used to support training events as well as increases in fugitive dust, these emissions would tend to remain localized and produce no significant effect on regional air quality.

5.3.5 Geological Resources

No significant effects on geology or soils would be expected from implementing the Proposed Action. As identified in **Table 5-19**, an erosion-and-sediment control plan (ESCP) should be prepared for projects that would disturb more than 1 acre. Projects of this size have more potential to result in adverse effects as a result of soil erosion and sedimentation, but the ESCP would minimize these potentially adverse effects. The removal of rocks from proposed borrow pits (Projects TI12 and TI13) could result in long-term, moderate adverse effects on geological resources. Negligible effects on geological resources would be expected with implementation of BMPs.

Topography. Long-term, negligible to minor, direct, adverse effects would be expected on the natural topography as a result of demolition, site preparation (i.e., grading, excavating, and recontouring), and construction under the Proposed Action.

Geology. Long-term, negligible to moderate, direct, adverse effects on geological resources would be expected to result from demolition, site preparation (i.e., grading, excavating, and recontouring), and construction under the Proposed Action.

Soils. Long-term, minor adverse effects on geology and soils would be expected from implementation of the Proposed Action. The primary effects would be soil compaction, disturbance, and erosion. Implementation of BMPs would mitigate the possibility of excavation wall sloughing. Site-specific soil surveys should be conducted prior to implementing projects to determine if limitations exist and to determine appropriate BMPs to offset potential adverse effects. ESCPs would be developed and implemented both during and following site development to contain soil and runoff on site, and would reduce potential for adverse effects associated with erosion and sedimentation and transport of sediments in runoff.

Geologic Hazards. Adverse effects on humans and property could occur in the event of earthquake activity. Any new construction under the Proposed Action would be designed consistent with requirements established in UFC 3-310-03 (*Seismic Design for Buildings*), EO 12699 (*Seismic Safety*), and seismic hazard codes found in the *Guidelines for Evaluating and Mitigating Seismic Hazards in California*, which would reduce the potential for adverse effects on humans associated with structural failure during or following a seismic event.

5.3.6 Water Resources

No significant effects on water resources would be expected. The Proposed Action would result in short-term, minor to long-term, minor to moderate effects on water resources as impervious surfaces increase, soil becomes compacted and alters natural drainage flow, soil erosion and sedimentation occurs, and vegetation is removed. The proposed upgraded and expanded storm water system (Project C3) would reduce these effects, especially within the cantonment area. A National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges would be required for projects disturbing more than 1 acre. In addition, the State Water Resources Control Board in California issued storm water runoff permit regulations for construction projects as of 2 September 2009. As stated in the regulation (State Water Board Order 99-08-DWQ), the NPDES permit would be required for any construction project disturbing 1 or more acres of land. It also identifies appropriate control requirements based on the risk of sediment pollution running off the site. The permit requires conservation of water and methods to

keep pollution out of storm drains after construction is completed. Low-impact development features could include the planting of trees and vegetation, redirecting gutter-downspouts to planter beds, and the installation of rain barrels, green roofs, and porous pavement (SWRCB 2009).

These techniques would be consistent with the intent of the recently signed Energy Independence and Security Act (EISA) of 2007. The EISA includes Part 438, *Storm Water Runoff Requirements for Federal Development Projects* (10 CFR Part 438), which requires that "the sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow."

In addition to compliance with the CWA and EISA Section 438, Fort Hunter Liggett has identified several other measures to reduce the effect of the Proposed Action on water resources, including the following:

- As appropriate, Fort Hunter Liggett would use storm water catchments, permeable pavement, oil/water separators, or other applicable technologies for new development, and would review existing development sites for feasibility of adding these technologies.

- A riverine monitoring program would be developed and implemented for the San Antonio and Nacimiento Rivers to monitor at minimum three sites from each river on at minimum a quarterly basis for water quality parameters, such as pH, dissolved oxygen, and other measures.

- Storm water compliance would be included as an Environmental Management Action Plan as part of the federally mandated Environmental Management System to document and monitor success criteria. Fort Hunter Liggett would develop and implement an installation policy and standard operating procedure outlining installation procedures and responsibilities to comply with construction storm water requirements. Fort Hunter Liggett would develop and implement a drip-pan policy and inspection procedure.

- The storm water drainage system would be upgraded to provide for adequate run-off control of the expanded cantonment area. The design would ensure that there will be no net increase in storm water runoff from the cantonment area. Similarly, the design would ensure that there will be no degradation of current storm water discharge quality.

- The installation Master Plan would include Cantonment area storm water system considerations to address future development needs.

Effects on groundwater would be expected to be long-term, minor, and adverse as soil compaction could create less permeable soil, which could hamper ground-water recharge through infiltration. The Mission-San Antonio Basin and the Jolon-Lockwood Basin contain a total usable water supply of 12,500 acre-feet per year. FHL currently uses less than 500 acre-feet per year (FHL 2004a). Therefore, groundwater supply would not be significantly affected as water supply is sufficient and water supply for the TTBs would be supplemented with water from reverse osmosis water purification units (ROWPUs).

Construction of new structures in the area of the identified groundwater plumes within the Cantonment area should be avoided until the plumes are better characterized and remediated, or structure foundations should be designed to incorporate passive soil gas collection and venting systems employing a flexible membrane liner pursuant to State of California Title 27 regulations.

Construction within floodplains would be avoided to the greatest extent practicable. Because the amount of construction of pervious surfaces would be small, it is anticipated that construction within floodplains could be avoided. However, there is a floodplain mapped through the proposed site of the MPMG Range. Construction of the MPMG Range would not be expected to divert flow or alter floodwater volume or velocity. If, upon final design, impacts cannot be avoided, measures would be developed to minimize the impacts as is appropriate and consistent with EO11988.

The change in the amount of impervious surfaces associated with each proposed project is identified in **Appendix A, Tables A-1**, **A-2**, and **A-3**. Development activities at FHL are coordinated as required with regulatory agencies to ensure that potentially adverse effects, primarily associated with increased storm water runoff, are avoided, minimized, or mitigated appropriately.

As identified in **Table 5-19**, an ESCP should be prepared for projects that would disturb more than 1 acre. Projects requiring an ESCP or NPDES permit would have more potential to result in adverse effects as a result of soil erosion and sedimentation into surface water bodies, but the ESCP would minimize adverse effects. Negligible effects on water resources would be expected with implementation of BMPs.

5.3.7 Biological Resources

Vegetation. No significant effects on vegetation would be expected. Short- and long-term, moderate, adverse effects on terrestrial vegetation would result from implementing the Proposed Action. Tree removal would be kept at a minimum, and a 3:1 tree replacement program is in place at FHL. Tree replacement, however, can take many years to compensate for tree loss (especially for live oaks), and young trees do not provide as much cover and are much smaller than older trees. Additionally, oak trees that are not removed could be damaged through soil compaction from vehicle use and training activities.

Vegetation clearing would be minimized to the extent practicable, and revegetation and landscaping would be implemented to reduce the potential for long-term effects and would be conducted in accordance with the installation's replanting procedures. Projects involving vegetation clearing also have the potential to result in direct and indirect, adverse effects on wildlife.

Long-term, minor adverse effects could occur from the increased spread of exotic species from proposed activities. The effect of sediment deposition, scouring, and erosion due to water runoff from current road surfaces and other surface disturbances would continue to disturb soils, providing habitat for exotic or invasive plant species. The spreading of invasive species could degrade vegetation communities. Sustainment of vegetation and erosion-control practices would be conducted by FHL in accordance with the Integrated Training Area Management (ITAM) program during training. Use of existing roads and integration of current natural resources management practices would reduce potentially adverse effects on vegetation communities. Thus, effects on the overall training areas are anticipated to be focused in small areas of intense effects and large areas with minor to no effects. All new construction activities would likely result in surface disturbance. Increased training activities could also result in surface disturbance. Approximately 820 acres of undeveloped habitats would be converted to developed or semi-developed status, representing 0.5 percent of the developed land on the installation. Although primary habitat type affected by the Proposed Action would be grasslands, less than 4 percent of FHL grasslands would be converted to developed status.

Wetlands. No significant effects on wetlands would be expected. Short- to long-term, negligible to minor, adverse effects would be expected on wetlands. In accordance with EO 11990, avoidance of all long- and short-term effects on wetlands on Federal lands is a priority. EO 11990 also promotes initiatives to enhance the natural value of wetlands. Disturbance associated with troop training activities

or land maintenance and new construction activities present a potential for damaging wetlands would be minimized to the maximum extent practicable.

Projects proposed within 50 feet of wetlands could have short-term and long-term, minor, indirect, adverse effects on such wetlands from storm water runoff and erosion and sedimentation. In addition to short-term, adverse effects, demolition projects in wetland transition areas could result in long-term, beneficial effects because of the potential decrease in impervious surfaces in the vicinity of the wetland. Storm water management and erosion and sediment control BMPs would be implemented to minimize and avoid these effects. Adverse effects on wetlands and wetlands transition areas would be minimized to the maximum extent practicable. No construction activities would occur in wetlands. Projects potentially within wetland buffer areas would be coordinated with regulatory agencies to determine if wetlands could be affected and if mitigation measures would be required.

The development over time of the Schoonover TTB and cantonment area would indirectly affect vernal pools and their watersheds. Infrastructure projects, construction projects, and increased training in these areas and in the Milpitas TTB and MPMG Range could result in adverse effects on vernal pools. Training exercises and construction in and adjacent to vernal pools would be avoided to the maximum extent practicable.

Jurisdictional and nonjurisdicitonal wetlands and sensitive aquatic features that have not been documented could exist within the Proposed Action areas. To minimize the potential for adverse effects on wetlands, vernal pools, swales, and wet meadows, wetland delineations are recommended for each project area prior to construction, and consultation with USACE when appropriate.

Wildlife Resources. No significant effects on wildlife would be expected. Short- and long-term, minor, adverse effects on wildlife could occur as a result of implementing the Proposed Action. Short-term, minor adverse effects on wildlife would be expected during construction activities. Indirect effects include those on wildlife from degradation and loss of habitat. Effects on fish or other aquatic fauna would be expected to occur as storm water runoff could impact water quality. However, following an approved erosion-sediment control plan would reduce the impacts to negligible.

Short- and long-term minor effects on migratory birds could occur by disturbing habitat, converting habitat, or causing mortality during training activities, and disturbance from the use of access roads and noise associated with training events. Impacts on migratory birds could occur from ground-disturbing activities and vegetation clearing associated with the Proposed Action. Any decrease in vegetation cover would result in direct effects on migratory bird species by potentially displacing adult or breeding birds. Some individuals could be permanently displaced if activities occur during the breeding season. However, implementation of seasonal timing and other natural resources management practices to avoid or minimize adverse effects would reduce the effects.

Construction, increased training, and improvement of existing roadways would most likely increase vehicle usage of the area and the “edge effect” on the existing wildlife. Habitat “edge effects” include noise, brood parasitism, mortality, and increased exotic species. Although all-wheeled vehicles are capable of off-road travel, the majority of, if not all, mission-related travel would be on existing paved and gravel roadways. The exception would be heavy equipment operator training equipment, which would be assigned to designated areas for training in earthmoving and grading. See **Section 5.4** for detailed analyses.

5.3.8 Threatened and Endangered Species

No significant effects on threatened and endangered species would be expected from implementing the Proposed Action. Short- and long-term, minor, adverse effects on Federal- or state-threatened or endangered species could occur under the Proposed Action. Potential habitat for all of the special status species described in **Section 4.8.2** occurs at FHL. Negligible adverse effects on the California condor, red-legged frog, least Bell's vireo, and Santa Lucia mint are anticipated. The increases in training would not directly affect any of these species or preclude their use of the area. The California condor only occasionally occurs on the installation, construction and training activities are not anticipated to alter its occurrence. An increase in take or adverse effect on this species is not expected. Potential habitat for the red-legged frog and the least Bell's vireo occurs on FHL; however, neither species is known to occur on the installation (FHL 2009e, FHL 2009b). The Proposed Action would not significantly affect potential habitat for either the red-legged frog or the least Bell's vireo; however, minor effects can be anticipated on potential habitat of these species. Santa Lucia mint would not likely be affected by additional training or construction associated with the Proposed Action because it occurs only along drainages and pools on the western hills of FHL.

Potential effects from the Proposed Action include short-term, minor, adverse effects from construction-related projects and long-term, negligible to minor adverse effects due to habitat modification and changes to functionality. Negligible to minor, short-and long-term, adverse effects would be expected on kit fox, purple amole, arroyo toad, and vernal pool fairy shrimp. Anticipated effects on these species are summarized below. Section 7 consultations would be needed for projects affecting federally listed species, and surveys and mitigation measures would need to be implemented to avoid violating the ESA and the MBTA.

The proposed facilities would occur in occupied vernal pool fairy shrimp habitat, but these areas would be avoided, per U.S. Army protocol. The pools are monitored annually and marked for avoidance as needed. There are three vernal pools adjacent to dirt roads that lead into the southwestern corner of the cantonment area. The pools are 35 meters, 70 meters, and 300 meters from proposed urban planning areas in the cantonment area and separated by the cantonment area perimeter fence. No vernal pools are expected to be directly affected.

In the cantonment area, there are three areas of purple amole. The first site supports about 200 plants in a narrow (120-meter-by-230-meter) open space of blue oaks and foothill pines situated between a former barracks development of the 1950s and housing development from the 1990s. Purple amole would be avoided during construction.

There is no breeding or upland sandy soil habitat for arroyo toads associated with development in the cantonment area. However, the cantonment area storm water system flows into the San Antonio River at four sites: Mission Creek, Sulpher Springs Creek, an unnamed creek drainage south of Sulpher Springs Creek, and an unnamed creek near the intersection of Nacimiento and Mission roads. Arroyo toads could be affected by increased or polluted runoff from construction and military activities in the cantonment area. To reduce the potential for adverse effects on waterways and arroyo toad habitat, guidelines provided in the SWPPP would be followed for construction sites of 1 acre or more, and an additional plan would be maintained for installation industrial activities, such as the ECS compound. The plans require BMPs including the use of silt fences, fiber rolls, and fiber matting; limiting unnecessary disturbance; hydroseeding; using drip pans and secondary containment for toxic materials; storm drain protection; proper disposal of wastes and fluids; proper spill clean-up procedures; educational signage for storm drain inlets; and periodic employee training. Additionally, the plans include monitoring such as periodic visual inspections for unauthorized discharges and storm water sampling. U.S. Army regulation requires that new construction use "low-impact development" techniques such as maintaining vegetated buffers

between drainages and development, or creating bio-swales for vegetation to trap sediments and pollutants before they can enter a waterway.

Increased training would likely result in greater risk of disturbance to vernal pool fairy shrimp and purple amole sites within 30 meters of existing roads and an increase in the use of established river crossings in arroyo toad breeding habitat (FHL 2009b). As outlined in the 2009 programmatic biological assessment (PBA), vernal pools and purple amole sites would be marked near roads or other areas where disturbance of these sensitive resources could occur so impacts are minimized. Federally listed species would be considered during design of projects to reduce potential adverse effects (FHL 2009b).

Cantonment construction projects could affect 473 acres of San Joaquin kit fox habitat, potential adverse effects on 23 patches of purple amole in Training Area 16B totaling approximately 0.6 acres, and potential indirect effects on arroyo toad from cantonment area storm water flows (FHL 2009b).

Range development would result in conversion of 227 acres of San Joaquin kit fox habitat, potential loss of one and adverse effect on a second vernal pool fairy shrimp pool (FHL 2009b).

Any project potentially affecting a state-listed species would be coordinated with California Department of Fish and Game (CADFG), in accordance with the guidelines set forth in the installation's INRMP. Any project potentially affecting federally listed species must be coordinated with USFWS. Because the potential existed for a federally protected species to be adversely affected by the Proposed Action, a Biological Assessment was prepared and submitted to the USFWS. The USFWS then prepared a Biological Opinion on the effects of the project proposal on federally protected species, as required under Section 7 of the Endangered Species Act (ESA) of 1973, and mitigation measures were determined. Fort Hunter Liggett would comply with the terms and conditions of the programmatic biological opinion for Fort Hunter Liggett issued by the USFWS in 2007, or as revised.

The USFWS has identified mitigation measures to reduce the effects of the Proposed Action on threatened and endangered species. These mitigation measures include the following:

- SRPAs would be re-designated as SRMAs to highlight their long-term management requirements. Re-designation would help foster compatible land uses, assist in identifying best long-term management actions for habitat improvement, and highlight a long-term commitment to these resource areas rather than the current SRPA designation that equates to areas just being off-limits. Management area boundaries would be adapted as new information becomes available, with changes proposed by U.S. Fish and Wildlife Service and included in annual updates to the Integrated Natural Resources Management Plan.

- Eighty-one acres within SRPA 2 would be removed from protective status to eliminate conflicts with proposed facilities. To offset this reduction, 5,125 acres would be added through re-designation to various existing and newly created areas. The new SRMAs would address arroyo toad habitat along the San Antonio River, purple amole habitat with high potential for conflicts and/or very large and dense populations, and vernal pool fairy shrimp pool complexes with high potential for conflicts.

- Proposed upgrades to the cantonment area storm water system would ensure that current discharge levels and water quality in areas of potential arroyo toad habit would remain unchanged. Mitigation measures mentioned above would result in compliance with the CWA and Section 438 of the EISA to ensure that water quality would not be affected and that no change in hydrology would occur.

San Joaquin Kit Fox. Long-term, negligible to minor, adverse effects on potential San Joaquin kit fox habitat are anticipated due to increased foot and vehicle traffic; however, the Proposed Action would not have a significant effect on habitat degradation. On FHL, there are 36,405 acres of suitable San Joaquin kit fox habitat, of which 35,027 acres are undeveloped and 1,353 acres are developed under baseline conditions. The Proposed Action could disturb up to 700 acres of undeveloped kit fox habitat. This would affect 2 percent of undeveloped kit fox habitat on FHL. Affected habitat would not be expected to disrupt habitat connectivity due to the small percentage of habitat affected and locations of affected habitat (FHL 2009b). Current management practices that facilitate coexistence of the San Joaquin kit fox with similar types of training would continue to be implemented.

Arroyo Toad. Long-term, minor, adverse effects on arroyo toads would be expected from the Proposed Action. The potential effects include additional erosion and sedimentation in streams and the increased potential for mortality from vehicle traffic and training activities. The San Antonio River watershed is known to be occupied by arroyo toads. Training activities would occur within this watershed. The proposed Schoonover TTB, Milpitas TTB, MPMG Range, Hand Grenade Familiarization Course, and cantonment area projects are located within the watershed. The proposed increased levels of training elevate the probability that aestivating toads or toads moving to or from breeding sites (up to 1 kilometer from breeding areas) could be affected by the training activities.

Vernal Pool Fairy Shrimp. Short- and long-term, moderate, direct and indirect adverse, impacts could be expected due to the loss of one vernal pool and adverse effects on another. There are occurrences of vernal pool fairy shrimp in the MPMG Range and adjacent to cantonment area project sites on FHL. There is potential to encounter vernal pool fairy shrimp populations during increased training activities on other portions of the installation; however, vernal pools at risk of damage from vehicle traffic or other training or construction activities are marked for avoidance (FHL 2009b). The increased activity could have short-term, negligible, direct or indirect effects on vernal pool fairy shrimp as a result of the Proposed Action. Vernal pool fairy shrimp are present in areas near the perimeter of the proposed Schoonover TTB in vernal pools and in low quality road ruts in disturbed lands. Within the MPMG Range, one vernal pool would be lost during development and another adjacent pool outside of the site could expect short- and long-term, moderate, direct and indirect adverse effects from the Proposed Action.

Purple Amole. Long-term, moderate, indirect, and direct adverse effects on purple amole are anticipated due to increased foot traffic and bivouacking that would cause trampling, compaction, and erosion to 0.6 acres of known occurrences of purple amole within the proposed Schoonover TTB. Additional effects can occur at populations near the MPMG Range, Hand Grenade Familiarization Course, and within the cantonment area. Purple amole is noticeably affected by wet season vehicle traffic that uproots bulbs as well as habitat loss from construction and development. However, light human activity does not appear to adversely affect the populations and could help reduce thatch from annual grasses (FHL 2009b). Purple amole sites would be marked and avoided to minimize adverse effects.

5.3.9 Cultural Resources

No significant effects on cultural resources would be expected. Effects that would be expected from implementing the Proposed Action would be long-term, minor, and adverse. Projects identified in **Table 5-19** as having potentially adverse effects on architectural resources would involve structures that have not yet been evaluated for eligibility for the NRHP. Demolition, construction, or infrastructure projects might also have the potential to alter the viewshed or introduce noise and vibrations; therefore, structures surrounding proposed projects should also be evaluated for NRHP eligibility to ensure no indirect adverse effects would occur.

It is recommended that any anticipated increased levels of training or the completion of any future training infrastructure, range construction, or cantonment area construction projects at FHL that fall under the coverage of this EA should take into consideration all known and undiscovered cultural resources. As two-thirds of the installation has not been systematically surveyed for cultural resources, it is important that all cultural resources within a project's APE are identified prior to development. If previously recorded cultural resources that are ineligible for the NRHP are present within a given APE, then no further work would be warranted as effects on these cultural resources would be potentially minor or negligible. If unevaluated or potentially eligible cultural resources are present within a given APE, each should be documented and evaluated for NRHP eligibility. Project effects on unevaluated or potentially eligible cultural resources could be significant as NRHP eligibility status has not been determined. Determination of NRHP eligibility for cultural resources is of particular importance as many previously recorded cultural resources have not been formally evaluated. Once documented and evaluated, adverse effects on NRHP-eligible and -listed cultural resources should be avoided or, if avoidance is not possible, then mitigation of adverse effects is requested.

Should any future projects be proposed that have the potential to impact the known sites, FHL would need to coordinate with the SHPO pursuant to 36 CFR Part 800, regarding ways to avoid, minimize, or mitigate adverse effects. Similarly, impacts on archaeological sites would be avoided or minimized through consultation with SHPO pursuant to NHPA (36 CFR 800). In the event of any inadvertent find of archaeological materials within the APE during implementation of the Proposed Action, FHL will follow the procedures for inadvertent discovery outlined in the installation's ICRMP (FHL 2008c).

5.3.10 Socioeconomics and Environmental Justice

Socioeconomics. No significant effects on socioeconomics would be expected from implementing the Proposed Action. Short-term, moderate, beneficial effects on the local economy would be expected under the Proposed Action due to construction expenditures. As of 2000, approximately 9,500 and 7,850 residents of Monterey and San Luis Obispo counties, respectively, were employed in the construction industries. Therefore, ample construction workers would be available near FHL; however, construction of some projects would be completed by soldiers stationed at FHL. Short-term increases in local business volume and employment within the ROI would be expected from construction and renovation of facilities, and long-term increases could be expected from the provision of services during operation. Additionally, long-term, minor, beneficial effects on the local economy and employment within the ROI would be expected from the potential increase of expenditures in nearby communities by the soldiers permanently reassigned to and contractors employed at FHL, and those soldiers temporarily stationed at the installation participating in the training exercises. While beneficial, these effects would be localized and are not anticipated to significantly affect the local economies in the ROI and larger region.

It is likely that there would be long-term, minor, beneficial, and adverse effects on population and housing due to implementation of the Proposed Action. The Proposed Action would require an increase of approximately 500 full-time equivalents (military and civilian personnel) and short-term population increases of approximately 3,000 to 5,000 soldiers and possibly up to 7,000 soldiers (FHL 2007f, FHL undated, FHL 2007a). Military personnel and their dependents could be housed on the installation with existing housing. However, civilian employees and contractors would require local housing. The vacant housing stock in the ROI, as well as in Monterey and San Luis Obispo counties is adequate to accommodate the demand that could result from the Proposed Action.

Environmental Justice. The Proposed Action would not result in significant effects on environmental justice. Short-term, minor, adverse effects on off-installation populations could result from construction of the proposed projects identified under the Proposed Action. Possible adverse effects from construction

activities could include increased traffic and noise levels and decreased air quality, but these effects would be minimal and would likely affect on-installation residents more than off-installation populations. The potential construction effects, of which noise production would likely be the most evident, on off-installation populations would be localized to a rural sparsely populated area immediately adjacent to the eastern installation boundary in Monterey County, and not the whole ROI. Depending on the location of the project, it appears there could be between 3 and approximately 45 residences within 1 mile of some of the projects. While the economic statuses of the residents in these areas are not known, these areas do not consist of disproportionately higher percentages of racial or ethnic minority populations.

Long-term operations associated with the Proposed Action would include the use of the proposed training facilities, as well as associated increases in training activities, training loads, and full-time support personnel. Use of the proposed facilities and the increased training levels at these sites could result in long-term, minor, adverse effects on off-installation populations due to noise production. While the economic statuses of the residents in these areas that could be impacted are not known, these areas do not consist of disproportionately higher percentages of racial and ethnic minority populations, and the adverse effects from increased noise would be minor, and would not be disproportionate to those experienced by on-installation residents. Population increases under the Proposed Action would result in long-term, minor, beneficial effects on the local economy in the ROI, which does not have disproportionately higher minority and low-income populations, and would not create significant adverse effects on the housing market.

5.3.11 Infrastructure

The Proposed Action would not be expected to result in significant effects on infrastructure.

Electrical Systems. Short-term, negligible, adverse effects on the installation's electrical system would be expected during implementation of the Proposed Action. Short-term electrical interruptions could be experienced when newly constructed buildings are connected to the FHL electrical distribution system.

Long-term, minor, adverse, and beneficial effects on the FHL electrical system would be expected from the implementation of the Proposed Action. The increase in facilities and personnel from implementing the Proposed Action would increase the demand for electrical power. Currently, peak electrical demand is approximately 2.8 MVA, which is approximately 70 percent of the available electrical system capacity. Implementation of all the Proposed Action projects could increase the demand for electricity beyond the current capacity of the electrical system. Prior to implementing the Proposed Action, a detailed electrical system capacity analysis would be conducted to determine if the electrical system could support all of the projects of the Proposed Action. If the electrical system could not support the increased electrical demand from all of the projects, the electrical system would need to be improved by installing a second electrical circuit to FHL from the Jolon Substation.

To provide electricity service to the proposed facilities in the remote portions of the installation (e.g., Schoonover TTB and Milpitas TTB), new electrical transmission lines would be installed along roadways and under bridges. The addition of these new electrical transmission lines would require trenching to install underground electrical cables and utility poles to support overhead electrical cables. Despite minor effects from trenching activities (see **Section 5.4**, Geological Resources), the installation of the new electrical transmission lines would expand the current FHL electrical power distribution system and would be an overall minor beneficial effect.

Solar power can be used as an electrical energy source at the proposed facilities that are a substantial distance from existing electric transmission lines and would not justify the installation of new electrical

transmission lines. The proposed facilities that would receive electrical energy from solar power would not increase demand or affect the electrical system at FHL.

Propane. Short-term and long-term, negligible, adverse effects on gas service would be expected from the implementation of the Proposed Action. As noted in **Section 4.11**, FHL does not have a centralized gas distribution system. Gas service is provided to the majority of the buildings on the installation by aboveground propane storage tanks outside of each structure or by local distribution networks. Therefore, all new structures that would require gas service would need to be connected to a propane storage tank or a local propane service network. The implementation of the Proposed Action would result in a minor increase in demand for propane from the increase in buildings and personnel. Outside contractors would be required to provide sufficient quantities of propane to meet the increased demand.

Liquid Fuel. Long-term, minor, adverse effects on liquid fuels would be expected from the implementation of the Proposed Action. Some of the new facilities proposed as part of the Proposed Action might use JP-8 for heating purposes. Additionally, the increase in personnel would increase the demand for JP-8 in military vehicles and training applications. Increased quantities of diesel and gasoline fuels would also be expected from the increased number of personnel and vehicles at FHL following the implementation of the Proposed Action. Outside contractors would be required to meet the increase in demand for all liquid fuels.

Water Supply Systems. Short-term, negligible, adverse effects on water supply would be expected from implementing the Proposed Action. Water necessary for the construction of the Proposed Action would be obtained from the FHL water supply system. Construction water needs would be limited and would have little effect on the installation's water supply system.

The Proposed Action projects that would require water service and are proposed within a reasonable distance of existing water supply lines, such as cantonment area projects, would be connected to the existing water supply system. To connect these proposed facilities to the water supply system, trenching would occur to install underground water supply piping. Short-term water service interruptions could be experienced when new facilities are connected to the water supply system. The Proposed Action projects that would require water service and are proposed for remote portions of the installation, such as training projects, would be supplied with water from onsite wells, from portable aboveground storage tanks (ASTs) that would be delivered and filled on an as-needed basis, or from ROWPUs.

Long-term, minor, adverse effects on the water supply system would be expected from the implementation of the Proposed Action. The implementation of the Proposed Action would increase the demand for water. Currently, the water supply system is operating at approximately 12.3 percent of its available capacity; therefore, the existing water supply system would have the capacity to meet a potential doubling in water demand.

Sanitary Sewer and Wastewater Systems. Short-term, negligible, adverse effects on the sanitary sewer and wastewater systems of FHL would be expected during the implementation of the Proposed Action. The Proposed Action projects that would require wastewater service and are proposed for the portions of the installation where sanitary sewer is currently available, such as the cantonment area, would be connected to the sanitary sewer system. To connect these proposed facilities to the sanitary sewer system, soil trenching would occur to install underground piping. Short-term, minor interruptions could be experienced when proposed buildings are connected to the sanitary sewer system. The Proposed Action projects that would require wastewater service and are proposed for remote portions of the installation where sanitary sewer service is not available would either use onsite septic systems or wastewater would be collected, stored, transported, and discharged at appropriate sanitary sewer connection locations within the cantonment area.

Long-term, minor, adverse effects on the sanitary sewer and wastewater systems would be expected from the implementation of the Proposed Action. The added buildings and personnel from implementing the Proposed Action would result in an increase in the volume of wastewater generated at FHL. Currently, the sanitary sewer system is operating at approximately 15 percent of capacity; therefore, the existing system would have the capacity for a potential doubling in wastewater generation. Wastewater generated at facilities that would use septic systems would not increase the overall demand on the sanitary sewer system.

Storm Water Systems. Short-term, minor, adverse effects on the FHL storm water drainage systems would be expected during implementation of the Proposed Action. The implementation of the Proposed Action would require ground disturbance due to vegetation clearing, slope grading, and contouring of land. These activities would disrupt natural and man-made storm water drainage methods and increase the potential for storm water runoff to erode soil during construction activities. Soil erosion and sediment production would be minimized during construction periods by following ESCPs in addition to using construction BMPs that would minimize ground surface disturbance and attempt to provide adequate temporary storm water management techniques.

Long-term, moderate, beneficial effects on storm water drainage systems would be expected from implementation of the Proposed Action. Although implementing the Proposed Action would result in increases in the amount of impervious surfaces at FHL, which would increase the amount of storm water runoff, a major proposed project is a storm water drainage system expansion and upgrade (Project C3). The intent of this project is to reduce storm water discharge following implementation of the Proposed Action, while maintaining and improving upon the present quality of storm water. Therefore, although the Proposed Action would increase the amount of storm water runoff, overall long-term, moderate, beneficial effects would be expected. The occasional flooding and erosion currently experienced at FHL would be reduced in frequency or eliminated from occurring in the future.

Communications. Short-term, negligible, adverse effects on the communication and data transmission system of FHL would be expected from the implementation of the Proposed Action. Short-term interruptions in communication and data transmission services could be experienced when new buildings are connected to the communication and data transmission system.

Long-term, minor, adverse, and beneficial effects on the communication and data transmission system would be expected from the implementation of the Proposed Action. The increase in facilities and personnel from implementing the Proposed Action would increase the demand for communication and data transmission services, and this increase in demand might exceed the current capacity of the communication and data transmission system. Prior to implementing the Proposed Action, a detailed communication and data transmission capacity analysis would be conducted to determine if the FHL communication and data transmission system could support all of the projects of the Proposed Action. If the communication and data transmission system could not support the increased demand on communication and data services, the system would need to be improved prior to implementation of all of the proposed projects.

To provide communication and data transmission services to the proposed facilities in remote portions of the installation (e.g., Schoonover TTB and Milpitas TTB), new communications and data transmission lines would be installed along roadways and under bridges. The addition of these new communication and data transmission lines would require trenching to install underground cables and utility poles to support overhead cables. Despite minor effects from trenching activities (see **Section 5.4**, Geological Resources), the installation of the new communication and data transmission lines would expand the current communication system and would be an overall minor beneficial effect.

Solid Waste. Short-term, minor, adverse effects on solid waste management would be expected from the implementing the Proposed Action. Increased quantities of solid waste would be generated during the construction of the various projects of the Proposed Action and would consist mainly of building materials such as concrete, metals (e.g., conduit, piping, and wiring), and lumber; and soil piles and yard debris, such as trees and shrubs. Contractors would be required to recycle construction debris to the greatest extent possible, thereby diverting it from landfills. Recycling of any road or other materials would entail determining if naturally occurring asbestos would be present, and any ACM found would be disposed of consistent with hazardous waste regulations. Contractors would dispose of nonrecyclable construction debris at an off-site permitted landfill facility. Implementing the Proposed Action would require clearing of vegetation. Vegetation debris would be converted to mulch or recycled to the greatest extent possible. All excess soils generated during construction operations would be reused to the greatest extent possible for grading and contouring.

Long-term, minor, adverse effects on solid waste management would be expected from the implementation of the Proposed Action. Implementing the Proposed Action would result in additional quantities of solid waste being generated from the increase in personnel and structures at FHL. The Jolon Road Sanitary Landfill has sufficient capacity to handle the potential doubling in solid waste generation at FHL.

Infrastructure. Implementation of all proposed projects would be expected to result in long-term beneficial effects on infrastructure systems by providing the required airfield, road, and utilities upgrades to support existing and future missions.

However, construction and infrastructure projects would result in adverse effects as a result of increased solid waste generation. Clean demolition and construction debris (e.g., concrete, asphalt) would be ground, recycled, and used for fill and road work rather than disposed of in a landfill.

Implementation of all the Proposed Action projects could increase the demand for electricity beyond the current capacity of the electrical system. Prior to implementing the Proposed Action, a detailed electrical system capacity analysis would be conducted to determine if the electrical system could support all of the projects of the Proposed Action. If the electrical system could not support the increased electrical demand from all of the projects, the electrical system would need to be improved by installing a second electrical circuit to FHL from the Jolon Substation.

5.3.12 Traffic and Transportation Systems

The Proposed Action would not be expected to result in significant effects on traffic and transportation systems. Short-term, negligible to minor, adverse effects on traffic and transportation systems would be expected from the Proposed Action associated with construction. Construction projects within the ranges and cantonment area would create short-term increases in construction traffic to various areas on FHL. There are no notable traffic or congestion problems in or around FHL; however, construction activities would temporarily increase traffic on local and installation roads, particularly when construction equipment arrives and departs. Impacts would be greatest during commuter hours, as this is when construction crews would be expected to travel to and from FHL. Construction activities within the cantonment area would have the greatest effects on traffic, as the majority of installation personnel and civilian traffic on installation would be traveling through this area. Short-term effects created from construction activities for training infrastructure and range construction projects would be less than those in the cantonment area since the majority of the proposed sites are removed from the residential areas and administrative facilities on FHL.

Long-term, intermittent, minor, adverse effects on traffic and transportation systems at FHL would be expected as a result of the Proposed Action associated with training activities. There are no notable traffic or congestion problems in or around FHL; however, military training activities would temporarily increase traffic on local and installation roads, particularly when units arrive and depart. The proposed projects include increased facility operations in the cantonment area to support increased training activities on FHL. An additional 295 personnel were requested in the 2007 U.S. Army CSTC personnel request (U.S. Army 2007b). The increase in vehicular traffic on-installation caused by increased Army and civilian personnel, installation residents, and transportation of supplies to the installation would be negligible to minor. Roadways on FHL have few driving constraints with a low volume of traffic and a controlled environment. The existing cantonment area roads are in good condition and adequately support current traffic loads, missions, and mission-support requirements; however, continued maintenance is required to avoid deterioration. Upgrades would be required as the mission and traffic loads increase (FHL 2007a).

Since most soldiers traveling to FHL would arrive at nearby airfields and use mass transit to arrive at the installation, the increase in vehicles at FHL from the Proposed Action would mainly be from the increase in support personnel and families and would likely be minor. Impacts on local roads would be greatest from the traffic traveling from the north near King City, as that portion of Jolon Road has the greatest congestion problems (LOS C); however, effects would still likely be negligible to minor.

All equipment used to support CS units would be housed on site at an ECS, thereby reducing the amount of traffic entering the installation. In addition, most units would be transported to FHL via USAF transport aircraft to an airstrip on the installation and bussed to their destination; therefore, a negligible amount of traffic would be expected to enter the installation via the access roads and access control points. Since troops would generally remain in the proposed TTBs and other training areas and these areas are removed from residential and administrative areas on the installation, adverse effects on traffic due to increased training activities would not be significant. In addition, increased working personnel would contribute to traffic increases, but this would not be expected to increase traffic congestion to a level of significance.

Increased unit training and vehicle movement on the installation would result in long-term, negligible to moderate, adverse effects on installation roads. Virtually all of the roads in the FHL training areas are improved gravel roads. Under the Proposed Action, training would be anticipated to increase from the current annual level of 750,000 man-days to a future training load of 1,500,000 man-days. As a result of the training load on FHL doubling, the roadways in the installation's training areas and cantonment area would likely require more frequent maintenance.

Military convoys en route to FHL could have the potential of increasing the number of traffic accidents on the road network (e.g., Jolon Road) leading to the installation. Increased use of pre-positioned vehicles at the ECS by units training at FHL would reduce that potential risk. In addition, increased unit training and vehicle movement on the installation would also be expected to increase the risk of conflicts between military and civilian vehicles. This risk could be mitigated by improved training and awareness for operators of civilian vehicles who live and work on the installation. The installation could potentially mitigate the risk of conflicts with civilian vehicle operators who use the installation's public roadways by providing a vehicle safety brochure when they enter the installation (Booz Allen 2006).

5.3.13 Hazardous Materials and Waste

No significant effects would be expected on hazardous materials and waste. The Proposed Action would result in short-term, minor, direct adverse effects from the use of hazardous materials and disturbance of ERP sites during demolition and construction. Direct and indirect long-term, minor adverse effects on

hazardous materials use and hazardous waste generation would result from the increased volume of training.

Many of the proposed projects are in or are adjacent to ERP sites, so soil and groundwater contamination could be present. Construction of new structures in the area of the identified groundwater plumes within the Cantonment area should be avoided until the plumes are better characterized and remediated, or structure foundations should be designed to incorporate passive soil gas collection and venting systems employing a flexible membrane liner pursuant to State of California Title 27 regulations.

The largest ERP site is the MMRP site FTHE-001-R-01. A Site Investigation was conducted in 2008 and concluded that a Remedial Investigation should be conducted for Munitions and Explosives of Concern at this MMRP site. An Explosives Safety Submission report would be prepared prior to any remedial investigation activity. It is assumed that FHL would perform the recommended Remedial Investigation and address any remedial actions prior to the initiation of any projects within the FTHE-001-R-01 site. When there is the potential for construction workers to encounter contamination, a health and safety officer must be present during groundbreaking activities and a Health and Safety Plan should be prepared. If contamination is encountered, it would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulations; ARs; and close coordination with the Environmental Coordinator. Short-term, minor, adverse effects could occur in the event that contamination is encountered. Future construction would not be sited on identified hazardous materials contaminations sites without appropriate planning to protect human health and prevent pollutant migration offsite.

According to the P2 Plan, 50 percent of all contaminated soils are generated through U.S. Army equipment failure. The other 50 percent is split evenly between aging heating units and refueling spills. Mitigation measures, in the form of education, have been implemented by the Department of Public Works (DPW). The DPW is educating the on-installation units to minimize the environmental effects from these occurrences; other mitigation measures such as the use of drip pans at refueling points have been implemented. FHL recognizes that there are no means presently available to eliminate these hazardous waste streams. In accordance with the Hazardous Waste Management Plan and Business Response and Installation Spill Contingency Plan, all contaminated soils would be excavated and transported off-installation to a permitted hazardous waste disposal facility (U.S. Army 2001a, FHL 2001).

Some proposed projects would involve fuel or other hazardous materials storage facilities during demolition or after their construction. Appropriate secondary containerization of storage tanks and adherence to the Hazardous Materials Management Plan; Hazardous Waste Management Plan; Spill Prevention, Control, and Counter-measures Plan (SPCC); and all other Federal, state, and local laws and regulations would minimize the potential for adverse effects.

Pollution Prevention. Indirect, minor, short-term, adverse effects on the P2 Program at FHL would be expected from the construction projects. Direct, minor, long-term, adverse effects on the P2 Program at FHL would be expected from the proposed projects and increased training. Along with the identified 50 percent of soils generated by equipment failure, 25 percent of all contaminated soils are generated at refueling points (FHL 2000).

Hazardous Materials. No effects on hazardous materials during construction projects would be expected. Products containing hazardous materials would be procured and used during the proposed construction projects in accordance with practices established at FHL and their hazardous materials procurement mechanism (DPW Environmental Division). Contractors would be responsible for the management of hazardous materials, which would be handled in accordance with Federal and state regulations. Contractors must report use of hazardous materials to the DPW Environmental Division including

pertinent information (e.g., MSDS). If a less hazardous material can be used, the DPW Environmental Division should make these recommendations. Use of the DPW Environmental Division system would also ensure that ozone-depleting substances (ODSs) are not available for use. Use of ODSs in such products as refrigerants, aerosols, and fire suppression systems is not permitted by the DOD without a formal request for a waiver. There would be no new chemicals or toxic substances used or stored at FHL. It is anticipated that the quantity of products containing hazardous materials used during the construction projects would be minimal and their use would be of short duration.

Direct, minor, long-term, adverse effects on hazardous materials at FHL would be expected from the proposed projects and increased training capacity. The DPW Environmental Division would be required to acquire and maintain a larger quantity of hazardous materials, primarily petroleum, oils, and lubricants (POLs). The proposed training activities would require a larger number of vehicles to be in use, for longer periods of time.

Hazardous Waste. Long-term, indirect, minor adverse effects on the FHL hazardous waste management program would be expected from the construction projects and proposed increased levels of training. FHL participates in several recycling programs for the hazardous wastes generated onsite, including used oil, contaminated diesel fuel, lead-acid batteries, waste antifreeze, and used oil or fuel filters. Most of the hazardous materials that are recycled are generated through vehicle maintenance and are recycled in a closed-loop program. The contaminated diesel fuel and antifreeze are both recycled on-installation through reuse as drip torch fuel, and filtering. The used oil is sent to a recycling facility that refines it and returns the product, which meets all quality standards for new oil.

The remaining products that are sent for off-installation recycling are lead-acid batteries and used oil and fuel filters. The filters are squeezed free of product on-installation, the metal is sent to be recycled as scrap and the remaining paper is disposed of as hazardous waste. Meanwhile the used vehicle batteries are collected and sent to be recycled off-installation.

Environmental Restoration Program. Short-term, direct, adverse effects in the ERP at FHL would be expected from the Proposed Action. Many of the proposed projects are in or adjacent to ERP sites, so soil and groundwater contamination could be present. It is assumed that FHL would perform the recommended Remedial Investigation and address any remedial actions prior to the initiation of any projects within the ERP sites. If contamination is encountered, it would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulations and ARs. Close coordination with the Environmental Coordinator would occur.

Asbestos-Containing Materials. Any buildings proposed for demolition as part of this EA that were constructed before 1972 would be expected to contain ACM. Adherence to all Federal, state, and local regulations in addition to installation management plans would result in negligible effects during demolition.

Lead-Based Paint. Most buildings proposed for demolition as part of this EA were constructed before 1972 and would be expected to contain LBP. Adherence to all Federal, state, and local regulations in addition to FHL management plans would result in negligible effects during demolition.

Polychlorinated Biphenyls. No effects would be expected on PCBs at the installation. No PCB-containing electrical transformers would be installed or removed for the proposed construction projects. Any PCB-containing fluorescent light ballasts that might be within buildings proposed for remodeling or demolition would be handled and disposed of in accordance with Federal, state, and local regulations.

Pesticides. Long-term, indirect, minor adverse effects on pesticide use at FHL would be expected from the Proposed Action. Use of pesticides might increase with an increased on-installation population. Pesticide use at TTBs would likely increase to protect kitchens and food service areas. The primary uses of pesticides in the cantonment area would not increase due to use of integrated pest management practices.

5.3.14 Health and Safety

The Proposed Action would not be expected to result in significant effects on health and safety. **Table 5-19** identifies several projects with potential safety concerns. Projects that are near or within ERP sites increase the potential for construction workers to encounter contamination. A health and safety officer should be present during groundbreaking activities for these projects. If contamination is encountered, it would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulation.

Contractor Safety. Short-term, minor, adverse effects on contractor safety would be expected. Construction of the proposed projects would slightly increase the short-term risk associated with contractors performing work at the project sites during the normal workday because the level of such activity would increase. Contractors would be required to establish and maintain safety programs for their employees. The DPW Environmental Division would be responsible for ensuring that all contractors are informed of the facility-appropriate hazardous materials and waste handling procedures, and would coordinate the use of hazardous materials and wastes with the Hazardous Waste Program Manager and Department of Logistics, Hazardous Materials Coordinator. Other proposed training construction projects would also likely have short-term, minor, adverse effects on construction contractor safety due to increased risk of construction-related accidents. This risk could be managed by adherence to established Federal, state, and local safety regulations.

Military Personnel Safety. Short-term, minor, adverse and long-term, minor, beneficial effects on military personnel safety would be expected. Due to increased training intensity and use of various weapons and munitions, the Proposed Action would slightly increase the short-term risk to military personnel during training. However, soldiers would comply with all U.S. Army safety regulations and policies to ensure that safety risks are minimized. The proposed projects would also likely have either no effect or long-term, negligible, adverse effects on military personnel safety due to use of the facilities for training activities. Improvement of Sulphur Springs Road (TI17) would result in long-term beneficial effects on military personnel and public safety due to improvements to shoulders and corners and installation of guardrails. The training associated with the Proposed Action would ultimately result in soldiers that are better prepared for deployment, which would be a long-term, beneficial effect.

Public Safety. No adverse effects on public safety would result from construction of the proposed projects. Constructing the proposed facilities would not pose a safety risk to other personnel or to activities at FHL or off-installation areas. Work areas surrounding construction activities would be fenced and appropriate signs posted to further reduce safety risks to other installation personnel and the general public. No long-term adverse effects would be expected as long as no structures were sited within the approach/departure zones and APZs for the Tusi Airfield heliport. Long-term, minor, beneficial effects on public safety would result from the incorporation of current AT/FP standards into the design, construction, or renovation of the proposed cantonment area construction projects.

Long-term, negligible, adverse effects on public safety would be expected from the training activities associated with the proposed projects. The noise produced during training activities at the live-fire ranges or light demolition range could startle installation personnel or the general public traveling within hearing range, which could possibly result in negligible, adverse effects. Increased training would also increase

the number of personnel and vehicles traveling on the installation roadway network and on off-installation roadways. This increase in traffic volume could increase the potential for conflicts between civilian and military vehicles, and therefore, also increase the demand on FHL emergency services. The risk of fires ignited due to increased training activities would also produce a minor increased risk to the off-installation populations, and increase the demand on fire department and emergency services.

Explosives and Munitions Safety. Long-term, minor, adverse effects related to explosives and munitions safety would result from increased training activities. Soldiers would comply with all safety standards for handling, transportation, and use of ammunition and explosives. No adverse safety effects would occur on off-installation populations.

Fire Safety. Long-term, minor, adverse, and beneficial effects on fire safety would be expected under the Proposed Action. No effects on fire safety would be expected from construction activities because construction contractors would develop and adhere to project safety plans that would reduce the risk of fire hazards. The increase of training activities, including increased use of vehicles and live-fire and demolition ranges could potentially cause unplanned brush fires at FHL. However, standard military training protocols could minimize the quantity of unplanned ignitions.

5.4 Detailed Environmental Consequences of the Proposed Action

5.4.1 Representative Training Infrastructure Projects

5.4.1.1 Schoonover TTB

Airspace Management and Safety. Long-term, negligible, adverse effects on airspace management and minor, long-term, beneficial effects on aircraft operations and aircraft safety would be expected from construction of a taxiway at Schoonover runway. The taxiway would be 4,300 feet (1,311 meters) long by 80 feet (24 meters) wide and would be parallel to Schoonover runway along the northeast side, joining with the existing apron (FHL 2009b) as shown on **Figure 4-2**. The taxiway would allow more than one C-17 aircraft to use the runway at the same time (FHL 2009b), which would provide greater flight scheduling flexibility for the installation, resulting in a minor beneficial effect on aircraft operations. Personnel and equipment-loading operations could be conducted on the taxiway instead of the runway, which would be a minor beneficial effect on aircraft safety. Overcrowding and other airspace management issues would not be expected from more than one C-17 aircraft using the runway at the same time. Continued coordination between the services over joint use of Schoonover runway after implementation of the Proposed Action would ensure that effects associated with use of airspace and airspace management requirements are negligible.

Long-term, minor adverse effects on airspace management and aircraft safety would be expected from operation of a helipad/medivac pad at Schoonover TTB. The level of potential adverse effects on airspace management and aircraft safety would depend on whether fixed-wing aircraft flights at Schoonover runway and helicopter flights at the proposed helipad/medivac pad would be conducted simultaneously. Per UFC 3-260-01, when simultaneous operations are desired on a permanent helipad and an LZ, minimum separation distances are required. The minimum separation distance is dependent on whether VFR or IFR operations are being conducted. As stipulated by UFC 3-260-01, the centerline of an LZ (Schoonover runway is defined as an LZ by UFC 3-260-01) and the centerline of a parallel permanent helipad must be separated by the following distances if simultaneous operations are conducted (DOD 2008):

- Minimum of 700 feet (213 meters) for simultaneous VFR operations
- Minimum of 2,500 feet (762 meters) for IFR simultaneous operations (where the fixed-wing aircraft and helicopter depart simultaneously, or one approaches and one departs)
- Minimum of 4,300 feet (1,311 meters) if fixed-wing aircraft and helicopters approach simultaneously.

The centerline of an LZ and the centerline of a parallel permanent helipad must be separated by a minimum of 700 feet (213 meters) for nonsimultaneous operations. This distance can be reduced to 200 feet (61 meters); however, a waiver is required and must be based on wake-turbulence and jet blast. Per UFC 3-260-01, when situating a helipad, consideration must be given to hold position marking. Helicopters must be located away from the LZ (on the apron side of the hold position markings) during LZ operations.

If a combination of fixed-wing aircraft and helicopters were to conduct separate and simultaneous operations, all aircraft would maintain radio contact with Tusi Advisory and normal see-and-avoid rules would apply while in the closed-pattern and landing environments. It is expected that these procedures would reduce the potential for airspace management issues (e.g., congestion), as well as aircraft safety issues (e.g., accidents). The continued implementation of AR 385-10, *The Army Safety Program*, and AR 385-95, *Army Aviation Accident Prevention,* would also reduce the potential for accidents. The aircraft and helicopter safety, accident, and incident procedures outlined in FHLR 350-2 would also continue to be applied (FHL 2006a).

Long-term, minor, beneficial effects on airspace management, aircraft operations, and aircraft safety would be expected from the establishment of safety zones, imaginary surfaces, and the exclusion area required by UFC 3-260-01 as development constraints at Schoonover runway. These zones and surfaces are identified as installation constraints (see **Section 2.1.1**) and would provide restrictions on the siting of the Schoonover TTB facilities included under the Proposed Action. These restrictions would have a beneficial effect on aircraft safety. Safety zones (CZs and APZs), imaginary surfaces, and the exclusion area for Schoonover runway are discussed in detail in **Section 4.1.2** and are shown in **Figure 4-2**. As discussed in **Section 4.1.2**, DOD analysis has determined that the areas immediately beyond the ends of runways and along the approach and departure flight paths have significant potential for aircraft accidents. Based on this analysis, the DOD developed zones for military runways that have a high relative potential for aircraft accidents. The CZ, the area closest to the runway end, is the most hazardous for relative potential for aircraft accidents. The APZ is the land use control area beyond the CZ of an LZ that possesses a significant potential for accidents; therefore, land use is a concern. The establishment of these zones at Schoonover TTB as development constraints would be expected to have a long-term, minor, beneficial effect on human safety. The establishment of the CZs and APZs at Schoonover TTB would not reduce the potential for aircraft accidents themselves; however they would prevent development at both ends of the LZ, which have the highest relative potential for aircraft accidents. Please see **Section 4.3.2** for the land use guidelines for the CZs and APZs. Establishment of an exclusion area as required by UFC 3-260-01 would restrict development of facilities around the entire LZ, not just the runway end. This would be expected to provide a long-term, beneficial effect on human safety and aircraft safety (e.g., hazardous materials such as fuel cannot be stored in the exclusion area). Please see **Section 4.3.2** for the land use guidelines for the exclusion area. Establishment of the imaginary surfaces as required by UFC 3-260-01 would define the protected airspace around the runway, which would be expected to provide a long-term beneficial effect on airspace management.

Noise. Short-term, minor, adverse effects on noise levels would be expected as a result of various minor construction activities to support the Schoonover TTB. The noise emanating from the proposed minor construction activities would be localized, short-term, and intermittent during construction equipment and machinery operations. Construction activities would be isolated to normal working hours (i.e., between

7:00 a.m. and 5:00 p.m.) in the vicinity of the construction site. Schoonover airfield is approximately 1,250 feet southwest of the edge of the cantonment area. The cantonment area contains the largest concentration of noise-sensitive receptors on-installation including schools, libraries, medical clinics, and office buildings supporting installation functions. However, these noise-sensitive areas on the installation are in the northwest corner of the cantonment area and are unlikely to be affected by the minor construction activities associated with the Schoonover TTB (see **Figure 5-1**). Installation personnel around Schoonover airfield could experience noise levels of approximately 80 dBA at a distance of 50 feet to 77 dBA if they were 100 feet away. These noise levels would be short-term in nature, and therefore, no long-term adverse effects on noise would be expected from construction activities that could include grading, paving, and heavy equipment.

Land Use. The proposed Schoonover TTB is southeast of the cantonment area, and west of the main installation access gate and a primitive campground used by hunters and fishers. The Schoonover TTB would be compatible with some surrounding land uses, such as the rifle and pistol range to the north and the TTB (Miller Ranch Bivouac) to the east. Hunting is permitted in Training Area 16B (FHL undated), and while the Schoonover TTB would not preclude hunting in the affected training areas, it would reduce the area where hunting activities could be conducted. The existing Schoonover TTB was recently used as a large bivouac site in association with the installation's C-130 and C-17 capable airfield, and the Schoonover TTB area was intensively used for training during 1950s to 1960s. After a hiatus from activity in the 1990s and early 2000s, the area was used starting in 2006 for encampments of 800 to 1,200 personnel three times per year. In 2007 and 2008, portions of the area were used for up to 2,500 soldiers for annual WAREXs (FHL 2009b). Therefore, the Schoonover TTB area has been previously used for large troop concentrations and exercises similar to those proposed under the Proposed Action.

A portion of the proposed Schoonover TTB would be within the exclusion area for the existing Schoonover Airfield (see **Figure 4-2**). UFC 3-260-01 prohibits the siting of all land uses within the exclusion area, except those uses that are required to operate the associated LZ. Therefore, the majority of the facilities included under the proposed Schoonover TTB would be prohibited in the exclusion area. Proper adherence to the land use restrictions for the exclusion area provided in UFC 3-260-01 would ensure compatible development of the Schoonover TTB; therefore negligible adverse effects on land use would be expected from the proposed expansion.

The Schoonover runway exclusion area discussed in **Section 4.1.2** and shown in **Figure 4-2** is the minimum size as required by UFC 3-260-01 for a safe environment for aircraft and ground operations. For long-term airfields such as the Schoonover runway, restricting the use of available land beyond the minimum distances is highly recommended in order to protect the U.S. Army's operational capability and enhance the potential for future mission expansion (DOD 2008). The goal is to provide an airfield environment that provides the greatest margin of safety and compatibility for personnel, equipment, and facilities. Therefore, it is recommended that the uses described in **Section 4.3.2** for the APZ be restricted for as great a distance from Schoonover runway as is practical for mission requirements. UFC 3-260-01 also identifies the separation distances required for simultaneous operations of a fixed-wing runway and a helipad. Schoonover TTB would be capable of supporting a helipad or medivac pad; however, the exact location of the proposed helipad or medivac pad has not been determined. Minimum separation distances for simultaneous operations at Schoonover Airfield and Schoonover TTB helipad or medivac pad would range from 700 feet to 4,300 feet based the type of aircraft operations (VFR or IFR) (see **Section 4.1.2** for additional information). Nonsimultaneous operations must be separated by a minimum of 700 feet; however, this distance may be reduced to 200 feet with a waiver. Depending on the location of the Schoonover TTB helipad or medivac pad and whether fixed-wing aircraft flights at Schoonover runway would occur simultaneously with helicopter flights at Schoonover TTB, the Schoonover TTB helipad or medivac pad could be within the minimum separation distance from Schoonover runway and be noncompliant with UFC 3-260-01.

Figure 5-1. Existing and Proposed Noise Contours for Schoonover TTB

Therefore, construction and use of the Schoonover TTB could result in long-term, minor, adverse effects on land use due to the incompatibility with the Schoonover runway and the potential conflict with the criteria identified in UFC 3-260-01. If Schoonover TTB in not compliant with UFC 3-260-01, an operational waiver must be obtained from the major command director of operations in order to continue flying operations at Schoonover Airfield during construction and operation of the proposed Schoonover TTB. Please see **Section 5.4.1.1**, Airspace Management and Safety, for the analysis of airspace management and aircraft safety under the Proposed Action.

Air Quality. Short-term, minor, adverse effects would be expected as a result of the construction of the Schoonover TTB to include concrete pads, facilities, helipad or medivac pad, and associated utilities. Construction activities would result in air emissions from the operation of heavy construction machinery. BMPs to control dust might include spraying water over the construction area. Long-term, minor, adverse effects would be expected from the operation of aircraft during mission training activities. This project would not result in an adverse effect on local or regional air quality, would not violate NAAQSs or SAAQSs, and would not produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimated from construction and operations at Schoonover TTB are shown in **Table 5-4**.

Table 5-4. Estimated Air Emissions Resulting from Schoonover TTB (Project TI1)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Estimated TI1 Construction Emissions	2.773	0.627	2.624	0.196	13.548	0.857
Percent of NCCI AQCR Inventory	0.009	0.002	0.002	0.002	0.073	0.017
Estimated Operational Emissions	4.950	0.599	2.507	0.422	1.720	1.720
Percent of NCCI AQCR Inventory	0.016	0.002	0.002	0.005	0.009	0.033

Geological Resources. Short-term, minor and long-term, negligible to minor, adverse effects on soils would be expected from constructing and using the proposed Schoonover TTB. Establishment of temporary tent structures, construction of concrete pads, and the helipad or medivac pad would slightly increase impervious surfaces and therefore erosion and sedimentation would increase. Excavation activities to install power, communications, and data lines would disturb the soil structure and increase erosion and sedimentation rates as vegetation is removed and soil is exposed. Erosion and sedimentation would decrease once vegetation is reestablished.

Soils at the site of the proposed Schoonover TTB were analyzed for engineering limitations for the following: bivouac suitability, helicopter LZs, and excavation. Soil limitations were analyzed using the Natural Resources Conservation Service's Web Soil Survey (NRCS 2009). Bivouac suitability analysis examines soils that influence the ease of developing bivouac sites; soil properties considered in the analysis of helicopter LZs include ability for the ease of construction, maintenance, and readiness of the LZs. Bivouac suitability was chosen for analysis as it would most closely resemble the temporary tent structures that would be home for 600 soldiers. Excavation limitations are based on the ease of digging and the soil's resistance to sloughing.

At the proposed Schoonover TTB, the Placentia sandy loam and the Xerothents, sandy soil units would be rated as very limited for bivouac suitability due to slow percolation of storm water or sandiness, respectively. Only the Elder loam, in the southern portion of the site, is rated as not limited. The other soil units are limited primarily because they are considered too gravelly or have slow percolation. Soil associations with the least limitations for a helicopter LZ would be the Arroyo Seco gravelly sandy loam (0 to 2 percent slopes), which has no limitations and is in the central and the northwestern corner of the site. The limited soils are considered limited due to slope and because of the potential for dust generation. At the proposed Schoonover TTB site, all soils mapped are rated as limited for excavation activities. This is because of the potential for unstable excavation walls (NRCS 2009).

Due to the limitations of some soils at the site of the proposed Schoonover TTB, site-specific soil surveys should be conducted prior to development. Best management practices (BMPs) should be implemented to aid in the design and training procedures for mitigation purposes. Effects on soils, including sedimentation and erosion, would be reduced to negligible by implementing BMPs. Examples of erosion and sediment controls and BMPs could include temporary sediment basins, sediment fencing, or revegetation for ground stabilization. A detailed analysis of environmental consequences of the Proposed Action on water resources can be found in **Section 5.4.1.1**, Water Resources. Erosion has both short-term and long-term effects on Training Areas including restricted troop and vehicle movements, and reduced tactical training value due to the creation of hazardous surface conditions. Additionally, erosion is responsible for increased sedimentation of rivers and other water features and can result in increased susceptibility of affected areas to establishment and spread of exotic and invasive plant species (discussed in **Section 4.7.3**, Biological Resources). Impacts associated with potential seismic activity for utility cables would be minimized through design consistent with UFC 3-310-03, EO 12699, and seismic hazard codes found in the *Guidelines for Evaluating and Mitigating Seismic Hazards in California* for underground utilities (CGS 1997).

Water Resources. Construction and use of the proposed Schoonover TTB would be expected to result in long-term, minor effects on water resources. A decrease in soil permeability and water infiltration as a result of soil compaction in the surface layers could occur. A decrease in soil permeability and rate of water infiltration has the potential to decrease storm water quality and increase storm water quantity and flow velocity, particularly during large rain events. Overland storm flows can pick up contaminants and carry them directly into receiving water bodies. Increased storm water runoff associated with large areas of newly compacted soils can increase the volume and velocity at which storm water enters channels; if a stream channel cannot accommodate the increased volume of storm water, areas downstream can flood. In addition, the channel morphology of the receiving streams could adjust to accommodate increased flows often resulting in streambank erosion and associated impacts on downstream water quality and habitat. A decrease in soil permeability and water infiltration associated with compaction can also reduce the rate and volume of groundwater recharge in the affected area. Decreased soil permeability would alter natural storm water flow regimes. Storm water BMPs would be developed to promote recharge of runoff on the site resulting in a minimization of loss of recharge to groundwater in proximity to the site. While the establishment of the proposed bivouac sites and reduction in soil permeability and water infiltration rates as a result of compaction of soil is an irretrievable adverse effect, this reduction of recharge area and rate of recharge for the groundwater basins would be negligible when compared with the total recharge area that is available.

In the event of a spill or leak of fuel or other contaminants, there could be adverse effects on the receiving water bodies. All fuels and other potentially hazardous materials would be contained and stored appropriately. In the event of a spill, procedures identified in the installation's SPCC Plan would be followed to quickly contain and clean up a spill. Please see **Section 4.13** for a discussion on hazardous materials and wastes. There remains the possibility that a spill or leak could occur, but implementation of

the BMPs identified in the SPCC Plan would minimize the potential for and extent of associated contamination.

Development is not expected to occur within the floodplain (see **Figure 5-2** for water and biological features associated with the proposed Schoonover TTB). Impacts on floodplains would be avoided to the maximum extent practicable consistent with EO 11988.

Storm water BMPs would ultimately attenuate the potential adverse effects the Proposed Action could have on water quality and quantity.

Structural BMPs could include combinations of the following:

- Good housekeeping (cleaning up trash, maintaining equipment in proper operating condition)
- Implementation of SPCC measures when necessary
- Adoption of a Spill Prevention Plan
- Timely soil stabilization in disturbed areas
- Rotation of beddown sites and staging areas to reduce compaction
- Use of silt fencing, hay bales, or other method to keep sediment from being transported off site
- Use of retention, detention, or infiltration practices to prevent any increase in storm water runoff from leaving the site or flowing into adjacent receiving waters.

Appropriate BMPs would be implemented and would follow the guidelines provided in documents such as FHL's Water Resources Management Plan, Storm Water Pollution Prevention Plan (SWPPP), INRMP, Land Rehabilitation and Maintenance Report, and Federal and state permitting processes. Direct effects on waters of the United States would be avoided or minimized to the maximum extent possible and any required Section 404, 401, or other state permitting for unavoidable effects would be acquired prior to implementing the action. This project would disturb greater than 1 acre of land, and an NPDES permit would be required. Assuming proper use of BMPs to contain the effects of establishing the proposed Schoonover TTB including potential nonpoint source pollution to water bodies associated with increased trash, vehicle use, and storm water runoff; potential increased erosion and sedimentation; removal of vegetation; and soil compaction, effects on water resources would be expected to be minor.

Biological Resources. Construction and use of the Schoonover TTB would result in short-term and long-term, moderate adverse effects on biological resources due to loss of habitat. The proposed Schoonover TTB contains previously disturbed land that would be used for training and infrastructure. The Schoonover TTB area is approximately two-thirds grasslands and one-third oak woodland/savanna. There is a dense blue oak woodland in the area, with large valley oaks scattered throughout the lowland valley where Schoonover Airfield is located. The proposed Schoonover TTB training infrastructure project would affect approximately 34.60 acres of grassland habitat, 17.03 acres of blue oak woodland, and 3.35 acres of valley oak savannah. There are 0.57 acres of wetlands delineated within the Schoonover TTB.

The Proposed Action could affect one vernal pool that does not support listed species (i.e., vernal pool fairy shrimp are absent); this pool rarely fills but likely acts as an important lowland area for drainage of adjacent areas. There is a vernal swale in the northeastern corner of the proposed Schoonover TTB and it extends out of the Proposed Action area to the east. Vernal pools and swales would be avoided to the extent feasible during design, construction, and use of the areas.

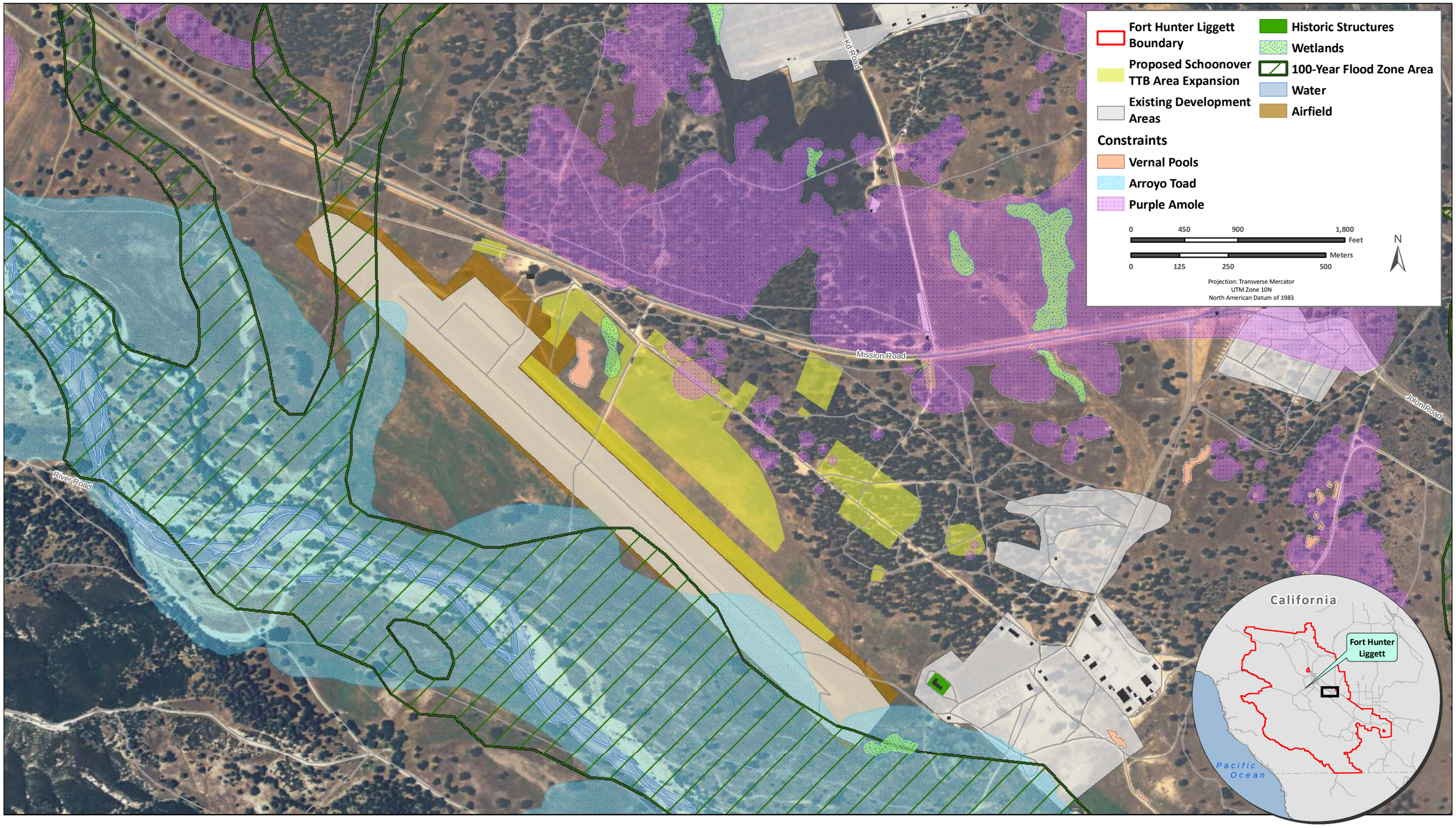

Figure 5-2. Biological and Water Resources at Schoonover TTB

Threatened and Endangered Species. Short-term and long-term, moderate effects on threatened and endangered species could occur from construction and use of the Schoonover TTB due to potential loss of habitat. The proposed Schoonover TTB occurs in potential kit fox habitat and is located near arroyo toad habitat. Purple amole and vernal pools are present on the site. Approximately 45 acres would be developed with hardscape or heavy compaction. The Proposed Action would potentially affect kit fox habitat, arroyo toad, and purple amole habitat. A corridor of kit fox habitat would remain unaffected south of the proposed Schoonover TTB. Vernal pool fairy shrimp are absent from the pool located in the project footprint.

Two- and three-quarter acres of purple amole are interspersed on site between blue oak trees. The site was surveyed in December 2007 and January 2008 and mapped in May 2008. A total of 0.6 acres of sparsely occupied purple amole habitat that is dispersed in small scattered patches would be adversely affected and likely lost due to development and increased human activity associated with proposed Schoonover TTB. Marking purple amole sites with stakes is not feasible due to the proximity of a personnel parachute DZ. North and east of the proposed Schoonover TTB are thousands of purple amole plants in numerous patches, including a larger patch of purple amole with about 6,000 plants in a 1-acre site near Mission Road. These areas are placed off-limits during training and would be avoided for the Proposed Action.

Potential effects from the proposed Schoonover TTB on arroyo toad habitat would be primarily from erosion and sedimentation from the training site and a nearby low-water crossing (dirt vehicle crossings) of the San Antonio River. Effects on arroyo toads would be minor due to vegetated buffers between the river and the TTB and limiting vehicle crossings of the river to existing low-water crossings. TTB activities at Schoonover would occur about 300 meters directly upland from arroyo toad breeding habitat at Miller Ranch crossing. Miller Ranch crossing itself is within arroyo toad breeding habitat, and its use for military training activities would continue and likely increase. In 2008, training-related mortality of four juvenile arroyo toads and an undetermined number of larvae were reported at the Miller Ranch crossing, and an additional 82 arroyo toads were relocated at the crossing (FHL 2009e). Adverse effects to arroyo toad breeding habitat would be minimized by limiting vehicle crossing to nine existing crossings within 17 linear miles of arroyo toad habitat. Sandy soil habitat associated with the San Antonio River occur about 150 meters from the proposed site; however, this is not likely to result in an effect on the species because the site and river are separated by the Schoonover Airfield.

Cultural Resources. Three cultural resources are present near the APE of the proposed Schoonover TTB project area. CA-MNT-1645 is a small multi-component site along the Schoonover airstrip that is highly disturbed. CA-MNT-1615H is an historic site that is in within the current boundaries of the existing TTB. CA-MNT-963 is the Jose Maria Gil Adobe, a site listed on the NRHP. An extensive portion of the site lies within the existing Schoonover TTB and airfield, while the northeastern 43 portion of the site lies within the proposed Schoonover TTB expansion area. Moreover, as CA-MNT-963H also contains extensive architectural resources, the Proposed Action could result in an alteration of the visual characteristics of the surrounding environment that contribute to the resource's significance. Given the presence of these three sites within the Schoonover TTB area, the Proposed Action would potentially have long-term, minor, adverse effects on these resources. Avoidance, evaluation, or mitigation of adverse effects for these sites would occur through consultation with the SHPO prior to any construction activities, pursuant to Section 106 of the NHPA (36 CFR 800). Any new construction should be designed for compatibility with the existing historic architectural context or to reduce significant visual effects on CA-MNT-963H.

Socioeconomics and Environmental Justice. Short-term, minor, beneficial effects on socioeconomic resources would be expected from the proposed construction of the Schoonover TTB. The estimated construction cost of the Schoonover TTB has not been determined. While it is assumed that local materials and contractors would be used, some of the construction could be completed by soldiers stationed at FHL. Construction would occur entirely on FHL and would have little potential to adversely affect off-installation residents. No long-term effects on socioeconomic resources or environmental justice are expected to result from the operation of the Schoonover TTB.

Infrastructure. Long-term, minor, adverse effects on infrastructure would be expected with the establishment of the Schoonover TTB. Currently, no utility services are provided at the proposed area of Schoonover TTB; however, as part of the Proposed Action, electricity, communications, water, and wastewater utility services would be installed. Electricity and communications service would be provided by installing copper and fiber optic electric and communication cables along roads and underneath bridges from the nearest respective source to Schoonover TTB. Water service at Schoonover TTB could be linked to cantonment area water system or could be provided by on site measures or ROWPU. Wastewater would be handled by onsite septic systems or it would be collected, stored, transported, and discharged at appropriate sanitary sewer connections. Because only a limited number of structures would be built, only minimal quantities of solid waste would be generated during the construction of this facility. Following construction, increases in utility demand and solid waste production at FHL would result from the increased personnel and buildings at Schoonover TTB; however, this increase would be minor compared to the total utility usage and total solid waste production at the entire installation. Overall, the installation of utility service to this portion of the installation would be a minor, adverse effect.

Traffic and Transportation. Short-term, minor, adverse effects on traffic and transportation systems would be expected from construction of the Schoonover TTB. Short-term effects would be expected from construction equipment entering and leaving FHL. The proposed Schoonover TTB is approximately 2.5 miles from the nearest on- and off-installation residences (U.S. Army 2009c); therefore, construction of the Schoonover TTB would not likely disrupt traffic patterns near residential areas.

Long-term, minor, adverse effects on traffic and transportation systems would be expected from operation of the Schoonover TTB. Long-term, intermittent effects would be expected from the in- and out-processing of soldiers. Soldiers would most likely be bused to the Schoonover TTB or arrive by aircraft at the adjacent airstrip; therefore, traffic from processing would be minor as there would be few vehicles traveling to and from the TTB. Since the proposed Schoonover TTB is approximately 2.5 miles from the nearest on- and off-installation residences, operation of the Schoonover TTB would not likely disrupt traffic patterns near residential areas. Soldiers would generally remain on site during the training period; therefore, increases in traffic due to additional soldiers on the installation would be negligible to minor. Long-term, minor, adverse effects on installation roads at the Schoonover TTB would be expected. Increased volume of traffic on the gravel roads in this training area would increase the requirement for maintenance of those roadways.

Hazardous Materials and Waste. Short-term, minor to negligible, adverse effects would be expected from the use of hazardous materials during the construction process. The construction process would use hydraulic construction equipment (i.e., bulldozer, front-end loader, grader, and scraper). This TTB is proposed to house a fueling point and several 30,000-gallon fuel bags. Long-term, minor, adverse effects would be expected from the proposed training activities. The proposed Schoonover TTB would not generate new waste streams, and, therefore, no modifications to FHL permits or hazardous materials or wastes would be expected.

Health and Safety. Short-term, minor, adverse effects on construction contractor safety could occur. Construction activities pose an increased risk of construction-related accidents, but this level of risk would be managed by adherence to established Federal, state, and local safety regulations. The proposed location for the Schoonover TTB is also partially within the AOC as identified in the MMRP Final Site Inspection Report (USACE 2008). Inspection of the area prior to commencement of construction would determine if any UXO exists, and, if necessary, removal would be conducted using U.S. Army SOPs.

Long-term, minor, adverse effects on explosives and munitions safety could result from use of the Schoonover TTB due to its location partially within the AOC (USACE 2008). However, this area has been previously disturbed and used as a bivouac site for various large-scale exercises, and would be inspected prior to construction.

5.4.1.2 Milpitas TTB

Airspace Management and Safety. No effect on airspace management and safety would occur because establishment of the Milpitas TTB does not involve changes in airspace.

Noise. Short-term, minor, adverse effects on noise levels would be expected as a result of various construction activities to support the Milpitas TTB. The noise emanating from the proposed construction activities would be localized, short-term, and intermittent during construction equipment and machinery operations. Personnel at 50 feet from a noise source could experience noise levels of 89 dBA while persons at 100 feet could experience noise at 86 dBA. Grading activities associated with the Milpitas TTB could have a noise value of approximately 74 dBA for persons at a distance of 300 feet. These noise levels would be short-term in nature, and therefore no long-term adverse effects on noise would be expected from construction activities (e.g., grading, paving, and heavy equipment).

Land Use. The construction and operation of the expanded Milpitas TTB would not preclude the use and viability of surrounding land uses and would therefore be considered compatible. The Nuclear, Biological and Chemical chamber; a land navigation course; and Milpitas DZ and airstrip are in the vicinity of the Milpitas TTB area. The Milpitas TTB has been previously used as a bivouac site for large exercises and was recently used to stage firefighters battling wildfires (FHL 2008d). No adverse effects on land use from the construction and operation of the Milpitas TTB site would be expected. Hunting is permitted in Training Area 2 (FHL undated), and while the proposed project would not preclude hunting in the affected training areas, it would reduce the area in which hunting activities could be conducted.

Air Quality. Short-term, minor, adverse effects would be expected as a result of the construction and expansion of the Milipitas TTB to include concrete pads, facilities, and associated utilities. Construction activities would result in air emissions from the operation of heavy construction machinery. BMPs to control dust can include spraying water over the construction area. No emissions are anticipated from operation of the Milipitas TTB expansion. This project would not result in an adverse effect on local or regional air quality, violate NAAQSs or SAAQSs, or produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimated from the expansion of the Milipitas TTB are shown in **Table 5-5**.

Geological Resources. Short-term, minor and long-term, negligible to minor, adverse effects on geology and soils would be anticipated from constructing and using the proposed Milpitas TTB. Similar to the proposed Schoonover TTB, the Milpitas TTB would entail establishment of temporary structures. Excavation for power, communications, and data lines would result in disturbing soil structure and increasing erosion and sedimentation rates until vegetation was reestablished. Construction of concrete pads and a water well would disturb soil and slightly increase impervious surfaces, thereby increasing erosion and sedimentation potential.

Table 5-5. Estimated Air Emissions Resulting from the Milpitas TTB (TI2)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Estimated TI2 Construction Emissions	3.024	0.498	1.294	0.202	26.905	1.539
Percent of NCCI AQCR Inventory	0.010	0.002	0.001	0.002	0.145	0.030

The proposed Milpitas TTB site soils were analyzed for engineering limitations for bivouac development. Of the eight soils mapped at the site, four are considered very limited for development of bivouac sites. This is primarily due to flooding, sandiness, and slope. Only one soil, the Pfeiffer fine sandy loam, is not limited for bivouac development. This soil is mapped in the northeasternmost corner of the site. Site-specific soil surveys should be conducted prior to the expansion of the Milpitas TTB to determine if any other limitations exist. Implementation of BMPs should reduce effects on soils and geology to negligible.

Water Resources. Construction and operation of the proposed Milpitas TTB would be expected to result in short-term and long-term, minor, adverse effects on water resources. Short-term effects could occur from the removal of vegetation and excavation of soil for installation of electrical power, communications, and data lines, resulting in increased sedimentation and storm water runoff velocity temporarily until vegetation has been reestablished. Disturbance of soil and removal of vegetation associated with development could result in erosion of disturbed soils and transport of sediment and other pollutants into nearby water bodies during storm water flow events. Long-term impacts could result from compaction of soils due to foot and vehicle traffic and could result in a decrease in soil permeability and water infiltration rates and potential subsequent alteration of drainage patterns. Appropriate storm water management BMPs could reduce runoff and minimize the potential for adverse effects on adjacent and downstream water bodies. Storm water BMPs would be developed to promote recharge of runoff on the site resulting in a minimization of loss of recharge to groundwater in proximity to the site. This project would disturb greater than 1 acre of land, and an NPDES permit would be required.

Groundwater would be withdrawn from the proposed water well, and would result in a long-term negligible impact on groundwater supply. Appropriate BMPs would be implemented to ensure onsite storm water infiltration to allow groundwater recharge, minimizing any effects on groundwater supply. However, well water might be inefficient, and it is possible that drinking water pipelines could be extended from the cantonment area to all TTBs. Direct effects on waters of the United States (see **Section 5.4.1.2**, Biological Resources) would be avoided or minimized to the maximum extent possible and any required Section 404 or 401 permitting for unavoidable effects would be acquired prior to constructing the Milpitas TTB. Assuming proper use of BMPs to contain the effects of establishing the Milpitas TTB, effects on water resources would be expected to be long-term, minor, and adverse.

Only minor construction would occur within the Milpitas TTB, therefore it is not anticipated that floodplains would be adversely affected. Impacts on floodplains to the southwest, south, and southeast of the proposed site would be avoided by designing the TTB accordingly.

Biological Resources. The proposed Milpitas TTB site was selected because it contains previously disturbed, open land that would be used for training and infrastructure. Therefore, short-term and long-term, minor adverse effects would be anticipated by constructing and using the Milpitas TTB. Milpitas TTB is a mosaic of grasslands and valley and blue oak woodlands and savannas. Most of the area affected by the Proposed Action is classified as valley oak savanna. The proposed Milpitas TTB

training infrastructure project would affect 65.61 acres of valley oak savanna, 12.28 acres of grassland, 8.9 acres of valley oak woodland, 3.15 acres of blue oak woodland, and 0.81 acres of mixed riparian habitat.

Three vernal pools are within the proposed construction and operational area of Milpitas TTB. These are pools that do not support listed species (i.e., vernal pool fairy shrimp are absent). Each of the pools would be avoided to the maximum extent feasible during design, construction, and use of the areas. **Figure 5-3** shows water and biological resources associated with the proposed Milpitas TTB site.

Threatened and Endangered Species. The Milpitas TTB site is approximately 3.5 miles upstream from arroyo toad breeding habitat. Indirect, long-term, minor, adverse effects from the Milpitas TTB on arroyo toad habitat would be primarily from erosion and sedimentation from the training site and a nearby low-water crossing (dirt vehicle crossing) of the San Antonio River. The effects on arroyo toads would be minor due to vegetated buffers between the river and the TTB, by limiting vehicle crossings of the river to existing low-water crossings, and through the use of BMPs. Design plans would incorporate a 75-meter vegetated buffer between the training site and the river to reduce the potential for sedimentation and erosion into the river. A 25-meter vegetated buffer would protect tributaries. Use of Milpitas crossing, an unimproved low water crossing, would likely increase. Therefore effects from construction and operation of the Milpitas TTB would result in short-term and long-term, minor, adverse effects on threatened and endangered species.

Cultural Resources. Four previously recorded archaeological sites (CA-MNT-864, CA-MNT-867, CA-MNT-871, and CA-MNT-873) occur within the areas proposed for the Milpitas TTB. The Proposed Action would potentially have long-term, minor, adverse effects on these resources. Through consultation with the SHPO, avoidance, evaluation, or mitigation of adverse effects is recommended for these sites.

Socioeconomics and Environmental Justice. Short-term, minor, beneficial effects on socioeconomic resources would be expected from the proposed expansion of the Milpitas TTB. The estimated construction cost of the Milpitas TTB has not been determined. While it is assumed that local materials and contractors would be used, some of the construction could be completed by soldiers stationed at FHL. Construction would occur entirely on FHL and would have little potential to adversely affect off-installation residents. No long-term effects on socioeconomic resources or environmental justice are expected to result from the operation of the Milpitas TTB.

Infrastructure. Long-term, minor, adverse effects on infrastructure would be expected with the expansion of the Milpitas TTB. Currently, no utility services are provided to the area proposed for the Milpitas TTB; however, as part of the Proposed Action, electricity, communications, water, and wastewater utility services would be installed. Electricity and communications service would be provided by installing copper and fiber optic electric and communications cables along roads and underneath bridges from the nearest respective source to the Milpitas TTB. Water service at Milpitas TTB could be independent of or tied into the existing water system. If independent of the existing water system, water would be provided by an onsite groundwater well connected to an AST or by utilizing a ROWPU when surface water conditions allow. Wastewater would be handled by onsite septic systems or it would be collected, stored, transported, and discharged at appropriate sanitary sewer connections. Because only a limited number of structures would be built, only minimal quantities of solid waste would be generated during the development of this facility. Following construction, increases in utility demand and solid waste production at FHL would result from the increased personnel and buildings; however, this increase would be negligible compared to the total utility usage and solid waste production at the entire installation. Overall, the installation of utility service to this portion of the installation would be a minor adverse effect.

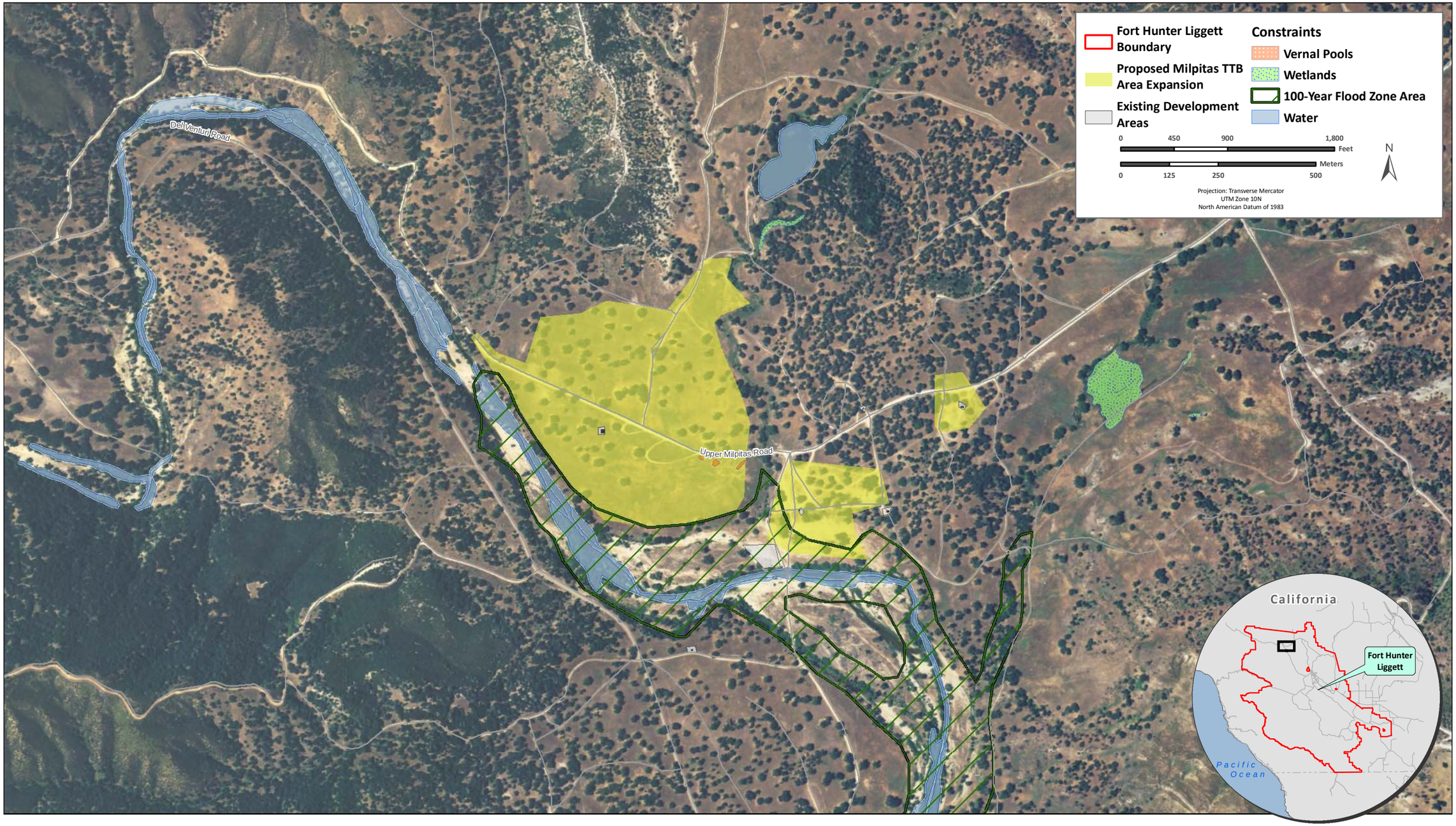

Figure 5-3. Locations of Water and Biological Resources at Milpitas TTB

Traffic and Transportation. Short-term, negligible adverse effects on traffic and transportation systems would be expected from construction of the Milpitas TTB. Short-term effects would be expected from construction equipment entering and leaving FHL. The proposed Milpitas TTB is approximately 5 miles northwest of the cantonment area; therefore, construction of the Milpitas TTB would not likely disrupt traffic patterns on FHL.

Long-term, negligible to minor, adverse effects on traffic and transportation systems would be expected from operation of the Milpitas TTB. Long-term, intermittent effects would be expected from arrival and departure of soldiers. Soldiers would most likely be bused to the Milpitas TTB; therefore, traffic from processing would be negligible as there would be few vehicles traveling to and from the TTB. Since the proposed Milpitas TTB is approximately 5 miles northwest of the cantonment area, operation of the Milpitas TTB would not likely disrupt traffic patterns on FHL. Soldiers would generally remain on site during the training period; therefore, increases in traffic due to additional soldiers on the installation would be negligible. Long-term, minor, adverse effects on installation roads at the Milpitas TTB would be expected. Increased volume of traffic on the gravel roads in this training area would increase the requirement for maintenance of those roadways.

Hazardous Materials and Waste. Short-term minor to negligible adverse effects would be expected from the use of hazardous materials during the construction process. The construction process would use hydraulic construction equipment (i.e., bulldozer, front-end loader, grader, and scraper). Long-term, minor, adverse effects would be expected from the proposed training activities. The proposed Milpitas TTB would not generate new waste streams, and therefore, no modifications to FHL permits or hazardous materials or wastes would be expected.

Health and Safety. Short-term, minor, adverse effects on construction contractor safety could occur. Construction activities pose an increased risk of construction-related accidents, but this level of risk would be managed by adherence to established Federal, state, and local safety regulations. Long-term, negligible, adverse effects on military personnel safety could result due to the use of the TTB expansion during training exercises.

5.4.1.3 Heavy Equipment Operator Training Site

Airspace Management and Safety. No effect on airspace management and safety would occur because establishment of the Heavy Equipment Operator Training Site would not involve changes in airspace.

Noise. Short- to long-term, minor, adverse effects on noise levels would be expected as a result of year-round heavy equipment training. Heavy equipment training would involve the use of loaders, backhoes, hydraulic excavators, scrapers, bulldozers, and graders; see **Table 4-4** for noise values associated with this construction machinery. There are off-installation residential structures approximately 0.6 miles northeast and 0.75 miles east of the proposed site, and there is an airstrip and DZ just east of the site. Off-installation residents approximately 0.6 and 0.75 miles away could experience noise of approximately 75 to 80 dBA from the use of graders and pavers for training purposes. Because the training program is intended to last year-round with multiple phases, effects are expected to be more long term. However, it is assumed that training would primarily take place during the day.

Land Use. Jolon Road is a publicly accessible roadway, and is the primary access route for FHL and recreational areas on the San Antonio Reservoir to the south (Booz Allen 2006). There are off-installation structures that are believed to be residential approximately 0.6 miles northeast and 0.75 miles east of the proposed site, and there is an airstrip and DZ just east of the site. The Heavy Equipment Operator Training Site in Training Area 10 would not change the existing land use category,

but would use an area of the installation that is not currently used for a specific training activity. It would be compatible with the surrounding military land uses, but could be incompatible with any nearby off-installation residential uses resulting in long-term, minor, adverse effects on land use due to noise and dust creation.

Air Quality. Short-term, minor, adverse effects would be expected as a result of the construction of the Heavy Equipment Operator Training Site to include initial grading of the project area. Construction activities would result in air emissions from the operation of heavy construction machinery. BMPs to control dust could include spraying water over the construction area. Long-term, minor, adverse effects would be expected from operation of the heavy equipment operator training site to include use of a variety of heavy construction equipment to include scrapers, excavators, graders, loaders, backhoes, bulldozers, and water trucks. The Heavy Equipment Operator Training Site would be frequently watered to minimize potential fugitive dust emissions during ground-disturbing activities. These emissions would not result in an adverse effect on local or regional air quality, violate NAAQSs or SAAQSs, or produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimated from construction and operation of the Heavy Equipment Operator Training Site are shown in **Table 5-6**.

Table 5-6. Estimated Air Emissions Resulting from the Heavy Equipment Operator Training Site (Project TI3)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Estimated TI3 Construction and Operational Emissions	170.693	12.703	64.113	10.361	41.187	10.995
Percent of NCCI AQCR Inventory	0.557	0.044	0.046	0.122	0.222	0.212

Geological Resources. Long-term, negligible to minor adverse effects on geology and soils would be expected from construction and operation of the proposed Heavy Equipment Operator Training Site. All 30 acres of this site would be disturbed under this project. Soil erosion and storm water runoff would result because of compaction of soil due to vehicle use, foot traffic, and earth-moving activities. Erosion would be exacerbated from the removal of vegetation to create training space. Berming along nearby water bodies would decrease the amount of sedimentation. Wetting of soils would occur on a daily basis to prevent erosion and generation of dust (see discussion on Air Quality, **Section 5.4.1.2**). BMPs, including wetting of soils, and implementation of erosion and storm water management practices to contain soil and runoff onsite, should reduce the potential for adverse effects.

Trafficability and the ability for vegetation to grow after heavy use of the site was analyzed at the proposed Heavy Equipment Operator Training Site. Soil properties important in analysis of vehicle trafficability include the capacity of the soils to support vehicles during dry and wet periods. At the proposed Heavy Equipment Operator Training Site, all soils were rated as excellent for trafficability (NRCS 2009).

Water Resources. Indirect, long-term, minor to moderate adverse effects on water resources could occur from construction and operation of the Heavy Equipment Operator Training Site. Because all 30 acres of the site would be disturbed and soils compacted, the natural storm water flow regime would be altered. Storm water could decrease in quality and increase in quantity and velocity, which could negatively impact the receiving water body. During times of increased precipitation, runoff velocity could increase and eroded sediments could be deposited further downstream, contributing to modification of existing

streambank morphology. However, construction of berms along the riparian areas would minimize the potential for storm water runoff to enter nearby water bodies. In addition, if storm water infiltrates on site, groundwater could be recharged. Because this area is primarily underlain by the well-drained Rincon clay loam, storm water remaining on site should not cause flooding during normal storm events. No floodplains would be affected by constructing and use of the Heavy Equipment Operator Training Site. This project would disturb greater than 1 acre of land, and an NPDES permit would be required.

Biological Resources. The Proposed Action would affect 23.39 acres of grassland and 9.18 acres of blue oak woodland. Avoidance of trees would occur, but some trees might be removed and others damaged by soil compaction from use of heavy equipment. The Heavy Equipment Operator Training Site would be expected to result in short-term and long-term, minor to moderate effects on vegetation, as some clearing could be necessary for site development. Long-term, minor effects on wildlife could occur. No wetlands are present at the site, so no effects would be expected.

Threatened and Endangered Species. The Heavy Equipment Operator Training Site occurs in potential kit fox habitat. The site would be entirely disturbed by heavy equipment operation. However, because the kit fox has had few occurrences on the installation in the past decade, the potential adverse effect from construction and operation of the Heavy Equipment Operator Training Site on kit fox habitat would be anticipated to be negligible.

Cultural Resources. No cultural resources are known to occur within the proposed Heavy Equipment Operator Training Site. Accordingly, no adverse effects would be expected on any architectural or archaeological resources on or eligible for the NRHP. No adverse effects would be expected on any American Indian resources or sacred sites.

Socioeconomics and Environmental Justice. Short-term, negligible, beneficial effects on socioeconomic resources would be expected from construction of the Heavy Equipment Operator Training Site. The construction activities required to prepare the site are expected to be minimal and would most likely be completed by soldiers stationed at FHL.

Due to the site's location at the eastern installation boundary, off-installation populations to the east likely could experience long-term noise from heavy equipment training activities. This area is rural and sparsely populated. Based on aerial photographs, there are approximately five residential structures within 1 mile of the site that could experience noise during operation of this training site. In order to characterize environmental justice aspects of this small subset of the ROI, census block-level data from the 2000 U.S. Census were used. Census blocks are the smallest geographic unit used by the U.S. Census Bureau, and economic data are not available at this level. The off-installation area includes blocks 1296, 1299, 1300, and 1301 within census tract 114. Within these blocks, 17.8 percent reported to be of a racial minority population and 16.3 percent were of Hispanic or Latino origin (see **Table 5-7**). These minority populations are not disproportionate when compared to the ROI or Monterey County, which are 30.7 percent and 44.1 percent, respectively, of residents of a racial minority and 38.3 percent and 46.8 percent, respectively, of Hispanic or Latino origin (see **Table 4-19**).

Therefore, while the economic status of the residents in the area that could be affected by the Heavy Equipment Operator Training Site (census blocks 1296, 1299, 1300, and 1301) is not known, this area does not consist of a disproportionately higher percentage of racial or ethnic minority populations. The noise resulting from operation of the Heavy Equipment Operator Training Site could be adverse, but would not be disproportionate. However, because the economic status of the potentially affected residents is not known, operation of the Heavy Equipment Operator Training Site could have long-term, minor, adverse effects on environmental justice due to noise production.

Table 5-7. Minority Data in Census Blocks 1296, 1299, 1300, and 1301 (2000 [a])

	Census Blocks 1296, 1299, 1300, and 1301
Total Population	**135**
Percent Male	48.1
Percent Female	51.9
Percent Under 5 Years	8.9
Percent Over 65 Years	3.7
Percent White	82.2
Percent Black or African American	1.5
Percent American Indian Alaska Native	7.4
Percent Asian	0.0
Percent Native Hawaiian and Other Pacific Islander	0.0
Percent Some Other Race	2.2
Percent Reporting 2 or more races	6.7
Percent Hispanic or Latino [b]	16.3

Source: U.S. Census Bureau 2001c

Notes:

a. Census 2000 data are the most recent social and economic data for the ROI.

b. Persons of Hispanic or Latino origin can be of any race, and thus are also included in applicable race categories.

Infrastructure. Long-term, negligible, adverse effects on infrastructure would be expected from the construction of a Heavy Equipment Operator Training Site at FHL. The only utilities expected to be required for this facility would be electrical power for lighting and water service for dust suppression. Electrical power would be provided either by installing electrical cables from the nearest respective source to the heavy equipment operator training site or by using solar energy. The use of electricity from the electrical system would result in a minor increase in electrical demand; the use of solar energy would be independent of the electrical system and would not affect the overall electric system of the installation. Water would be provided by an onsite groundwater well or would be delivered by vehicle to an onsite AST. Only minimal amounts of water would be required. Because only a limited number of structures would be built, only minimal quantities of solid waste would be generated during the development of this facility. Minimal quantities of solid wastes would be generated during use of this facility.

Traffic and Transportation. Short-term, negligible, adverse effects on traffic and transportation systems would be expected from construction of the Heavy Equipment Operator Training Site due to construction equipment entering and leaving the site. The scope of construction would require minimal construction equipment. Construction crews would use Jolon Road, which is the most traveled road in the area; however, since the LOS of this portion of Jolon Road is above the standard, negligible effects on traffic would be expected.

Long-term, negligible to minor, adverse effects on traffic and transportation systems would be expected from operation of the Heavy Equipment Operator Training Site. Equipment would be kept on site during the span of the training classes; however, engineers and soldiers would be expected to commute to the site daily. Students would most likely carpool or be bused to the site; therefore, the additional amount of

vehicles utilizing Jolon Road would be negligible. Long-term, minor, adverse effects on installation roads at the Heavy Equipment Operator Training Site would be expected. Increased volume of traffic on the gravel roads in this training area would increase the requirement for maintenance of those roadways.

Hazardous Materials and Waste. Long-term, minor adverse effects would be expected from the use of hazardous materials and generation of hazardous wastes during the proposed training activities. The construction process would use hydraulic construction equipment (i.e., bulldozer, front-end loader, back hoe, grader, and scraper). All contaminated soils would be excavated and transported off installation to a permitted hazardous waste disposal facility.

Health and Safety. No adverse effects are expected during construction of the Heavy Equipment Operator Training Site due to the low-intensity construction that would be required. Long-term, negligible, adverse effects on military personnel safety could result due to the use of the site during training exercises.

5.4.2 Representative Range Construction Projects

5.4.2.1 MPMG Range

Airspace Management and Safety. No effect on airspace management and safety would occur because establishment of the MPMG Range would not involve changes in airspace.

Noise. Long-term, moderate, adverse effects on noise would be expected as a result of operations at the MPMG Range associated with the Proposed Action. Under the Proposed Action, a modernized MPMG Range would be constructed in order to meet training requirements. The proposed range would be constructed with seven firing lanes. As discussed in **Section 4.2.1**, noise from small arms weapons is assessed with PK15(met), a single event metric. Consequently, to analyze noise effects at the MPMG Range, the M2 .50 Caliber Machine Gun was chosen as the representative weapon. This type of weapon is one of the loudest weapons routinely used at this type of range. The Proposed Action PK15(met) 87 dBP and 104 dBP noise contours are plotted on a map of the proposed range location. As shown on **Figure 5-4**, the majority of the land within these noise contours consists of installation property. A residence exists northeast of the proposed range, outside of the installation boundary, and within the Proposed Action 104 dBP noise contour, which is within Noise Zone III (see **Section 4.2.1**). Residential land use is not normally recommended in Noise Zone III.

Land Use. There is a residence adjacent to the north of the proposed MPMG Range, just across Jolon Road outside of the installation boundary. This residence would be within Noise Zone III under the Proposed Action (within the 104 dBP noise contour) (see **Section 5.4.2.1**, Noise). Residential land use is not normally recommended in Noise Zone III. Except for the land use incompatibility with the residence within Noise Zone III, operations at the MPMG would be compatible with most of the surrounding off-installation land uses, such as agriculture and open space, and would not preclude the use or viability of any on- or off-installation land uses. Training Area 22 includes several live-fire ranges that would surround the proposed MPMG Range; therefore, it would be compatible with and would not preclude the surrounding on-installation land uses. The use of the MPMG Range could result in long-term, moderate, adverse effects on land use compatibility outside of the installation boundary due to the presence of a residence within Noise Zone III. Noise produced during use of the MPMG Range would be temporary and would last only as long as training activities are being conducted at the range.

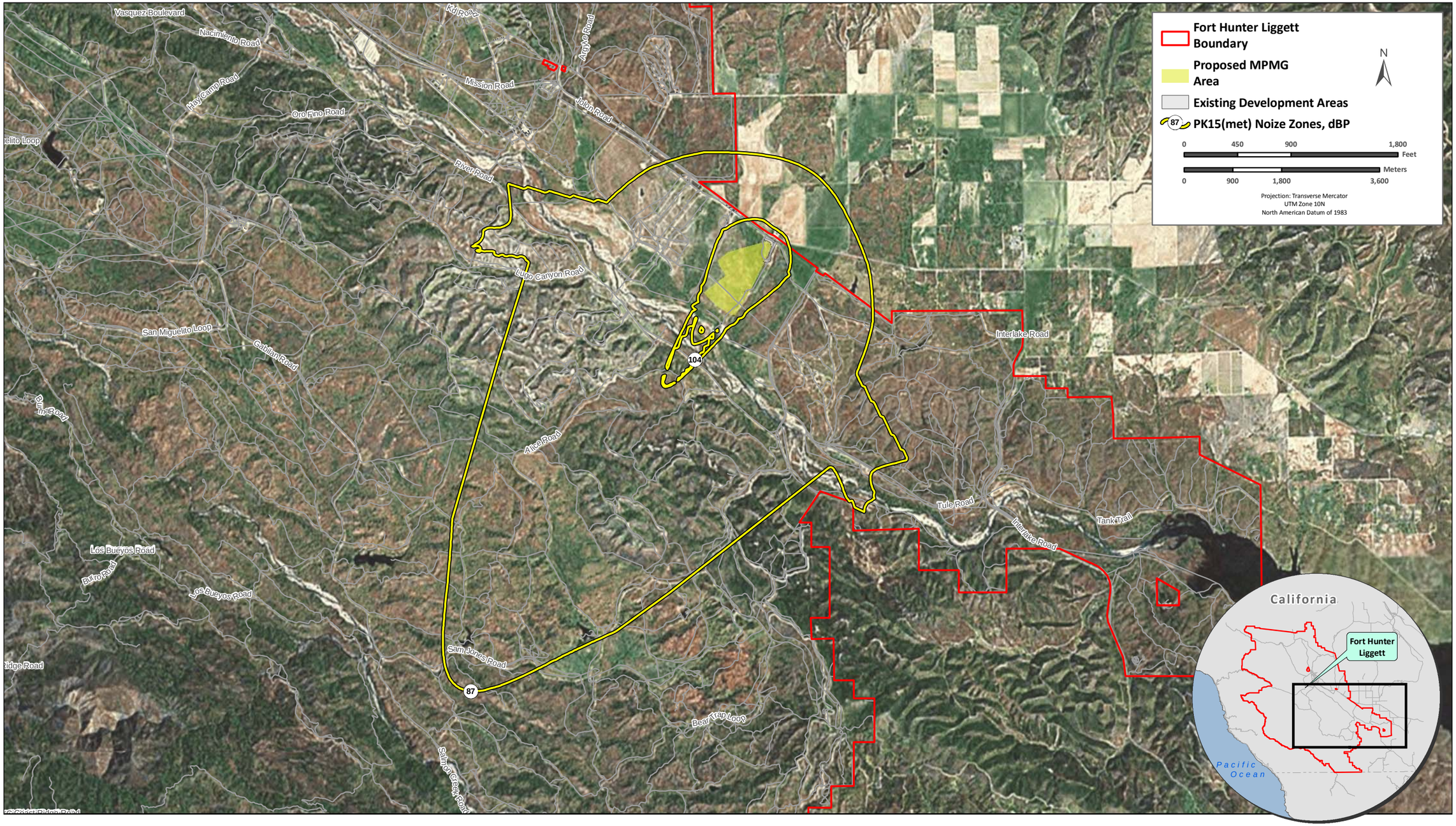

Figure 5-4. Peak Noise Contours Associated with the Proposed MPMG Range

Safety-Related Land Use Issues Associated with Range Operations. Future operations of the MPMG Range would result in less than significant safety impacts associated with land use. Development of the range would occur on land identified as suitable for live-fire weapons training with safety fans appropriately established and compatible with the ordnance intended for the range. Operations of the range would not result in any potential for projectiles to escape the installation boundaries. FHL has completed and documented a detailed SDZ/ricochet analysis study, which conclusively establishes that the installation topography and range facility design would ensure that any ordnance fired at the range would remain within the safety fan established for the range (FHL 2009i). All SDZ data comply with AR 385-63. Range control officers would require proper scheduling and coordination of range use that would ensure that personnel would not be permitted within the SDZ when the range was in use. Therefore, safe operation of the range would be ensured. In general, land use within the SDZ would be precluded from use for other training purposes due to normal range safety requirements within the safety fan area associated with the range.

Air Quality. Short-term, minor, adverse effects would be expected as a result of the construction of the MPMG Range to include facilities and associated utilities. Construction activities would result in air emissions from the operation of heavy construction machinery. BMPs to control dust can include spraying water over the construction area. Long-term, minor, adverse effects would be expected from operation of the MPMG Range to include criteria pollutant and hazardous air pollutant (HAP) emissions from firing of ammunition. These emissions would not result in an adverse impact on local or regional air quality, violate NAAQSs or SAAQSs, or produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimated from construction and operation of an MPMG Range are shown in **Table 5-8**.

Table 5-8. Estimated Air Emissions Resulting from the MPMG Range (Project R1)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	Lead tpy
Estimated R1 Construction Emissions	6.874	0.835	5.222	0.370	198.509	10.351	--
Percent of NCCI AQCR Inventory	0.022	0.003	0.004	0.004	1.071	0.200	--
Estimated R1 Operational Emissions	0.288	--	3.213	--	0.085	0.055	0.007
Percent of NCCI AQCR Inventory	0.001	--	0.002	--	0.0005	0.001	--

Geological Resources. Construction and operation of the proposed MPMG Range would result in long-term, moderate effects on geology and soils. The MPMG Range would involve grading so an appropriate line-of-sight could be obtained, and soil would be excavated for installation of stationary and moving targets. Grading and compaction of soil would result in disturbance of soil structure, resulting in increased storm water runoff and erosion and sedimentation. Excavation limitations were analyzed for the MPMG Range. Soil properties considered in the analysis of building construction include the capacity of a soil to support a load without movement, the ease and amount of excavation, and depth to the water table. All of the soils mapped at the site of the proposed MPMG Range are considered to be limited for excavations, primarily due to slope or potentially unstable excavation walls. The Santa Lucia shaly clay loam, located in the south-central portion of the site, would be limited because of the shallow depth to bedrock (less than 40 inches). Implementation of BMPs would mitigate the possibility of excavation wall sloughing. Site-specific soil surveys should be conducted prior to construction of the MPMG Range to determine if other limitations exist and to determine appropriate BMPs to offset potential adverse effects.

Water Resources. Construction and operation of the MPMG Range would result in short-term, minor and long-term, negligible effects on water resources. Short-term, minor, adverse effects would result from erosion and subsequent sedimentation during grading activities. Long-term effects would occur from changes in natural drainage patterns from the grading activities. Once vegetation has been reestablished at the site, effects would be reduced to long-term and negligible. Appropriate storm water management BMPs could reduce runoff and minimize the potential for adverse effects on adjacent and downstream water bodies. Storm water BMPs would be developed to promote recharge of runoff on the site resulting in a minimization of loss of recharge to groundwater in proximity to the site. This project would disturb greater than 1 acre of land, and an NPDES permit would be required.

A floodplain is mapped through the center of the site and just beyond the eastern border of the site. Construction within floodplains would be avoided to the greatest extent practicable. Construction of the MPMG Range would not be expected to divert flow or alter floodwater volume or velocity. If, upon final design, impacts cannot be avoided, measures would be developed to minimize the impacts as is appropriate and consistent with EO11988.

Biological Resources. The MPMG Range is dominated by grasslands and wet meadows. The Proposed Action would affect 193.35 acres of grassland and 14.8 acres of wet meadows, and would potentially affect 0.89 acres of vernal pools. The two vernal pools within the proposed MPMG Range support vernal pool fairy shrimp, which are regulated by the USFWS. One pool is artificial and one is a natural pool associated with wet meadow habitat. The wet meadow is connected to a small ephemeral creek. Each of the pools would be avoided to the best extent feasible during design, construction, and use of the areas. However, range construction could result in loss of one of these pools and adversely affect the second pool. The MPMG Range could also increase fire frequency both within the range and within its surface danger zone. Therefore the MPMG Range would be expected to result in short-term and long-term, minor effects on vegetation and wildlife resources. Short-term, minor to moderate and long-term, minor effects on wetlands would be anticipated. Wetlands would be avoided to the greatest extent possible, and consultation with USFWS and USACE would occur, as necessary.

Threatened and Endangered Species. Effects on threatened and endangered species from constructing and using the MPMG Range would be short-term and long-term, minor, and adverse. The proposed MPMG Range supports vernal pools, is located within kit fox habitat, and is adjacent to purple amole and arroyo toad habitat (see **Figure 5-5**). The Proposed Action would affect potential kit fox habitat and two vernal pools that support vernal pool fairy shrimp. The range would be primarily on an existing range (B-9 Bradley Range), southeast of the other ranges in Training Area 22, in the uplands northeast of the San Antonio River. In recent years this range has received moderate training use as a zero range for rifles and machine guns. Frequency and intensity of use of the ranges would be expected to increase.

For this analysis, it was assumed that the artificial pool would be lost to development, and the natural pool would be protected; however, portions of the uplands that fill the pool would likely be disturbed during development. Any change in this information would require additional coordination with USFWS to determine consultation requirements. A vernal pool supporting vernal pool fairy shrimp is northeast of the proposed MPMG Range along the edge of the existing MPMG Area. The Proposed Action is not expected to have any significant direct effect on vernal shrimp associated with this pool because it is separated by the existing MPMG Area. However, increased training and development in the surrounding upland could cause indirect adverse effects over time. Range development could affect seven pools that do not support vernal pool fairy shrimp (FHL 2009b).

The MPMG Range would be adjacent to an upland spur of sandy soil that does not support arroyo toad breeding habitat and would lie more than 650 meters from breeding habitat. Use of the range could affect arroyo toads and purple amole primarily through increased fire frequency and intensity in the area;

however, the area currently burns almost every year with some fingering into the riparian corridor. Riparian vegetation is reported as somewhat denser in the area that would be affected by the proposed MPMG Range than areas affected by existing ranges; the open areas where arroyo toads breed are interspersed with narrow canopied sections that run close to the southwestern bank, which is relatively steep and incised (FHL 2009b). The effect of fire could be beneficial by keeping riparian vegetation at early succession and maintaining open breeding sites favorable to arroyo toads.

The proposed MPMG Range would affect potential kit fox habitat. The Proposed Action would occur in an area of potential habitat already converted for range use. Long-term, minor adverse effects on kit fox habitat in the area would result from increased range activity, machine gun training, and infantry and armory targets.

Cultural Resources. No cultural resources are known to occur within the proposed MPMG Range. Accordingly, no adverse effects would be expected on any architectural or archaeological resources on or eligible for the NRHP. No adverse effects would be expected on any American Indian resources or sacred sites.

Socioeconomics and Environmental Justice. Short-term, minor beneficial effects on socioeconomic resources would be expected from the construction of the proposed MPMG Range. The estimated construction cost of this range has not been determined. While it is assumed that local materials and contractors would be used, some of the construction could be completed by soldiers stationed at FHL.

Due to its location at the eastern boundary of the installation, use of the MPMG Range would produce long-term intermittent noise that might be heard by off-installation populations in the immediate vicinity. This area is rural and sparsely populated. Based on aerial photographs, there are approximately five residential structures that appear to exist within 1 mile of the site, including one residence that is immediately north of the proposed MPMG Range. This residence would experience noise (greater than 104 dBP [Noise Zone III]) during operation of the MPMG Range (see **Section 5.4.2.1**, Noise). Environmental justice characteristics of the one affected residence could not be determined; therefore, demographic data from the 2000 U.S. Census for blocks 1863, 1864, 1865, 1869, 1870, 1871, and 1872 within census tract 114 were used in order to characterize environmental justice aspects of this small subset of the ROI that could be affected by operational noise. Within these blocks, 7.8 percent reported to be of a racial minority population and 7.8 percent were of Hispanic or Latino origin (see **Table 5-9**). These minority populations are not disproportionate when compared to the ROI or Monterey County, which include 30.7 percent and 44.1 percent, respectively, of residents of a racial minority and 38.3 percent and 46.8 percent, respectively, of Hispanic or Latino origin (see **Table 5-9**). Therefore, while the economic statuses of the one known residence as well as other people in the area that could be affected by the MPMG Range are not known, the general area (census blocks 1863, 1864, 1865, 1869, 1870, 1871, and 1872) does not consist of disproportionately higher percentage of racial or ethnic minority populations. This noise effect would be minor, and would be intermittent occurring only during training exercises at the range. The noise produced by operation of the MPMG Range would not be disproportionate compared to existing noises resulting from training in this area. However, because the economic status of the potentially affected residents is not known, operation of the MPMG Range could have long-term, minor, adverse effects on environmental justice due to noise production.

Infrastructure. Long-term, minor, adverse effects on infrastructure would be expected from the construction of the MPMG Range at FHL. The only utilities expected to be required for this facility would be electrical power and fiber optic communication service, and both of these utilities are currently available to the area where this project is proposed. The use of this facility would result in a minor increase in the demand for electricity and communication and data transmission services; however, the increase in demand would be negligible compared to the total respective uses at the installation.

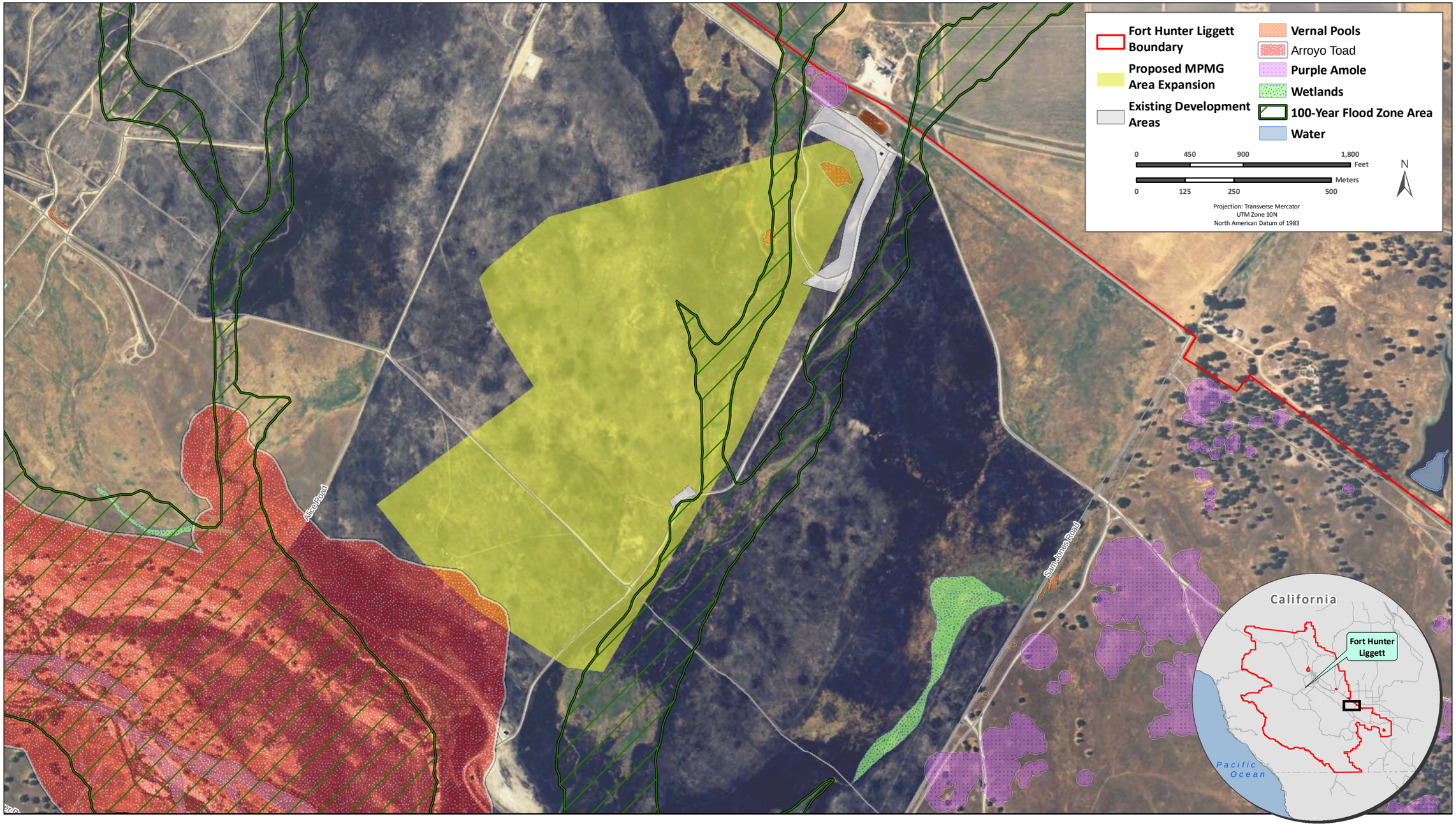

Figure 5-5. Locations of Water and Biological Resources of Concern at MPMG Range

Table 5-9. Minority Data in Census Blocks 1863, 1864, 1865, 1869, 1870, 1871, and 1872

	Census Blocks 1863, 1864, 1865, 1869, 1870, 1871, and 1872a
Total Population	64
Percent Male	51.6
Percent Female	48.4
Percent Under 5 Years	12.5
Percent Over 65 Years	4.7
Percent White	92.2
Percent Black or African American	0.0
Percent American Indian Alaska Native	4.7
Percent Asian	0.0
Percent Native Hawaiian and Other Pacific Islander	0.0
Percent Some Other Race	3.1
Percent Reporting 2 or more races	0.0
Percent Hispanic or Latino [b]	7.8

Source: U.S. Census Bureau 2001c

Notes:

a. Census 2000 data are the most recent social and economic data for the ROI.

b. Persons of Hispanic or Latino origin can be of any race, and thus are also included in applicable race categories.

Minimal quantities of construction waste would be generated during the construction of this facility; construction waste is generally composed of clean materials, and most of this waste would be recycled as clean fill and processed for reuse. Although minimal amounts of solid waste would be generated during the use of this facility, the amount of additional solid waste would be minimal compared to the total solid waste generated at FHL.

Traffic and Transportation. Short-term, negligible, adverse effects on traffic and transportation systems would be expected from construction of the MPMG Range. Short-term effects would be expected from construction equipment entering and leaving the site. Since the proposed range would not be near any major or highly traveled roads, construction activities would not be expected to cause any notable delays or exceed capacity of the roadways entering the proposed site.

Long-term, negligible to minor, adverse effects on traffic and transportation systems would be expected from operation of the MPMG Range. Negligible, long-term effects would be expected from the operation of the MPMG Range. Since an existing temporary zero range for rifles and machine guns is in the same area, the proposed MPMG Range would not be expected to bring a significant amount of additional soldiers or vehicles to the site. Additionally, the proposed range would not be located near any major roads; therefore, only negligible adverse effects on traffic and transportation systems would be expected from use of the site. Long-term, negligible to minor, adverse effects on installation roads at the proposed MPMG Range would be expected. The increased volume of traffic entering the range would increase the requirement for maintenance of gravel roadways, particularly the access road into the site.

Hazardous Materials and Waste. Short-term, minor, adverse effects would be expected from the use of hazardous materials and generation of hazardous wastes during the construction process. The construction process would use hydraulic construction equipment (i.e., bulldozer, front-end loader, grader, and scraper). All contaminated soils would be excavated and transported off-installation to a permitted hazardous waste disposal facility. No long-term effects would be expected from the proposed training activities. The bullets would land in the range and downrange. In accordance with the Hazardous Waste Management Plan and Business Response and Installation Spill Contingency Plan, all hazardous materials and wastes would be handled and stored at the DPW maintenance facility and transported off-installation under the DOL contract to a permitted hazardous waste disposal facility (U.S. Army 2001a).

Health and Safety. No adverse effects are expected during construction of the MPMG Range due to the low-intensity construction that would be required. Long-term, minor, adverse effects on fire safety would result due to the use of live-fire weapons during training exercises.

5.4.2.2 Light Demolition Range

Airspace Management and Safety. No effect on airspace management and safety would occur because establishment of the Light Demolition Range would not involve changes in airspace.

Noise. Long-term, minor, adverse effects on noise would be expected as a result of operations at the Light Demolition Range associated with the Proposed Action.

As discussed in **Section 4.2.1**, noise from large arms weapons and demolition explosives is assessed with DNL and PK15(met) metrics. As shown on **Figure 5-6**, the Proposed Action DNL 57 dBC, 62 dBC, and 70 dBC noise contours are plotted on a map of the proposed range locations. In addition, the PK15(met) 115 dBP, 130 dBP, and 140 dBP noise contours are plotted on **Figure 5-6**. All of the land within these noise contours consists of installation property.

Land Use. Construction and use of the Light Demolition Range would be compatible with the existing surrounding military land uses; however, due to safety reasons, it could preclude the use of the area for hunting and other military uses. Therefore, the Light Demolition Range would result in long-term, negligible, adverse effects on land use due to the preclusion of some land uses for safety reasons.

Safety-Related Land Use Issues Associated with Range Operations. Future operations of the Light Demolition Range would result in less than significant safety impacts associated with land use. Development of the range would occur on land identified as suitable for live-fire weapons training with safety fans appropriately established and compatible with the ordnance intended for the range. Operations of the range would not result in any potential for projectiles to escape the installation boundaries. FHL has completed and documented a detailed SDZ/ricochet analysis study, which conclusively establishes that the installation topography and range facility design would ensure that any ordnance fired at the range would remain within the safety fan established for the range (FHL 2009i). All SDZ data comply with AR 385-63. Range control officers would require proper scheduling and coordination of range use that would ensure that personnel would not be permitted within the SDZ when the range was in use. Therefore, safe operation of the range would be ensured. In general, land use within the SDZ would be precluded from use for other training purposes due to normal range safety requirements within the safety fan area associated with the range.

Air Quality. Short-term, minor, adverse effects would be expected as a result of the construction of the Light Demolition Range to include facilities, paved parking area, and associated utilities. Construction activities would result in air emissions from the operation of heavy construction machinery. BMPs to control dust can include spraying water over the construction area. Light demolition activities would

increase slightly from implementing the Proposed Action. Current and proposed operational emissions would not result in an adverse effect on local or regional air quality, violate NAAQSs or SAAQSs, or produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimated from construction of the Light Demolition Range are shown in **Table 5-10**.

Table 5-10. Estimated Air Emissions Resulting from the Light Demolition Range (Project R2)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Estimated R2 Construction Emissions	2.206	0.430	2.148	0.161	2.536	0.271
Percent of NCCI AQCR Inventory	0.007	0.001	0.002	0.002	0.014	0.005

Geological Resources. The proposed Light Demolition Range would be expected to result in long-term, minor to moderate effects on geology and soils. Impervious surfaces would increase from construction of the three missile-proof shelters and a storage bunker, and the installation of concrete pads, which would increase the rates of erosion and sedimentation. In addition, localized soil structure would be permanently altered once charges have detonated. Unless the soil is periodically compacted after explosives have been detonated, the soil would be less compacted, which could contribute to an increase in erosion caused by wind and water eroding bare, susceptible soils. Implementation of erosion and storm water management practices to contain soil and runoff onsite would reduce potential for adverse effects associated with erosion and sedimentation and transport of sediments in runoff.

Soils mapped at the site of the proposed Light Demolition Range were analyzed for building construction limitations. All soils were considered to be limited due to shrink-swell potential or because the soils are sloping between 4 and 8 percent. BMPs should be implemented to mitigate these constraints, and site-specific soil surveys should be conducted prior to project implementation. Buildings and other structures would be constructed consistent with building code requirements for development in a region with a seismic rating of approximately 32 to 48 percent g. This would minimize potential for adverse effects on human life associated with earthquakes and development in the area.

Water Resources. At the Light Demolition Range, effects on water resources would be expected to be long-term, moderate, and adverse. The primary effect on water sources would be from construction of three shelters and storage bunker, which would increase impervious surfaces and associated soil erosion and sedimentation. Detonation of mines and creation of the mine field and obstacle field could reduce or remove vegetative growth, further contributing to a decrease in percolation of precipitation, and increasing storm water runoff. An increase in storm water runoff could equate to an increased velocity of runoff which could facilitate soil erosion and alter natural stream channel morphology. In addition, construction of safety berms could also alter natural storm drainage flow patterns; the natural drainage patterns would be considered during demolition point and safety berm placement and design. This project would disturb greater than 1 acre of land, and an NPDES permit would be required. No floodplains would be affected by the Light Demolition Range.

Biological Resources. The five small sites composing the Light Demolition Range occur on oak savanna. The Proposed Action would affect 4.84 acres of valley oak savanna and 0.09 acres of blue oak savanna. It is likely that wildlife resources would avoid this site during operations. Because of site development activities including construction of buildings, burying of utility lines, and any other ground disturbance (e.g., grading, recontouring), effects on vegetation and biological resources would be expected to be short-term, moderate, and adverse during construction activities, and long-term, minor, and adverse during operations.

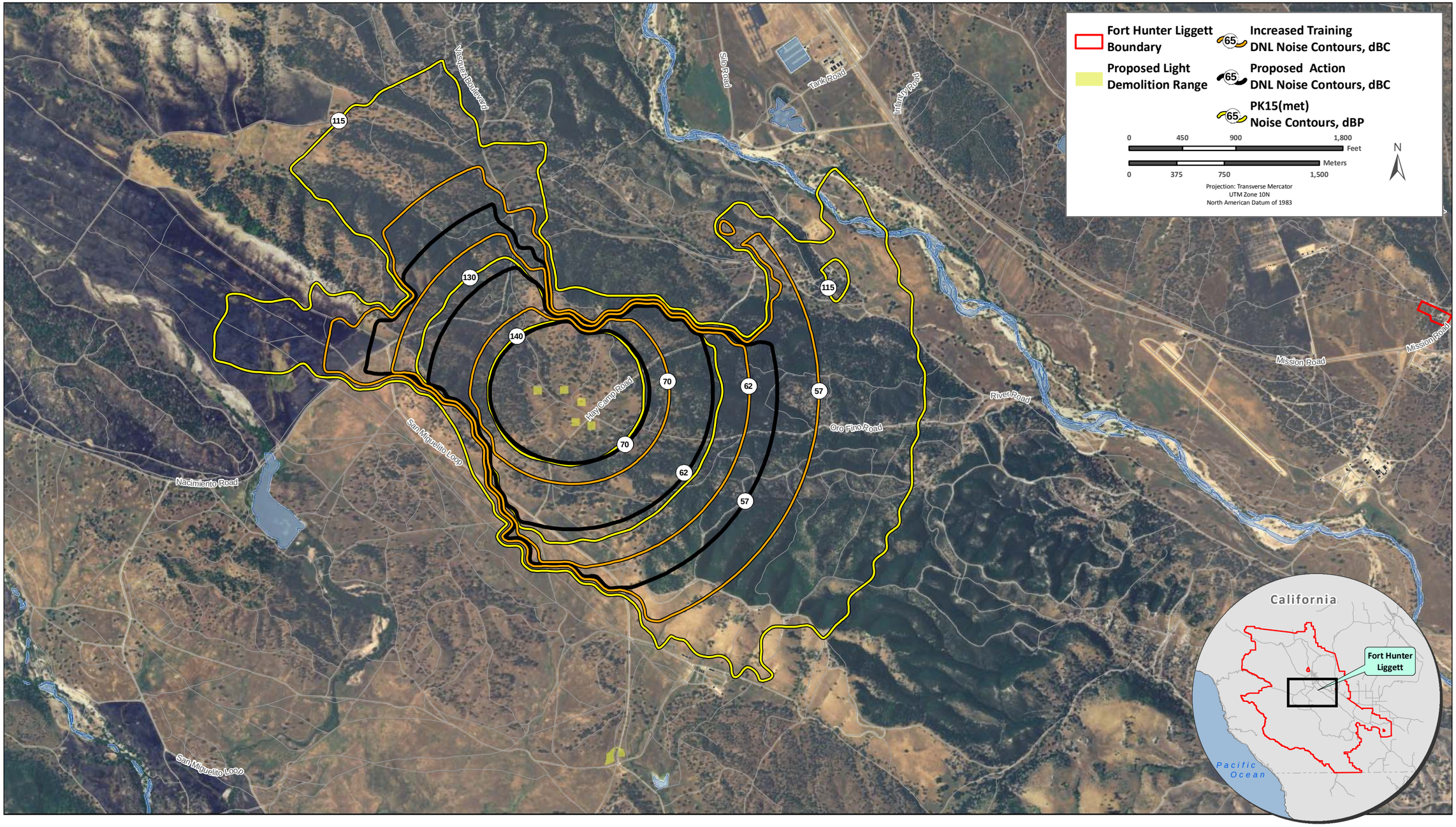

Figure 5-6. Noise Contours at the Light Demolition Range

Threatened and Endangered Species. The proposed Light Demolition Range would affect potential kit fox habitat. The Proposed Action would convert the entire 5 acres of potential kit fox habitat for range use. The proposed Light Demolition Range would potentially affect kit fox habitat. However, because kit fox has had few occurrences on the installation in the past decade, these effects would be anticipated to be negligible.

Cultural Resources. No cultural resources are known to occur within the proposed Light Demolition Range. Accordingly, no adverse effects would be expected on any architectural or archaeological resources on or eligible for the NRHP. No adverse effects would be expected on any American Indian resources or sacred sites.

Socioeconomics and Environmental Justice. Short-term, minor beneficial effects on socioeconomic resources would be expected from the proposed construction of the Light Demolition Range. While it is assumed that local materials and contractors would be used, some of the construction could be completed by soldiers stationed at FHL. Construction would occur entirely on the installation and would have little potential to adversely affect off-installation residents. No long-term effects from construction or operation of the Light Demolition Range on socioeconomic resources or environmental justice are expected to occur.

Infrastructure. No short-term or long-term effects on infrastructure would be expected with the construction of a light demolition range. It is not expected that the light demolition range would require the use of electricity, gas, liquid fuel, water, wastewater, or communication services; therefore, no effects on these utilities would be expected. If, however, electricity were required, solar energy could be used to provide electricity. Solar energy would be independent of the electrical system and would not affect the overall electric system of the installation.

Traffic and Transportation. Short-term, negligible, adverse effects on traffic and transportation systems would be expected from construction of the Light Demolition Range. Short-term effects would be expected from construction equipment entering and leaving the site. The range would be south of the cantonment area and would not be located near any major or highly traveled roads; therefore, construction activities would not be expected to cause any notable delays or exceed capacity of the roadways entering the proposed site.

Long-term, negligible to minor, adverse effects on traffic and transportation systems would be expected from operation of the Light Demolition Range. Long-term effects would be expected from the operation of the Light Demolition Range due to increased traffic to the site. However, since the range would not be located near any major roads, only negligible adverse effects on traffic would be expected from increased use of the site. Long-term, negligible to minor, adverse effects on installation roads at the proposed Light Demolition Range would be expected. The increased volume of traffic entering the range would increase the requirement for maintenance of gravel roadways, particularly the access roads to the site.

Hazardous Materials and Waste. Short-term minor adverse effects would be expected from the use of hazardous materials and generation of hazardous wastes during the construction process. The construction process would use hydraulic construction equipment (i.e., bulldozer, front-end loader, grader, and scraper). All contaminated soils would be excavated and transported off-installation to a permitted hazardous waste disposal facility. Long-term, minor to negligible, adverse effects would be expected from the proposed training activities. The explosive used in most demolition activities is Composition C-4, a mixture of primarily Royal Demolition Explosive (RDX) with small amounts of other constituents. RDX is recognized as a possible carcinogen by the USEPA and has known neurological effects in humans. It is assumed that the detonation of C-4 would not create the complete ignition of all RDX.

Health and Safety. Short-term, minor, adverse effects on construction contractor safety could occur. Construction activities pose an increased risk of construction-related accidents, but this level of risk would be managed by adherence to established Federal, state, and local safety regulations.

Long-term, minor, adverse effects on military personnel safety, public safety, explosives and munitions safety, and fire safety would be expected from use of the Light Demolition Range. Use of the demolition range would increase safety risks to the military personnel using the range due to the use of high explosives. However, soldiers would comply with all safety standards for the handling, transportation, and use of ammunition and explosives in order to protect persons in the vicinity. Adverse effects on fire safety could also result due to the increased risk of wildland fire ignition with use of high explosives. Long-term, minor, adverse effects on public safety could result from startling noise associated with training at this range, although training would be intermittent.

5.4.2.3 Hand Grenade Familiarization Course

Airspace Management and Safety. No effect on airspace management and safety would occur because establishment of the Hand Grenade Familiarization Course would not involve changes in airspace.

Noise. Long-term, minor to moderate, adverse effects on noise would be expected as a result of operations at the Hand Grenade Familiarization Course associated with the Proposed Action. In 2008, the Hand Grenade Familiarization Course was used approximately 10 days. During that time period about 390 weapons were fired, which equates to 39 weapons fired per day. Under the Proposed Action, the range would be used approximately 242 days with about 39 weapons fired per day. The noise effects at the range were assessed using a daily average or the average number of weapons fired over a 24-hour period.

Since the proposed range would be constructed with five firing points, the number of weapons fired per day was divided evenly among these points. The M67 Hand Grenade was used the representative weapon type.

As shown on **Figure 5-7**, the Proposed Action noise contours for the DNL of 57 dBC, 62 dBC, and 70 dBC are plotted on a map of the project area. The majority of the land within these noise contours consists of installation property. The 57 to 62 dBC noise contours encompass portions of the Miller Ranch Bivouac, a military campground, and portions of land proposed for development at Schoonover Airfield, all of which are military land uses. In addition, St. Luke's Episcopal Church and associated cemetery (not on installation property) are within the 57 to 70 dBC noise contours northeast of Schoonover Airfield. Noise levels greater than 70 dBC encompass land that is uninhabited. As discussed in **Section 4.2.1**, the area between the 57 to 62 dBC noise contours is within the LUPZ and Noise Zone I and the area between the 62 to 70 dBC noise contours is within Noise Zone II. Normally all types of land uses are acceptable within the LUPZ and Noise Zone I; therefore, the current military land uses and urban military development would be considered compatible. Noise-sensitive land uses (such as a church or a cemetery) are strongly discouraged in Noise Zone II when it is the result of large arms or demolition weapon activities (USACHPPM 2005).

As shown on **Figure 5-8**, the Proposed Action PK15(met) 115 dBP, 130 dBP, and 140 dBP noise contours are plotted on a map of the project area. The majority of the land within these noise contours consists of installation property. The 115 to 130 dBP noise contours encompass the Miller Ranch Bivouac, a military campground, St. Luke's Episcopal Church and associated cemetery, and property proposed for development at Schoonover Airfield. Noise levels greater than 140 dBP encompass land that is uninhabited.

As discussed in **Section 4.2.1**, the risk of noise complaints within the 115 to 130 dBP noise zone is considered to be medium. To mitigate adverse effects from noise, USACHPPM recommends reducing

the noise, thereby eliminating or reducing the impact on off-installation land uses; installing sound suppression measures; regulating operating hours; and similar measures, within mission requirements. Sound suppression measures, such as silencers or mufflers, are not applicable to hand grenade use; and mitigation along the sound propagation path such as barriers or berms are generally not effective in noise reduction for large arms (USACHPPM 2005); therefore, there are no viable options to reduce the noise at the firing location. The noise level-reduction measures for structures subject to large arms noise are lacking scientific studies to accomplish the recommended noise level reduction of 25 to 30 dB. For this reason it is strongly discouraged that noise-sensitive land uses be allowed in Noise Zone II from large caliber weapons (U.S. Army 2007a). Therefore, regulating operating hours would be the most effective measure to mitigate some of the adverse effects to St. Luke's Episcopal Church from noise. The installation could coordinate with St. Luke's Episcopal Church to amend their operating hours to avoid church activities, such as the church's services at 10:00 a.m. on Sunday mornings (St. Luke's Episcopal Church 2008) and activities at the cemetery such as funerals. This measure is expected to be effective at preventing annoyance and noise complaints from persons accessing the church.

Land Use. Construction and use of the Hand Grenade Familiarization Course would not be expected to preclude the viability of existing land uses or continued use of nearby land. While no range currently exists at the proposed site, the land use category would not change as it would be within an existing training area. Several ranges exist along Jolon Road in Training Area 22, including the Modified Record Fire range; and the existing pistol range, MPMG Range (Project R1), Multi-purpose Range Complex, and proposed Zero Ranges (Project R4) to the southeast. The Hand Grenade Familiarization Course would be compatible with the existing ranges; however, it could result in short-term, minor, adverse effects on land use compatibility. The course's presence on a public roadway could result in short-term, minor, adverse effects on roadway traffic due to production of startling noises while the course is active. In addition, a church and cemetery within the installation boundary would be within the LUPZ and Noise Zones I and II (57 to 70 dBC noise contours) for operation of the Hand Grenade Familiarization Course, which would result in long-term, moderate, adverse effects on these noise-sensitive uses. The area between the 57 to 62 dBC noise contours is within the LUPZ and Noise Zone I and the area between the 62 to 70 dBC noise contours is within Noise Zone II (see **Section 5.4.2.3**, Noise). Normally all types of land uses are acceptable within the LUPZ and Noise Zone I; therefore, the current military land uses and urban military development would be considered compatible. However, noise-sensitive land uses, such as a church or a cemetery, are strongly discouraged in Noise Zone II when it is the result of large arms or demolition weapon activities. Please see **Section 5.4.2.3**, Noise for a description of the noise expected from operation of the MPMG Range. The Hand Grenade Familiarization Course would also have a long-term, moderate, beneficial effect on U.S. Army operations as it would allow for compliance with U.S. Army training and safety standards that are not met by the existing hand grenade course.

Safety-Related Land Use Issues Associated with Range Operations. Future operations of the Hand Grenade Familiarization Course would result in less than significant safety impacts associated with land use. Development of the range would occur on land identified as suitable for live-fire weapons training with safety fans appropriately established and compatible with the ordnance intended for the range. Operations of the range would not result in any potential for projectiles to escape the installation boundaries. FHL has completed and documented a detailed SDZ/ricochet analysis study, which conclusively establishes that the installation topography and range facility design would ensure that any ordnance fired at the range would remain within the safety fan established for the range (FHL 2009i). All SDZ data comply with AR 385-63. Range control officers would require proper scheduling and coordination of range use that would ensure that personnel would not be permitted within the SDZ when the range was in use. Therefore, safe operation of the range would be ensured. In general, land use within the SDZ would be precluded from use for other training purposes due to normal range safety requirements within the safety fan area associated with the range.

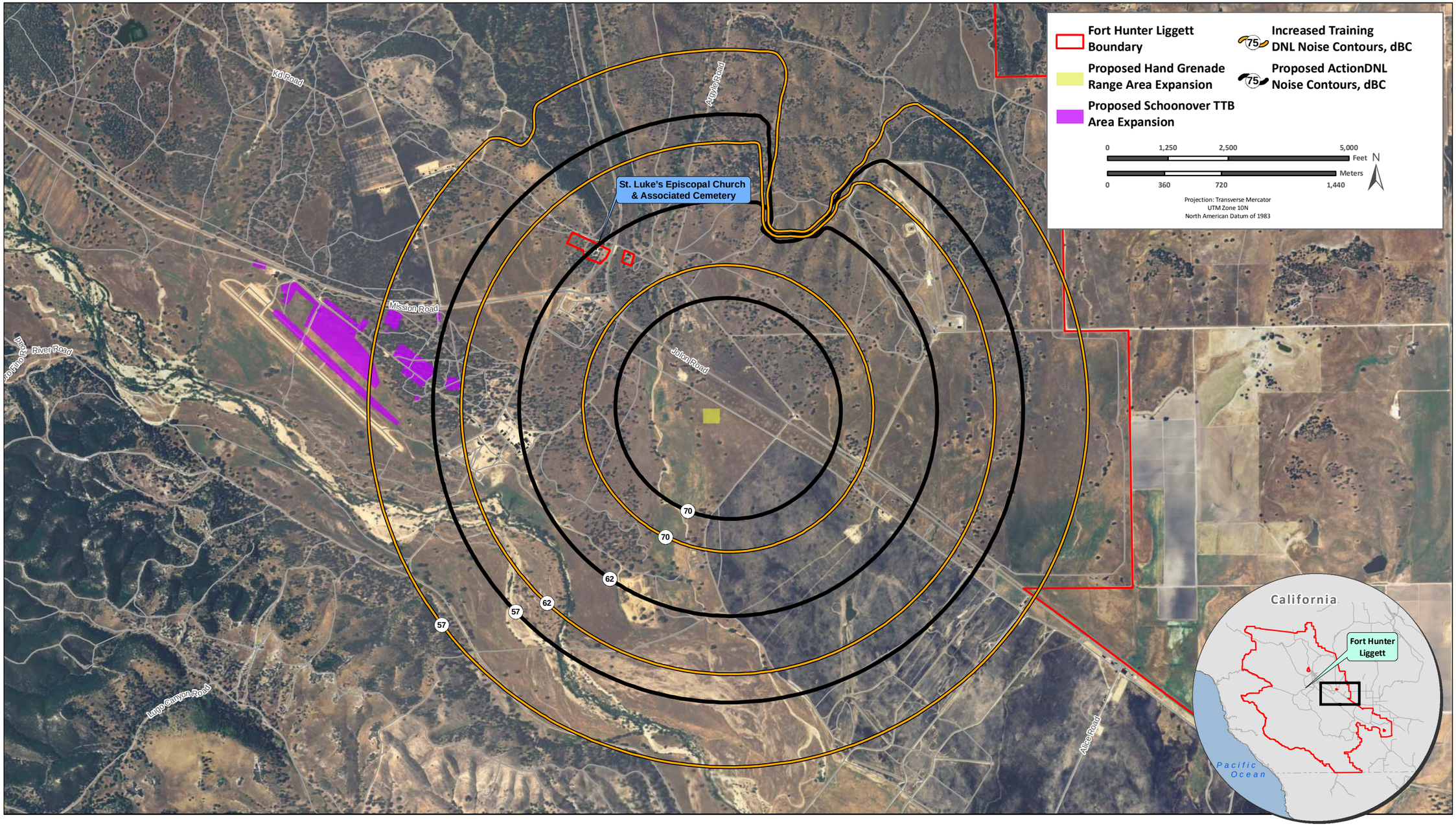

Figure 5-7. Proposed DNL Noise Contours and Increased Training at the Hand Grenade Familiarization Course

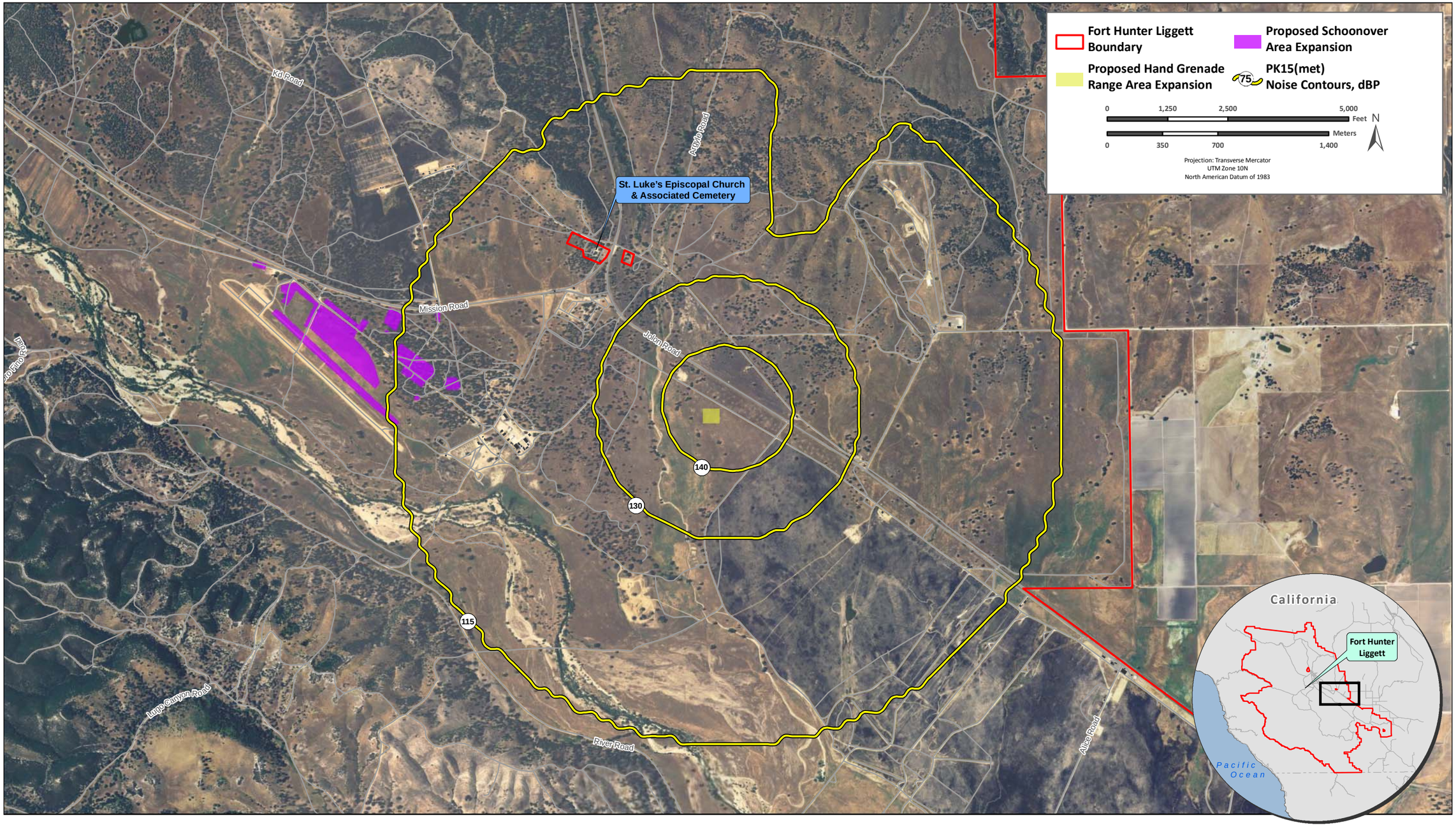

Figure 5-8. Peak Noise Contours at the Hand Grenade Familiarization Course

Air Quality. Short-term, minor, adverse effects would be expected as a result of the construction of the Hand Grenade Familiarization Course to include facilities, paved parking area, and associated utilities. Construction activities would result in air emissions from the operation of heavy construction machinery. Fugitive dust would be minimized by spraying water over the construction area. Current and proposed operational emissions would not result in an adverse effect on local or regional air quality, would not violate NAAQSs or SAAQSs, and would not produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimated from construction of the Hand Grenade Familiarization Course are shown in **Table 5-11**.

Table 5-11. Estimated Air Emissions Resulting from the Hand Grenade Familiarization Course (Project R3)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Estimated R3 Construction Emissions	1.342	0.201	1.296	0.098	0.811	0.128
Percent of NCCI AQCR Inventory	0.004	0.001	0.001	0.001	0.004	0.002

Geological Resources. Construction of the proposed Hand Grenade Familiarization Course would result in short-term, negligible and long-term, negligible to minor effects on geology and soils. Soils would be graded and compacted to construct the five throwing bays, and erosion and sedimentation rates would increase due to soil disturbance and increased impervious surfaces. Erosion would be exacerbated if vegetation were removed to construct the throwing bays. Demolition of the existing Hand Grenade Range (Live-Fire) would result in short-term negligible effects due to increased soil disturbance, erosion, and sedimentation. Long-term adverse effects associated with erosion and sedimentation would be minimized if the area is revegetated.

The soil mapped at the site of the proposed Hand Grenade Familiarization Course is considered limited for excavation, due to the probability of unstable excavation walls. BMPs should be implemented to mitigate this limitation, and site-specific soil surveys should be conducted prior to construction of the throwing bays.

Water Resources. Construction and operation of the Hand Grenade Familiarization Course would result in short-term and long-term, minor, adverse effects on water resources. If grading would be conducted, drainage patterns could be altered. Drainage patterns would also be changed if storm water runoff pathways would be affected by construction of the bays and dividers between the bays. Because the five throwing bays would be stationary, it is plausible that pits could develop from detonation of grenades within the same area over time. Unless these pits are periodically filled in with soil, drainage patterns could change to follow the depressions created by the pits. Removal of vegetation during construction activities would result in increased storm water runoff volume and velocity. This effect would be reduced if vegetation were reestablished. This project would disturb greater than 1 acre of land, and an NPDES permit would be required. The Hand Grenade Familiarization Course would not be constructed within close proximity to a floodplain and would not be expected to affect floodplains.

Biological Resources. The Hand Grenade Familiarization Course occurs approximately 250 meters east of an ephemeral drainage. The site occurs in an open area and would affect up to 2.43 acres of grassland, but is not anticipated to directly affect the drainage. It is likely that wildlife would avoid this site during operations. The Hand Grenade Familiarization Course would be expected to result in similar effects as the Light Demolition Range. Short-term and long-term, moderate effects during construction and operations would be expected.

Threatened and Endangered Species. The proposed Hand Grenade Familiarization Course would have potentially negligible effects on kit fox habitat and is adjacent to purple amole and arroyo toad habitat. The course is located in Training Area 22 in the uplands northeast of the San Antonio River. Use of the course would affect arroyo toad primarily due to annual burning of uplands and fingering of fire into riparian areas. The course is not likely to change current effects from fire because the area is already affected by wild or preventative prescribed fires each year. The Proposed Action would not affect purple amole in the vicinity, and effects would be negligible.

Cultural Resources. No cultural resources are known to occur within the proposed Hand Grenade Familiarization Range. Accordingly, no adverse effects would be expected on any architectural or archaeological resources on or eligible for the NRHP. No adverse effects would be expected on any American Indian resources or sacred sites.

Socioeconomics and Environmental Justice. Short-term, minor, beneficial effects on socioeconomic resources would be expected from the proposed construction of the Hand Grenade Familiarization Course. While it is assumed that local materials and contractors would be used, some of the construction could be completed by soldiers stationed at FHL. Construction would occur entirely on the installation and would have little potential to adversely affect off-installation residents.

Infrastructure. No short-term or long-term effects on infrastructure would be expected with the construction of a Hand Grenade Familiarization Course. It is not expected that the Hand Grenade Familiarization Course would require the use of electricity, gas, liquid fuel, water, wastewater, or communications services; therefore, no effects on these utilities would be expected. If, however, electricity were required, solar energy could be used. Solar energy would be independent of the installation's electrical system and would not affect the overall electric system of the installation. Any increases in solid waste generation would be offset with the removal of the current hand grenade range within this facility.

Traffic and Transportation. Short-term, negligible to minor, adverse effects on traffic and transportation systems would be expected from construction of the Hand Grenade Familiarization Course due to construction equipment entering and leaving the site. Construction crews would reach the proposed site via Jolon Road, the primary access road for virtually all traffic to the installation. Jolon Road is also a route for campers and boaters to reach the recreational areas on the San Antonio Reservoir, southeast of FHL. However, this traffic is heaviest on Fridays and Sundays and would most likely not conflict with construction traffic. Since the LOS of this portion of Jolon Road is above the standard, negligible effects on traffic would be expected.

Long-term, negligible to minor, adverse effects on traffic and transportation systems would be expected from operation of the Hand Grenade Familiarization Course. Although the proposed course is near Jolon Road, it is not anticipated that the level of military traffic to the area would create significant delays or exceed the capacity of Jolon Road, which is above the LOS standard, or access roads to the site. Long-term, negligible to minor, adverse effects on installation roads at the proposed Hand Grenade Familiarization Course would be expected. The increased volume of traffic entering the site would increase the requirement for maintenance of gravel roadways, particularly the access roads to the site.

Hazardous Materials and Waste. Short-term, minor, adverse effects would be expected from the use of hazardous materials and generation of hazardous wastes during the construction process. The construction process would use hydraulic construction equipment (i.e., bulldozer, front-end loader, grader, and scraper). Long-term, minor to negligible, adverse effects would be expected from the proposed training activities. The explosive used in most fragmentation grenades is Composition B, a mixture of RDX and 2,4,6 trinitrotoluene (TNT). Both constituents are recognized as possible

carcinogens by the USEPA; RDX has known neurological effects and TNT has known effects on the reticuloendothelial system in humans. It is assumed that the detonation of hand grenades would not create the complete ignition of all Composition B materials. In accordance with the Hazardous Waste Management Plan and Business Response and Installation Spill Contingency Plan, the range would be monitored for the presence of hazardous wastes above the corresponding action levels (U.S. Army 2001a, FHL 2001).

Health and Safety. Short-term, minor, adverse effects on construction contractor safety could occur. Construction activities pose an increased risk of construction-related accidents, but this level of risk would be managed by adherence to established Federal, state, and local safety regulations.

Long-term, moderate, beneficial effects on military personnel safety would result from the replacement and demolition of the existing unsafe Live-Fire Hand Grenade Range. However, due to the inherent risk associated with use of explosives and the risk of fire ignition from live explosives, there would also be long-term, minor, adverse effects on military personnel safety and fire safety, respectively. This risk to military personnel would be managed by adherence to U.S. Army safety standards.

5.4.3 Representative Cantonment Construction Projects

5.4.3.1 ECS

Airspace Management and Safety. No effect on airspace management and safety would occur because establishment of the ECS would not involve changes in airspace.

Noise. Short-term, minor, adverse effects on the ambient noise environment would be expected as a result of various construction activities to support the ECS. The noise emanating from the proposed minor construction activities would be localized, short-term, and intermittent during construction equipment operations. Construction activities would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.) in the vicinity of the construction site. These noise levels would be only short-term in nature, and therefore, no long-term adverse effects on noise would be expected from construction activities that could include grading, paving, and heavy equipment.

Land Use. The proposed ECS would expand the existing ECS, and include the construction and operation of a vehicle maintenance facility, storage warehouse, wash rack, and equipment parking area (ECS yard). The existing ECS is classified as maintenance land use, and its expansion would be into an adjacent unused area to the east with no assigned land use category (FHL 2007a). Construction and operation of the expanded ECS would convert unused land to the maintenance land use category, thereby assuming a land use function for a previously unused area. While the land use category and function would change if the ECS expanded into the adjoining area, it would be compatible with the mission support-related function of the cantonment area, as well as with adjacent land uses (e.g., maintenance, classroom training, and unused land). In addition to expansion of the ECS, a warehouse and a maintenance facility would be constructed within the existing ECS. Construction of these facilities would continue the existing maintenance land use. Expansion of the ECS would separate the potentially noisy or disturbing activities from incompatible land uses (housing) or other sensitive uses (community service, outdoor recreation, and medical). Therefore, long-term, negligible, adverse effects on land use would be expected from the expanded ECS.

Air Quality. Short-term, minor, adverse effects would be expected as a result of the construction of the ECS to include facilities, paved parking area, and associated utilities. Construction activities would result in air emissions from the operation of heavy construction machinery. BMPs to control dust can include spraying water over the construction area. Long-term, minor, adverse effects would be expected from

operation of the ECS, including operational emissions from boilers used to provide comfort heating. These emissions would be negligible, would not result in an adverse effect on local or regional air quality, would not violate NAAQSs or SAAQSs, and would not produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimated from construction and operation of the ECS are shown in **Table 5-12**. The impact of the use of the vehicles stored in the ECS is addressed in **Section 5.4.4.**

Table 5-12. Estimated Air Emissions Resulting from the ECS (Project C1)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Estimated C1 Construction Emissions	11.287	1.549	9.095	0.643	77.125	5.517
Percent of NCCI AQCR Inventory	0.037	0.005	0.007	0.008	0.416	0.106
Estimated C1 Operational Emissions	1.028	0.057	0.863	0.006	0.078	0.078
Percent of NCCI AQCR Inventory	0.003	0.0002	0.001	0.0001	0.0004	0.002

Geological Resources. Short-term, minor and long-term, minor to moderate, adverse effects on geology and soils would be expected from constructing and using the ECS. Construction of the vehicle maintenance facility and organizational storage warehouse would result in short-term effects from erosion and sedimentation if vegetation is removed. The maintenance facility and organizational storage warehouse would increase impervious surfaces, resulting in long-term, minor to moderate, adverse effects due to increased erosion and sedimentation.

The proposed ECS site in the southeastern portion of the cantonment area was analyzed for engineering limitations for construction of buildings. The only soil rated as having no limitations for building construction is the Arroyo Seco gravelly sandy loam (0 to 2 percent slopes) in the west-central and southern portion of the site. All other soils are considered limited due to slope and shrink-swell potential. Badland bedrock is not rated.

Soil productivity, which is the capacity of the soil to produce vegetative biomass, would decline in disturbed areas and be eliminated in those areas within the footprint of building structures, roadways, or parking facilities. Implementation of BMPs would mitigate limitations and minimize effects on soils from construction. Site-specific soil surveys should be conducted prior to development, and an ESCP would be developed and implemented both during and following site development. Buildings and other structures would be constructed consistent with building code requirements for development in a region with a seismic rating of approximately 32 to 48 percent g. This would minimize potential for adverse effects on human life associated with earthquakes and development in the area.

Water Resources. Short-term, minor, and long-term, negligible to minor effects on water resources would be expected from the construction and use of the ECS. Short-term effects would result from removal of vegetation during construction activities associated with the vehicle maintenance facility, equipment parking area, and organizational storage warehouse, which would result in increased storm water runoff. These impacts would be reduced with proper BMPs and once vegetation has been reestablished, if possible. Long-term minor effects would be expected due to the increase in impervious surfaces from buildings and parking areas, and from compaction of soils from increased foot and vehicle traffic. These activities would result in increased storm water runoff volume and velocity. In addition, water quality could degrade as leaking vehicle fluids could enter water bodies during storm events. During storm events, overland storm flows can pick up and carry contaminants (e.g., soil or leaked motor

oil) directly into receiving surface water bodies. BMPs would be implemented to reduce the potential for soil erosion and sedimentation. Furthermore, the Storm Water System Upgrade/Expansion (Project C3) would result in a zero net increase in storm water runoff; therefore, long-term effects on water resources would be expected to be minimized. However, this project would disturb greater than 1 acre of land, and an NPDES permit would be required. BMPs would reduce this effect to minor. The proposed site for the ECS would not be expected to affect floodplains.

Biological Resources. The proposed ECS would be constructed on a partially disturbed site dominated by grassland and scattered valley and blue oak. The Proposed Action would affect 23.35 acres of grassland, 1.01 acres of valley oak woodland, and 0.01 acre of blue oak woodland. A previously developed area measuring 0.14 acres would be affected as well.

There are 0.73 acres of vernal swale and 0.3 acres of vernal pool in the proposed site of the ECS in the cantonment area that have been previously documented. These areas would be designed to take into consideration and utilize the existing swale. If design cannot incorporate swale, then appropriate permitting and possible mitigation measures may be necessary. Effects from constructing the ECS would be anticipated to be short-term and moderate to long-term and moderate. Removal of vegetation would occur to construct the parking area, maintenance facility, and storage warehouse. Effects on vegetation would be reduced if vegetation is reestablished after construction activities cease. Effects on wetlands would be short- and long-term, minor, and adverse (see **Figure 5-9).** Negligible effects would be expected on wildlife as this site is adjacent to the Tusi airfield and within the cantonment area, which is a populated and developed area of the installation. No vernal pools exist within or adjacent to the second proposed ECS site northeast of the cantonment area.

Threatened and Endangered Species. Within the cantonment area, the ECS project would occur over a 33-acre area. Development in the cantonment area would occur in areas previously affected by development. The Proposed Action would primarily affect kit fox habitat, vernal pool fairy shrimp habitat, and occupied purple amole habitat. Arroyo toads associated with the San Antonio River could also be affected. **Figure 5-9** depicts the locations of sensitive resources in the vicinity of the cantonment area.

Effects on threatened and endangered species from construction and use of the ECS would be expected to be minor. Although the entire site is potential San Joaquin kit fox habitat, because few kit fox sightings have occurred on the installation in the past decade, effects would be expected to be minor.

Cultural Resources. One NRHP-listed cultural resource (CA-MNT-940H) occurs within the existing cantonment area and one NRHP-listed cultural resource (CA-MNT-100H) shares a common border with the existing cantonment area. The Milpitas Ranch House, aka “Hacienda” (CA-MNT-940H), was built in 1929–30 for publishing magnate William Randolph Hearst Jr. to serve as headquarters for his Milpitas Ranch. The structure was designed by renowned California architect Julia Morgan and is a notable example of Spanish Colonial Revival architecture. The house later served as a military headquarters and nearby buildings were used as barracks, storage facilities, maintenance buildings, and housing. Site CA-MNT-100H is the Mission San Antonio de Padua. The Mission, founded in 1771, was the third Spanish mission established in California and is adjacent to the cantonment area. Neither site is within the footprint of the proposed ECS site. No other cultural resources exist within the site of the Proposed Action, which is outside of the Mission Viewshed Restricted Building Zone. Therefore, no effects would be anticipated.

Socioeconomics and Environmental Justice. Minor beneficial effects on socioeconomic resources would be expected from the proposed construction of the ECS. While it is assumed that local materials and contractors would be used, some of the construction could be completed by soldiers stationed at FHL.

This area is rural and sparsely populated, although based on aerial photographs approximately 45 residential structures appear to exist within 1 mile of the site. In order to characterize environmental justice aspects of this small subset of the ROI, 2000 U.S. Census data from census blocks 1296, 1299, 1300, and 1301 within census tract 114 were consulted. Within these blocks, 17.8 percent reported to be of a racial minority population and 16.3 were of Hispanic or Latino origin (see **Table 5-9**). These minority populations are not disproportionate when compared to the ROI or Monterey County, which include 30.7 percent and 44.1 percent, respectively, of residents of a racial minority and 38.3 percent and 46.8 percent, respectively, of Hispanic or Latino origin (see **Table 5-9**).

Therefore, while the economic status of the residents in the area that could be affected by the ECS (census blocks 1296, 1299, 1300, and 1301) is not known, this area does not consist of a disproportionately higher percentage of racial or ethnic minority populations. The noise resulting from operation of the ECS would be long-term and minor, but would not be disproportionate. However, because the economic status of the potentially affected residents is not known, operation of the ECS could have long-term, minor, adverse effects on environmental justice due to noise production.

Infrastructure. Long-term, minor, adverse effects on infrastructure would be expected from the expansion of the ECS. The expansion of this facility would result in a minor increase in the demand for water, electricity, communications, and sanitary sewer services. However, the increased demand for these utilities would be minimal compared to their total respective uses at FHL. Minimal quantities of construction waste would be generated during the construction of this facility; construction waste is generally composed of clean materials, and most of this waste would be would be recycled as clean fill and processed for reuse. Although minimal additional amounts of solid waste would be generated during the use of this expanded facility, the amount of additional solid waste would be minimal compared to the total solid waste produced at FHL.

Traffic and Transportation. Short-term, negligible to minor, adverse effects on traffic and transportation systems could be expected from the construction of the ECS from construction equipment entering and leaving the site. Construction crews would need to access the site by driving through the main cantonment area, thereby potentially conflicting with residential and administrative traffic.

Long-term, minor to moderate, adverse effects on traffic could be expected from the expansion of the ECS within the cantonment area. Essentially all military equipment stored at the ECS would need to travel from the north through the cantonment area on Mission Road or from the south through the access gate on Jolon Road and Mission Road. Although the existing cantonment area roads are in good condition and adequately support current traffic loads and missions, the proposed ECS would substantially increase the number of military vehicles traveling through the area. Not only could delays be expected for soldiers, Army and civilian staff, and their families, but also for visitors that would not be familiar with the installation and military activities. This could increase the interface between military and civilian vehicles, resulting in potential traffic delays and an increase in potential accidents at FHL. Per FHL's *Traffic and Transportation Analysis* performed in 2006, the installation could mitigate the potential risk of conflicts with civilian vehicle operators who use the installation's public roadways by providing a vehicle safety brochure when they enter the installation (Booz Allen 2006).

Long-term, minor to moderate, adverse effects on installation roads would be expected from military equipment traveling to and from the ECS. The increased volume of traffic entering the ECS would increase the requirement for maintenance of gravel and asphalt roadways. Tracked military vehicles could especially be damaging to asphalt roadways (i.e., in the cantonment area) on the installation. According to FHL's *Real Property Master Plan*, the existing cantonment area roads are in good condition and adequately support current traffic loads; however, continued maintenance is required to avoid deterioration.

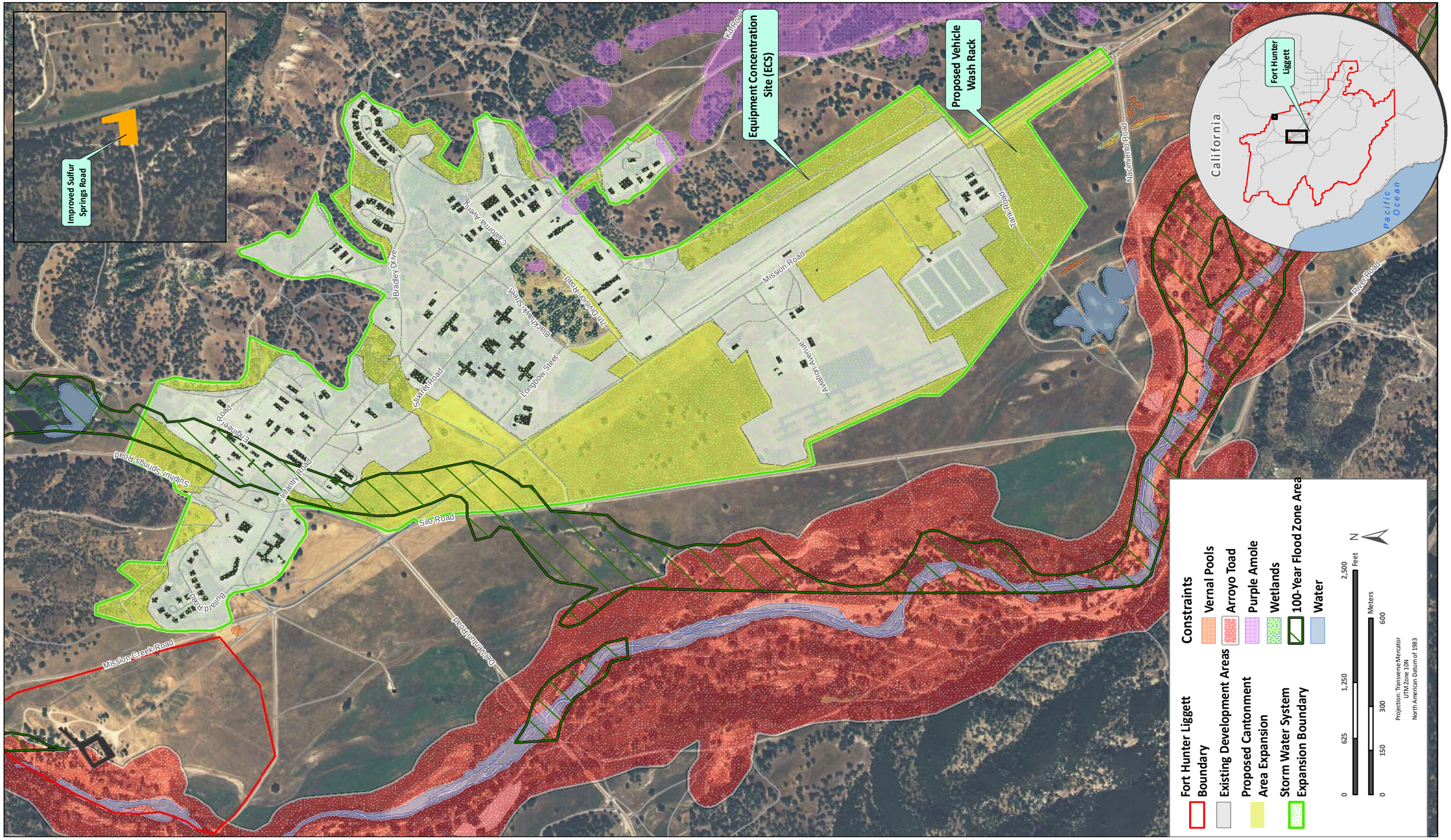

Figure 5-9. Water and Biological Resources in the Cantonment Area

Long-term, minor, beneficial effects on traffic would be expected from the expansion of the ECS at either proposed site on FHL. Allowing additional storage of military equipment on the installation would reduce the amount of traffic entering and leaving the installation when units arrive and depart, thereby reducing potential for delays of traffic entering and leaving the installation. Storage of equipment on-installation would also have beneficial effects for the local roadways leading to the installation, as maintenance requirements for those roadways would likely be lessened.

Hazardous Materials and Waste. Short-term, minor, adverse impacts would be expected from the use of hazardous materials and generation of hazardous wastes during the construction process. Construction activities would require the use of hydraulic construction equipment (i.e., bulldozer, front-end loader, grader, and scraper). It is anticipated that the quantity of products containing hazardous materials used during construction activities would be minimal and their use would be of short duration. The quantity of hazardous wastes generated from the construction activities would be minor and would not be expected to exceed the capacities of existing hazardous waste disposal facilities. Long-term, minor, adverse impacts would be expected from operation of the consolidated vehicle wash rack. The increased number of equipment operating at the installation would increase the volume of hazardous materials and POLs required to maintain the vehicles. Hazardous materials and wastes used during operation of the consolidated vehicle wash rack would be handled under the existing DOD RCRA-compliant waste management programs and, therefore, would not be expected to increase the risks of exposure to installation personnel.

Health and Safety. Short-term, minor, adverse effects on construction contractor safety could occur. Construction activities pose an increased risk of construction-related accidents, but this level of risk would be managed by adherence to established Federal, state, and local safety regulations. The proposed location for the ECS is also within the AOC as identified in the MMRP Final Site Inspection Report (USACE 2008), and, therefore, adverse effects on contractor safety could result due to potential exposure to UXO materials. Inspection of the area prior to commencement of construction would determine if any UXO exists, and, if necessary, removal would be conducted using U.S. Army standard operating procedures. No long-term adverse effects would be expected.

5.4.3.2 Consolidated Vehicle Wash Rack

Airspace Management and Safety. No effect on airspace management and safety would occur because establishment of the Consolidated Vehicle Wash Rack would not involve changes in airspace.

Noise. Short-term, minor, adverse effects on the ambient noise environment would be expected as a result of construction activities to support the consolidated vehicle wash rack. Construction would involve concrete and asphalt driveways and would be in the southeastern portion of the cantonment area. Grading, paving, and some excavation could be required to establish the consolidated vehicle wash rack. Construction equipment associated with this activity has the potential to expose installation personnel to noise levels of 80 dBA at 300 feet away. If personnel were 100 feet away from construction they could potentially experience noise levels of 85 dBA. The noise emanating from the proposed minor construction activities would be localized, short-term, and intermittent during construction equipment operations. Construction activities would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.) in the vicinity of the construction site. These noise levels would be only short-term in nature and therefore, no long-term adverse effects on noise would be expected from construction activities that could include grading, paving, and heavy equipment.

Land Use. Construction of the wash rack would change the land use category and function to maintenance or supply and logistics. The proposed wash rack would be compatible with surrounding land uses that include a complex of several storage, maintenance, and general purpose structures in the maintenance land use category to the north, unused area to the east and south, and outdoor training land use category to the west. Long-term, negligible, adverse effects on land use would be expected from the consolidated vehicle wash rack.

Air Quality. Short-term, minor, adverse effects would be expected as a result of the construction of the Consolidated Vehicle Wash Rack to include facilities, paved parking area, and associated utilities. Construction activities would result in air emissions from the operation of heavy machinery. BMPs to control dust can include spraying water over the construction area. No emissions are anticipated from operation of the consolidated vehicle wash rack. This project would not result in an adverse effect on local or regional air quality, would not violate NAAQSs or SAAQSs, and would not produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimates from construction of the Consolidated Vehicle Wash Rack are shown in **Table 5-13**.

Table 5-13. Estimated Air Emissions Resulting from the Consolidated Vehicle Wash Rack (Project C2)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Estimated C2 Construction Emissions	4.047	1.083	3.897	0.290	10.993	0.842
Percent of NCCI AQCR Inventory	0.013	0.004	0.003	0.003	0.059	0.016

Geological Resources. Construction of the Consolidated Vehicle Wash Rack would result in short-term, minor and long-term, minor adverse effects on geology and soils. Construction activities would temporarily disturb soils and increase the potential for elevated rates of erosion and sedimentation, resulting in short-term, minor, adverse effects. Increased impervious surfaces from buildings and roads would result in increased erosion and sedimentation. Clearing of vegetation would additionally increase erosion and sedimentation potential. Soil erosion and sediment production would be minimized for all construction operations as a result of following an approved ESCP.

Soil productivity would decline in disturbed areas and be eliminated in those areas within the footprint of building structures, roadways, or parking facilities. Construction of buildings and associated structures and loss of soil structure due to compaction from foot and vehicle traffic could result in changes in drainage patterns. Soil erosion and sediment control and storm water management measures would be included in site plans to minimize long-term erosion and associated sedimentation.

The proposed site for the Consolidated Vehicle Wash Rack was analyzed for engineering limitations for building construction. Only one soil, the Arroyo Seco gravelly sandy loam (2 to 5 percent slopes) is mapped as underlying this site, and is classified as limited for building construction due to slope. Therefore, site-specific soil surveys would be conducted prior to the initiation of construction activities and site design would incorporate BMPs to minimize potential adverse effects associated with site limitations. Buildings and other structures would be constructed consistent with building code requirements for development in a region with a seismic rating of approximately 32 to 48 percent g. This would minimize potential for adverse effects on human life associated with earthquakes and development in the area.

Water Resources. The Consolidated Vehicle Wash Rack would be expected to result in short-term, moderate and long-term, minor adverse effects on water resources. Short-term, moderate, adverse effects would be expected from construction of the Consolidated Vehicle Wash Rack. Construction activities would involve removal of vegetation, which would result in erosion and sedimentation. These effects would be reduced as vegetation is reestablished, where possible. Long-term minor adverse effects would occur from an increase in impervious surfaces from buildings and parking areas, and from compaction of soils from increased foot and vehicle traffic. These activities would result in increased storm water runoff volume and velocity. In addition, water quality could degrade as leaking vehicle fluids could enter water bodies during storm events. During storm events, overland storm flows can pick up and carry contaminants (e.g., soil or leaked motor oil) directly into receiving surface water bodies. BMPs would be implemented to reduce the potential for soil erosion and sedimentation. This project would disturb greater than 1 acre of land, and an NPDES permit would be required. Increased sedimentation and storm water runoff volume and velocity could alter existing natural streambank morphology.

Although long-term minor adverse effects would be expected, long-term beneficial effects would also be realized from construction and use of the Consolidated Vehicle Wash Rack. The proposed Consolidated Vehicle Wash Rack would be farther from water bodies than the current vehicle wash racks, which are within close proximity to a drainage creek. In addition, an adequate OWS would be constructed at the proposed Consolidated Vehicle Wash Rack, which would be an improvement to the current vehicle wash racks, and would have a beneficial effect on water quality. The Storm Water System Upgrade/Expansion (Project C3) would result in a zero net increase in storm water runoff; therefore, long-term effects on water resources would be expected to be reduced to negligible. The Consolidated Vehicle Wash Rack would not be within or adjacent to a floodplain and would not be expected to affect floodplains.

Biological Resources. The Consolidated Vehicle Wash Rack would affect grassland and vernal pools. The area would be marked for avoidance and is not expected to be affected by the Proposed Action. Thus, construction and operation of the Consolidated Vehicle Wash Rack would be expected to result in short-term, moderate and long-term, minor effects on vegetation. Vegetation would be removed or disturbed during construction activities, but if vegetation is reestablished where possible, effects would be reduced.

Threatened and Endangered Species. The Consolidated Vehicle Wash Rack would be built south of Mission Road and within the San Joaquin Kit Fox Range. No effects on threatened or endangered species would be expected from this project.

Cultural Resources. No cultural resources exist within the proposed location for the Consolidated Vehicle Wash Rack and it is located outside of the Mission Viewshed Restricted Building Zone. No effects would be anticipated.

Socioeconomics and Environmental Justice. Minor, beneficial effects on socioeconomic resources would be expected from the proposed construction of the Consolidated Vehicle Wash Rack. While it is assumed that local materials and contractors would be used, some of the construction could be completed by soldiers stationed at FHL. Construction would occur entirely on the installation and would have little potential to adversely affect off-installation residents. No long-term effects from construction or operation of the Consolidated Vehicle Wash Rack on socioeconomics or environmental justice are expected to occur.

Infrastructure. Long-term, minor, adverse effects on infrastructure would be expected from the construction of the Consolidated Vehicle Wash Rack. The construction of this facility would result in a minor increase in the demand for water. Wastewater generated from the use of this facility would be drained either into the sanitary sewer system or into a storm water detention basin. OWSs would be used

to prevent oil and petroleum products from discharging from this facility into wastewater (see **Section 4.13**). A drainage system that would include a water recirculation system would be installed to reduce both water demand and wastewater generation volumes. Any increases in water demand and wastewater generation would be minimal compared to the total respective use at FHL. Electrical power for lighting would be provided by solar energy; therefore, there would be no effects on the electrical power system. Minimal quantities of construction waste would be generated during the construction of this facility; construction waste is generally composed of clean materials, and most of this waste would be recycled as clean fill and processed for reuse. Minimal amounts of solid waste would be generated from the use of this facility. The solid waste generated at the Consolidated Vehicle Wash Rack primarily would consist of mud and earthen debris that washes from vehicles and equipment undergoing cleaning. The standard operating procedures for the Consolidated Vehicle Wash Rack would require large quantities of caked mud and earthen materials to be removed from vehicles and equipment prior to using the facility.

Traffic and Transportation. Short-term, negligible to minor, adverse effects on traffic and transportation systems would be expected from the construction of the Consolidated Vehicle Wash Rack. The Consolidated Vehicle Wash Rack would be placed in the southern portion of the main cantonment area off Mission Road, the main road providing access from the main gate into the installation. Construction traffic in this portion of the installation could slow traffic entering or leaving the cantonment area; however, these effects would likely be rare and intermittent.

Long-term, minor, adverse effects on traffic and transportation systems would be expected from the increase of military vehicles entering the southern portion of the cantonment area. Depending on the amount of vehicles that enter the Consolidated Vehicle Wash Rack site at a time, military vehicle traffic could potentially slow traffic entering or leaving the cantonment area on Mission Road. However, long-term, negligible to minor, beneficial effects on traffic would also be expected due to the consolidation of the vehicle wash rack as opposed to the four existing dispersed wash racks on FHL. Increased access to wash racks would be expected to improve efficiency and decrease the amount of time military vehicles are on the main installation roadways.

Hazardous Materials and Waste. Short-term minor adverse effects would be expected from the use of hazardous materials and generation of hazardous wastes during the construction process. The construction process would use hydraulic construction equipment (i.e., bulldozer, front-end loader, grader, and scraper). Long-term minor adverse effects would be expected from the Consolidated Vehicle Wash Rack. The proposed construction includes an OWS which would minimize the amount of POLs that reach the environment. The OWS would increase the volume of hazardous waste to be disposed; however, the increased volumes are not anticipated to exceed those presently permitted at the installation. Additionally the soil that would be washed off of the vehicles could become contaminated through the OWS.

Health and Safety. Short-term, minor, adverse effects on construction contractor safety could occur. Construction activities pose an increased risk of construction-related accidents, but this level of risk would be managed by adherence to established Federal, state, and local safety regulations. No long-term adverse effects would be expected. The proposed location for the Consolidated Vehicle Wash Rack is also within the AOC as identified in the MMRP Final Site Inspection Report (USACE 2008), and, therefore, adverse effects on contractor safety could result due to potential exposure to UXO materials. Inspection of the area prior to commencement of construction would determine if any UXO exists, and, if necessary, removal would be conducted using U.S. Army standard operating procedures.

5.4.3.3 Storm Water System Upgrade/Expansion

Airspace Management and Safety. No effect on airspace management and safety would occur because the proposed Storm Water System Upgrade/Expansion would not involve changes in airspace.

Noise. The expansion and upgrade activities would involve minor construction activities throughout the cantonment area and only short-term, minor, adverse effects on the ambient noise environment are expected during construction activities. Upgrade and expansion activities for the storm water system would occur throughout the cantonment area and machine equipment could include the use of bulldozers and backhoes for culvert extensions. Use of these equipment types could result in personnel in the cantonment area experiencing noise levels of approximately 72 dBA if they were 300 feet away or approximately 82 dBA if they were 100 feet away. The noise emanating from the proposed minor construction activities would be localized, short-term, and intermittent during construction equipment operations. Construction activities would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.) in the vicinity of the construction site. These noise levels would be only short-term in nature; therefore, no long-term adverse effects on noise would be expected from construction activities that could include grading and filling.

Land Use. The expansion and upgrade of the cantonment area storm water system would improve the capacity and efficiency of the storm water system to accommodate the potential increase of nonpermeable surfaces within the cantonment area. While construction of this project might result in short-term, adverse effects on land use due to creation of noise and temporary traffic disruptions, it would ultimately result in long-term, moderate, beneficial effects on the land use of the cantonment area as support for the installation's overall training mission.

Air Quality. Short-term, minor, adverse effects would be expected as a result of constructing the Storm Water System Upgrade/Expansion. Construction activities would result in air emissions from the operation of heavy construction machinery. BMPs to control dust can include spraying water over the construction area. This project would not result in an adverse effect on local or regional air quality, would not violate NAAQSs or SAAQSs, and would not produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory. Emissions estimated from construction of the storm water drainage system are shown in **Table 5-14**.

Table 5-14. Estimated Air Emissions Resulting from the Storm Water System Upgrade/Expansion (Project C3)

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Estimated C3 Construction Emissions	20.351	3.225	20.289	1.516	26.364	2.648
Percent of NCCI AQCR Inventory	0.066	0.011	0.015	0.018	0.142	0.051

Geological Resources. The Storm Water System Upgrade/Expansion would be expected to result in short-term, minor, adverse effects due to initial soil disturbance and increased erosion and sedimentation during construction. However, because storm water runoff would be better managed once the system is operational, long-term beneficial effects on soils and geology would be expected as erosion and sedimentation rates would decrease.

Engineering limitations for excavations were analyzed for this proposed project, and all soils surrounding the perimeter of the cantonment area where construction would occur are rated as limited. The soils are limited due to depth to bedrock, slopes, and unstable excavation walls. Implementation of erosion and storm water management practices to contain soil and runoff onsite during development would reduce potential for adverse effects associated with erosion and sedimentation and transport of sediments in runoff. These construction BMPs would be implemented to minimize soil erosion; therefore, no significant adverse effects on the soils at the site of the proposed Storm Water System Upgrade/Expansion are anticipated.

Water Resources. Establishment of the Storm Water System Upgrade/Expansion would be expected to result in short-term minor adverse and long-term beneficial effects on water resources. Short-term, minor, adverse effects would initially occur during construction activities prior to operations where the soil would be compacted, vegetation removed, and impervious surfaces increased to create the storm water drainage flow structure. Once the system is in place and operational, long-term beneficial effects would be expected on water resources. Because OWSs and detention basins would be constructed in key locations to ensure a net zero increase in storm water drainage, effects on water resources from the ECS, and Consolidated Vehicle Wash Rack would be reduced to negligible. An NPDES general permit for storm water discharge, in conjunction with an SWPPP, would be required prior to the initiation of this project.

The presence of a floodplain through the west-central to the northeastern portion of the cantonment area would be avoided to the greatest extent possible. Design of the Storm Water System Upgrade/Expansion would incorporate avoidance of constructing impervious surfaces within the floodplain that would impede flood water flow. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative.

Biological Resources. The Storm Water System Upgrade/Expansion would occur throughout the cantonment area. **Figure 5-9** depicts biological resources of interest within cantonment area. The Proposed Action occurs in a variety of habitats, including vernal pool, vernal swale, and willow riparian areas, but would not be expected to significantly or adversely affect these habitats. Short-term, minor adverse effects would occur during construction activities as some vegetation would need to be cleared. The project is intended to improve the drainage system for the cantonment area and would result in indirect beneficial effects on habitats associated with the San Antonio River by improving the quality of cantonment area storm water runoff. Therefore, a long-term, beneficial effect from implementation would be expected on biological resources.

Threatened and Endangered Resources. Effects on threatened and endangered species would be expected to be negligible. Project areas that contain known vernal pools and purple amole occurrences within the cantonment area should be avoided through design or directional boring. Effects on arroyo toad would be long-term and beneficial due to improvements to the cantonment storm water system that drains into arroyo toad breeding habitat.

Cultural Resources. The proposed upgrades and expansion for the Storm Water System Upgrades/Expansion could potentially affect cultural resources within the cantonment. Impacts would be expected to be long-term, minor, and adverse. Avoidance, evaluation, or mitigation of adverse effects through consultation with the SHPO would minimize impacts.

Socioeconomics and Environmental Justice. Minor beneficial effects on socioeconomic resources would be expected from the proposed upgrade and expansion of the storm water system. The estimated cost of this action has not been determined. While it is assumed that local materials and contractors would be used, some of the construction could be completed by soldiers stationed at FHL. Upgrade and

expansion of the storm water system would occur entirely on the installation within the cantonment area, and would not affect off-installation residents. No long-term effects from the upgrade and expansion of the existing storm water system on socioeconomics or environmental justice are expected to occur.

Infrastructure. Long-term, moderate, beneficial effects on infrastructure would be expected with the expansion and upgrade of the storm water drainage system. As noted in **Section 4.12.2**, the storm water drainage system generally is adequate to serve the needs of the installation; however, approximately once every 10 years, flooding occurs just inside the cantonment area near a location known as "Check Point Charlie" and some drainage swales are prone to erosion. An expansion of the storm water drainage system would entail reinforcing drainage swales that are prone to erosion with rip-rap and appropriate vegetation buffers. Drainage culverts would be increased in size to manage potential storm water flow increases resulting from the Proposed Action; and detention basins and storm water OWSs would be installed to ensure a net zero increase in storm water discharge. This would maintain and improve upon the present quality of storm water. Because of this project, the occasional flooding and erosion currently experienced at FHL would be reduced in frequency or eliminated from occurring in the future. No other effects on infrastructure would be expected with the establishment of this project.

Traffic and Transportation. Short-term, negligible to minor, adverse effects on traffic would be expected from upgrading or expanding the storm water system on FHL. Culverts are in place where the roadways cross these drainage channels (FHL 2007a). Replacement of piping, inlets, and culverts that occur along the roads in the cantonment area could result in temporary lane or road closures and delays in the cantonment area. However, since the existing cantonment area roads adequately support current traffic loads, these effects would be negligible to minor.

Long-term, negligible to minor, beneficial effects on traffic and transportation systems would be expected from upgrading or expanding the storm water system on FHL. The upgraded storm water system would provide a higher storm water capture and transfer capacity at the installation, thereby decreasing potential for road flooding (although a rare occurrence) and damage at FHL.

Hazardous Materials and Waste. Short-term, minor, adverse effects would be expected from the use of hazardous materials and generation of hazardous wastes during the construction process. The construction process would use hydraulic construction equipment (i.e., bulldozer, front-end loader, grader, and scraper). Long-term minor beneficial effects would be expected from the updated storm water system. The proposed project includes an OWS which would reduce the amount of POLs that reach the environment. The OWS would increase the volume of hazardous waste to be disposed; however, the increased volumes are not anticipated to exceed those presently permitted at the installation.

The specific extent or dimensions of this update/expansion are not yet finalized; it is assumed that a portion of the project would occur within MMRP site FTHE-001-R-01. A Site Investigation was conducted in 2008 and concluded that a Remedial Investigation should be conducted for Munitions and Explosives of Concern at this MMRP site. FHL would perform the recommended Remedial Investigation and address any remedial actions prior to the initiation of the storm water system update/expansion project. A Health and Safety Plan would be developed and followed to protect construction workers during construction.

Health and Safety. Short-term, minor, adverse effects on construction contractor safety could occur. Construction activities pose an increased risk of construction-related accidents, but this level of risk would be managed by adherence to established Federal, state, and local safety regulations. No long-term adverse effects would be expected; however, long-term, negligible, beneficial effects on public safety could result from the reduction of flooding events and roadway erosion within the cantonment area.

5.4.4 Increased Training Associated with the Proposed Action

Airspace Management and Safety. An increase in training would correlate to an increase in flying operations out of Schoonover runway, as discussed in **Section 5.4.1.1**, Airspace Management and Safety. Although an increase in operations could occur at the DZs and LZs spread throughout FHL as well as Tusi AHP as a result of increased training, these flights would be sporadic and would be confined to the airspace within the installation boundary. Effects from the increase in aircraft operations as a result of the Proposed Action could be reduced by an increase in ATC personnel. No scheduling conflicts due to the proposed increase in aircraft operations would be expected. Coordination between the services over joint use of military training airspace and other training assets would continue after implementation of the Proposed Action. This coordination should ensure that effects associated with use of airspace and airspace management requirements are negligible. The continued implementation of AR 385-10, *The Army Safety Program* and AR 385-95, *Army Aviation Accident Prevention* would reduce the potential for aircraft accidents as discussed in **Section 5.4.1.1**, Airspace Management and Safety. The aircraft and helicopter safety, accident, and incident procedures outlined in FHLR 350-2 would also continue to be applied (FHL 2006a).

Noise. An increase in training would correlate to an increase in noise from various sources including aircraft operations, small arms weapons fire, and large arms weapons fire and demolition.

Aircraft Operations at Schoonover Airfield. Long-term, minor, adverse effects on noise would be expected from the increase in aircraft operations associated with training at FHL. Noise effects were estimated for the increased training requirements associated with the Proposed Action from aircraft and helicopters that operate out of Schoonover Airfield. Data for this analysis were based on the information obtained for the Baseline Scenario (see **Section 4.2.2**). Where the aircraft fly, how they fly, and the fleet mix would not change under the increased training. However, the total number of annual operations at Schoonover Airfield was estimated to increase from approximately 500 under the Baseline Scenario to 1,000 under increased training.

The noise contours under the Increased Training Scenario would expand in every direction as compared to the Baseline Scenario, as shown on **Figure 5-1**. The noise contours extend northwest and southeast from the runway centerline. As shown in **Table 5-15**, the total number of affected acres would increase from 75 under the Baseline Scenario to 132 under the Increased Training Scenario. However, even under the Increased Training Scenario, the DNL noise contour for 65 dBA and 70 dBA only encompass property around Runway 30. This is because Runway 30 is used approximately 80 percent of the time (i.e., aircraft depart to the north and arrive from the south) as compared to Runway 12 that is used approximately 20 percent of the time. Noise contours that extend beyond Runway 30 include the 60-dBA contour. The 60-dBA contour is within the LUPZ Noise Zone; all types of land uses are acceptable within this noise zone (see **Section 4.2.1**).

Table 5-15. Baseline Scenario CNEL Noise Zones at Schoonover Airfield

CNEL Noise Zones	Baseline Scenario (acres)	Increased Training Scenario (acres)
LUPZ: 60 – 64 dBA	63	105
Noise Zone I: 65 – 69 dBA	8	21
Noise Zone II: 70 – 74 dBA	4	5
Noise Zone III: 75 – 79 dBA	0	1
Total	**75**	**132**

Helicopter Operations. Long-term, minor, adverse effects on noise from helicopter operations would be expected as a result of an increase in training associated with the Proposed Action. Please see **Section 4.2.2** for a discussion of SEL values from helicopters.

Since SEL values show the effects of a single noise event, these values would not change with an increase in training requirements. However, there would be an increase in the number of SEL events. Since noise complaints are most likely to occur from residences at higher elevations and in or adjacent to the Bradley Pass, current noise-abatement procedures would be followed. These procedures include pilots navigating through Bradley Pass must maintain at least 2,500 feet above MSL, no flying within a 1,000-foot horizontal and vertical radius of Mission San Antonio, no overflights below 1,000 feet over the town of Jolon, and no overflights under 1,000 feet above the cantonment area (FHL 2006a).

MPMG Range. Long-term, minor to moderate, adverse effects on noise would be expected as a result of operations at the proposed MPMG Range associated with training increase. The types of weapons used at the MPMG Range are expected to remain the same with the increase in training as compared to the Proposed Action. Noise from small arms weapons is assessed using single-event metrics; consequently, the noise effects discussed in **Section 5.4.2.1**, Noise, would not change under the increase in training as compared to the Proposed Action.

Light Demolition Range. Long-term minor adverse effects on noise would be expected as a result of operations at the Light Demolition Range associated with increased training. The scenario for the increase in training requirements at the Light Demolition Range was created by taking the average number of operations per day from the 2008 data, as discussed under the Proposed Action in **Section 5.4.2.1**, Noise, and doubling the estimated operations. This scenario was estimated using the same number of training days, weapon type, and range layout that was used in the creation of the noise contours under the Proposed Action. Under the Increased Training Scenario, it was estimated that approximately 12 blasts would be heard during an average training day.

The results of the Increased Training Scenario are shown on **Figure 5-6** along with the DNL noise contours from the Proposed Action to compare the two scenarios. Under the Increased Training Scenario, the DNL noise contours extend out in every direction, but particularly to the northeast and the northwest, as compared to the Proposed Action. However, all of the land within the noise contours consists of installation property. The PK15(met) noise contours do not change under the training increase because it represents a single noise event. All of the land within PK15(met) noise contours consists of installation property.

Hand Grenade Familiarization Course. Long-term, minor to moderate, adverse effects on noise would be expected as a result of operations at the Hand Grenade Familiarization Course associated with increased training. The scenario for the increase in training requirements at the Hand Grenade Familiarization Course was created by taking the average number of operations per day from the 2008 data, as discussed under the Proposed Action in **Section 5.4.2.3**, Noise, and doubling the estimated operations. This scenario was estimated using the same number of training days, weapon type, and range layout that was used in the creation of the noise contours under the Proposed Action. Under the Increased Training Scenario, it was estimated that approximately 78 operations would be fired during an average training day.

The results of the Increased Training Scenario are shown on **Figures 5-7** and **5-8** along with the noise contours from the Proposed Action to compare the two scenarios. The DNL 57 dBC, 62 dBC, and 70 dBC noise contours are plotted on a map of the project area. The majority of the land within these noise contours consists of FHL property, although a church and cemetery are northeast of Schoonover Airfield. The noise contours expand out in every direction with the increase in training as compared to the Proposed Action. The 57 to 62 dBC noise contours encompass the Miller Ranch Bivouac, a military

campground, and portions of land proposed for development at Schoonover Airfield. The 57 to 62 dBC noise contours are within the LUPZ and Noise Zone I where normally all types of land uses are acceptable. Consequently, urban military development would be considered compatible. The church and cemetery are within the 62 to 70 dBC noise contours, which is within Noise Zone II. Noise-sensitive land uses (such as a church or a cemetery) are strongly discouraged in Noise Zone II when it is the result of large arms or demolition weapons activities (USACHPPM 2005).

Since PK15(met) is a single noise event, these noise contours would not change under the training increase. The PK15(met) for the Hand Grenade Familiarization Course is discussed in **Section 5.4.2.3**, Noise.

Noise-sensitive land uses exist under the Proposed Action. However, as previously discussed, operations at the Hand Grenade Familiarization Course would occur for approximately 242 days per year. Measures such as informing the public who frequent noise-sensitive facilities could mitigate some of the adverse effects.

Land Use. Effects on land use from the increased training at FHL result mainly from the siting of specific uses and functions within existing land uses and the associated compatibility and incompatibility. The effects on land use resulting from increased training are reflected in the analysis of the proposed training infrastructure, range construction, and cantonment area construction projects discussed in **Sections 5.4.1**, **5.4.2**, and **5.4.3**.

Air Quality. The typical types of vehicles and equipment used at FHL for training events; the number of vehicles and equipment estimated for baseline conditions (2009); and the number of operational miles, hours, or sorties for each type of vehicle and equipment are shown in **Table 5-16**. Baseline training activities were based on the following assumptions:

- Road motorized graders, scrapers, cranes, and scoop loaders operate 8 hours per day, 150 days per year.
- High mobility multipurpose wheeled vehicles (HMMWV), heavy expanded mobility tactical trucks (HEMTT), heavy equipment transporter (HET), palletized load system (PLS), and dump trucks travel 25 miles per day, 150 days per year.
- UH-60 helicopters fly below 3,000 feet above ground level (AGL). Sorties last for an average of approximately 28.6 minutes. There would be five sorties per aircraft, 150 days per year.

Emissions from training mission operations are estimated to increase proportionally with the increase in maximum supportable man-days over the next 5 years. **Table 5-17** shows emissions from baseline conditions (2009), emissions from training activity increases based on increases shown in **Table 5-4**, and the delta increase in emissions from the Proposed Action compared to baseline conditions. Detailed emissions estimates can be found in **Appendix D**. As shown in **Table 5-17**, the increase in military training would not result in an adverse effect on local or regional air quality, violate NAAQSs or SAAQSs, and would not produce criteria pollutant emissions exceeding 10 percent of the regional emissions inventory.

Current military training mission operations at FHL (2009) were based on approximately 5,000 troops conducting training 150 days a year, equating to a maximum of 750,000 supportable man-days. As part of the Proposed Action, maximum supportable man-days are estimated to increase proportionally over the next 5 years from 750,000 to 1,500,000. **Table 5-18** shows the baseline conditions and proportional increase planned as part of the Proposed Action.

Table 5-16. Baseline (2009) Training Mission Vehicles and Equipment

Vehicle/Equipment Types	Number of Vehicles/Equipment	Number of Operational Miles/Hours/Sorties
HMWVV	750	2,812,500 miles
HEMTT	100	375,000 miles
HET	150	562,500 miles
PLS	20	75,000 miles
UH-60 Helicopter	8	6,000 sorties
Road Motorized Grader	18	21,600 hours
Scraper (14–18 CY)	18	21,600 hours
Dump Truck – 5-ton	27	101,250 miles
Dump Truck – 20-ton	36	135,000 miles
Crane – 20-ton	9	10,800 hours
Scoop Loader	9	10,800 hours

Table 5-17. Projected Increase in Total Man-Days for Proposed Action

Year	Number of Military Troops	Number of Training Hours Per Day	Number of Training Days Per Year	Total Training Man-Days Per Year
2009 (Baseline)	5,000	8	150	750,000
2010	5,000	8	180	900,000
2011	5,000	8	210	1,050,000
2012	5,000	8	240	1,200,000
2013	5,000	8	270	1,350,000
2014	5,000	8	300	1,500,000

Geological Resources. Increased training at FHL would be expected to generate long-term, minor to moderate effects on geology and soils. Increased foot and vehicle traffic could lead to loss of soil structure and compaction, which would lead to decreased percolation of storm water into the substrate and increased runoff, erosion, and sedimentation. This would also have implications on biota, as discussed in **Section 5.4**, Biological Resources. In addition, erosion from wind or air movement generated by increased helicopter transport has the potential to affect disturbed soils where vegetation has been removed or the earth is bare. BMPs could include installing silt fencing and sediment traps, rotating training and bivouac areas when possible to reduce compaction, applying water to disturbed soil, and revegetating disturbed areas as soon as possible after disturbance, as appropriate.

Table 5-18. Estimated Air Emissions Associated with Proposed Training Compared to Baseline Conditions

Calendar Year	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Baseline Conditions (2009)	**158.48**	**19.87**	**86.11**	**8.28**	**11.63**	**11.10**
Percent of NCCI AQCR Inventory	0.517	0.069	0.062	0.097	0.063	0.214
2010	**190.18**	**23.84**	**103.33**	**9.94**	**13.96**	**13.32**
Delta Change from Baseline	+31.70	+3.97	+17.22	+1.66	+2.33	+2.22
Percent of NCCI AQCR Inventory	0.621	0.083	0.074	0.117	0.075	0.257
2011	**221.88**	**27.82**	**120.55**	**11.60**	**16.29**	**15.55**
Delta Change from Baseline	+63.39	+7.95	+34.44	+3.31	+4.65	+4.44
Percent of NCCI AQCR Inventory	0.724	0.097	0.086	0.136	0.088	0.300
2012	**253.27**	**31.79**	**137.77**	**13.25**	**18.61**	**17.77**
Delta Change from Baseline	+95.09	+11.92	+51.66	+4.97	+6.98	+6.66
Percent of NCCI AQCR Inventory	0.828	0.110	0.099	0.156	0.100	0.343
2013	**285.27**	**35.77**	**154.99**	**14.91**	**20.94**	**19.99**
Delta Change from Baseline	+126.79	+15.90	+68.89	+6.63	+9.31	+8.88
Percent of NCCI AQCR Inventory	0.931	0.124	0.111	0.175	0.113	0.386
2014	**316.97**	**39.74**	**172.21**	**16.57**	**23.27**	**22.21**
Delta Change from Baseline	+158.48	+19.87	+86.11	+8.28	+11.63	+11.10
Percent of NCCI AQCR Inventory	1.034	0.138	0.124	0.195	0.126	0.429

Water Resources. Long-term minor adverse effects on water resources would be expected from implementing the Proposed Action at FHL. Increases in training would result in increased foot and vehicle traffic, which would lead to increased storm water runoff volume and velocity, which in turn could contribute to altered stream channel morphology. The construction of the Storm Water System Upgrade/Expansion would result in a net zero increase in storm water runoff for the cantonment area. Additionally, increased water use would be necessary to support the added soldiers. A zero net increase in storm water runoff for the cantonment area would result in percolation of precipitation and recharge of groundwater supply. All development would follow guidelines outlined in the SPCC and SWPPP. Impacts on floodplains would be avoided to the highest extent practicable as outlined in EO 11988. However, no direct or indirect effects on floodplains from increased training would be expected.

Biological Resources. Short- and long-term, minor, direct and indirect adverse effects would be expected from increased levels of training. Military training activities that include maneuvering vehicles, foot traffic, and bivouacs are anticipated to increase in the designated areas under the Proposed Action. These

activities could damage plants through trampling and compaction in the short -term and in some cases adversely affect communities over the long -term.

An increase in noise associated by the increase in combat and convoy training and vehicles as part of the Proposed Action would result in short-term (during the training exercises), direct and indirect, adverse effects on terrestrial wildlife species. These effects would include subtle, widespread effects in the areas of increased activity from the overall elevation of ambient noise levels. This would result in reduced communication ranges, interference with predator and prey detection, or habitat avoidance during training exercises. Predictors of wildlife response to noise include noise type (i.e., continuous or intermittent), prior experience with noise, proximity to a noise source, stage in the breeding cycle, activity, age, and sex. Prior experience with noise is the most important factor in the response of wildlife to noise, because wildlife can become accustomed (or habituate) to the noise.

Minor adverse effects on habitat quality of wetlands would be expected in the areas where training occurs. These effects would in part be offset by the current range management Land Rehabilitation and Maintenance Program (LRAM) being done at the installation. Foot traffic, vehicle operations, and other training activities in wetland transition areas would result in direct and indirect effects on wetlands. These activities would result in (1) a potential change in the normal seasonal flow patterns in the wetland, (2) a potential increase in erosion and sedimentation into the wetland, and (3) a potential change in wetlands species composition and habitat diversity. Disturbance to wetlands could result in the introduction or spread of exotic species which could degrade wildlife habitat quality. Vehicle movement, foot traffic, construction, or other ground-disturbing activities would be avoided in riparian/wetland areas of the Proposed Action.

Threatened and Endangered Species. Long-term, minor, adverse effects on threatened and endangered species and their habitats would be expected from the increase in training. Increased training activities would be more focused at fixed facilities, such as TTBs, simulated urban training sites, convoy routes, and live-fire and practice weapons ranges. Existing and proposed TTBs, simulated urban training sites, and weapons ranges are located in San Joaquin kit fox habitat and in and near arroyo toad, vernal pool fairy shrimp, and purple amole sites. California condors could be found foraging in these areas as well. No increases in take or other adverse effects on California condor would be expected. The effects of increased training are not expected to result in an increase in take of San Joaquin kit fox. Kit fox sightings were very rare in the past decade and training would remain far below historic levels (FHL 2009e).

The San Antonio River watershed is known to be occupied by arroyo toads. Training activities would occur within this watershed. Increased use of the nine established river crossings in arroyo toad breeding habitat would be expected. The increased levels of training increase the probability of aestivating toads or toads moving to or from breeding sites (up to 1 kilometer from breeding areas) being affected by the training activities.

There is potential to encounter vernal pool fairy shrimp populations during increased training activities on other portions of the installation. Vernal pools at high risk of disturbance are marked for avoidance. The increased activity would lead to the potential for negligible, short-term, direct or indirect effects on vernal pool fairy shrimp as a result of the Proposed Action.

Long-term, indirect and direct adverse effects on purple amole would be anticipated due to increased foot traffic and bivouacking; however, purple amole sites would be marked for avoidance to minimize impacts.

Increased training levels would primarily affect existing roads and would likely result in minor increases in off-road vehicle traffic over that seen since 2000. More disturbances are expected within 30 meters of roads from vehicles turning around, as opposed to seeing an increase in vehicle tracks that continue off road. In conjunction with annual vernal pool and purple amole monitoring, FHL is expanding and modifying methods for marking vernal pool and purple amole sites for avoidance to minimize disturbance, especially along roadsides.

Cultural Resources. Adverse effects on cultural resources would be expected as a result of the training requirements associated with the Proposed Action. Increased training would double the current level of annual man-days (from approximately 750,000 man-days to 1,500,000 man-days). For this Proposed Action, increased training levels, ground-disturbing activities, and visual effects associated with the Proposed Action constitute the most relevant potential effects on cultural resources at FHL. The operational effects of the training requirements associated with the Proposed Action could occur from an increase in vehicular activity that might cause rutting in areas containing surface and subsurface cultural resources. Surface artifact scatters might also be affected by an increase in military pedestrian traffic. Lastly, subsurface cultural deposits could be affected not only by construction activity but also by continued or increased ordnance training. Protection of sites within the proposed actions would occur by avoidance, evaluation, or mitigation through the Section 106 process of the NHPA.

Socioeconomics and Environmental Justice. Under the Proposed Action, increased training levels are anticipated in all functional levels of the ARFORGEN model, including TTB, RTC, WAREXs, CSTC, and other training. It is expected that approximately 500 additional full-time personnel would be required to operate and support the increased mission at FHL (FHL 2007d, FHL undated). The addition of 500 full-time permanent personnel would represent a 30 percent increase in total installation personnel. Military personnel and their dependents could be housed on the installation within existing housing or within proposed housing projects, including Unaccompanied Senior Non-commissioned Officer (NCO) Personnel Housing (Project C5), Transient Quarters Complex (Project C7), Unaccompanied Enlisted Personnel Housing (UEPH) (Project C24), and Transient Enlisted Barracks (Project C35) (see **Appendix A**). However, civilian employees and contractors would require local housing. The area immediately surrounding the installation is rural and does not support a large housing stock. In 2000, census blocks 1296, 1299, 1300, and 1301 (an area adjacent to the northeastern portion of the installation) had 50 housing units, and only 2 units were vacant. Whereas, census blocks 1863, 1864, 1865, 1869, 1870, 1871, and 1872, which include the area adjacent to the east-central portion of the installation closest to the main gate, had 25 housing units, and only 3 units were vacant (U.S. Census Bureau 2001c).

However, there are adequate vacant housing units in the ROI, which includes more populated areas of Monterey and San Luis Obispo counties such as King City and San Luis Obispo, to accommodate the demand that could result from the Proposed Action. As presented in **Section 4.10.2**, in 2000, the ROI had 2,120 vacant housing units. Monterey County had 13,339 vacant housing units, while San Luis Obispo County had 11,382 vacant units in 2007. Monterey and San Luis Obispo counties had vacancy rates of 9.6 percent and 9.6 percent, respectively. The installation would also experience short-term population increases when approximately 3,000 to 5,000 soldiers and possibly up to 7,000 soldiers come to FHL to complete required training exercises (FHL 2007a), thereby increasing the future training load to approximately 1,500,000 man-days. All of these soldiers would be housed on the installation at one of the existing or proposed TTBs during the duration of the training exercises; Therefore this would not result in any effects on housing or social services. The increase in permanent and temporary personnel would result in a long-term, minor, adverse effect on housing and population.

Long-term, minor, beneficial effects on the local economy and employment in the ROI would be expected from the potential increase of expenditures in nearby communities. The soldiers permanently reassigned to and contractors employed at FHL would represent a 30 percent increase in installation personnel, while

the increase of 3,000 to 5,000 soldiers in training would represent a doubling of the current training level by 2012. The full-time personnel and soldiers temporarily training at FHL would have certain living and travel expenditures that would benefit the ROI and surrounding area. While beneficial, these effects would be localized and are not anticipated to significantly affect the local economies in the region.

Generally, the ROI, which consists of census tracts surrounding FHL in Monterey and San Luis Obispo counties, has lower percentages of minority residents than Monterey County, but higher percentages than San Luis Obispo County. The economic status of the ROI population is slightly lower than that of both Monterey and San Luis Obispo counties, although not to a disproportionate level. Increased training levels would likely increase noise production that might be experienced by off-installation populations. However, it would be expected that only residents in close proximity to the installation's eastern boundary would be adversely affected by increased noise levels, thereby representing only a small portion of the ROI.

The off-installation areas most likely to be affected by construction and operation of the Proposed Action would be adjacent to the northeastern portion and east-central portions of the installation. The off-installation area northeast of the installation encompasses blocks 1296, 1299, 1300, and 1301 within census tract 114. Within these blocks, 17.8 percent reported to be of a racial minority population and 16.3 were of Hispanic or Latino origin (see **Table 5-7**). The off-installation area east of the central portion of the installation encompasses blocks 1863, 1864, 1865, 1869, 1870, 1871, and 1872 within census tract 114. Within these blocks, 7.8 percent reported to be of a racial minority population and 7.8 were of Hispanic or Latino origin (see **Table 5-9**). The minority populations within both sets of census blocks (off-installation areas most likely to be affected by the Proposed Action) are not disproportionate when compared to the ROI or Monterey County, which include 30.7 percent and 44.1 percent, respectively, of residents of a racial minority and 38.3 percent and 46.8 percent, respectively, of Hispanic or Latino origin (see **Table 4-19**). The adverse effects from increased training levels that could potentially affect these areas include increased noise, which would be minor and would not be disproportionate to that experienced by on-installation residents.

Increased training would also increase helicopter operations at FHL, which would increase the quantity of SEL noise events and could represent an increase in the quantity of noise complaints (see **Section 5.4.1.1**, Noise). Noise complaints are most likely to occur from residences at higher elevations and in or adjacent to the Bradley Pass. The socioeconomic status of these areas cannot be determined due to their diffuse locations; however, current noise abatement procedures would be adhered to.

No disproportionate adverse effects on minority or low-income populations would be expected to occur from increased training under the Proposed Action. However, because the economic statuses of potentially affected residents east of the installation, at higher elevations, and near Bradley Pass are not known, increased training under the Proposed Action could have long-term, minor, adverse effects on off-installation populations due to noise production.

Infrastructure. Long-term, minor, adverse effects on infrastructure would be expected from the increase in military training. The increase in personnel training would increase the demand for all utilities and generate increased quantities of solid waste. A potential doubling in utility demand and solid waste generation could result from the increase in training. The water supply system, sanitary sewer system, and solid waste management service have sufficient available capacity to handle the potential increase in demand from added training. The propane gas and liquid fuels utilities are provided by outside contractors on an as-needed basis; therefore, outside contractors would handle the increase in demand for these utilities. Only the electrical system and the communication and data transmission system might not be able to handle the increase in demand from added training. The electrical system is currently operating at approximately 70 percent of available capacity. An increase in electrical demand might exceed the

available electrical capacity and require a second electrical supply circuit to be installed. A detailed electrical capacity analysis would be conducted prior to full training utilization to determine if the second electrical circuit would need to be installed. Use of the communication and data transmission system is not currently available; therefore, an increase in demand might exceed the available capacity of this system. Prior to full training utilization, a detailed communication and data transmission capacity analysis would be conducted to determine if the communication and data transmission system could support the increase in training. If the system would not be able to support the increased demand, the communication and data transmission system would need to be improved prior to the implementation of full training at FHL.

Traffic and Transportation. Long-term, intermittent, minor, adverse effects on traffic at FHL would be expected as a result of the training requirements associated with the Proposed Action. Increased training would double the current level of annual man-days (from approximately 750,000 man-days to 1,500,000 man-days), and increase the temporary and permanent population on FHL. There are no notable traffic or congestion problems in or around the installation; however, military training activities would temporarily increase traffic on local and installation roads, particularly when units arrive and depart. Since most soldiers traveling to FHL would arrive at nearby airfields and be bused to the installation, the increase in vehicles at FHL from the Proposed Action would mainly be from the increase in support personnel and families and would likely be minor. Additionally, since troops would generally remain in the proposed TTBs and other training areas, and these areas are removed from residential and administrative areas on the installation, adverse effects on traffic due to increased training activities would not be significant.

Increased unit training and vehicle movement on the installation would result in long-term, negligible to moderate, adverse effects on installation roads. As a result of the training load on FHL doubling, the roadways in the installation's training areas and cantonment area would likely require more frequent maintenance.

Hazardous Materials and Waste. Direct and indirect long-term, minor adverse effects on hazardous materials use and hazardous waste generation would result from the increased volume of training. With the proposed doubling of the volume of training at FHL there would be additional refueling points, greater frequency of refueling, and increased use of U.S. Army equipment. Additionally, several proposed training ranges are intended for the familiarization of construction and U.S. Army equipment. FHL recognizes that there are no means presently available to eliminate these hazardous waste streams. In accordance with the Hazardous Waste Management Plan and Business Response and Installation Spill Contingency Plan all contaminated soils would be excavated and transported off installation to a permitted hazardous waste disposal facility (U.S. Army 2001a, FHL 2001).

Health and Safety. Increased training associated with implementation of the Proposed Action would double the current level of annual man-days (from approximately 750,000 man-days to 1,500,000 man-days), and increase the temporary and permanent population at FHL. This increase in soldiers and training activities would likely increase the risks faced by military personnel during training activities, thereby resulting in more accidents on an annual basis. It is also likely that the proposed increases in population and training would comparably increase traffic accidents and wildfires. The increase in soldiers combined with the risk of injuries and fires due to intensive training and weapons firing would moderately increase the demand on emergency services. Therefore, a long-term, minor adverse effect on health and safety due to increased training could occur.

5.5 Analysis of All Proposed Projects

Table 5-19 summarizes the potential environmental consequences associated with the remainder of the installation development projects that are identified in **Appendix A** but not previously analyzed as representative projects. The intent of the table in this section is to focus on those potential environmental consequences that would be expected as a result of location- or operation-specific activities. All range, training area infrastructure, and cantonment area demolition and construction activities generally would be expected to result in some increased noise, increased air emissions, potential for erosion and transport of sediment into surface water bodies, minor interruptions to traffic flow, generation of small amounts of hazardous materials and wastes, and generation of construction and demolition waste. All range, training area infrastructure, and cantonment area demolition and construction activities generally would be expected to result in minor beneficial effects on socioeconomics as a result of job creation and materials procurement. Furthermore, it should be assumed that demolition or renovation activities in older buildings have the potential to disturb ACM or LBP and the appropriate identification, handling, removal, and disposal of those materials would occur in accordance with existing FHL management plans and Federal, state, DOD, and USARC regulations and guidance. These types of short-term, construction-related effects are identified in **Section 5.3**, Hazardous Materials and Waste. Therefore, they are not identified as constraints to development in **Table 5-19** for each project; it is assumed that, in the absence of unique constraints, the potential environmental effects associated with the size of a demolition or construction project would be similar to those described in **Sections 5.3**, **5.4.1**, **5.4.2**, and **5.4.3**. The potential environmental consequences associated with implementation of all other projects and the potential constraints that are identified in **Table 5-19** (i.e., those not identified as "no or negligible effects") are elaborated upon as necessary in **Section 5.3**. The location of all proposed projects in **Appendix A** and environmental constraints are shown in **Figures 5-10** through **5-15**.

All construction and infrastructure activities would adhere to FHL's existing plans and policies that have been identified and referenced throughout **Sections 2**, **4**, **5**, **6**, and **7** of this EA. **Table 5-19** is not meant to substitute for or initiate coordination that might be required as a result of the proposed activities; it is meant to identify potential effects on sensitive resources. The following summarizes the potential adverse effects associated with constraints for the projects identified in **Appendix A** and the existing management plans and policies regarding those affected resources.

Table 5-19. Potential Environmental Consequences from All Proposed Projects Listed in Appendix A

Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
Representative Training Infrastructure Construction Projects in non-Cantonment Areas										
TI1. Schoonover TTB	♦	♦ EX	-	♦ ESCP	♦ NPDES	♦	♦ VS	♦	♦	♦
TI2. Milpitas TTB	♦	-	-	♦ ESCP	♦ NPDES	♦	♦	♦	♦	♦
TI3. Heavy Equipment Operator Training Site	♦	♦	♦	♦ ESCP	♦ NPDES	♦	-	-	♦	-
Other Training Related Infrastructure Projects IN non-Cantonment Areas										
TI4. 8J TTB Expansion	-	-	-	♦ ESCP	♦ NPDES	♦	♦	♦	♦ HAZ	-
TI5. Camp Ward TTB Expansion	-	-	-	♦ ESCP	♦ NPDES	♦	♦	♦	♦ HAZ	-
TI6. Urban Operations Training Site	-	-	-	♦ ESCP	♦ NPDES	-	♦	♦	-	-

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

■ Potentially significant (greater magnitude than representative projects)

Key:

ESCP = Erosion-and-sediment-control plan

ERP = Within or near known ERP site

EX = Exclusion area

HAZ = Change in quantity or storage for hazardous materials or wastes

NPDES = Erosion-and sediment-control plans recommended

SDZ = Surface Danger Zone

SRPA2 = Sensitive Resource Protection Area 2

VS = Potentially affected viewshed

Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
TI7. Improve Sulphur Springs Road	-	-	-	♦ ESCP	♦ NPDES	♦	♦	♦	-	⊕
Other Training Related Infrastructure Projects IN non-Cantonment Areas (continued)										
TI8. TTB 1 Support	-	-	-	-	-	♦	♦	♦		-
TI9. Schoonover Airfield Taxiway	-	♦ EX	♦	♦ ESCP	♦ NPDES	♦	♦	♦	-	-
TI10. Truck Driver Training Site	-	♦ SRPA 2	♦	♦ ESCP	♦ NPDES	♦	♦	♦	-	♦
TI11. Asphalt Plant and Rock Crusher	♦	-	♦	♦ ESCP	♦ NPDES	♦	♦	♦	♦ HAZ	-
TI12. Expansion of Soil Borrow Site 13	-	-	♦	♦ ESCP	♦ NPDES	♦	♦	♦	-	-
TI13. Develop Shale Borrow Site	-	-	♦	♦ ESCP	♦ NPDES	♦	♦	♦	-	-
TI14. MWR Facility	-	-	♦	♦ ESCP	-	♦	♦	♦	-	-

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

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Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
TI15. TTB Communications upgrades	-	-	-	-	-	♦	♦	♦	-	-
Representative Range Products										
R1. MPMG Range	♦	♦ SDZ	♦	♦ ESCP	♦ NPDES	♦	-	♦	♦	-
R2. Light Demolition Range	♦	- SDZ	♦	♦ ESCP	♦ NPDES	♦	-	-	♦	♦
R3. Hand Grenade Familiarization Course	♦	♦ SDZ	♦	- ESCP	♦ NPDES	♦	-	-	♦	♦
Other Range Projects										
R4. Zero Ranges (two)	♦	♦ SDZ	♦	-	-	♦	♦	♦	-	♦ SDZ
R5. M203 Grenade Launcher Range	♦	♦ SRPA 2	♦	♦ ESCP	♦ NPDES	♦	♦	♦	-	-
R6. Enemy Prisoner of War (EPW) Facility	-	-	♦	♦ ESCP	-	♦	♦	♦	-	-

Legend:

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Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
R7. MWR Camping Area	-	-	-	-	-	♦	♦	♦	-	-
Other Range Projects (continued)										
R8. Urban Operations Training Site	-	-	-	♦ ESCP	♦ NPDES	♦	♦	♦	-	-
R9. Urban Assault Course Station 4	-	-	-	♦ ESCP	-	♦	♦	♦	-	-
Representative Military Construction in the cantonment Area (Construction) Projects										
C1. Equipment Concentration Site (Warehouse, Maintenance Facility, and ECS Yard)	♦	-	♦	♦ ESCP	♦ NPDES	♦	-	♦	♦	♦
C2. Consolidated Vehicle Wash-Rack	♦	-	♦	♦ ESCP	♦ NPDES	♦	-	-	♦	♦

Legend:

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- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

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Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
C3. Storm Water System Upgrade/Expansion	♦	♦ / ⊕	-	♦ / ⊕ ESCP	♦ / ⊕ NPDES	♦ / ⊕	♦	- / ⊕	♦ / ⊕	♦ / ⊕
Other Military Construction in the Cantonment Area (Construction) Projects										
C4. Physical Fitness Center	-	-	♦	♦ ESCP	-	♦	-	-	-	-
C5. Unaccompanied Personnel Housing, Senior NCO (Transient Training NCO billets)	-	-	♦	♦ ESCP	♦ NPDES	♦	♦ VS	-	-	-
C6. Rotary-Wing Aircraft Landing Pad (Medivac)	♦	-	♦	-	-	♦	-	-	-	-
C7. Transient Quarters Complex	-	-	♦	♦ ESCP	♦ NPDES	♦	♦ VS	-	-	-
C8. Regional Training Center – Medical Facility	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	♦ HAZ	-

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

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Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
C9. Education Center	-	-	♦	♦ ESCP	-	♦	-	-	-	-
Other Military Construction in the Cantonment Area (Construction) Projects (continued)										
C10. Transient Training Officers Quarters	-	-	♦	♦ ESCP	♦ NPDES	♦	♦ VS	-	-	-
C11. Marksmanship Training Facility	-	-	♦	♦ ESCP	-	♦	-	-	-	-
C12. Family Care Clinic	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	-	-
C13. Operational Readiness Training Center	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	-	-
C14. Utility Upgrade Phase 1	-	-	-	-	-	♦	-	-	-	-
C15. Fire Response Site at Schoonover Airfield	-	-	♦	♦ ESCP	-	♦	♦ VS	-	-	-

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

■ Potentially significant (greater magnitude than representative projects)

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Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
C16. Training Exercise Warehouse	-	-	♦	♦ ESCP	-	♦	-	-	-	-
Other Military Construction in the Cantonment Area (Construction) Projects (continued)										
C17. Family Life Center	-	-	♦	♦ ESCP	-	♦	-	-	-	-
C18. Consolidated Housing Furniture, Storage	-	-	♦	♦ ESCP	-	♦	-	-	-	-
C19. Storage Building, General Purpose Org ESC and RTC	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	-	-
C20. Training Aids Center (TAC)	-	-	♦	♦ ESCP	-	♦	-	-	♦ HAZ, ERP	-
C21. Emergency Services Center	-	-	♦	♦ ESCP	♦ NPDES	♦	♦ VS	-	-	⊕
C22. Logistics Warehouse	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	♦ HAZ	♦

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

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Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
C23. Logistics Maintenance Facility, fenced with parking	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	♦ HAZ ERP	♦
Other Military Construction in the Cantonment Area (Construction) Projects (continued)										
C24. Unaccompanied Enlisted Personal Housing (UEPH)	-	-	♦	♦ ESCP	-	♦	-	-	-	-
C25. Unaccompanied Enlisted Personal Housing (UEPH)	-	-	♦	♦ ESCP	-	♦	-	-	-	-
C26. Unaccompanied Enlisted Personal Housing (UEPH)	-	-	♦	♦ ESCP	-	♦	-	-	-	-
C27. Community Activity Center	-	-	♦	♦ ESCP	-	♦	-	-	-	-

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

■ Potentially significant (greater magnitude than representative projects)

Key:

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Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
C28. Regional Training Site-Medical Warehouse	-	-	♦	♦ ESCP	-	♦	-	-	♦ HAZ	-
Other Military Construction in the Cantonment Area (Construction) Projects (continued)										
C29. General Instruction Building (Training Site and Army Reserve School) (104th)	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	-	-
C30. Battle Command Training Center	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	-	-
C31. Army Reserve Center (104th, 356th, OPFOR)	-	-	♦	♦ ESCP	-	♦	-	-	-	-
C32. Maintenance Shop, General Purpose (DOL)	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	♦ HAZ, ERP	♦

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

■ Potentially significant (greater magnitude than representative projects)

Key:

ESCP = Erosion-and-sediment-control plan

ERP = Within or near known ERP site

EX = Exclusion area

HAZ = Change in quantity or storage for hazardous materials or wastes

NPDES = Erosion-and sediment-control plans recommended

SDZ = Surface Danger Zone

SRPA2 = Sensitive Resource Protection Area 2

VS = Potentially affected viewshed

Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
C33. Entomology Facility 2,100 Modify portion of B 252	-	-	♦	-	-	♦	-	-	♦ HAZ, ERP	♦
Other Military Construction in the Cantonment Area (Construction) Projects (continued)										
C34. Administrative Building, General Purpose (Garrison Activities) 91st	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	♦ HAZ, ERP	-
C35. Enlisted Barracks, Transient Training	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	-	-
C36. Court Area	-	-	-	-	-	♦	-	-	-	-
C37. Playground	-	-	-	-	-	♦	-	-	-	-
C38. Softball Fields	-	-	-	♦ ESCP	♦ NPDES	♦	-	-	-	-
C39. Recreational Shelter	-	-	-	-	-	♦	-	-	-	-
C40. Dining Facility	-	-	♦	-	-	♦	-	-	-	-

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

■ Potentially significant (greater magnitude than representative projects)

Key:

ESCP = Erosion-and-sediment-control plan

ERP = Within or near known ERP site

EX = Exclusion area

HAZ = Change in quantity or storage for hazardous materials or wastes

NPDES = Erosion-and sediment-control plans recommended

SDZ = Surface Danger Zone

SRPA2 = Sensitive Resource Protection Area 2

VS = Potentially affected viewshed

Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
C41. Storage Building, General Purpose Installation DOL/DPW	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	♦ HAZ	-
Other Military Construction in the Cantonment Area (Construction) Projects (continued)										
C42. Chapel	-	-	♦	-	-	♦ -	-	-	-	-
C43. Physical Fitness Center with Parking Lot*	-	-	♦	♦ ESCP	♦ NPDES	♦	-	-	-	-
C44. Auto-Aide Instruction Building	-	-	♦	♦ ESCP	-♦ NPDES	♦	-	-	♦ HAZ	♦
C45. Bank	-	-	♦	-	-	♦	-	-	-	-
C46. Repair Range Area Bridges	-	-	-	-	-	♦	-	-	-	-
C47. Facility Campground	-	-	-	-	-	♦	-	-	-	-

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

■ Potentially significant (greater magnitude than representative projects)

Key:

ESCP = Erosion-and-sediment-control plan

ERP = Within or near known ERP site

EX = Exclusion area

HAZ = Change in quantity or storage for hazardous materials or wastes

NPDES = Erosion-and sediment-control plans recommended

SDZ = Surface Danger Zone

SRPA2 = Sensitive Resource Protection Area 2

VS = Potentially affected viewshed

Project Identification Number and Title	Noise	Land Use	Air Quality	Geological Resources	Water Resources	Biological Resources	Cultural Resources	Threatened and Endangered Species	Hazardous Materials and Wastes	Health and Safety
C48. Recreation Center	-	-	♦	-	-	♦	-	-	-	-
C49. The Army School System Center	-	-	♦	-	-	♦	-	-	-	-

Legend:

a. Indicates reuse of existing building; additional construction might not be required.

- No effects or negligible effects

⊕ Potential minor beneficial effects

♦ Potential minor or moderate adverse effects

■ Potentially significant (greater magnitude than representative projects)

Key:

ESCP = Erosion-and-sediment-control plan

ERP = Within or near known ERP site

EX = Exclusion area

HAZ = Change in quantity or storage for hazardous materials or wastes

NPDES = Erosion-and sediment-control plans recommended

SDZ = Surface Danger Zone

SRPA2 = Sensitive Resource Protection Area 2

VS = Potentially affected viewshed

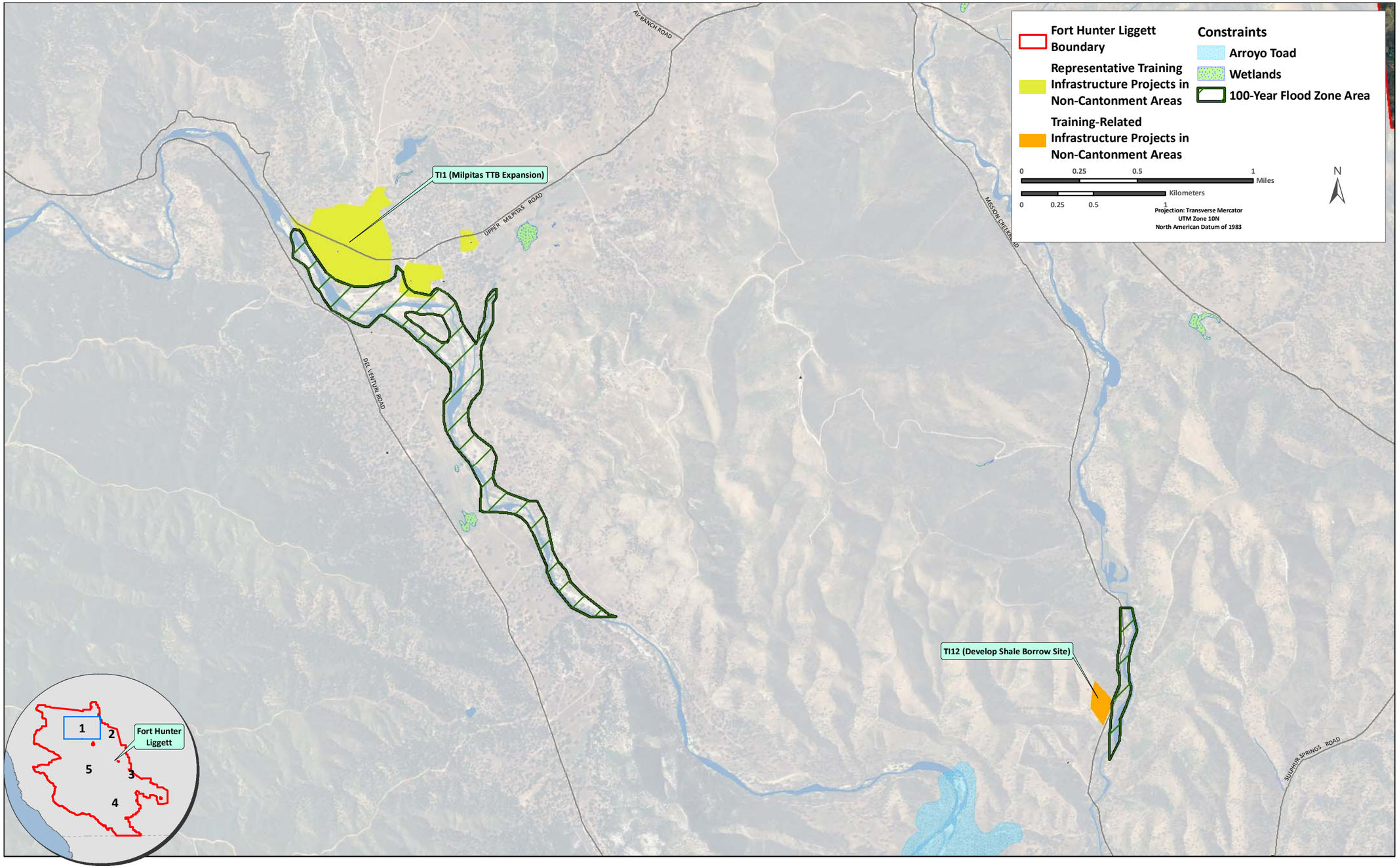

Figure 5-10. Location and Environmental Constraints of Projects TI2 and TI13.

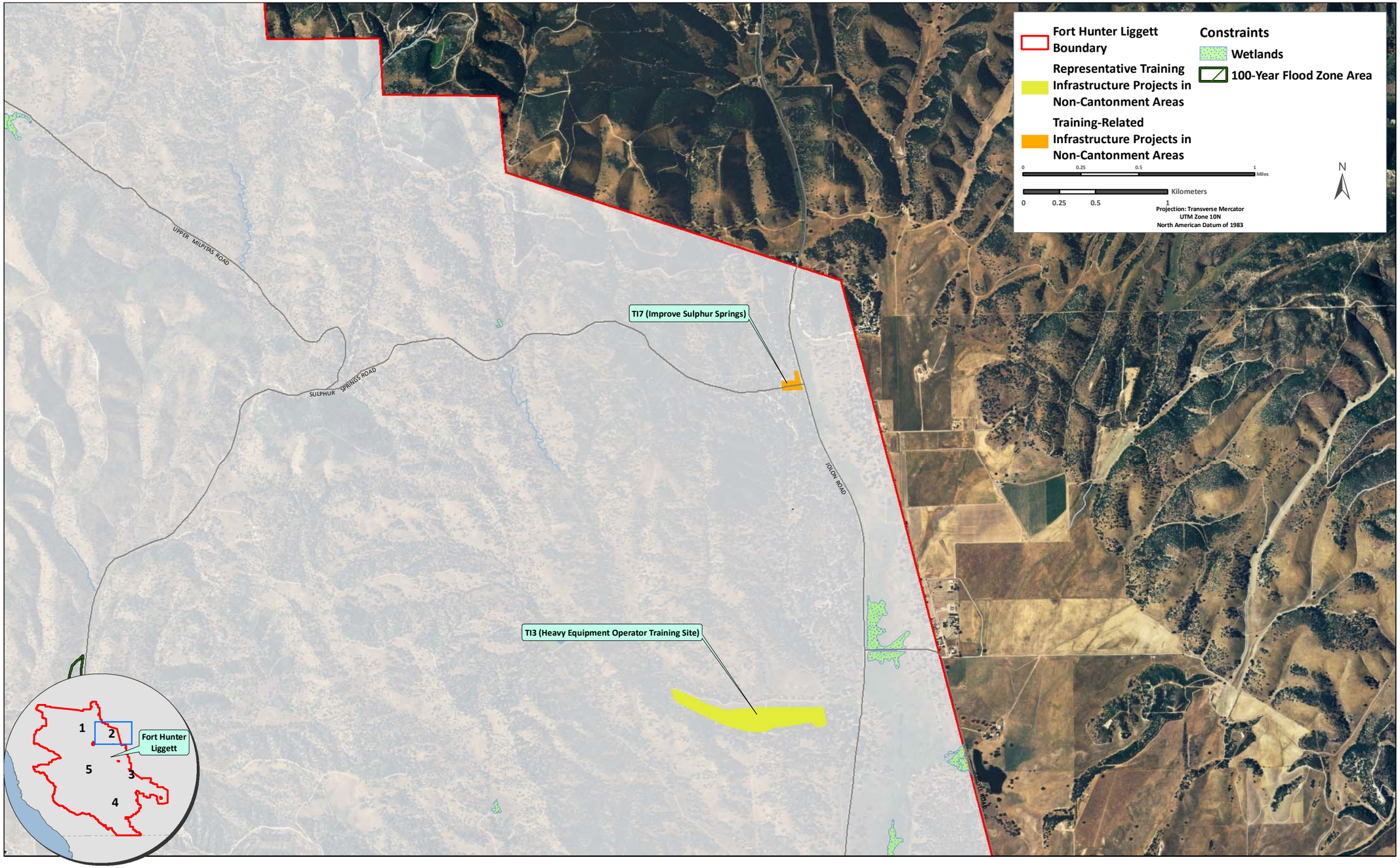

Figure 5-11. Location and Environmental Constraints of Projects TI3 and TI7.

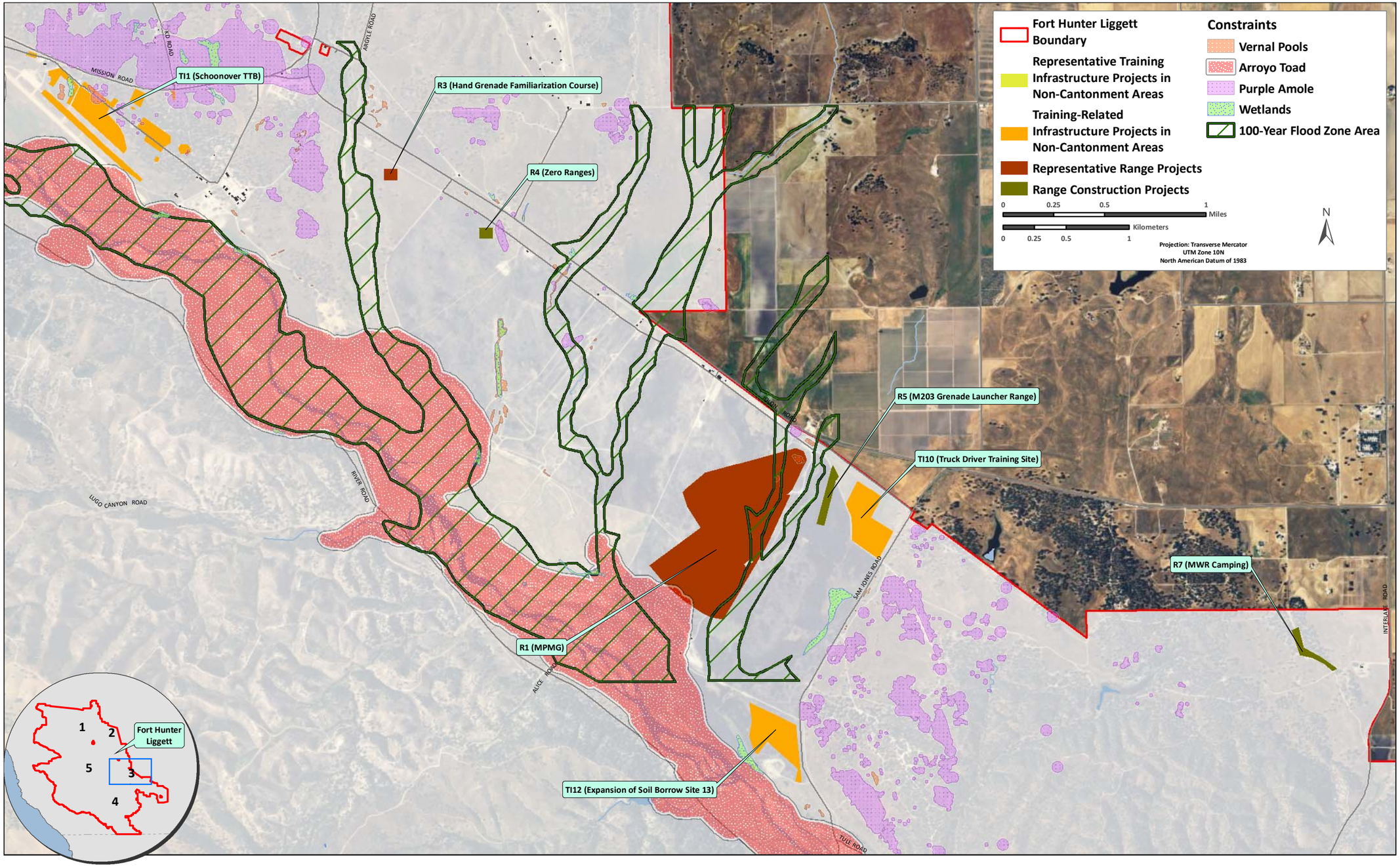

Figure 5-12. Location and Environmental Constraints of Projects TI1, TI10, TI11, R1, R3, R4, R5, and R7.

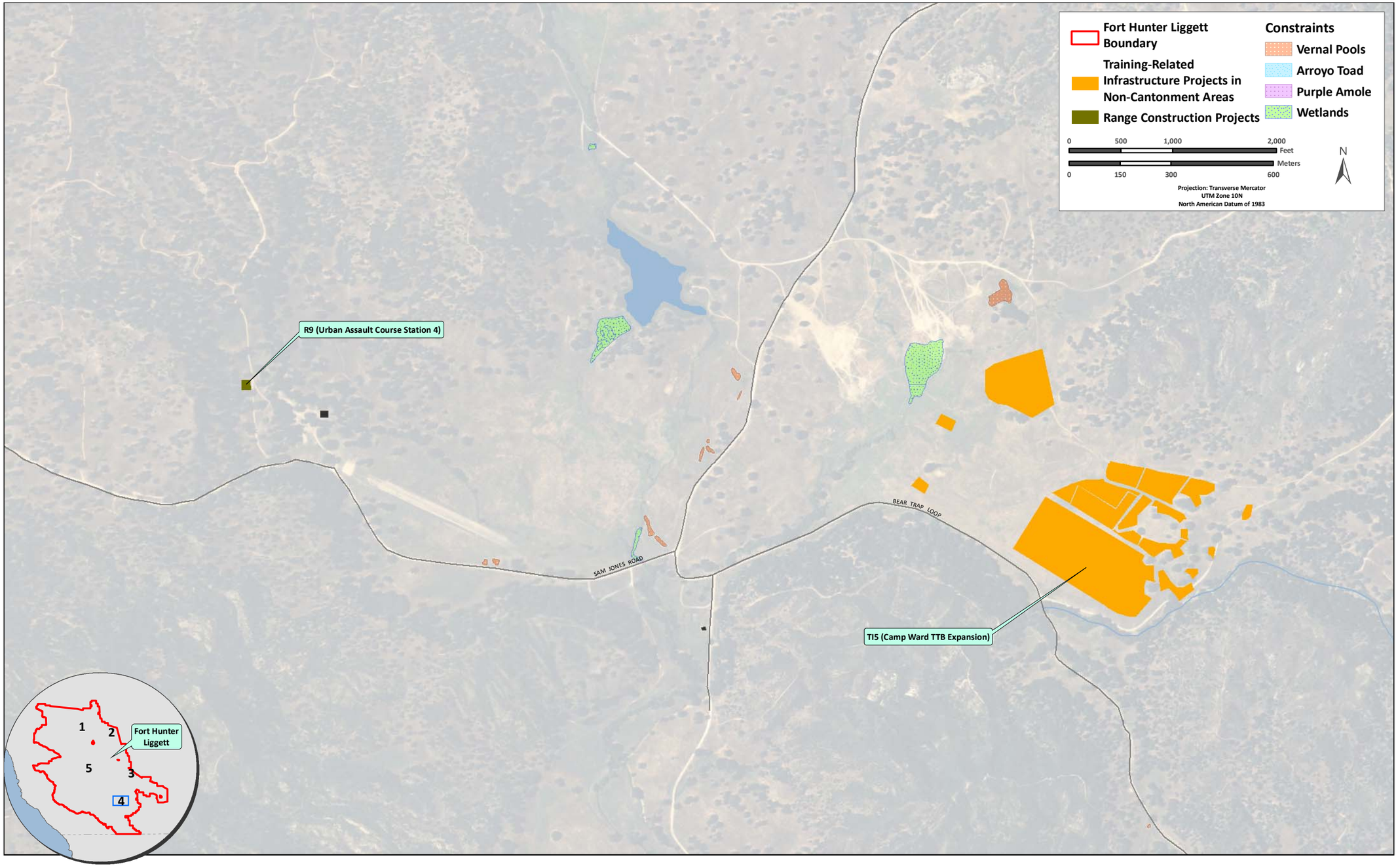

Figure 5-13. Location and Environmental Constraints of Projects R9 and TI5.

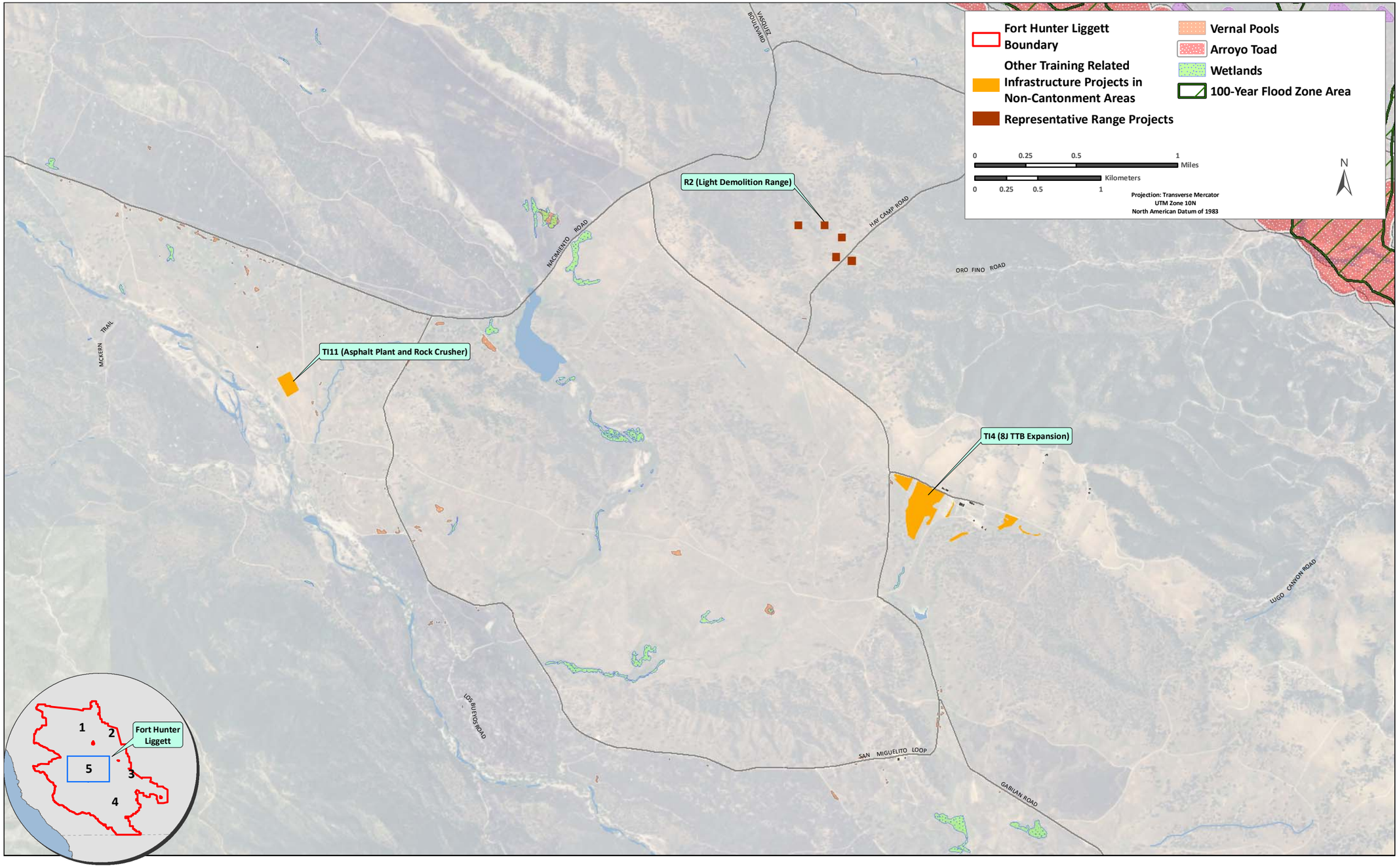

Figure 5-14. Location and Environmental Constraints for Projects TI11, R2, and TI4

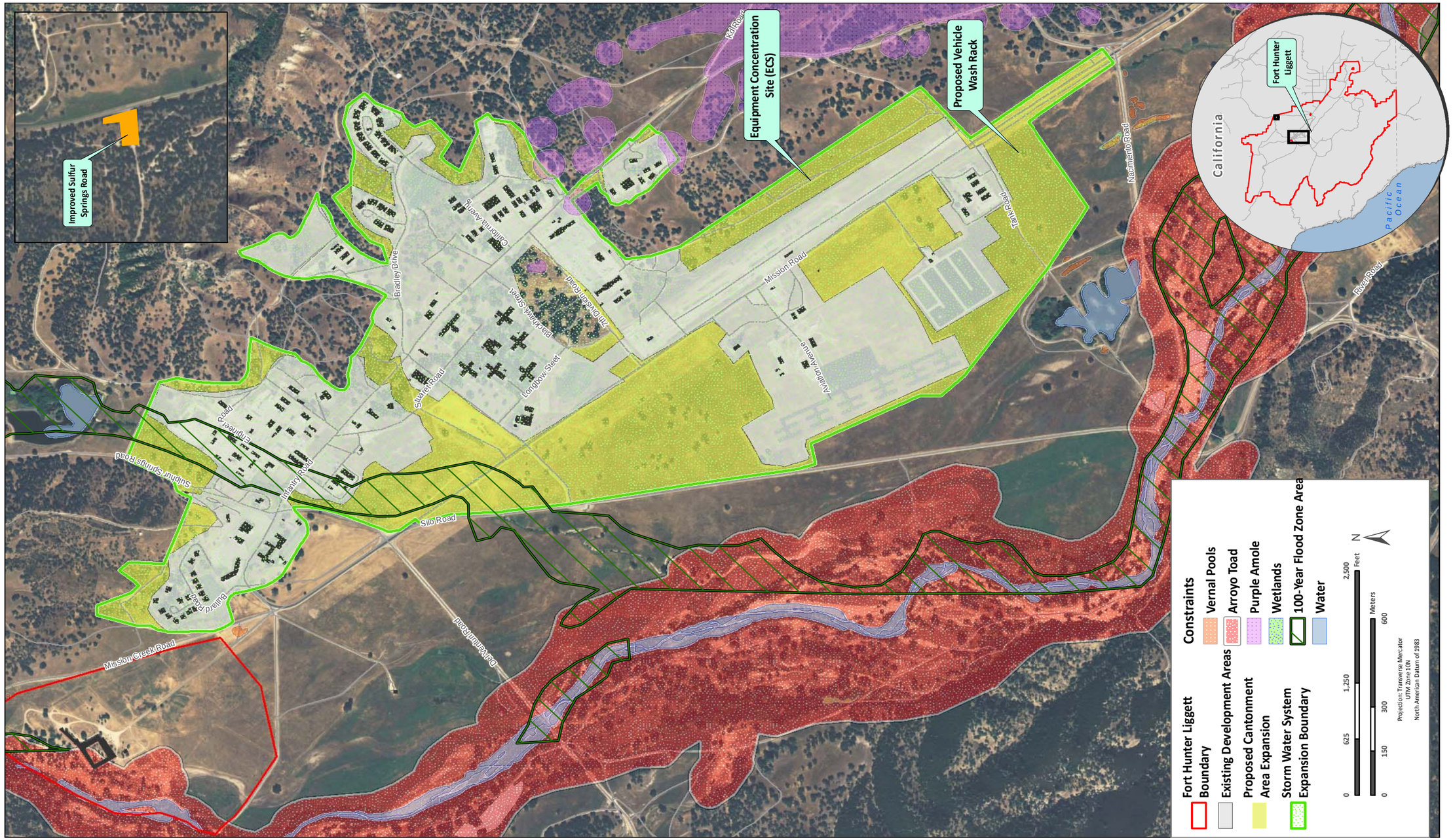

Figure 5-15. Location and Environmental Constraints for Projects in Cantonment

6. Cumulative and Adverse Impacts

6.1 Projects Identified With the Potential for Cumulative Effects

Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

The geographic ROI is an important consideration when discussing cumulative effects. For the purposes of this analysis, the ROI was determined to be FHL Army Garrison and the adjacent communities, including the City of Lockwood.

An effort was undertaken to identify other projects for evaluation in the context of the cumulative effects analysis. This was further developed through review of public documents and information gained from the coordination with various applicable agencies. Furthermore, cumulative impacts of this Proposed Action are thoroughly analyzed throughout the document by virtue of the effects of increased training being considered as part of the Proposed Action.

Activity within the adjacent communities was negligible. Planning for the ROI was undertaken by the South County Planning Area of Monterey County. The South County Planning Area is the largest and least populated of the Planning Areas in Monterey County. Overall, the future vision for the South County Area will be to maintain its rural character and expand the agriculturally based economy for the South County, while enhancing infrastructure and community services for the small, unincorporated communities. The vision for the South County will be to achieve a balance between the two perspectives of restricting additional subdivisions while maintaining property rights. The vision includes the development of the proposed Jolon Road winery corridor, providing revenue and jobs in the area. However, the development of this corridor is dependent upon concurrent improvement of the Planning Area's infrastructure (Monterey County 2005b). Industry within the ROI appears limited to some gas and oil exploration.

Past actions within the ROI mostly center on past activity at FHL. Training has occurred at varying degrees of intensity throughout the past 60 to 70 years. It is important to note that this activity was at a much greater level, occurred without the benefit of current environmental law, and impacted a much greater area of the garrison. Because the original boundaries extended westward from upland ridges and valleys in the Santa Lucia Mountains to the Pacific Ocean, naval personnel staged landings and practiced long-range artillery firing from the coast, in addition to Army infantry maneuver and artillery training on land. In 1956, military requirements for sophisticated technology resulted in the Fort Ord-based Combat Development and Experimentation Command (CDEC, later TEXCOM) conducting field laboratory tests within FHL boundaries. For four decades, CDEC activities included specialized tests and experimentation on equipment for soldiers, communications systems, weaponry, and armored vehicles (FHL 2008g). These activities far exceed the effects of the Proposed Action.

6.2 Cumulative Effects Analysis

Table 6-1 summarizes potential cumulative effects on resources from the Proposed Action when combined with other past, present, and future activities. Only those actions that are additive to the training infrastructure, range construction, and cantonment area construction projects and increased levels of training associated with the Proposed Action are considered.

Table 6-1. Cumulative Effects on Resources

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Airspace Management and Aircraft Safety	Past aircraft and helicopter activity supported division-level training exercises.	Aircraft and helicopter activity supports current Brigade-level of training	Increases in the number of Brigade-level exercises would result in a corresponding increase in aircraft and helicopter activity. No significant effect would result.	Continued increases in training operations could result in a continued increase in aircraft and helicopter activity.	Cumulative aircraft and helicopter activity would not pose a significant increase in aircraft operations and safety when compared to known past activity associated with division-level training.
Noise	Helicopter and aircraft activities and heavy artillery use during division-level training were the dominant noise sources.	Helicopters and aircraft activities in addition to small arms fire are the dominant noise sources.	Short-term noise impacts from construction and demolition. Long-term minor increase in noise from increase in aircraft, helicopter, and small arms range activity. No significant effect would result.	Continued increases in training operations could result in increased noise.	Aircraft and helicopter activities along with small arms fire will remain the dominant noise sources. Effect not significant.
Land Use	Past development practices have extensively modified land use.	Military installation and agricultural land uses.	No change in overall land use, and no significant effect would result.	No changes to current zoning or deviations of Military Development Plans anticipated.	Proposed Action would not significantly induce further development beyond the Proposed Action Effect not significant.

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Air Quality	AQCRs are classified as being in attainment.	Emissions from aircraft, vehicles, and stationary sources such as dust generated from training activities on unpaved surfaces.	Potential dust generation during construction and demolition activities and emissions due to asphalt paving activities. No significant effect would result.	Continued increases in field training and small arms range use and increases in aircraft and helicopter operations.	Minor long-term effects on air quality. Cumulative effects however will remain low beyond completion of construction component of the Proposed Action.
Water Resources	Surface water quality moderately impacted by past training activity.	Pollution from industrial and municipal sources is generally low.	Potential sedimentation from construction activities and an increase in percentage of impervious surface area. No significant effect would result.	Continued development of area would result in sedimentation from construction activities, and increase in impervious surfaces.	Increased impervious area would have minor impacts on storm water discharges and water quality. Proposed Action would not induce further degradation of water quality. Effect not significant.
Biological Resources	Degraded habitat of sensitive and common wildlife species.	Presence and operation of facilities and training lands impact wildlife and their habitat.	Minor disturbance of vegetation by construction. Moderate habitat loss as a result of construction. Indirect moderate adverse effects on wetlands. No significant effect would result.	Development of area would impact vegetation communities and wildlife habitat.	Permanent loss of vegetation and habitat. Indirect minor adverse effects on wetlands. Effect not significant.

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Threatened and Endangered Species	Degraded habitat of threatened and endangered species.	Presence and operation of facilities and training lands impact threatened and endangered species and their habitat.	Moderate disturbance and loss of threatened and endangered species habitat. No significant effect would result.	Development of area would have continuing minor impacts on threatened and endangered species habitat.	Permanent loss of threatened and endangered species habitat would be minimized through continued natural resources management and ITAM programs.
Cultural Resources	Possible destruction of eligible historic properties and archaeological sites. Unknown impacts on traditional cultural properties.	Presence and operation of facilities and training lands have no significant effects.	Possible significant effects that can be minimized through avoidance or consultation with the SHPO. No significant effect would result.	General development might have effects on viewsheds, archaeological sites, and traditional cultural properties. Consultation with the SHPO would be required to avoid significant effects.	Increased activity leading to erosion and deflation of landscapes could potentially have long-term, indirect, significant effects. Procedures following the ICRMP including survey, monitoring, and site protection will help minimize cumulative impacts.
Socioeconomics and Environmental Justice	FHL contributes to local economic community.	Continued support of local economic community.	Minor to moderate contribution to local construction industry. No significant effect would result.	Continued development of wine industry and oil and gas exploration area would impact local economy and services.	Minor stimulation of local economic community in context of increased level of service support.

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Infrastructure	Infrastructure developed to support current cantonment area.	FHL continues to improve infrastructure system.	New development and increased usage of infrastructure. No significant effect would result.	Road and infrastructure improvements on the installation.	Construction of new facilities and training facility upgrades combined with local development of wine industry would have a major effect on some aspects of infrastructure and a corresponding need to upgrade infrastructure.
Traffic and Transportation	Past division-level training exercises resulted in heavy convoy activity that impacted local traffic flows.	Current traffic flow relates to day-to-day operations and various schoolhouse training activities. Units primarily arrive by bus or aircraft with minimal convoy activity.	Potential increase in POVs associated with increase in number of FTEs and attendees to schoolhouses. Increases in Brigade-level training would increase vehicular activity on installation but would not likely have a major effect on adjacent county roads. No significant effect would result.	Increases in POVs arriving to the installation and increased combat vehicle activity on installation as a result of increases in operations.	Long-term, minor, adverse effects on traffic and transportation could result from increased operations but would be negligible when compared to past activity associated with division-level convoys arriving and training at FHL.

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Hazardous Materials and Wastes	34 ERP sites and 12 MMRP sites have been identified.	Presence and operation of facilities and training operations on ranges.	Small quantities of materials used and wastes generated during projects. Potential for workers to encounter hazardous materials and wastes within ERP sites. No significant effect would result.	Development of several maintenance facilities and TTB field operations will increase hazardous material use and waste generated but not to levels that cannot be managed by current practices.	Construction and demolition activities would have a minor effect on hazardous materials and wastes. Effect not significant. Potential for long-term, minor, beneficial effects created by possible further cleanup of ERP sites.

6.3 Reasonable and Prudent Measures and Best Management Practices

The Proposed Action would not result in significant adverse effects on the land or the surrounding area. However, BMPs and other minimization measures would be implemented to eliminate or reduce the impacts of adverse effects.

General BMPs that might be included as parts of the Proposed Action are summarized as follows:

- Clearing and grubbing would be timed with construction to minimize the exposure of cleared surfaces. Such activities would not be conducted during periods of wet weather. Construction activities would be staged to allow for the stabilization of disturbed soils. These BMPs would minimize adverse impacts associated with geological resources and water resources.
- Fugitive dust-control techniques such as watering and stockpiling would be used to minimize adverse effects. All such techniques would conform with applicable regulations. These BMPs would minimize adverse impacts associated with air quality, geological resources, and water resources.
- Soil erosion-control measures, such as soil erosion-control mats, silt fences, straw bales, diversion ditches, riprap channels, water bars, water spreaders, and hardened stream crossings, would be used as appropriate. These BMPs would minimize adverse impacts associated with geological resources and water resources.
- Minimize the disturbance of environmental resources and topography by integrating existing vegetation, trees, and topography into site design. These BMPs would minimize adverse impacts associated with geological resources and biological resources.
- Where feasible, minimize areas of impervious surface through shared parking, decked or structured parking, increased building height, or other measures as appropriate. These BMPs would minimize adverse impacts associated with geological resources and water resources.
- Provisions would be taken to prevent pollutants from reaching the soil, groundwater, or surface water. During project activities, contractors would be required to perform daily inspections of equipment, maintain appropriate spill-containment materials on site, and store all fuels and other materials in appropriate containers. Equipment maintenance activities would not be conducted on the construction site. These BMPs would minimize adverse impacts associated with geological resources, water resources, and hazardous materials and waste.
- Physical barriers and “no trespassing” signs would be placed around the demolition and construction sites to deter children and unauthorized personnel. All construction vehicles and equipment would be locked or otherwise secured when not in use. These BMPs would minimize adverse impacts associated with health and safety.
- Construction equipment would be used only as necessary during the daylight hours and would be maintained to the manufacturer’s specifications to minimize noise impacts. These BMPs would minimize adverse impacts associated with health and safety.

Construction impacts are short-term environmental effects resulting from the process of building the Proposed Action. Construction impacts might involve temporary changes in noise levels, air quality, water quality, land use, and community access.

6.4 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

Hazardous Materials and Waste. The generation of hazardous materials and wastes is an unavoidable condition associated with the Proposed Action. However, the potential for this would not significantly increase over baseline conditions and, therefore, is not considered significant.

Energy Resources. The use of nonrenewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action or No Action Alternative.

6.5 Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

The Proposed Action would be consistent with all applicable land use ordinances.

6.6 Relationship Between the Short-term Use of the Environment and Long-term Productivity

Short-term uses of the biophysical components of human environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

The Proposed Action would not result in an intensification of land use in the surrounding area. Development of the Proposed Action would not represent a significant loss of open space. Therefore, it is anticipated that the Proposed Action would not result in any cumulative land use or aesthetic impacts.

6.7 Irreversible and Irretrievable Commitments of Resources

The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of material resources, energy resources, land, biological habitat, and human resources. The use of these resources is considered to be permanent.

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals).

Material Resources. Material resources used for the Proposed Action and alternatives include building materials (for renovation or construction of facilities), concrete and asphalt (for parking lots and roads), and various material supplies (for infrastructure) and would be irreversibly lost. Most of the materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered significant.

Energy Resources. No significant impacts would be expected on energy resources used as a result of the Proposed Action, though any energy resources consumed would be irretrievably lost. These include petroleum-based products (e.g., gasoline and diesel), and electricity. During construction, gasoline and

diesel would be used for the operation of construction vehicles. During operation, gasoline or diesel would be used for the operation of privately owned and government-owned vehicles. Electricity would be used by operational activities. Consumption of these energy resources would not place a significant demand on their availability in the region.

Biological Habitat. The Proposed Action would result in the loss of some vegetation and wildlife habitat.

Human Resources. The use of human resources for construction and operation is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action and alternatives represent employment opportunities, and is considered beneficial.

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7. Conclusions and Recommendations

The EA contains a comprehensive evaluation of the existing conditions and environmental consequences of the Proposed Action. The conclusions in this section are limited to the Proposed Action and the No Action Alternative, as required under NEPA.

7.1 Impacts Identified

Implementation of the Proposed Action would not affect airspace management or land use. Beneficial effects on socioeconomics and water quality would be expected. Resources that could be adversely affected by the Proposed Action include air quality, cultural resources, geological resources, threatened and endangered species, water resources (including surface water, floodplains, and groundwater), hazardous materials, and traffic and transportation. In all instances effects on these resources are expected to be negligible to minor in significance. Short-term, minor to moderate effects could occur on infrastructure with long-term beneficial effects through eventual upgrades to utilities. Noise can have effects of minor to moderate significance but they would be short-term in duration. Minor to moderate effects on biological resources and infrastructure are anticipated. Adherence to the Goals and Objectives of FHL's INRMP and ITAM programs would help minimize effects on biological resources while upgrades to parts of FHL utilities would minimize effects on infrastructure. Implementation of the No Action Alternative would not result in a change in current conditions, and therefore, no significant direct or indirect effects would occur under the No Action Alternative.

Table 7-1 summarizes the effects of the Proposed Action and the activities that could be conducted during implementation to avoid or minimize these effects. Activities to minimize effects would be required by Federal or state regulations. Most of these requirements are currently observed at all locations. Evaluation of each of the effect categories during this EA process resulted in negligible to minor adverse effects which can be considered an "insignificant" effect or "no effect" classification. No significant effects would be anticipated from implementing the Proposed Action.

7.2 Cumulative Effects Identified

The potential for cumulative effects on the environment was evaluated by reviewing other projects in the vicinity of the FHL that could affect the same environmental resources as the Proposed Action. Although some cumulative effects could occur, they are expected to be negligible to minor in significance. Implementation of the No Action Alternative would not result in a change in current conditions, and therefore, no cumulative effects would occur to the quality of the human or natural environment.

7.3 NEPA Determination

Based upon the findings of this EA, implementation of the Proposed Action would not have a significant adverse direct, indirect, or cumulative effect on the quality of the human or natural environment on adjacent properties or on FHL. Implementation of the Proposed Action would ensure the readiness of Army Reserve soldiers through adequate training, facilities, and support.

Based upon the analysis of potential effects, it has been determined that the Proposed Action does not constitute a major Federal action affecting the quality of human health or the environment. Because there would be no significant effect resulting from the implementation of the Proposed Action, a FNSI has been prepared to accompany this EA and concludes that an EIS, the next higher level of environmental effect investigation under NEPA, is not required for this action.

Table 7-1. Summary of Environmental Consequences for the Proposed Action

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Airspace Management and Safety	Long-term, negligible adverse effects on airspace management are expected from additional helicopter traffic. Long-term, beneficial effects are anticipated from an additional taxiway, which would provide greater flight scheduling flexibility.	No adverse effects are anticipated.	No adverse effects are anticipated.	No adverse effects are anticipated.	No adverse effects would be anticipated.
Noise	Long-term, minor to moderate, adverse effects are anticipated.	Long-term, minor, adverse effects are anticipated.	Short-term, minor, adverse effects are anticipated.	Long-term, minor to moderate, adverse effects are anticipated.	No adverse effects would be anticipated.
Land Use	Negligible to minor, adverse effects are anticipated.	Negligible to moderate, adverse effects are anticipated.	Negligible to minor, adverse effects are anticipated.	Negligible to minor, adverse effects are anticipated.	No adverse effects would be anticipated.
Air Quality	Short- and long-term, minor, adverse effects are anticipated. Dust control and good equipment maintenance would help reduce overall emissions.	Short- and long-term, minor, adverse effects are anticipated. Dust control and good equipment maintenance would help reduce overall emissions.	Short-term, minor, adverse effects are anticipated. Dust control and good equipment maintenance would help reduce overall emissions.	Short- and long-term, minor, adverse effects are anticipated. Dust control and good equipment maintenance would help reduce overall emissions.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Geological Resources	Long-term, negligible to moderate, adverse effects on geology and soils are anticipated. Use of BMPs identified in the installation's SWPPP and project-specific ESCPs would help minimize effects on soils.	Long-term, negligible to moderate, adverse effects on geology and soils are anticipated. Use of BMPs identified in the installation's SWPPP and project-specific ESCPs would help minimize effects on soils.	Long-term, negligible to moderate, adverse effects on geology and soils are anticipated. Use of BMPs identified in the installation's SWPPP and project-specific ESCPs would help minimize effects on soils.	Long-term, negligible to moderate, adverse effects on geology and soils are anticipated. Use of BMPs identified in the installation's SWPPP would help minimize effects on soils. Additionally, adherence to principles of the ITAM program would also help reduce effects.	No adverse effects would be anticipated.
Water Resources	Long-term, negligible to moderate, adverse effects are anticipated. Use of BMPs identified in the installation's SPCC Plan, SWPPP, and project-specific ESCP would help minimize effects on surface and groundwater resources. Construction in floodplains would be avoided.	Long-term, negligible to moderate, adverse effects are anticipated. Use of BMPs identified in the installation's SPCC Plan, SWPPP, and project-specific ESCP would help minimize effects on surface and groundwater resources. Construction in floodplains would be avoided to the maximum extent practicable.	Long-term, minor, beneficial effects are anticipated from upgrade of cantonment area storm water system. Short-term, negligible to moderate, adverse effects on water resources are anticipated during individual construction projects. Use of BMPs identified in the installation's SPCC Plan, SWPPP, and project-specific ESCPs would help minimize effects on surface and groundwater resources.	Long-term, minor, adverse effects are anticipated. Use of BMPs identified in the installation's SPCC Plan and SWPPP would help minimize effects on surface and groundwater resources.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Biological Resources	Short-term, minor to moderate, adverse effects on vegetation are anticipated. Short- and long-term, minor to moderate effects on wildlife are anticipated. Long-term, minor, adverse effects on wetlands are anticipated. Adoption of the goals and objectives of the installation INRMP and the Integrated Training Area Management program would ensure the minimization of effects.	Short- and long-term, minor, adverse effects on vegetation and wildlife are anticipated. Long-term, minor, adverse effects on wetlands are anticipated. Adoption of the goals and objectives of the installation INRMP and the Integrated Training Area Management program would ensure the minimization of effects.	No adverse effects are anticipated.	Short-term, minor to moderate, adverse effects on vegetation are anticipated. Short- and long-term, minor to moderate, effects on wildlife are anticipated. Long-term, minor, adverse effects on wetlands are anticipated. Adoption of the goals and objectives of the installation INRMP and the Integrated Training Area Management program would ensure the minimization of effects.	No adverse effects would be anticipated.
Threatened and Endangered Species	Long-term, negligible to minor, adverse effects are anticipated. Adherence to Species Management Plans and goals and objectives of the installation INRMP would ensure the minimization of effects.	Short- and long-term, negligible to minor, adverse effects are anticipated. Adherence to Species Management Plans and goals and objectives of the installation INRMP would ensure the minimization of effects.	No adverse effects are anticipated	Short- and long-term, negligible to minor, adverse effects are anticipated. Adherence to Species Management Plans and goals and objectives of the installation INRMP would ensure the minimization of effects. Additionally, adherence to principles of the ITAM program would also help reduce effects.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Cultural Resources	No effects on historic structures, landscapes, or viewsheds are anticipated. No significant effects on archaeological sites are anticipated; if projects are not compatible, consultation with the SHPO would occur.	No effects on historic structures, landscapes, or viewsheds are anticipated. No significant effects on archaeological sites are anticipated; if projects are not compatible, consultation with the SHPO would occur.	No effects on historic structures, landscapes, or viewsheds are anticipated. No significant effects on archaeological sites are anticipated; if projects are not compatible, consultation with the SHPO would occur.	No effects on historic structures, landscapes, or viewsheds are anticipated. No significant effects on archaeological sites are anticipated; if projects are not compatible, consultation with the SHPO would occur.	No adverse effects would be anticipated.
Socioeconomics and Environmental Justice	No adverse effects on population, housing, or environmental justice are anticipated. Moderate, short-term, beneficial effects on local business, employment, and the local economy are anticipated.	No adverse effects on population, housing, or environmental justice are anticipated. Moderate, short-term, beneficial effects on local business, employment, and the local economy are anticipated.	No adverse effects on population, housing, or environmental justice are anticipated. Moderate, short-term, beneficial effects on local business, employment, and the local economy are anticipated.	Minor, short-term, beneficial effects on local business, employment, and the local economy are anticipated.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Infrastructure	No adverse effects on electrical systems and propane are anticipated. Long-term, minor, adverse effects on liquid fuel, communications, and solid waste are anticipated. Short- and long-term, minor, adverse effects on water supply and sanitary sewer and wastewater systems are anticipated.	No adverse effects on electrical systems anticipated. Short- and long-term, minor, adverse effects on water supply and sanitary sewer and wastewater systems are anticipated.	Minor to moderate, adverse effects on electrical systems. Short-term, negligible to minor, adverse effects on LPG are anticipated. Long-term, minor, adverse effects on solid waste and liquid fuel are anticipated. Short-term, minor, adverse effects on water supply are anticipated. Short- and long-term, minor to moderate, adverse effects on sanitary sewer and wastewater systems are anticipated. Short-term, negligible to minor, adverse and long-term, minor, beneficial effects on storm water systems are anticipated. Short-term, minor, adverse effects on communications are anticipated. Long-term, beneficial effects on infrastructure would occur through eventual upgrades to utilities.	No adverse effects on electrical systems and propane are anticipated. Long-term, minor, adverse effects on liquid fuel, communications, and solid waste are anticipated. Short- and long-term, minor, adverse effects on water supply and sanitary sewer and wastewater systems are anticipated.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Traffic and Transportation	No long-term, adverse effects are anticipated. Minor, short-term, intermittent adverse effects are anticipated.	No long-term, adverse effects are anticipated. Minor short-term, intermittent, adverse effects are anticipated.	No long-term, adverse effects are anticipated. Minor, intermittent, adverse effects are anticipated.	No long-term, adverse, effects are anticipated. Minor, intermittent, adverse effects are anticipated	No adverse effects would be anticipated.
Hazardous Materials and Waste	No adverse effects on ACM, radon, and ERP sites are anticipated. Long-term, minor, adverse effects on pollution prevention, hazardous materials, and hazardous wastes are anticipated. Use of Installation Hazardous Waste Management Plan and SPCC Plan would help minimize effects.	No adverse effects on ACM, radon, and ERP sites are anticipated. Long-term, minor, adverse effects on pollution prevention, hazardous materials, and hazardous wastes are anticipated. Short-term, minor and long-term, negligible to minor, adverse effects on lead-hazard management are anticipated. Use of Installation Hazardous Waste Management Plan and SPCC Plan would help minimize effects.	No adverse effects on ACM, radon are anticipated. ERP sites could be encountered on some projects with negligible to minor, short-term effects on safety and hazardous waste anticipated. Long-term, minor, adverse effects on pollution prevention, hazardous materials, and hazardous wastes are anticipated. Use of Installation Hazardous Waste Management Plan and SPCC Plan would help minimize effects.	No adverse effects on ACM, radon, and ERP sites are anticipated. Long-term, minor, adverse effects on pollution prevention, hazardous materials, and hazardous wastes are anticipated. Short-term, minor and long-term, negligible to minor, adverse effects on lead-hazard management are anticipated. Use of Installation Hazardous Waste Management Plan and SPCC Plan would help minimize effects.	No adverse effects would be anticipated.

Resource Area	Proposed Action				No Action
	Training Infrastructure	Range Construction	Cantonment Construction	Increased Training	
Health and Safety	Short-term, minor, adverse effects on construction contractor safety could occur during construction activities. Risk would be managed by adherence to established U.S. Army, Federal, state, and local safety regulations.	Short-term, minor, adverse effects on construction contractor safety could occur during construction activities. Long-term, minor, adverse effects on military personnel safety, public safety, explosives and munitions safety, and fire safety would be expected. Risk would be managed by adherence to established U.S. Army, Federal, state, and local safety regulations.	Short-term, minor, adverse effects on construction contractor safety could occur during construction activities. Risk would be managed by adherence to established U.S. Army, Federal, state, and local safety regulations.	Long-term, minor, adverse effects on health and safety could occur from increased training and the possibility of increased accidents.	No adverse effects would be anticipated.

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10. Abbreviations and Acronyms

$\mu g/m^3$	micrograms per cubic meter
AAFES	Army and Air Force Exchange Service
AC	Active Component
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
AGL	above ground level
AGM	aboveground magazine
AHA	Ammunition-Handling Area
AHP	Army Heliport
AOC	Area of Concern
APE	Area of Potential Effect
APZ	accident potential zone
AR	Army Regulation
ARFORGEN	Army Force Generation
ARPA	Archaeological Resource Protection Act
ARTCC	Air Route Traffic Control Center
AST	aboveground storage tank
AT/FP	Anti-Terror/Force Protection
ATC	air traffic control
AQCR	air quality control region
BDOC	Base Defense Operations Center
BMP	Best management practices
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CADFG	California Department of Fish and Game
CARB	California Air Resources Board
CDEC	Combat Development and Experimentation Command
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
CNDDB	California Natural Diversity Data Base
CO_2	carbon dioxide
CO	carbon monoxide
CS	Combat Support
CSS	Combat Support Services
CSTC	Combat Support Training Center
CWA	Clean Water Act
CZ	clear zone
DA PAM	Department of the Army Pamphlet
dB	decibels
dBA	A-weighted decibels
dBC	C-weighted decibels
dBP	unweighted decibels
DDT	dichlorodiphenyltrichloroethane

DERP	Defense Environmental Restoration Program
DES	Directorate of Emergency Services
DNL	Day-night average A-weighted sound level
DOD	Department of Defense
DOL	Department of Logistics
DPW	Department of Public Works
DZ	drop zone
EA	Environmental Assessment
ECM	earth-covered magazine
ECS	Equipment Concentration Site
ED	endocrine disruptors
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
EOD	Explosive Ordnance Disposal
EISA	Energy Independence and Security Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESCP	Erosion-and Sediment-Control Plan
EUL	Enhanced Use Lease
FAA	Federal Aviation Administration
FAR	Federal Air Regulation
FEMA	Federal Emergency Management Agency
FHL	Fort Hunter Liggett
FHLR	Fort Hunter Liggett Regulation
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
FNSI	Finding of No Significant Impact
FR	Federal Register
ft^2	square feet
FY	fiscal year
GIS	Geographical Information Systems
GHG	Greenhouse gas
HAP	hazardous air pollutant
HEMTT	heavy expanded mobility tactical trucks
HET	heavy equipment transporter
HMMWV	high mobility multipurpose wheeled vehicles
HQ	Headquarters
HRR	Historical Records Review
HUD	U.S. Department of Housing and Urban Development
ICRMP	Integrated Cultural Resources Management Plan
IDEA	Installation Development Environmental Assessment
IFR	instrument flight rules
INRMP	Integrated Natural Resources Management Plan
ISB	Initial Staging Base
ITAM	Integrated Training Area Management
LAN	local-area network
LBP	lead-based paint

lbs	pounds
LOS	level of service
LRAM	Land Rehabilitation and Maintenance Program
LUPZ	Land Use Planning Zone
LZ	landing zone
MBUAPCD	Monterey Bay Unified Air Pollution Control District
MBTA	Migratory Bird Treaty Act
METL	Mission Essential Task List
mg/m^3	milligrams per cubic meter
MGD	million gallons per day
MMRP	Military Munitions Response Program
mm	millimeter
MOA	Military Operations Area
MOS	military occupational specialty
MOU	Memorandum of Understanding
MPMG	Multipurpose Machine Gun
MR	Military Reservation
MRF	Modified Record Fire
MSDS	materials safety data sheets
MSL	mean sea level
MVA	million-volt amperes
MWR	morale, welfare, and recreation
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Airspace System
NAVAID	navigational aid
NCCI	North Central Coast Intrastate
NCO	Non-commissioned Officer
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOTAM	Notice to Airman
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRCS	Natural Resources Conservation Service
NVD	Night Vision Device
O_3	ozone
ODS	ozone-depleting substances
OSH	occupational safety and health
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
PAH	polycyclic aromatic hydrocarbon
P2 Plan	Pollution Prevention Plan
Pb	lead
PBA	Programmatic Biological Assessment
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
percent g	percentage of the force of gravity
PG&E	Pacific Gas and Electric
PK 15(met)	peak sound pressure level

PLS	palletized load system
PM_{10}	Particulates equal to or less than 10 microns in diameter
$PM_{2.5}$	Particulates equal to or less than 2.5 microns in diameter
POL	petroleum, oils, and lubricants
PPE	personal protective equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
QDR	Quadrennial Defense Review
RCRA	Resource Conservation and Recovery Act
RDX	Royal Demolition Explosive
ROI	Region of Influence
ROWPU	Reverse Osmosis Water Purification Unit
RTC	Regional Training Center
SDZ	Surface Danger Zone
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOP	Standard Operating Procedures
SPCC	Spill Prevention Control and Countermeasures
SRMA	Sensitive Resource Management Area
SRPA	Sensitive Resource Protection Area
SUA	Special Use Airspace
SVOC	semi-volatile organic compound
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TNT	2,4,6 trinitrotoluene
TSCA	Toxic Substances Control Act
TTB	Tactical Training Base
TTC	TASS Training Center
UAV	unmanned aerial vehicle
UEPH	Unaccompanied Enlisted Personnel Housing
UFC	United Facilities Criteria
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAF	U.S. Air Force
USAR	U.S. Army Reserve
USARC	U.S. Army Reserve Command
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	unexploded ordnance
VFR	visual flight rules
VOC	volatile organic compound
VMC	visual meteorological conditions
WAREX	Warrior Exercises

APPENDIX A

PROPOSED FORT HUNTER LIGGETT DESIGN DRAWINGS AND INSTALLATION DEVELOPMENT AND TRAINING PROJECTS

APPENDIX A

PROJECTS PROPOSED FOR FORT HUNTER LIGGETT

Table A-1. Proposed Training Infrastructure Projects in Non-Cantonment Areas

Installation Project Number	EA Project Identification Number and Title	FY	Land Use	Project Area (ft^2)	Change in Impervious Surface (ft^2)
Representative Training Infrastructure Construction Projects in Non-Cantonment Areas					
	TI1. Schoonover TTB	2010	OS	1,916,640	
	TI2. Milpitas TTB	2010	OS	3,963,960	
	TI3. Heavy Equipment Operator Training Site	2010	OS	1,437,480	0
Other Training Related Infrastructure Projects in Non-Cantonment Areas					
	TI4. 8J TTB Expansion	2010	OS	1,132,560	
	TI5. Camp Ward TTB Expansion	2010	OS	1,785,960	
	TI6. Urban Operations Training Site*	2011	OS	522,720	
	TI7. Improve Sulphur Springs Road	2010	OS	65,340	
	TI8. TTB 1 Support*		OS		
	TI9. Schoonover Airfield Taxiway	2010	AF	566,280	566,280
	TI10. Truck Driver Training Site	2010	OS	1,306,800	1,306,800
	TI11. Asphalt Plant and Rock Crusher	2010	OS	217,800	217,800
	TI12. Expansion of Soil Borrow Site 13	2010	OS	1,306,800	
	TI13. Develop Shale Borrow Site	2010	OS	304,920	
	TI14. MWR Facility*	2010	OS	217,800	217,800
	TI15. TTB Communications upgrades*	2010	OS	65,340	0
Total Square Feet					

Source: FHL undated, FHL 2009c

Key:

OS = Open Space

Note:

* Denotes GIS data for project requested.

Table A-2. Proposed Range Construction Projects

Installation Project Number	EA Project Identification Number and Title	FY	Land Use	Project Area (ft^2)	Change in Impervious Surface (ft^2)
Representative Range Projects					
71702	R1. MPMG Range	2012	OS	9,060,480	
71701	R2. Light Demolition Range	2011	OS	217,800	
71700	R3. Hand Grenade Familiarization Course	2011	OS	108,900	
Other Range Projects					
	R4. Zero Ranges (two)	2010	OS	108,900	
71699	R5. M203 Grenade Launcher Range	2011	OS	304,920	
	R6. Enemy Prisoner of War (EPW) Facility*	2010	OS		
	R7. MWR Camping Area	2010	OS	217,800	
	R8. Urban Operations Training Site*	2011	OS	304,920	
	R9. Urban Assault Course Station 4	2012	OS	8,712	
			Total Square Feet		

Source: FHL 2009b, FHL undated

Key:

OS = open space

Note:

* Denotes GIS data for project requested.

Table A-3. Proposed Military Construction in the Cantonment Area Projects

Installation Project Number	Real Property Master Plan Project Number	EA Project Identification Number and Title	FY	Land Use	Project Area (ft^2)	Change in Impervious Surface (ft^2)
Representative Military Construction in the Cantonment Area (Construction) Projects						
72103 (Warehouse) 72097 (Maintenance Facility) 73703 (ECS yard)	P13	C1. Equipment Concentration Site (Warehouse, Maintenance Facility, and ECS yard)	2011	ADM	103,700 (Warehouse) 74,688 (Maintenance Facility) 1,437,480 (ECS yard)	681,971
72098	P5	C2. Consolidated Vehicle Wash-Rack	2011	ADM	435,600	435,600
75510	--	C3. Storm water System Upgrade/Expansion	2010	OS	79,200	79,200
Other Military Construction in the Cantonment Area (Construction) Projects						
71160	--	C4. Physical Fitness Center	2010		22,100	59,027
72170	P22	C5. Unaccompanied Personnel Housing, Senior NCO (Transient Training NCO billets)	2010	HU	506,295	
11130	P40	C6. Rotary Wing Landing Pad (Medivac)	2009	AOM	15,624	
71382 / 71334	--	C7. Transient Quarters Complex	2010	ADM	276,634	276,634
74398	--	C8. Regional Training Center – Medical Facility	2010	ADM	44,000	44,000
74689	--	C9. Education Center	2010	COM	8,700	
72412	P23	C10. Transient Training Officers Quarters	2010	HU	194,760	
17211	P41	C11. Marksmanship Training Facility	2010	ADM	3,600	
70442	--	C12. Family Care Clinic	2010	MED	55,157	55,157
71482	--	C13. Operational Readiness Training Center	2010	ADM	304,797	
73704	--	C14. Utility Upgrade Phase 1	2010		63,000	
73738	P24	C15. Fire Response Site at Schoonover Airfield	2010	AF	6,100	

Installation Project Number	Real Property Master Plan Project Number	EA Project Identification Number and Title	FY	Land Use	Project Area (ft^2)	Change in Impervious Surface (ft^2)
Other Military Construction in the Cantonment Area (Construction) Projects (continued)						
74731	--	C16. Training Exercise Warehouse	2010	ADM	8,000	
74732	--	C17. Family Life Center	2010	COM	3,400	
44271	P16	C18. Consolidated Housing Furniture, Storage	2011	ADM	4,050	
44224	P17	C19. Storage Building, General Purpose Org ESC and RTC	2011	ADM	105,000	
71035	P4	C20. Training Aids Center (TAC)	2011	ADM	37,134	
71036	--	C21. Emergency Services Center	2011	ADM	161,114	
71037	--	C22. Logistics Warehouse	2011	ADM	103,700	
72106	--	C23. Logistics Maintenance Facility, fenced with parking	2011	ADM	126,785	
72079	--	C24. Unaccompanied Enlisted Personal Housing (UEPH)	2012	ADM	30,744	
73713	--	C25. Unaccompanied Enlisted Personal Housing (UEPH)	2012	ADM	13,500	
72160	--	C26. Unaccompanied Enlisted Personal Housing (UEPH)	2013	ADM	22,000	
73699	--	C27. Community Activity Center	2012	COM	36,304	
73702	--	C28. Regional Training Site-Medical Warehouse	2012	ADM	30,000	
71038	P6	C29. General Instruction Building (Training Site and Army Reserve School) (104th)	2014	ADM	84,073	
71460 (FY 2013) / 72336 (FY 2015)	--	C30. Battle Command Training Center	2013 and 2015	ADM	237,231	
	--	C31. Army Reserve Center (104th, 356th, OPFOR)	2014	ADM	41,000	
	P14	C32. Maintenance Shop, General Purpose (DOL)	2014	ADM	50,000	

Installation Project Number	Real Property Master Plan Project Number	EA Project Identification Number and Title	FY	Land Use	Project Area (ft^2)	Change in Impervious Surface (ft^2)
Other Military Construction in the Cantonment Area (Construction) Projects (continued)						
	P15	C33. Entomology Facility 2,100 Modify portion of B 252	2014	ADM	2,100	
	P7	C34. Administrative Building, General Purpose (Garrison Activities) 91st	2014	ADM	80,000	
	P21	C35. Enlisted Barracks, Transient Training	2014	HU	174,982	
75011	P31	C36. Court Area	2014	OR	4 each	
	P32	C37. Playground	2015		1 each	
	P33	C38. Softball Fields	2015		5 each	
	P36	C39. Recreational Shelter				
72212	P39	C40. Dining Facility	2014	COM	17,000	
44220	P16	C41. Storage Building, General Purpose Installation DOL/DPW	2015	ADM	99,250	
72834	P26	C42. Chapel	2015	COM	3,400	3,400
74001	--	C43. Physical Fitness Center with Parking Lot[a]	2011	COM	18,500	
	P9	C44. Auto-Aide Instruction Building	TBD	ADM	2,249	
74006	P27	C45. Bank	TBD	COM	1,500	
70700	--	C46. Repair Range Area Bridges	2010	OS		
72247	--	C47. Facility Camp Ground	2010	OS	217800	
74068	P30	C48. Recreation Center	2015		19,800	
72284	--	C49. TASS Center	2014		59,953	71,257
Total			**Square Feet**			

Source: FHL 2009b, FHL 2009c, FHL 2007

Note:

a. Indicates reuse of existing building; additional construction may not be required.

Key:

ADM = administrative
COM = community
OS = open space
HU = housing unaccompanied
OR = outdoor recreation
AOM = aircraft operations and maintenance
MED = medical
AF = airfield

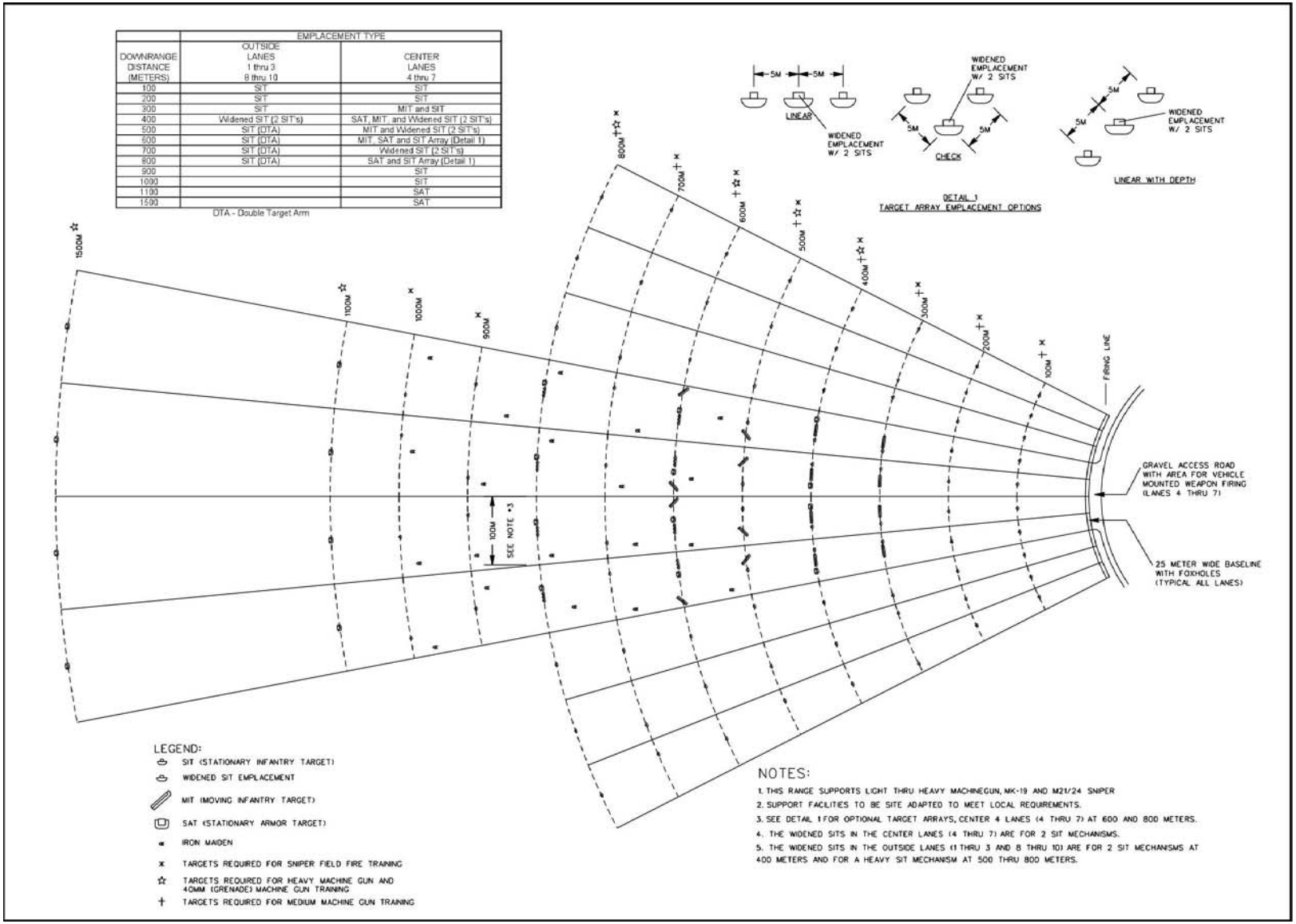

Figure A-1. Conceptual Design for a Multi-Purpose Machine Gun Range

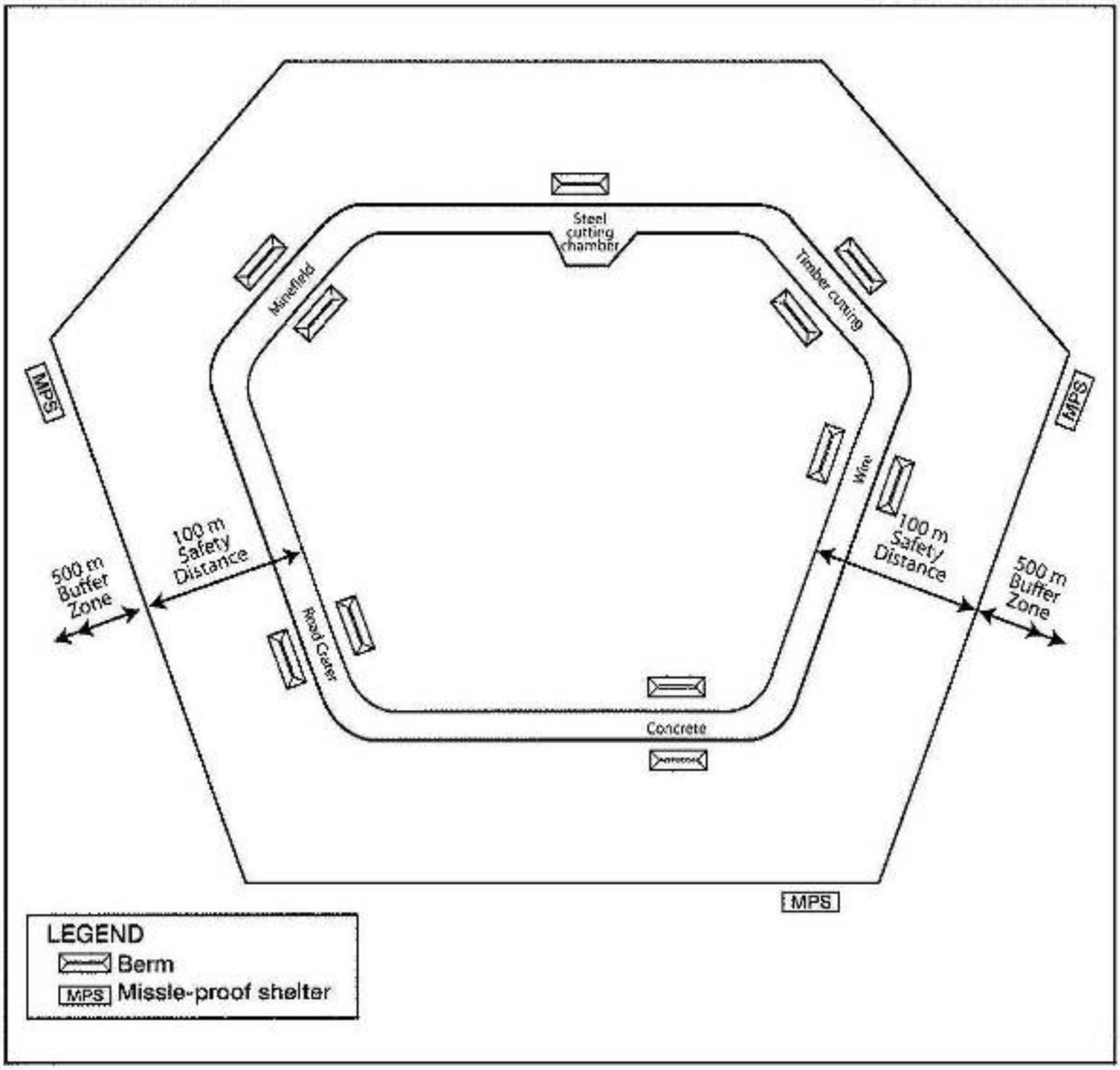

Figure A-2. Conceptual Design for a Light Demolition Range

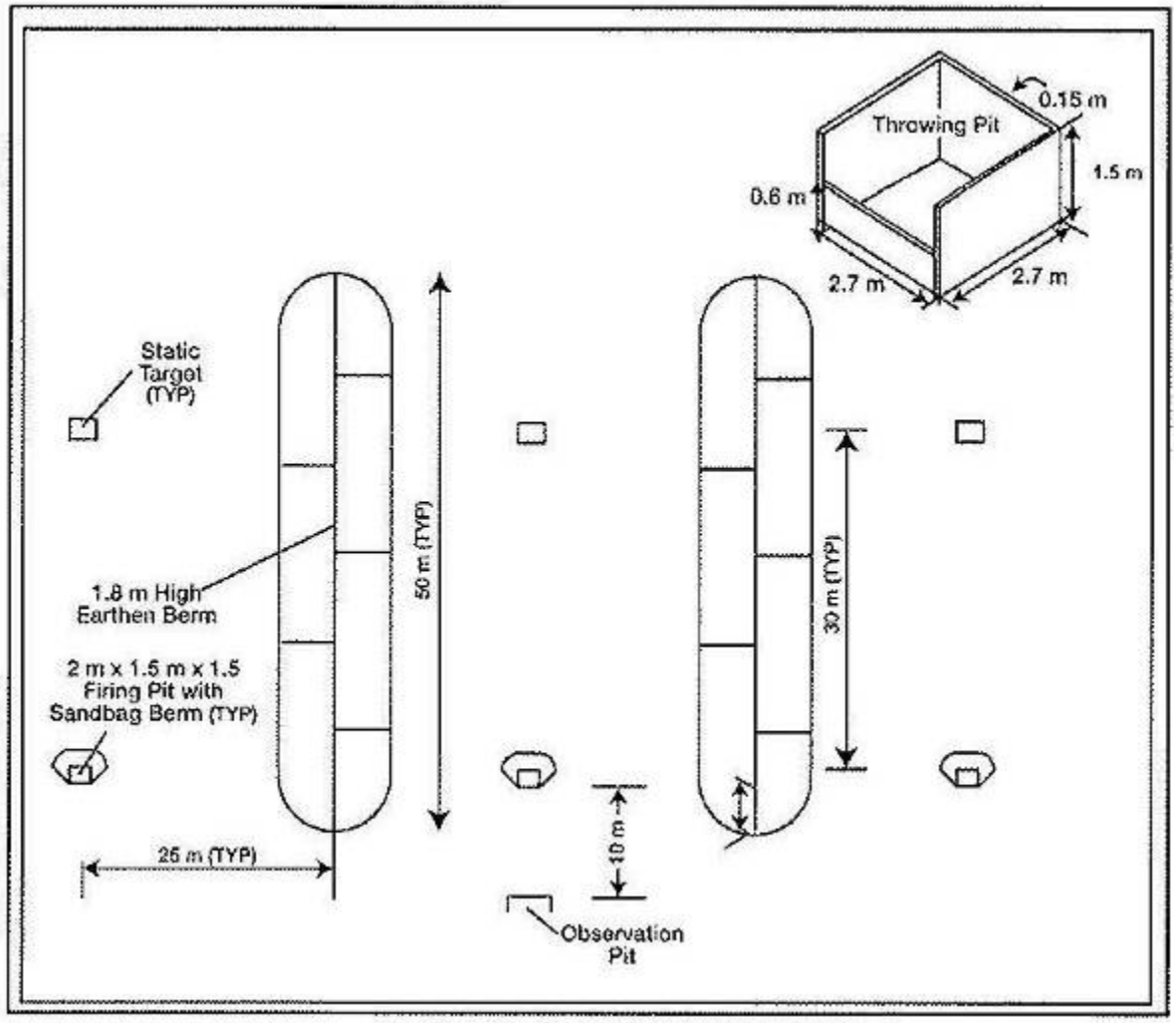

Figure A-3. Conceptual Design for a Hand Grenade Familiarization Course

APPENDIX B

APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

APPENDIX B

APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

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APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

When considering the affected environment, the various physical, biological, economic, and social environmental factors must be considered. The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] Section 4321–4347) is a Federal statute requiring the identification and analysis of potential environmental effects associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decisionmakers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that was charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires Federal agencies to use an interdisciplinary and systematic approach in their decisionmaking process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action.

The process for implementing NEPA is codified in Title 40 Code of Federal Regulations (CFR), Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The CEQ was established under NEPA to implement and oversee Federal policy in this process. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FNSI) or whether the preparation of an Environmental Impact Statement (EIS) is necessary. This EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, states that the U.S. Army will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The U.S. Army's implementing regulation for NEPA is 32 CFR Part 651, the *Environmental Analysis of Army Actions*.

In addition to the NEPA, there are other environmental laws as well as Executive Orders (EOs) to be considered when preparing environmental analyses. These laws are summarized below.

NOTE: This is not a complete list of all applicable laws, regulations, policies, and planning criteria potentially applicable to documents, however, it does provide a general summary for use as a reference.

Airspace Management

Airspace management procedures assist in preventing potential conflicts or aircraft accidents associated with aircraft using designated airspace in the United States, including restricted military airspace. Airspace management involves the coordination, integration, and regulation of the use of airspace. The Federal Aviation Administration (FAA) has overall responsibility for managing airspace through a system of flight rules and regulation, airspace management actions, and air traffic control (ATC) procedures. All military and civilian aircraft are subject to Federal Aviation Regulations (FARs). The FAA's *Aeronautical Informational Manual* defines the operational requirements for each of the various types or classes of military and civilian airspace.

The U.S. Army, per Army Regulation (AR) 95-2, *Airspace, Airfields/Heliport, Flight Activities, Air Traffic Control and Navigational Aids*, provides guidance and procedures for U.S. Army airspace operations, including guidance and procedures for developing and processing special use airspace (SUA). It covers aeronautical matters governing the efficient planning, acquisition, use, and management of

airspace required to support U.S. Army flight operations. It applies to activities that have operational or administrative responsibility for using airspace, establishes practices to decrease disturbances from flight operations that might cause adverse public reaction, and provides flying unit commanders with general guidance for dealing with local problems.

Noise

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. The U.S. Department of Housing and Urban Development (HUD), in coordination with the Department of Defense (DOD) and the FAA, has established criteria for acceptable noise levels for aircraft operations relative to various types of land use. The U.S. Army, through AR 200-1, *Environmental Protection and Enhancement*, implements Federal laws concerning environmental noise form U.S. Army activities.

Land Use

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activities occurring on a defined parcel of land. In many cases, land use descriptions are codified in local zoning laws. However, there is no nationally recognized convention or uniform terminology for describing land use categories. The U.S. Army uses the 12 land use types for installation land use planning, and these land use types roughly parallel those employed by municipalities in the civilian sector.

Air Quality

The Clean Air Act (CAA) of 1970, and Amendments of 1977 and 1990, recognizes that increases in air pollution result in danger to public health and welfare. To protect and enhance the quality of the Nation's air resources, the CAA authorizes the U.S. Environmental Protection Agency (USEPA) to set six National Ambient Air Quality Standards (NAAQSs) which regulate carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter pollution emissions. The CAA seeks to reduce or eliminate the creation of pollutants at their source, and designates this responsibility to state and local governments. States are directed to use financial and technical assistance as well as leadership from the Federal government to develop implementation plans to achieve NAAQS. Geographic areas are officially designated by the USEPA as being in attainment or nonattainment to pollutants in relation to their compliance with NAAQS. Geographic regions established for air quality planning purposes are designated as Air Quality Control Regions (AQCR). Pollutant concentration levels are measured at designated monitoring stations within the AQCR. An area with insufficient monitoring data is designated as unclassifiable. Section 309 of the CAA authorizes USEPA to review and comment on effect statements prepared by other agencies.

An agency should consider what effect an action might have on NAAQS due to short-term increases in air pollution during construction as well as long-term increases resulting from changes in traffic patterns. For actions in attainment areas, a Federal agency could also be subject to USEPA's Prevention of Significant Deterioration (PSD) regulations. These regulations apply to new major stationary sources and modifications to such sources. Although few agency facilities will actually emit pollutants, increases in pollution can result from a change in traffic patterns or volume. Section 118 of the CAA waives Federal immunity from complying with the CAA and states all Federal agencies will comply with all Federal- and state-approved requirements.

The General Conformity Rule requires that any Federal action meet the requirements of a SIP or Federal Implementation Plan. More specifically, CAA conformity is ensured when a Federal action does not cause a new violation of the NAAQS, contribute to an increase in the frequency or severity of violations of NAAQS, or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

The General Conformity Rule applies only to actions in nonattainment or maintenance areas and considers both direct and indirect emissions. The rule applies only to Federal actions that are considered "regionally significant" or where the total emissions from the action meet or exceed the *de minimis* thresholds presented in 40 Code of Federal Regulations (CFR) 93.153. An action is regionally significant when the total nonattainment pollutant emissions exceed 10 percent of the AQCR's total emissions inventory for that nonattainment pollutant. If a Federal action does not meet or exceed the *de minimis* thresholds and is not considered regionally significant, then a full Conformity Determination is not required.

Health and Safety

OSHA (29 U.S.C. 651) was passed in 1970 to ensure worker and workplace safety. Employers are to provide a workplace free of safety and health hazards, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions. This is done through establishing safety standards, inspections, training, and providing educational materials.

The AR 385-10, *The Army Safety Program*, implements OSHA requirements through prescribing policy, responsibilities, and procedures to protect and preserve Army personnel and property against accidental loss. It provides for safe and healthful workplaces, procedures, and equipment critical to Army operations and activities.

Geological Resources

Recognizing that millions of acres per year of prime farmland are lost to development, Congress passed the Farmland Protection Policy Act to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland (7 CFR Part 658). Prime farmland are soils that have a combination of soil and landscape properties that make them highly suitable for cropland, such as high inherent fertility, good water-holding capacity, deep or thick effective rooting zones, and are not subject to periodic flooding. Under the Farmland Protection Policy Act, agencies are encouraged to conserve prime or unique farmlands when alternatives are practicable. Some activities that are not subject to the Farmland Protection Policy Act include Federal permitting and licensing, projects on land already in urban development or used for water storage, construction for national defense purposes, or construction of new minor secondary structures such as a garage or storage shed.

Water Resources

The Clean Water Act (CWA) of 1977 is an amendment to the Federal Water Pollution Control Act of 1972, is administered by USEPA, and sets the basic structure for regulating discharges of pollutants into U.S. waters. The CWA requires USEPA to establish water quality standards for specified contaminants in surface waters and forbids the discharge of pollutants from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are issued by USEPA or the appropriate state if it has assumed responsibility. Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE). Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce,

recreation, industry, sources of fish, and other purposes. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Each agency should consider the effect on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility occupation.

Section 303(d) of the CWA requires states and USEPA to identify waters not meeting state water-quality standards and to develop Total Maximum Daily Loads (TMDLs). A TMDL is the maximum amount of a pollutant that a waterbody can receive and still be in compliance with state water-quality standards. After determining TMDLs for impaired waters, states are required to identify all point and nonpoint sources of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source to meet the state standards. The TMDL program is currently the Nation's most comprehensive attempt to restore and improve water quality. The TMDL program does not explicitly require the protection of riparian areas. However, implementation of the TMDL plans typically calls for restoration of riparian areas as one of the required management measures for achieving reductions in nonpoint source pollutant loadings.

The USEPA issued a Final Rule for the CWA concerning technology-based Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development point source category. All NPDES storm water permits issued by the USEPA or states must incorporate requirements established in the Final Rule. As of February 1, 2010, all new construction sites are required to meet the non-numeric effluent limitations and design, install, and maintain effective erosion and sedimentation controls. In addition, construction site owners and operators that disturb 1 or more acres of land are required to use best management practices (BMPs) to ensure that soil disturbed during construction activities does not pollute nearby water bodies. Effective August 1, 2011, construction activities disturbing a total of 20 or more acres must comply with the numeric effluent limitation for turbidity in addition to the non-numeric effluent limitations. The maximum daily turbidity limitation is 280 nephelometric turbidity units (ntu). On February 2, 2014, construction site owners and operators that disturb 10 or more acres of land are required to monitor discharges to ensure compliance with effluent limitations as specified by the permitting authority. Construction site owners are encouraged to phase ground-disturbing activities to limit the applicability of the monitoring requirements and the turbidity limitation. The USEPA's limitations are based on its assessment of what specific technologies can reliably achieve. Permittees can select management practices or technologies that are best suited for site-specific conditions.

The Coastal Zone Management Act (CZMA) of 1972 declares a national policy to preserve, protect, and develop, and, where possible, restore or enhance the resources of the Nation's coastal zone. The coastal zone refers to the coastal waters and the adjacent shorelines including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, and includes the Great Lakes. The CZMA encourages states to exercise their full authority over the coastal zone, through the development of land and water use programs in cooperation with Federal and local governments. States may apply for grants to help develop and implement management programs to achieve wise use of the land and water resources of the coastal zone. Development projects affecting land or water use or natural resources of a coastal zone, must ensure the project is, to the maximum extent practicable, consistent with the state's coastal zone management program.

The Safe Drinking Water Act (SDWA) of 1974 establishes a Federal program to monitor and increase the safety of all commercially and publicly supplied drinking water. Congress amended the SDWA in 1986, mandating dramatic changes in nationwide safeguards for drinking water and establishing new Federal enforcement responsibility on the part of USEPA. The 1986 amendments to the SDWA require USEPA to establish Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), and Best Available Technology (BAT) treatment techniques for organic, inorganic, radioactive, and microbial

contaminants; and turbidity. MCLGs are maximum concentrations below which no negative human health effects are known to exist. The 1996 amendments set current Federal MCLs, MCLGs, and BATs for organic, inorganic, microbiological, and radiological contaminants in public drinking water supplies.

EO 11988, *Floodplain Management* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. An agency may locate a facility in a floodplain if the head of the agency finds there is no practicable alternative. If it is found there is no practicable alternative, the agency must minimize potential harm to the floodplain, and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted flood proofing and flood protection to include elevating structures above the base flood level rather than filling in land.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (October 5, 2009), directed the USEPA to issue guidance on Section 438 of the Energy Independence and Security Act (EISA). The EISA establishes into law new stormwater design requirements for Federal construction projects that disturb a footprint of greater than 5,000 square feet of land. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology would be calculated and site design would incorporate stormwater retention and reuse technologies to the maximum extent technically feasible. Post-construction analyses will be conducted to evaluate the effectiveness of the as-built storm water reduction features. These regulations were to be incorporated into applicable DOD Unified Facilities Criteria by July 2010. Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*.

Biological Resources

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the U.S. Fish and Wildlife Service (USFWS) maintains the list. A list of Federal endangered species can be obtained from the Endangered Species Division, USFWS (703-358-2171). States might also have their own lists of threatened and endangered species which can be obtained by calling the appropriate State Fish and Wildlife office. Some species, such as the bald eagle, also have laws specifically for their protection (e.g., Bald Eagle Protection Act).

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. The MBTA also makes it unlawful to ship, transport or carry from one state, territory, or district to another, or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

EO 11514, *Protection and Enhancement of Environmental Quality* (March 5, 1970), states that the President, with assistance from the Council on Environmental Quality (CEQ), will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 11990, *Protection of Wetlands* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

EO 13112, *Invasive Species*, states that Federal Agencies subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them. Furthermore the EO directs Agencies not to authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

EO 13186, *Conservation of Migratory Birds* (January 10, 2001), creates a more comprehensive strategy for the conservation of migratory birds by the Federal government. EO 13186 provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 will be coordinated and implemented by the USFWS. The MOU will outline how Federal agencies will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

Cultural Resources

The American Indian Religious Freedom Act of 1978 and Amendments of 1994 recognize that freedom of religion for all people is an inherent right, and traditional American Indian religions are an indispensable and irreplaceable part of Indian life. It also recognized the lack of Federal policy on this issue and made it the policy of the United States to protect and preserve the inherent right of religious freedom for Native Americans. The 1994 Amendments provide clear legal protection for the religious use of peyote cactus as a religious sacrament. Federal agencies are responsible for evaluating their actions and policies to determine if changes should be made to protect and preserve the religious and

cultural rights and practices of Native Americans. These evaluations must be made in consultation with native traditional religious leaders.

The Archaeological Resource Protection Act (ARPA) of 1979 protects archaeological resources on public and Indian lands. It provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource, defined as material remains of past human life or activities which are at least 100 years old. Before archaeological resources are excavated or removed from public lands, the Federal land manager must issue a permit detailing the time, scope, location, and specific purpose of the proposed work. ARPA also fosters the exchange of information about archaeological resources between governmental agencies, the professional archaeological community, and private individuals. ARPA is implemented by regulations found in 43 CFR Part 7.

The National Historic Preservation Act (NHPA) of 1966 sets forth national policy to identify and preserve properties of state, local, and national significance. The NHPA establishes the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officers (SHPOs), and the National Register of Historic Places (NRHP). ACHP advises the President, Congress, and Federal agencies on historic preservation issues. Section 106 of the NHPA directs Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the NRHP. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned cultural properties. Section 106 of the act is implemented by regulations of the ACHP, 36 CFR Part 800. Agencies should coordinate studies and documents prepared under Section 106 with NEPA where appropriate. However, NEPA and NHPA are separate statutes and compliance with one does not constitute compliance with the other. For example, actions which qualify for a categorical exclusion under NEPA might still require Section 106 review under NHPA. It is the responsibility of the agency official to identify properties in the area of potential effects, and whether they are included or eligible for inclusion in the NRHP. Section 110 of the NHPA requires Federal agencies to identify, evaluate, and nominate historic property under agency control to the NRHP.

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 establishes rights of American Indian tribes to claim ownership of certain “cultural items,” defined as Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by Federal agencies. Cultural items discovered on Federal or tribal lands are, in order of primacy, the property of lineal descendants, if these can be determined, and then the tribe owning the land where the items were discovered or the tribe with the closest cultural affiliation with the items. Discoveries of cultural items on Federal or tribal land must be reported to the appropriate American Indian tribe and the Federal agency with jurisdiction over the land. If the discovery is made as a result of a land use, activity in the area must stop and the items must be protected pending the outcome of consultation with the affiliated tribe.

EO 11593, *Protection and Enhancement of the Cultural Environment* (May 13, 1971), directs the Federal government to provide leadership in the preservation, restoration, and maintenance of the historic and cultural environment. Federal agencies are required to locate and evaluate all Federal sites under their jurisdiction or control which might qualify for listing on the NRHP. Agencies must allow the ACHP to comment on the alteration, demolition, sale, or transfer of property which is likely to meet the criteria for listing as determined by the Secretary of the Interior in consultation with the SHPO. Agencies must also initiate procedures to maintain federally owned sites listed on the NRHP.

Public Law 102-190, *The Mission San Antonio de Padua Viewshed Buffer*, (December 5, 1991), directs the Secretary of the Army to prohibit any above-ground construction within a portion of the Fort Hunter Liggett Military Reservation in California, in order to protect a viewshed of the Mission property. EO 13007, *Indian Sacred Sites* (May 24, 1996), provides that agencies managing Federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate American

Indian religious practitioners' access to and ceremonial use of American Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13007, *Indian Sacred Sites* (May 24, 1996), provides that agencies managing Federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate Indian religious practitioners' access to and ceremonial use of Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13175, *Consultation and Coordination with Indian Tribal Governments* (November 6, 2000), was issued to provide for regular and meaningful consultation and collaboration with Native American tribal officials in the development of Federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Native American tribes. EO 13175 recognizes the following fundamental principles: Native American tribes exercise inherent sovereignty over their lands and members, the United States government has a unique trust relationship with Native American tribes and deals with them on a government-to-government basis, and Native American tribes have the right to self-government and self-determination.

EO 13287, *Preserve America* (March 3, 2003), orders Federal agencies to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. EO 13287 established new accountability for agencies with respect to inventories and stewardship.

Socioeconomics and Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), directs Federal agencies to make achieving environmental justice part of their mission. Agencies must identify and address the adverse human health or environmental effects that its activities have on minority and low-income populations and develop agency wide environmental justice strategies. The strategy must list "programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations, ensure greater public participation, improve research and data collection relating to the health of and environment of minority populations and low-income populations, and identify differential patterns of consumption of natural resources among minority populations and low-income populations." A copy of the strategy and progress reports must be provided to the Federal Working Group on Environmental Justice. Responsibility for compliance with EO 12898 is with each Federal agency.

Infrastructure

EO 13514, *Federal Leadership In Environmental, Energy, And Economic Performance*, directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas emissions, water use, pollution prevention, regional

development and transportation planning, sustainable building design and promote sustainability in its acquisition of goods and services.

Hazardous Materials and Waste

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 authorizes USEPA to respond to spills and other releases of hazardous substances to the environment, and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a Federal "Superfund" to respond to emergencies immediately. Although the "Superfund" provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters.

As an amendment to CERCLA, the Superfund Amendments and Reauthorization Act (SARA) of 1986 mandates strong clean-up standards and authorizes USEPA to use a variety of incentives to encourage settlements. Title III of SARA authorizes the Emergency Planning and Community Right to Know Act (EPCRA), which requires facility operators with "hazardous substances" or "extremely hazardous substances" to prepare comprehensive emergency plans and to report accidental releases. If a Federal agency acquires a contaminated site, it can be held liable for cleanup as the property owner/operator. A Federal agency can also incur liability if it leases a property, as the courts have found lessees liable as "owners." However, if the agency exercises due diligence by conducting a Phase I Environmental Site Assessment, it can claim the "innocent purchaser" defense under CERCLA. According to Title 42 United States Code (U.S.C.) 9601(35), the current owner/operator must show it undertook "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" before buying the property to use this defense.

The Pollution Prevention Act (PPA) of 1990 encourages manufacturers to avoid the generation of pollution by modifying equipment and processes, redesigning products, substituting raw materials, and making improvements in management techniques, training, and inventory control. Consistent with pollution prevention principles, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (January 24, 2007 [revoking EO 13148]) sets a goal for all Federal agencies that promotes environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products, and use of paper of at least 30 percent post-consumer fiber content. In addition, EO 13423 sets a goal that requires Federal agencies to ensure that they reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of, increase diversion of solid waste as appropriate, and maintain cost effective waste prevention and recycling programs in their facilities. Additionally, in *Federal Register* Volume 58 Number 18 (January 29, 1993), CEQ provides guidance to Federal agencies on how to "incorporate pollution prevention principles, techniques, and mechanisms into their planning and decision making processes and to evaluate and report those efforts, as appropriate, in documents pursuant to NEPA."

The Resource Conservation and Recovery Act (RCRA) of 1976 is an amendment to the Solid Waste Disposal Act. RCRA authorizes USEPA to provide for "cradle-to-grave" management of hazardous waste and sets a framework for the management of nonhazardous municipal solid waste. Under RCRA, hazardous waste is controlled from generation to disposal through tracking and permitting systems, and restrictions and controls on the placement of waste on or into the land. Under RCRA, a waste is defined as hazardous if it is ignitable, corrosive, reactive, toxic, or listed by USEPA as being hazardous. With the Hazardous and Solid Waste Amendments (HSWA) of 1984, Congress targeted stricter standards for waste disposal and encouraged pollution prevention by prohibiting the land disposal of particular wastes. The HSWA amendments strengthen control of both hazardous and nonhazardous waste and emphasize the prevention of pollution of groundwater.

The Toxic Substance Control Act (TSCA) of 1976 consists of four titles. Title I established requirements and authorities to identify and control toxic chemical hazards to human health and the environment. TSCA authorized USEPA to gather information on chemical risks, require companies to test chemicals for toxic effects, and regulate chemicals with unreasonable risk. TSCA also singled out polychlorinated biphenyls (PCBs) for regulation, and, as a result, PCBs are being phased out. PCBs are persistent when released into the environment and accumulate in the tissues of living organisms. They have been shown to cause adverse health effects on laboratory animals and could cause adverse health effects in humans. TSCA and its regulations govern the manufacture, processing, distribution, use, marking, storage, disposal, clean-up, and release reporting requirements for numerous chemicals like PCBs. TSCA Title II provides statutory framework for "Asbestos Hazard Emergency Response," which applies only to schools. TSCA Title III, "Indoor Radon Abatement," states indoor air in buildings of the United States should be as free of radon as the outside ambient air. Federal agencies are required to conduct studies on the extent of radon contamination in buildings they own. TSCA Title IV, "Lead Exposure Reduction," directs Federal agencies to "conduct a comprehensive program to promote safe, effective, and affordable monitoring, detection, and abatement of lead-based paint and other lead exposure hazards." Further, any Federal agency having jurisdiction over a property or facility must comply with all Federal, state, interstate, and local requirements concerning lead-based paint.

Energy

EO 13514, *Federal Leadership In Environmental, Energy, And Economic Performance*, dated October 5, 2009, directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas emissions, water use, pollution prevention, regional development and transportation planning, sustainable building design and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*. The CEQ regulations at 40 CFR 1502.16(e) directs agencies to consider the energy requirements and conservation potential of various alternatives and mitigation measures.

Section 503(b) of Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, instructs Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically, and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. EO 13423 sets goals in energy efficiency, acquisition, renewable energy, toxic chemical reduction, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation. Sustainable design measures such as the use of "green" technology (e.g., photovoltaic panels, solar collection, heat recovery systems, wind turbines, green roofs, and habitat-oriented storm water management) would be incorporated where practicable.

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APPENDIX C

INTERAGENCY COORDINATION AND PUBLIC INVOLVEMENT

APPENDIX C

ENVIRONMENTAL ASSESSMENT
ADDRESSING INSTALLATION DEVELOPMENT AND TRAINING
AT FORT HUNTER LIGGETT, CALIFORNIA

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION LIST

U.S. Environmental Protection Agency
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California State Historic Preservation Officer
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Roger Root
Acting Assistant Field Supervisor
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Monterey County Water Resources Agency
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Governor's Office of Planning and Research
California State Clearinghouse
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Sacramento, CA 95812-3044

Regional Water Quality Control Board
Central Coast Region 3
896 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

3 March 2010

MEMORANDUM FOR DISTRIBUTION

The United States Army Reserve Command (USARC), in conjunction with Fort Hunter Liggett, has completed a Draft Environmental Assessment (EA) that evaluates the potential effects of Installation Development and Training at Fort Hunter Liggett, California.

The EA assesses impacts from proposed construction of cantonment facilities and infrastructure to support military training, increased levels of training, and improvements and additions of new ranges and training base facilities. These facilities are associated with implementation of the Range Complex and Real Property Master Plans at Fort Hunter Liggett, California. The Proposed Action would allow for increasing annual maximum training days from 1,000,000 to 1,500,000. Additional training would occur throughout the military installation.

Based on congressional and executive mandates, USARC is assessing operational requirements and land use issues throughout Fort Hunter Liggett. Preparation of the EA does not necessarily mean that all aspects of the Range Complex and Real Property Master Plans would be completed, but the Proposed Action and/or Proposed Actions with a similar level of impact would be implemented and the plan amended to reflect any changes. This effort is a prudent part of the planning process needed to assess any environmental concerns in accordance with the National Environmental Policy Act of 1969 (NEPA), the National Historic Preservation Act (NHPA), the Clean Water Act (CWA), Endangered Species Act (ESA) and other applicable environmental laws and regulations.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the U.S. Army requests your participation and solicits comments on the attached Draft EA and Draft Finding of No Significant Impact (FNSI). Public comments on the Draft EA and FNSI will be accepted through 2 April 2010. Your written comments should be sent to:

Liz Clark
Fort Hunter Liggett Environmental Office
P.O. Box 7090, Fort Hunter Liggett, CA 93928-7090
public.comment@liggett-emh1.army.mil

If members of your staff have any questions or comments please feel free to call Mr. Michael Moeller, the Fort Hunter Liggett point-of-contact for this project. He may be reached at (831) 386-2219.

Sincerely,

David Boyes
Senior Project Manager
HDR|e²M

Environmental Assessment
Addressing Installation Development and Training
at Fort Hunter Liggett, California

Interagency and Intergovernmental Coordination List

U.S. Environmental Protection Agency
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USDA Los Padres National Forest
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Goleta, CA 93117

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Air Pollution Control Officer
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Monterey County Water Resources Agency
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Governor's Office of Planning and Research
California State Clearinghouse
P.O. Box 3044
Sacramento, CA 95812-3044

Regional Water Quality Control Board
Central Coast Region 3
896 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

Pinnacles National Monument (NPS)
Park Headquarters
5000 Hwy 146
Paicines, CA 95043

San Antonio School Library
PO Box 5000
Lockwood, CA 93932

Fort Hunter Liggett Library
Attn: AFRC-FMH-PAD
Building 191, Fort Hunter Liggett
Jolon, CA 93928

Monterey County Free Library
26 Central Avenue
Salinas, CA 93901

The following letter was distributed to all parties listed in the preceding interested party list. The comments received are enclosed.

1 March 2010

Subject: *Environmental Assessment Addressing Installation Development and Training at Fort Hunter Liggett, California*

Dear Douglas Quetin,

The United States Army Reserve Command (USARC), in conjunction with Fort Hunter Liggett, has completed a Draft Environmental Assessment (EA) that evaluates the potential effects of Installation Development and Training at Fort Hunter Liggett, California.

The EA assesses impacts from proposed increased levels of training, the construction of cantonment facilities and infrastructure to support that training, and improvements and additions of new range and training base facilities that are associated with implementation of the *Fort Hunter Liggett Range Complex Master Plan* and the *Fort Hunter Liggett Real Property Master Plan* at Fort Hunter Liggett, California. The Proposed Action would allow for increasing annual maximum training days from 750,000 to 1,500,000. Additional training would occur throughout the military base.

Based on congressional and executive mandates, USARC is assessing operational requirements and land use issues throughout Fort Hunter Liggett. Preparation of the EA does not necessarily mean that all aspects of the range complex and real property master plans would be completed, but the Proposed Action with a similar level of impact would be implemented and the plan amended to reflect any changes. This effort is a prudent part of the planning process needed to assess any environmental concerns in accordance with the National Environmental Policy Act of 1969 (NEPA), the National Historic Preservation Act (NHPA), the Clean Water Act (CWA), Endangered Species Act (ESA), and other applicable environmental laws and regulations.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the U.S. Army requests your participation and solicits comments on the attached Draft EA and Draft Finding of No Significant Impact (FNSI). Copies of the Draft EA showing the analysis are available for review at the following libraries: San Antonio School Library, P.O. Box 5000, Lockwood, CA 93932; Monterey County Free Library, 26 Central Avenue, Salinas, CA 93901; Fort Hunter Liggett Library, Building 191, Fort Hunter Liggett, Jolon, CA 93928.

The document is also available at:

www.fhlidtea.com

Public comments on the Draft EA and FNSI will be accepted through 2 April 2010. Your written comments should be sent to:

Liz Clark
Fort Hunter Liggett Environmental Office
P.O. Box 7090, Fort Hunter Liggett, CA 93928-7090
Liz.r.clark@us.army.mil

If members of your organization have any questions or comments please feel free to call Mr. Michael Moeller, the Fort Hunter Liggett point-of-contact for this project. He may be reached at (831) 386-2219.

Sincerely,

David Boyes
Senior Project Manager
HDR | e²M

MBUAPCD
Monterey Bay Unified Air Pollution Control District
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PHONE: (831) 647-9411 • FAX: (831) 647-8501

March 30, 2010

Sent Electronically to:
liz.r.clark@us.army.mil
Original Sent by First Class Mail.

Ms. Liz Clark
Fort Hunter Liggett Environmental Office
P. O. Box 7090
Fort Hunter Liggett, CA 93928-7090

SUBJECT: FONSI FOR INSTALLATION DEVELOPMENT AND TRAINING AT FORT HUNTER LIGGETT, CALIFORNIA

Dear Ms. Clark:

GENERAL COMMENTS

FHL FONSI: Proposed Action. Page 1.
For reference, the Monterey Bay Unified Air Pollution Control District (MBUAPCD) assumes that the Proposed Action (project) consists of the following:

- Increasing maximum supportable troop training from 750,000 to 1,500,000 troop training days per year.
- Construction of cantonment area facilities, including the addition of 255 acres to the area.
- Improvement and construction of additional ranges, including the addition 240 acres to the range development training area.
- Upgrading Tactical Training Base (TTB) facilities, including an increase in area of 325 acres.
- Increase in urban planning area from 639 to 1,220 acres.

Training Day Clarification.
The first sentence in the second paragraph of the FONSI indicates that the project would increase maximum annual training from 750,000 to 1,500,000 days (a 100% increase). However, the last sentence in the second paragraph of the March 1, 2010 letter from HDR/e^2M indicates the increase would be from 1,000,000 to 1,500,000 days per year (a 50% increase). Although we assume the increase would be from 750,000 to 1,500,000, please confirm the actual increase proposed for this key activity indicator.

General Conformity Significance Thresholds.
The FONSI concludes that emissions from the project would be below applicable thresholds for General Conformity, based on the National Emission Inventory developed for the North Central Coast Intrastate Air Quality Control Region. This inventory is not the same as the 2002 Maintenance Inventory and forecasts used in the MBUAPCD's 2007 Federal Maintenance Plan (2007 FMP) for the 8-hour National Ambient Air Quality Standard for ozone (the applicable State Implementation Plan for the region). Nonetheless, as a result of MBUAPCD's cross-checking these inventories, it concurs with the conclusion specified in the FONSI, because emissions from the project would be at least an order of magnitude below applicable thresholds, regardless of the inventory used.

MBUAPCD CEQA Air Quality Guidelines and Significance Thresholds.
Though estimated emissions from the project would be below thresholds of the General Conformity Rule, the FONSI does not specify sufficient information to enable one to determine if it would exceed MBUAPCD's thresholds of significance, which are expressed in lbs/day. Without this essential information, it is not possible to determine if the project would violate the California Environmental Quality Act (CEQA). The MBUAPCD suggests that emissions be calculated in lbs/day and evaluated according to the Air District's 2008 CEQA Air Quality Guidelines, which can be found on the MBUAPCD website at:

http://www.mbuapcd.org/mbuapcd/pdf/mbuapcd/pdf/CEQA_full.pdf

Prescribed Burns.
The training areas are typically burned prior to the scheduled training exercises for troop safety and wildfire control. The annual Burn Permit FHL has with the MBUAPCD should be updated to reflect any changes or increases in burning of the training areas, which would result from the project.

PROJECT-SPECIFIC COMMENTS

FONSI Cover Letter, Mitigation. Page 3.
The third bullet point under Mitigation indicates that various techniques would be used to minimize fugitive dust emissions, which would conform to applicable regulations. Please see Appendix I of this letter, which includes Table 8-2 of the MBUAPCD's CEQA Guidelines (a list of best management practices for mitigating fugitive dust).

Summary of Key Environmental Compliance Requirements. § 1.4 on Page 1-5.
The California Environmental Quality Act and the MBUAPCD's CEQA Air Quality Guidelines (February 2008), referenced herein, should be added to this list. Referencing these documents and analyzing impacts in accord with the thresholds of significance specified therein would likely identify the MBUAPCD's concerns associated with exceeding thresholds of significance.

NAAQS, Table 4-11. Page 4-20.
The table should also include applicable California Standards, which may be found at:
http://www.arb.ca.gov/research/aaqs/aaqs2.pdf
A copy is also included in this comment letter as Appendix I.

Existing Conditions. § 4.4.2, Page 4-21.
This indicates that the project would be subject to the rules and regulations of the MBUAPCD. This includes State and federal air quality plans, as well as the MBUAPCD's CEQA Air Quality Guidelines.

Air Quality Evaluation Criteria. § 5.1.4.
In addition to federal criteria, air quality impacts should also address the requirements of CEQA. As stated previously in this letter, please refer to the MBUAPCD's CEQA Air Quality Guidelines.

De Minimis Thresholds, Table 5-1. Page 5-4.
In addition to the federal Conformity *de minimis* threshold expressed in tons per year, the impacts of the project should also have been expressed in accord with the daily significance thresholds for criteria pollutants. These thresholds of significance are expressed in pounds per day, and can be found in Chapter 5 of the MBUAPCD's CEQA Air Quality Guidelines. They include construction-related emissions, as well as direct and indirect operational emissions resulting from the project.

Emission Inventory, Table 5-3. Page 5-12.
Table 5-3 compares project emissions with a surrogate national inventory for the North Central Coast Intrastate Air Quality Control Region (equivalent to the North Central Coast Air Basin) rather than the 2007 FMP, the applicable federal plan for the region. The project emissions estimated in the table are in tons per year rather than tons per ozone seasonal day, which complicates comparison with the 2007 FMP.

Traffic and Transportation System. § 5.3.12.
The potential increase in local traffic and motor vehicle emissions from the increase in military and support personnel has not been estimated. Accordingly, there is insufficient evidence in the FONSI to support the conclusion of no significant impact. The URBEMIS 2007 Version 9.2.4 Model, available on the MBUAPCD's web-site, could be used to estimate emissions from the doubling in training activity.

Construction of MPMG Range. § 5.4.2.1, Air Quality, Page 5-48.
This section indicates that Best Management Practices (BMPs) to control dust could include spraying of water over the construction area. BMPs are good practice, but no specifics for the project are provided. A more complete list of measures for construction can be found in Table 8-2 of the MBUAPCD's CEQA Air Quality Guidelines. A copy is included in this comment letter as Appendix II.

For particulate emissions from construction projects, the significance threshold is 82 lbs per day, which is roughly equivalent to grading 8.1 acres per day, or grading and excavating 2.1 acres per day.

MBUAPCD suggests that the following measures from Table 8-2 be implemented:

- Limit grading to 8.2 acres per day and grading and excavation to 2.2 acres per day.
- Water graded or excavated areas at least twice daily. Frequency should be based on the type of operations, soil and wind exposure.
- Apply chemical soil stabilizers on roads that are unused for at least four consecutive days.
- Apply non-toxic binders to exposed areas after cut and fill operations, and hydro-seed area.
- Plant vegetative ground cover in disturbed area as soon as possible.
- Haul trucks shall maintain at least 2'0" of freeboard.
- Cover all haul trucks.

Construction of Light Demolition Range. § 5.4.2.2, Air Quality, Page 5-53;
Construction of Hand Grenade Familiarization Course. § 5.4.2.3, Air Quality, Page 5-61;
ECS Construction. § 5.4.3.1, Air Quality, Page 5-63;
Construction of Consolidated Vehicle Wash Rack. § 5.4.3.2, Air Quality, Page 5-69; and
Construction of Storm Water System Upgrade/Expansion. § 5.4.3.3, Air Quality, Pg 5-72.
Please see the suggested mitigation measures for fugitive dust that are specified on page 3 of this comment letter.

ECS Construction. § 5.4.3.1, Air Quality, Page 5-63.
Please note that any new stationary boilers at the Equipment Concentration Site may be subject to MBUAPCD permit. Please contact Lance Ericksen, Manager of the District's Engineering Division, at (831) 647-9411.

Appendix D, Air Quality Impacts, Emission Units
The criteria pollutant emission calculations presented in Appendix D for the various phases of the project are expressed in lbs or in tons per year. The FONSI does not include sufficient information to estimate maximum lbs per day emissions, which would allow a comparison with the MBUAPCD's thresholds of significance. Please compare these estimates with applicable daily thresholds of significance to determine if the project would create significant air quality impacts.

Appendix C, Interagency Mailing List
The Environmental Assessment was sent to P.O. Box 946, King City, CA 93930 (not a District address), which eliminated the opportunity for the MBUAPCD to comment on the EA. In contrast, the FONSI was sent to the District's correct mailing address in Monterey. Please make sure that the MBUAPCD is added to Ft. Hunter Liggett's mailing address, as follows:

Monterey Bay Unified Air Pollution Control District
24580 Silver Cloud Court
Monterey, CA 93940
(831) 647-9411

Appendix D, Air Quality Impacts, Indirect Emissions.
The emission calculations in Appendix D focus on construction, construction vehicles, construction commuting and aircraft operational emissions. There is no mention of any increases in offsite travel by the soldiers and support staff who would be active in the area and traveling to other locations in the region. Unless the soldiers would remain on base for the entire training period and there would be no increase in the magnitude of logistical support required for the proposed increase in training days, an estimate should be developed for emissions associated with increased vehicle miles traveled. This would include estimates for increased truck trips associated with the delivery of supplies and any other support.

Thank you for the opportunity to review the FONSI.

Sincerely,

Jean Getchell, Supervising Planner
Planning and Air Monitoring Division

Appendix I

State Ambient Air Quality Standards

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15.0 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m^3)		0.100 ppm (see footnote 8)	None	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		—	—	—
Lead[9]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average[10]	—		0.15 µg/m^3		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[9]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page …

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calender year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

8. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

9. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

10. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

TABLE 8-2

[To be Updated in Next Update per URBEMIS 2007]

MITIGATION MEASURES CONSTRUCTION EMISSIONS

Pollutant: PM_{10} (Fugitive Dust)

Mitigation Measure	Source Category	Effectiveness	Source
Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure.	Fugitive emissions from active, unpaved construction areas	50%	U.S. EPA, "AP-42, Vol. I." Pg 11.2.4-1.
Prohibit all grading activities during periods of high wind (over 15 mph).	Grading emissions	Reduces potential for exceedance	SCAQMD, "SIP for PM_{10} in the Coachella Valley" 1990. Pg 5-15
Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days).	Wind erosion from inactive areas	Up to 80%	U.S. EPA, "AP-42, Vol. I." Pg. 11.2.4-1.
Apply non-toxic binders (e.g., latex acrylic copolymer) to exposed areas after cut and fill operations and hydro seed area.	Wind erosion from inactive areas	Up to 80%	U.S. EPA, "AP-42, Vol. I." Pg. 11.2.4-1. 90%
Haul trucks shall maintain at least 2'0" of freeboard.	Spills from haul trucks	90%	MBUAPCD
Cover all trucks hauling dirt, sand, or loose materials.	90	%	MBUAPCD
Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land.	Wind erosion from inactive areas	4% (15% for mature trees)	SCAQMD, "SIP for PM_{10} in the Coachella Valley" 1990. Pg 5-15
Plant vegetative ground cover in disturbed areas as soon as possible.	Wind erosion from inactive areas	5%-99% (based on planting plan)	SCAQMD, "SIP for PM_{10} in the Coachella Valley" 1990. Pg 5-15
Cover inactive storage piles.	Wind erosion from storage piles	Up to 90%	U.S. EPA "AP-42, Vol. I." Page 11.2.3-4)

TABLE 8-2 – Continued

MITIGATION MEASURES CONSTRUCTION EMISSIONS
Pollutant: PM_{10} (Fugitive Dust)

Mitigation Measure	Source Category	Effectiveness	Source
Install wheel washers at the entrance to construction sites for all exiting trucks.	On-road entrained PM_{10}	50%	SCAQMD, "SIP for PM_{10} in the Coachella Valley" 1990. Pg 4-11
Pave all roads at construction sites.	On-road entrained PM_{10}	90%	SCAQMD, "SIP for PM_{10} in the Coachella Valley" 1990. Pg 4-12
Sweep streets if visible soil material is carried out from the construction site.	On-road entrained PM_{10}	34%	SCAQMD, "SIP for PM_{10} in the Coachella Valley" 1990. Pg 5-18.
Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the MBUAPCD shall also be visible to ensure compliance with Rule 402 (Nuisance).	All emissions	Minimizes nuisance levels	MBUAPCD
Limit the area under construction at any one time.	Fugitive emissions from active, unpaved construction areas	71 lb/acre/day	MBUAPCD based on U.S. EPA "AP-42," Vol. I

Note: These effectiveness estimates are not additive within a source category (i.e., the benefit of 2 or more mitigation measures that address the same source of emissions would not be the sum of both measures).

MONTEREY COUNTY

WATER RESOURCES AGENCY

PO BOX 930
SALINAS , CA 93902
(831)755-4860
FAX (831) 424-7935

CURTIS V. WEEKS
GENERAL MANAGER

STREET ADDRESS
893 BLANCO CIRCLE
SALINAS, CA 93901-4455

April 1, 2010

Liz Clark
Fort Hunter Liggett Environmental Office
P.O. Box 7090
Fort Hunter Liggett, CA 93928-7090

RE: Draft Environmental Assessment (DEA) for Installation Development and Training at Fort Hunter Liggett, California

Dear Ms. Clark:

After reviewing the DEA for Installation Development and Training at Fort Hunter Liggett, dated March 2010, the Monterey County Water Resources Agency (Agency) has the following comments:

5.3.6 Water Resources

This section of the DEA cites Executive Order 011988 as the regulatory framework for development within a FEMA defined Special Flood Hazard Area (SFHA). Regulations for floodplains in Monterey County are contained in Monterey County Code Chapter 16.16. These regulations hold a higher regulatory standard for development in SFHAs than Title 44 of the Code of Federal Regulations. The Agency recommends revising this section to ensure any development in a SFHA is consistent with Monterey County Code Chapter 16.16.

Thank you for the opportunity to review the Draft Environmental Assessment. If you have any questions, please feel free to contact me at (831) 755-4860.

Sincerely,

Jennifer Bodensteiner, CFM
Water Resources Hydrologist
Floodplain Management and Development Review Section

California Regional Water Quality Control Board

Central Coast Region

Linda Adams
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

Internet Address: http://www.swrcb.ca.gov/rwqcb3
895 Aerovista Place, Suite 101, San Luis Obispo, California 93401
Phone (805) 549-3147 • FAX (805) 543-0397

April 5, 2010

Ms. Liz Clark
U.S. Army Reserve Command
California Avenue, Building 238
Fort Hunter Liggett, CA 93928
Liz.r.clark@us.army.mil

Dear Ms. Clark,

Draft Environmental Assessment; Addressing Installation Development and Training at Fort Hunter Liggett, County of Monterey, SCH# 2010034001

Thank you for the opportunity to review the above-referenced document**.** The Central Coast Regional Water Quality Control Board (Water Board) is a responsible agency under the California Environmental Quality Act (CEQA).

Water Board staff understands that the current cantonment areas will be expanded with numerous building projects as represented on Figure 5-15 in Appendix A. Please be advised that our staff is currently working with Fort Hunter Liggett and Army Corps of Engineers staff to characterize and remediate two large groundwater contaminant plumes, associated with Buildings 194 and 258, in the current and proposed cantonment areas.

As our staff discussed and agreed with Army and Army Corps representatives at a March 4, 2010 meeting at the former Fort Ord, we have significant concerns regarding the location of proposed and existing structures above these contaminant plumes. Site conditions associated with these groundwater plumes suggest a significant risk of volatile organic compound buildup beneath and within adjacent structures. This buildup can create an explosive risk and/or an inhalation hazard to building occupants.

Current data indicate that proposed structures located south-west of the intersection of 7th Division Road and Mission Road, down-gradient of the Building 258 plume, may be at the greatest risk. Consequently, we recommend either avoiding the construction of new structures in this area until the plume is better characterized and/or remediated; or, design any new structure foundations for this area with passive soil gas collection and venting systems employing a flexible membrane liner pursuant to State of California Title 27 regulations.

Please consider these comments in the CEQA approval process for this project. If you have questions, please contact Grant Himebaugh at (805) 542-4636.

Sincerely,

Roger W. Briggs
Executive Officer

S:\CEQA\Comment Letters\Monterey County\FHL Installation Development EA.doc

cc:
Mr. David Eisen
Fort Ord HTW PM
Army Corps of Engineers
P. O. Box 5004
Monterey, CA 93944-5004
DAVID.EISEN@USACE.ARMY.MIL

Mr. Michael Moeller
Fort Hunter Liggett
Attn: DPW-E
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Jolon, CA 93928-7000
Michael.Moeller1@us.army.mil

Mr. Edward Ticken
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ejticken@mactec.com

Mr. Robert Fernandez
Monterey County Environmental Health Department
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Salinas, CA 93906
fernandezrb@co.monterey.ca.us

Mr. Charles Holman
AHTNA Engineering Services
3680 Industrial Boulevard, Suite 600H
West Sacramento, CA 95691-6504
CHolman@ahtnagov.com

Rose, Jennifer A

To: Boyes, David
Subject: RE: comments on draft Environmental Assessment (EA) for Fort Hunter Liggett (UNCLASSIFIED)

-----Original Message-----
From: John Bystra [mailto:JBystra@dtsc.ca.gov]
Sent: Thursday, April 15, 2010 1:26 PM
To: Clark, Liz Ms CIV USA
Cc: Donn Diebert; Eric Wallberg
Subject: comments on draft Environmental Assessment (EA) for FortHunter Liggett (FHL)

Good morning Ms. Clark:

I wanted to send you my comments on the above document. My intention is once you have a chance to review them, we can discuss them before I issue a formal DTSC letter (the letter would be for tracking purposes in the facility file). My comments are below, and they are separated into major and minor comments:

Major:

1) Section 4.4.2, page 4-21 of the EA details the existing air quality conditions in the area of FHL. However, the report does not actually specify the FHL area, but rather FHL as part of the North Central Coast Interstate (NCCI) Air Quality Control Region (AQCR). For this NCCI AQCR, O3 and PM10 are both listed as nonattainment, and all criteria pollutants have been characterized as unclassified/attainment. By earlier definition in this document, unclassified means that "there is not enough information to appropriately classify an AQCR, so the area is considered attainment." So, as far as I can tell, it is possible that there are several pollutants, including O3 and PM10, that will see increases due to the proposed installation and increased development of FHL. Since FHL's present potential contributions to the criteria pollutants of the NCCI AQCR are not estimated nor conjectured, the additional load that will be anticipated through performing these construction activities over the next 4 or 5 years is somewhat unknown.
Air impacts due to this project and its activities should be compared not just to the effect on the environment as a whole, but an understanding of what increases over present operations would also be created during the course of this project. The site specific effects would better determine what will be the effects on the population at the base itself, rather than through the region as a whole.

2) Section 4.13.2, page 4-56 of the EA describes the buildings that have previously been surveyed for asbestos containing materials. Two buildings, identified as Buildings 124 and 360, are presently recommended as "Do Not Use." It would be more appropriate to put some sort of administrative control on the building to actually prevent people from using the building, rather than just having a sign that recommends people do not use it.

3) Section 5.3.11, page 5-23 of the EA states that "contractors would be required to recycle construction debris to the greatest extent possible..." If this recycling includes road base and road materials, then it would be necessary to determine if any Naturally Occurring Asbestos (NOA) were in the road material being recycled, and appropriate measures would need to be taken to ensure that recycling of these material is done in a manner consistent with any applicable hazardous
waste regulations. This of course would also apply to any other
construction materials being recycled that might contain hazardous substances, such as recycling of building materials for buildings previously identified as containing asbestos.

4) Section 5.3.13, page 5-25 of the EA identifies that there is an MMRP site at FHL, and that remedial investigations for Munitions and Explosive of concern would need to be performed at this site. Since the precise location of this site at FHL has not been displayed, I would assume that it does not coincide with any of the areas proposed as part of this EA. If any of these proposed areas were adjacent or part of the MMRP site identified as needing further investigation, I assume that an Explosives Safety Submission (ESS) would be part of this further investigations, to verify that no ordinance nor explosives exist at the appropriate areas, so that safety would be better ensured at the appropriate locations on the site.

Minor:

1) Section 2.1.3, page 2-9, Figure 2-4 of the EA shows the general design of the MPMG range area. While the proposed design infers a certain direction of arms fire, the final EA should show the line(s) of fire that would take place on the site, which could influence where deposition of shell casings or contaminants from continuous firing would likely end up.

Those are my comments, Liz. If you have any questions or concerns, or would like to discuss them, please contact me using my information posted below.

Thank you, and have a good day.

Regards,

John Bystra
Hazardous Substance Engineer
Open Base Navy and Formerly Used Defense Sites Brownfields and Environmental Restoration Program Department of Toxic Substances Control 8800 Cal Center Drive Sacramento, CA 95826
Phone 916.255.3669 Fax 916.255.3697 jbystra@dtsc.ca.gov

Making the world a better place...one site at a time

Classification: UNCLASSIFIED
Caveats: FOUO

Other Interested Parties Coordination List

Ms. Sherry Tune
District Ranger
Los Padres National Forest
Monterey Ranger District
406 South Mildred Avenue
King City, CA 93930

Ventana Wilderness Society
19045 Portola, Suite F-1
Salinas, CA 93908

Doug Alger, President
Salinan Nation Cultural Preservation Association
PO Box 56
Lockwood, CA 93932

California Waterfowl Association
4630 Northgate Boulevard, Suite 150
Sacramento, CA 95834

Charlotte Andersen
Sierra Club, Ventana Chapter
PO Box 5667
Carmel, CA 93921

Monterey Peninsula Audubon Society
PO Box 985
Pacific Grove, CA 93950

Steve Craig
Ventana Land Trust
PO Box 410990, #836
San Francisco, CA 94141

William Bartosh, Co-President
San Antonio Valley Historical Association
62893 Indian Valley Road
San Miguel, CA 93451-9740

Robert Hoover, Co-Board Chairman
Friends of Historic San Antonio Mission
Cabrillo College
Aptos, CA 95003

Ann Beckett, Co-Board Chairman
Friends of Historic San Antonio Mission
PO Box 43
Lockwood, CA 93932

Monterey Bay Chapter
California Native Plant Society
P.O. Box 221303
Carmel, CA 93922-1303

Ventana Wilderness Alliance
Post Office Box 506
Santa Cruz, CA 95061

The following letter was distributed to all parties in the preceding list of non-governmental agencies. No comments from non-governmental agencies were received.

1 March 2010

Subject: *Environmental Assessment Addressing Installation Development and Training at Fort Hunter Liggett, California*

Dear [INTERESTED PARTY],

The United States Army Reserve Command (USARC), in conjunction with Fort Hunter Liggett, has completed a Draft Environmental Assessment (EA) that evaluates the potential effects of Installation Development and Training at Fort Hunter Liggett, California.

The EA assesses impacts from proposed increased levels of training, the construction of cantonment facilities and infrastructure to support that training, and improvements and additions of new range and training base facilities that are associated with implementation of the *Fort Hunter Liggett Range Complex Master Plan* and the *Fort Hunter Liggett Real Property Master Plan* at Fort Hunter Liggett, California. The Proposed Action would allow for increasing annual maximum training days from 750,000 to 1,500,000. Additional training would occur throughout the military installation.

Based on congressional and executive mandates, USARC is assessing operational requirements and land use issues throughout Fort Hunter Liggett. Preparation of the EA does not necessarily mean that all aspects of the range complex and real property master plans would be completed, but the Proposed Action with a similar level of impact would be implemented and the plan amended to reflect any changes. This effort is a prudent part of the planning process needed to assess any environmental concerns in accordance with the National Environmental Policy Act of 1969 (NEPA), the National Historic Preservation Act (NHPA), the Clean Water Act (CWA), Endangered Species Act (ESA), and other applicable environmental laws and regulations.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the U.S. Army requests your participation and solicits comments on the Draft EA and Draft Finding of No Significant Impact (FNSI). Copies of the Draft EA showing the analysis are available for review at the following libraries: San Antonio School Library, P.O. Box 5000, Lockwood, CA 93932; Monterey County Free Library, 26 Central Avenue, Salinas, CA 93901; Fort Hunter Liggett Library, Building 191, Fort Hunter Liggett, Jolon, CA 93928.

The document is also available online at:

www.fhlidtea.com

Public comments on the Draft EA and FNSI will be accepted through 2 April 2010. Your written comments should be sent to:

Liz Clark
Fort Hunter Liggett Environmental Office
P.O. Box 7090, Fort Hunter Liggett, CA 93928-7090
Liz.R.Clark@us.army.mil

If members of your organization have any questions or comments please feel free to call Mr. Michael Moeller, the Fort Hunter Liggett point-of-contact for this project. He may be reached at (831) 386-2219.

Sincerely,

David Boyes
Senior Project Manager
HDR|e²M

PUBLIC NOTICE
United States Army Reserve Command

Notice of Availability

Draft Environmental Assessment Addressing Installation Development and Training at Fort Hunter Liggett, California

The United States Army Reserve Command, in conjunction with Fort Hunter Liggett, has completed a Draft Environmental Assessment (EA) that evaluates the potential effects of Installation Development and Training at Fort Hunter Liggett, California.

The analysis considered in detail potential environmental effects of the Proposed Action and the No Action Alternative. The results, as found in the EA, show that the Proposed Action would not have an adverse impact on the environment, indicating that a Finding of No Significant Impact (FNSI) would be appropriate. An Environmental Impact Statement should not be necessary to implement the Proposed Action.

Copies of the Draft EA showing the analysis are available for review at the following libraries: San Antonio School Library, PO Box 5000, Lockwood, CA 93932; Monterey County Free Library,26 Central Avenue, Salinas, CA 93901; Fort Hunter Liggett Library, Attn: IMWE-CST-MW, Building 191, Fort Hunter Liggett, Jolon, CA 93928.
The document is also available at:

www.fhlidtea.com

Written comment on the Draft EA is invited and will be received for 30 days from the publication of this notice. Comment for consideration by the United States Army Reserve Command on this document should be provided in writing to:

Liz Clark
Fort Hunter Liggett Environmental Office
P.O. Box 7090, Fort Hunter Liggett, CA 93928-7090
Liz.r.clark@us.army.mil

PROOF OF PUBLICATION

STATE OF CALIFORNIA
County of Monterey

This space is for the county clerk's filing stamp

I am a citizen of the United States and a Resident of the County aforesaid: I am over the age of eighteen years and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of The King City Rustler, Greenfield News, Soledad Bee and Gonzales Tribune newspapers of general circulation by The Superior Court of the County of Monterey, State of California: that the notice of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspapers and not in any supplement thereof on the following dates, to wit:

3/3/2010

I certify (or declare) under penalty of perjury that the forgoing is true and correct.

Executed on: **3/3/2010**

At King City, California

TRICIA BERGERON, Office Manager

No:

PUBLIC NOTICE
United States Army Reserve Command

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#53 Publish: 3/3/10

Monterey County
The Herald

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PROOF OF PUBLICATION

STATE OF CALIFORNIA

County of Monterey

I am a citizen of the Unites States and a resident of the County aforesaid. I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of The Herald, a newspaper of general circulation, printed and published daily and Sunday in the City of Monterey, County of Monterey, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Monterey, State of California; that the notice, of which the annexed is a printed copy (set in type not smaller than 6 point), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

March 3, 2010

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Executed on 3/3/10

at Monterey, CA.

Laurie Albanese

Signature

This space is reserved for the County Clerk's Filing Stamp

No. 1319326

PUBLIC NOTICE
UNITED STATES ARMY RESERVE COMMAND

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT ADDRESSING INSTALLATION DEVELOPMENT AND TRAINING AT FORT HUNTER LIGGETT, CALIFORNIA

The United States Army Reserve Command, in conjunction with Fort Hunter Liggett, has completed a Draft Environmental Assessment (EA) that evaluates the potential effects of Installation Development and Training at Fort Hunter Liggett, California.

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Liz Clark
Fort Hunter Liggett Environmental Office
P.O. Box 7090,
Fort Hunter Liggett, CA 93928-7090
Liz.R.Clark@us.army.mil

Published March 3, 2010

2 March 2010
Fort Hunter Liggett Library
Attn: AFRC-FMH-PAD, Building 191
Fort Hunter Liggett, Jolon, CA 93928

Dear Sir or Madam:

The public notice shown below has been published in the *King City Rustler* and *The Monterey Herald* on 3 March 2010. You should receive a copy of the Draft Environmental Assessment (EA) shortly. Please place a copy of this document either on reserve or in the reference section of your library. Members of the public have been invited to review the document at your library until 2 April 2010. The document should not leave the library.

PUBLIC NOTICE

Notice of Availability
Draft Finding of No Significant Impact (FNSI) for the Environmental Assessment Addressing Installation Development and Training at Fort Hunter Liggett, California

The EA assesses impacts from proposed increased levels of training, the construction of cantonment facilities and infrastructure to support that training, and improvements and additions of new range and training base facilities that are associated with implementation of the Fort Hunter Liggett Range Complex Master Plan and the Fort Hunter Liggett Real Property Master Plan at Fort Hunter Liggett, California. The Proposed Action would allow for increasing annual maximum training days from 750,000 to 1,500,000. Additional training would occur throughout the military base.

Based on congressional and executive mandates, USARC is assessing operational requirements and land use issues throughout Fort Hunter Liggett. Preparation of the EA does not necessarily mean that all aspects of the range complex and real property master plans would be completed, but the Proposed Action with a similar level of impact would be implemented and the plan amended to reflect any changes. This effort is a prudent part of the planning process needed to assess any environmental concerns in accordance with the National Environmental Policy Act of 1969 (NEPA), the National Historic Preservation Act (NHPA), the Clean Water Act (CWA), Endangered Species Act (ESA), and other applicable environmental laws and regulations.

Copies of the Draft FNSI and Draft EA describing the Proposed Action and the No Action alternative in detail and presenting the analysis are available for review at the San Antonio School Library, Monterey County Free Library, and the Fort Hunter Liggett Library. Public comments on the Draft FNSI and Draft EA will be accepted through 2 April 2010.

Written comments and inquiries on the Draft FNSI and Draft EA should be directed to Liz Clark, Fort Hunter Liggett Environmental Office, P.O. Box 7090, Fort Hunter Liggett, CA 93928-7090, or email liz.r.clark@us.army.mil.

If you have any questions, please contact me at (401) 440-0166. Thank you.

Sincerely,

David Boyes
Senior Project Manager
HDR|e^{2}M

2 March 2010

Monterey County Free Library,
26 Central Avenue
Salinas, CA 93901

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David Boyes
Project Manager
engineering-environmental Management, Inc.

2 March 2010

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David Boyes
Project Manager
engineering-environmental Management, Inc.

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APPENDIX D

AIR QUALITY CALCULATIONS

T1. Construction and Operation of a Schoonover Support Initial Staging Base (ISB)

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
Mission Training	Estimates baseline and Proposed Action aircraft operational emissions for Schoonover ISB training
AQCR Tier Report	Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Emissions from Construction of Schoonover Support Initial Staging Base

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	2.608	0.462	1.137	0.194	0.186	0.180	296.176
Construction Fugitive Dust	-	-	-	-	13.347	0.667	-
Construction Commuter	0.165	0.165	1.487	0.002	0.016	0.010	197.223
TOTAL	***2.773***	***0.627***	***2.624***	***0.196***	***13.548***	***0.857***	***493.399***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***447.513*** ***metric tons***

Air Quality Emissions from Operation of Schoonover Support Initial Staging Base

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Baseline Flight Operations (2009)	2.475	0.300	1.254	0.211	0.860	0.860	-
Proposed Action Flight Operations	4.950	0.599	2.507	0.422	1.720	1.720	-
Delta Change From Baseline	2.475	0.300	1.254	0.211	0.860	0.860	-

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Emissions from Construction of Schoonover Support Initial Staging Base Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Construction Emissions	2.77	0.63	2.62	0.20	13.55	0.86
% of Regional	**0.009%**	**0.002%**	**0.002%**	**0.002%**	**0.073%**	**0.017%**

Air Emissions from Operation of Schoonover Support Initial Staging Base Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Construction Emissions	4.95	0.60	2.51	0.42	1.72	1.72
% of Regional	**0.016%**	**0.002%**	**0.002%**	**0.005%**	**0.009%**	**0.033%**

Combustion Emissions for Schoonover Support ISB

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Construct Concrete Pads for Tents and Facilities	100,000	ft^2	
Install underground utility lines	20,000	ft^2	Assume 20 foot wide construction corridor
Grade ISB Area (includes helipad/medivac pad)	1,000,000	ft^2	
Total General Construction Area:	100,000	ft^2	
	2.3	acres	
Total Pavement Area:	0	ft^2	
	0	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	1,020,000	ft^2	
	23	acres	
Construction Duration:	6	months	
Annual Construction Activity:	120	days/yr	Assume 6 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	2	83.282	5.154	31.420	1.666	5.091	4.938	9883.053
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			25.773					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994
Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	1,020,000	23.42	5	(from "Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	0	
Building Construction:	100,000	2.30	120	
Architectural Coating	100,000	2.30	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	416.41	25.77	157.10	8.33	25.46	24.69	49,415
Paving	-	-	-	-	-	-	0
Demolition	-	-	-	-	-	-	0
Building Construction	4,727.56	375.58	2,085.88	373.96	339.49	329.30	535,741
Architectural Coatings	71.48	522.91	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**5,215.45**	**924.26**	**2,274.28**	**387.31**	**371.13**	**359.99**	**592,352**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	5,215.45	924.26	2,274.28	387.31	371.13	359.99	592,352
Total Project Emissions (tons)	2.61	0.46	1.14	0.19	0.19	0.18	296.18

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	-	months
Area	-	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	6	months
Area	23.4	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	0.00	0.00	0.00	0.00
General Construction Activities	26.69	13.35	1.33	0.67
Total	**26.69**	**13.35**	**1.33**	**0.67**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month). The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States
EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and
MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 23.4 acres/yr (from Combustion Worksheet)

Qty Equipment: 8.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	23.42	2.93
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	23.42	11.45
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	11.71	11.81
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	11.71	4.84
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	23.42	8.21
TOTAL								39.24

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 39.24
Qty Equipment: 8.00
Grading days/yr: 4.90

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used.

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	120	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**330.531**	**329.036**	**2974.592**	**3.879**	**31.312**	**19.721**	**394445.645**
tons	**0.165**	**0.165**	**1.487**	**0.0019**	**0.0157**	**0.0099**	**197.223**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

Total Training Combustion Emissions (Baseline - 2009)

Aircraft Type	Number of Aircraft Operations	Units of Measure	Training Mission Emissions (Tons/Year)						
			NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
C-130	123	sorties/year	0.848	0.136	0.327	0.097	0.335	0.335	-
C-17	38	sorties/year	1.336	0.058	0.573	0.073	0.446	0.446	-
C-12	5	sorties/year	0.001	0.023	0.027	0.000	0.016	0.016	-
CH-46	33	sorties/year	0.132	0.038	0.149	0.019	0.029	0.029	-
CH-53	25	sorties/year	0.101	0.029	0.115	0.014	0.022	0.022	-
UH-1	28	sorties/year	0.056	0.016	0.063	0.008	0.012	0.012	-
		Total	2.475	0.300	1.254	0.211	0.860	0.860	-

Example: UH-60 NOx = sum of NOx pounds per sortie * number of sorites per year/2000
UH-60 NOx = 3.45 * 55/2000 = 0.096 tons

Notes: C-130 sorties per year = idle, approach, intermediate, and military time in modes.
C-130 closed patterns = approach, intermediate, and military time in modes only.

Total Training Combustion Emissions (Proposed Action - 2010 and beyond)

Aircraft Type	Number of Aircraft Operations	Units of Measure	Training Mission Emissions (Tons/Year)						
			NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
C-130	247	sorties/year	1.697	0.272	0.654	0.193	0.669	0.669	-
C-17	76	sorties/year	2.672	0.115	1.145	0.146	0.893	0.893	-
C-12	10	sorties/year	0.003	0.045	0.054	0.001	0.032	0.032	-
CH-46	66	sorties/year	0.264	0.076	0.298	0.037	0.057	0.057	-
CH-53	50	sorties/year	0.203	0.059	0.230	0.029	0.044	0.044	-
UH-1	55	sorties/year	0.112	0.032	0.126	0.016	0.024	0.024	-
		Total	4.950	0.599	2.507	0.422	1.720	1.720	-
		Delta Change From Baseline	2.475	0.300	1.254	0.211	0.860	0.860	-

Emission Factors

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
UH-1	T400-GE-400	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
Number of Engines:	1	8.0	6.8	6.8	7.0	284	1217	1714	1882

	NO_x Emission Index (lb/1000 lb)				VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	1.62	5.49	7.45	8.01	27.97	0.20	0.06	0.29	75.46	4.97	1.85	2.97
pounds/sortie	0.06	0.76	1.45	1.76	1.06	0.03	0.01	0.06	2.86	0.69	0.36	0.65

	SO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	0.96	0.96	0.96	0.96	2.36	1.97	1.61	0.92
pounds/sortie	0.04	0.13	0.19	0.21	0.09	0.27	0.31	0.20

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
C-130	T56-A-15	Idle	App	Int	Mil	Idle	App	Int	Mil
Number of Engines:	4	15.9	5.1	0.4	1.2	900	1240	2180	2456

	NO_x Emission Index (lb/1000 lb)				VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
	7.79	8.31	9.69	11.42	1.97	0.58	0.42	0.28	3.84	2.82	1.65	1.77
pounds/sortie	7.43	3.50	0.56	2.24	1.88	0.24	0.02	0.06	3.66	1.19	0.10	0.35

	SO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Idle	App	Int	Mil	Idle	App	Int	Mil
	0.96	0.96	0.96	0.96	3.64	3.85	1.46	1.22
pounds/sortie	0.92	0.40	0.06	0.19	3.47	1.62	0.08	0.24

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
C-17	F117-PW-100	Idle	App	Int	Mil	Idle	App	Int	Mil
Number of Engines:	4	15.9	5.1	0.4	1.2	1104	4279	10919	13976

	NO_x Emission Index (lb/1000 lb)				VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
	3.96	13.03	30	34	2.15	0.30	0.21	0.03	23.86	1.25	0.36	0.40
pounds/sortie	4.63	18.96	8.74	38.35	2.52	0.44	0.06	0.03	27.92	1.82	0.10	0.45

	SO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Idle	App	Int	Mil	Idle	App	Int	Mil
	0.96	0.96	0.96	0.96	10.54	5.52	2.31	2.31
pounds/sortie	1.12	1.40	0.28	1.07	12.33	8.03	0.67	2.58

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
C-12	PT6A-42	Idle	App	Int	Mil	Idle	App	Int	Mil
Number of Engines:	2	15.9	5.1	0.4	1.2	147	273	473	510

	NO_x Emission Index (lb/1000 lb)				VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
	1.96	4.64	7.55	7.58	101.46	22.69	2.02	1.75	115.12	34.77	6.48	5.10
pounds/sortie	0.15	0.22	0.05	0.15	7.90	1.05	0.01	0.00	8.97	1.61	0.04	0.10

	SO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Idle	App	Int	Mil	Idle	App	Int	Mil
	0.96	0.96	0.96	0.96	25.17	46.81	81.10	87.50
pounds/sortie	0.07	0.04	0.01	0.02	1.96	2.17	0.51	1.78

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
CH-53	T64-GE-100	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
Number of Engines:	2	8.0	6.8	6.8	7.0	284	1217	1714	1882

	NO_x Emission Index (lb/1000 lb)				VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	1.62	5.49	7.45	8.01	27.97	0.20	0.06	0.29	75.46	4.97	1.85	2.97
pounds/sortie	0.12	1.51	2.89	3.52	2.12	0.06	0.02	0.13	5.71	1.37	0.72	1.30

	SO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	0.96	0.96	0.96	0.96	2.36	1.97	1.61	0.92
pounds/sortie	0.07	0.26	0.37	0.42	0.18	0.54	0.63	0.40

Example: SO_x emission factor calculated based on the average sulfur content of JP-8 fuel, Table 3-6 USAF IERA 2002.
SOx EF = 20 * wt % sulfur = 20 * 0.048 wt % = 0.96 lb/1000 lb fuel.
NO_x emissons for UH-60 App = (6.8 min/(60 min/hr))*(589 lb/hr)*(8.18 lb/1000 lb)*(2 engines) = 1.09 lbs/sortie

Notes: EPCpol,mode = (TIM/60)* (FFR/1000) *EF* NE
EPCpol,mode = Emissions per cycle for a particular pollutant during a particular mode (lb/cycle)
TIM = Time in Mode (min/cycle)
60 = Factor for converting minutes to hours (min/hr)

FFR = Fuel Flow Rate per engine (lb/hr)
1000 = Factor for converting lb/hr to 1000 lb/hr
EF = Emission Factor (lb/1000 lb)
NE = Number of Engines on the aircraft
Emission factors for $PM_{2.5}$ are conservatively assumed to be equivilent to PM_{10}.

Emission factors for UH-60 were used to estimate emissions from CH-46 helicopters.

Source: USAF IERA 2002. *Air Emissions Inventory Guidance* , Table 3-3 for Criteria Pollutant Emission Factors for Aircraft Engines. July 2002.

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

T2. Construction of Milipitas Tactical Training Base (TTB)

Summary Summarizes total emissions by calendar year.

Combustion Estimates emissions from non-road equipment exhaust.

Fugitive Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.

Grading Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.

Construction Commuter Estimates emissions for construction workers commuting to the site.

AQCR Tier Report Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Emissions from Milpitas Tactical Training Base Expansion

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	3.024	0.498	1.294	0.202	0.211	0.205	345.591
Construction Fugitive Dust	-	-	-	-	26.694	1.335	-
Construction Commuter	0.165	0.165	1.487	0.002	0.016	0.010	197.223
TOTAL	***3.024***	***0.498***	***1.294***	***0.202***	***26.905***	***1.539***	***345.591***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***313.451*** ***metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Emissions from RMilpitas Tactical Training Base Expansion Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Construction Emissions	3.02	0.50	1.29	0.20	26.91	1.54
% of Regional	**0.010%**	**0.002%**	**0.001%**	**0.002%**	**0.145%**	**0.030%**

Combustion Emissions for Milpitas Tactical Training Base Expansion

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Construct Concrete Pads for TTB Facilities	50,000	ft^2	
Construct AAFES Facility, MWR Facility, and Gymnasium	2,500	ft^2	
Construct Classroom	13,000	ft^2	
Construct Mayor Cell	2,500	ft^2	
Construct Hospital Module	10,000	ft^2	
Construct Village	10,000	ft^2	
Construct Entry Points	10,000	ft^2	
Construct Fuel Transfer and Storage Point	10,000	ft^2	
Install underground utility lines	40,000	ft^2	Assume 20 foot wide construction corridor
GradeTTB Area (includes helipad or medivac pad)	2,000,000	ft^2	
Total General Construction Area:	108,000	ft^2	
	2.5	acres	
Total Pavement Area:	0.0	ft^2	
	0.0	acres	
Total Demolition Area:	0.0	ft^2	
	0.0	acres	
Total Disturbed Area:	2,040,000	ft^2	
	46.8	acres	
Construction Duration:	6	months	
Annual Construction Activity:	120	days/yr	Assume 6 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	5	208.206	12.885	78.549	4.164	12.728	12.346	24707.632
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			26.784					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994
Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	2,040,000	46.83	6	(from "Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	0	
Building Construction:	108,000	2.48	120	
Architectural Coating	108,000	2.48	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1,249.24	77.31	471.30	24.98	76.37	74.07	148,246
Paving	-	-	-	-	-	-	0
Demolition	-	-	-	-	-	-	0
Building Construction	4,727.56	375.58	2,085.88	373.96	339.49	329.30	535,741
Architectural Coatings	71.48	543.14	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**6,048.28**	**996.02**	**2,588.48**	**403.97**	**422.04**	**409.38**	**691,183**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	6,048.28	996.02	2,588.48	403.97	422.04	409.38	691,183
Total Project Emissions (tons)	3.02	0.50	1.29	0.20	0.21	0.20	345.59

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	-	months
Area	-	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	6	months
Area	46.8	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	0.00	0.00	0.00	0.00
General Construction Activities	53.39	26.69	2.67	1.33
Total	**53.39**	**26.69**	**2.67**	**1.33**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and PI **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 46.8 acres/yr (from Combustion Worksheet)
Qty Equipment: 15.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	46.83	5.85
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	46.83	22.90
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	23.42	23.61
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	23.42	9.69
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	46.83	16.43
TOTAL								78.47

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 78.47
Qty Equipment: 15.00
Grading days/yr: 5.23

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD)

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used.

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	120	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**330.531**	**329.036**	**2974.592**	**3.879**	**31.312**	**19.721**	**394445.645**
tons	**0.165**	**0.165**	**1.487**	**0.0019**	**0.0157**	**0.0099**	**197.223**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

T3. Construction and Operation of a Heavy Equipment Operator Training Site

Summary	Summarizes total emissions by calendar year.
Heavy Equipment Combustion	Estimates emissions from non-road heavy construction equipment exhaust.
Fugitive	Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
AQCR Tier Report	Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Emissions from Heavy Equipment Operator Training Site

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Heavy Equipment Combustion	170.693	12.703	64.113	10.361	9.837	9.428	14,386.599
Construction Fugitive Dust	-	-	-	-	31.350	1.568	-
TOTAL	***170.693***	***12.703***	***64.113***	***10.361***	***41.187***	***10.995***	***14,386.599***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***13,048.646 metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Emissions from Heavy Construction Equipment Operator Training Site Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Operational Emissions	170.69	12.70	64.11	10.36	41.19	11.00
% of Regional	**0.557%**	**0.044%**	**0.046%**	**0.122%**	**0.222%**	**0.212%**

Heavy Equipment Operator Training Site Emission Combustion Estimates

Assumptions
There would be 22 classes (14 days each class -11 Class II and 11 Class III) held each calendar year.
Each piece of heavy equipment would be operated 8 hours per working day.
There would be two pieces of each type of heavy equipment available each class.

						USEPA NONROAD Emission Factors						
SCC	Equipment Type	Horsepower	Number of Equipment	Hours/Day	Days/Year	NOx (g/hp-hr)	VOC (g/hp-hr)	CO (g/hp-hr)	SO_2 (g/hp-hr)	PM_{10} (g/hp-hr)	$PM_{2.5}$ (g/hp-hr)	CO_2 (g/hp-hr)
22700002018	Diesel Scraper	1,000	2	8	154	6.52	0.49	2.60	0.37	0.39	0.38	535.90
22700002036	Diesel Excavator	3,000	2	8	154	6.30	0.45	2.31	0.37	0.35	0.34	536.00
22700002048	Diesel Grader	750	2	8	154	5.02	0.26	2.49	0.37	0.30	0.29	234.92
22700002066	Diesel Tractors/Loaders/Backhoes	300	2	8	154	6.93	1.16	4.36	0.44	0.70	0.44	623.70
22700002069	Diesel Crawler Tractor/Dozer	2,000	2	8	154	6.51	0.49	2.56	0.37	0.38	0.37	535.90
22700002072	Diesel Steer Skid Loader	175	2	8	154	7.66	1.68	6.11	0.43	1.01	0.98	622.10
22700002048	Diesel Off-Highway Truck (Water Truck)	3,000	2	8	154	5.74	0.34	1.57	0.37	0.27	0.27	536.30

Source: USEPA. 2007. Emission factors from NONROAD 2007 provided by Mr. Larry Landman (Air Quality and Modeling Center, USEPA, Office of Transportation and Air Quality) on 14 September 2007.

Equipment Type	NOx tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Diesel Scraper	17.71	1.33	7.06	1.00	1.06	1.03	1,455.56
Diesel Excavator	51.33	3.67	18.82	3.01	2.85	2.77	4,367.50
Diesel Grader	10.23	0.53	5.07	0.75	0.61	0.59	478.55
Diesel Tractors/Loaders/Backhoes	5.65	0.95	3.55	0.36	0.57	0.36	508.21
Diesel Crawler Tractor/Dozer	35.36	2.66	13.91	2.01	2.06	2.01	2,911.13
Diesel Steer Skid Loader	3.64	0.80	2.90	0.20	0.48	0.47	295.70
Diesel Off-Highway Truck (Water Truck)	46.77	2.77	12.79	3.01	2.20	2.20	4,369.95
	170.69	12.70	64.11	10.36	9.84	9.43	14,386.60

Example: NO_x emissions for Diesel Scraper = (horsepower) * (number of equipment) * (hours/day) * (days/year) * (NO_x emission factor/453.59)/2000
= (1,000 HP) * (2 equipment) * (8 hours/day) * (55 days/year) * (6.52 g/hp-hr)/453.56)/2000 = 6.32 tons per year.

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	-	months
Area	-	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	11	months
Area	30.0	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	0.00	0.00	0.00	0.00
General Construction Activities	62.70	31.35	3.14	1.57
Total	**62.70**	**31.35**	**3.14**	**1.57**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 30.0 acres/yr (from Combustion Worksheet)

Qty Equipment: 9.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	30.00	3.75
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	30.00	14.67
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	15.00	15.13
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	15.00	6.21
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	30.00	10.52
TOTAL								50.27

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 50.27
Qty Equipment: 9.00
Grading days/yr: 5.59

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

R1. Construction and Operation of a Multi-Purpose Machine Gun Range

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Operational Emissions	Estimates emissions from machine gun training activities.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
AQCR Tier Report	Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Construction Emissions from Multi-Purpose Machine Gun Range

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	6.599	0.561	2.744	0.367	0.446	0.433	761.365
Construction Fugitive Dust	-	-	-	-	198.036	9.902	-
Construction Commuter	0.275	0.274	2.479	0.003	0.026	0.016	328.705
TOTAL	***6.874***	***0.835***	***5.222***	***0.370***	***198.509***	***10.351***	***1,090.070***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***988.693*** ***metric tons***

Air Quality Operational Emissions from Multi-Purpose Machine Gun Range

	NO_x (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	Lead (ton)	CO_2 (ton)
Operational Emissions	0.288	3.213	-	0.085	0.055	0.007	1.553
Total	***0.288***	***3.213***	***-***	***0.085***	***0.055***	***0.007***	***1.553***

CO_2 emissions converted to metric tons = ***1.409*** ***metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Construction Emissions from Multi-Purpose Machine Gun Range Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Construction Emissions	6.87	0.83	5.22	0.37	198.51	10.35
% of Regional	**0.022%**	**0.003%**	**0.004%**	**0.004%**	**1.071%**	**0.200%**

Air Operational Emissions from Multi-purpose Machine Gun Range Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Operational Emissions	0.29	0.00	3.21	0.00	0.08	0.06
% of Regional	**0.001%**	**0.000%**	**0.002%**	**0.000%**	**0.0005%**	**0.001%**

Combustion Emissions for Multipurpose Machine Gun Range

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Construct MPMG Facility	10,000	ft^2	
Install underground utility lines	20,000	ft^2	Assume 20 foot wide construction corridor
Grade MPMG Range Area	9,060,480	ft^2	
Total General Construction Area:	10,000	ft^2	
	0.2	acres	
Total Pavement Area:	0	ft^2	
	0	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	9,080,480	ft^2	
	208	acres	
Construction Duration:	10	months	
Annual Construction Activity:	200	days/yr	Assume 10 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	21	874.466	54.117	329.908	17.489	53.456	51.852	103772.053
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			8.150					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	9,080,480	208.46	6	(from "Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	0	
Building Construction:	10,000	0.23	200	
Architectural Coating	10,000	0.23	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	5,246.79	324.70	1,979.45	104.94	320.73	311.11	622,632
Paving	-	-	-	-	-	-	0
Demolition	-	-	-	-	-	-	0
Building Construction	7,879.26	625.96	3,476.46	623.27	565.81	548.83	892,902
Architectural Coatings	71.48	170.46	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**13,197.54**	**1,121.13**	**5,487.22**	**733.23**	**892.73**	**865.95**	**1,522,730**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	13,197.54	1,121.13	5,487.22	733.23	892.73	865.95	1,522,730
Total Project Emissions (tons)	6.60	0.56	2.74	0.37	0.45	0.43	761.37

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006

$PM_{2.5}$ Emissions

$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	-	months
Area	-	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	10	months
Area	208.5	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	0.00	0.00	0.00	0.00
General Construction Activities	396.07	198.04	19.80	9.90
Total	**396.07**	**198.04**	**19.80**	**9.90**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 208.5 acres/yr (from Combustion Worksheet)

Qty Equipment: 63.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.

An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.

200 hp bulldozers are used for site clearing.

300 hp bulldozers are used for stripping, excavation, and backfill.

Vibratory drum rollers are used for compacting.

Stripping, Excavation, Backfill and Compaction require an average of two passes each.

Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	208.46	26.06
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	208.46	101.91
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	104.23	105.10
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	104.23	43.12
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	208.46	73.11
TOTAL								349.30

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 349.30

Qty Equipment: 63.00

Grading days/yr: 5.54

Multi-Purpose Machine Gun Range Operational Emissions

Emissions from operation of the proposed Multi Purpose Machine Gun Range (MPMG) are estimated on this sheet.

Emission Estimation Methods:
EPA AP-42 Section 15.1 Small Cartridges <30mm (February 2008).
Please note that some subsections of this AP-42 section are draft, however, the emission factors used to estimate emissions from the MPMG range are associated sections that have been finalized as indicated at the following website: http://www.epa.gov/ttn/chief/ap42/ch15/related/c15s01.html (Accessed 1 Sept 2009).
Specific Sections Referenced:

Section 15.1.7 A066, M193 5.56-mm Ball Cartridge
Section 15.1.15 A143, M80 7.62-mm Ball Cartridge
Section 15.1.28 A557, M33 .50 Caliber Ball Cartridge and M17 .50 Caliber Tracer Cartridge

Assumptions:
Annual quantity and types of ammunition fired at the proposed MPMG Range will be similar to the number fired at the current MPMG Range.
1,276,798 = total number of rounds fired (Training Ammunition Usage by Facilities Report Jan-Dec 2008 (FHL #84)
Proposed number of rounds fired are split equally between the three main types of ammunition fired at the MPMG Range (0.50 cal, 5.56-mm, 7.62-mm).

Multi-Purpose Machine Gun Range Emission Factors

Pollutant	Emission Factors by Ammunition Type		
	0.50 cal[1]	5.56-mm[2]	7.62-mm[3]
	lb/item	lb/item	lb/item
CO	1.1E-02	1.8E-03	2.3E-03
NO_x	1.2E-03	5.6E-05	9.7E-05
PM10	3.1E-04	3.8E-05	5.1E-05
PM2.5	1.9E-04	3.2E-05	3.8E-05
Lead	1.3E-05	1.3E-05	4.9E-06
CO_2	5.1E-03	1.0E-03	1.2E-03
Methane	1.3E-04	1.3E-05	1.0E-05

[1] Table 15.1.28-1 Emission Factors for the Use of DODIC A557, M33 .50 Caliber Ball Cartridge - Carbon Dioxide, Criteria Pollutants, Methane, and Total Suspended Particulate

[2] Table 15.1.7-1 Emission Factors for the Use of DODIC A066, M193 5.56-mm Ball Cartridge - Carbon Dioxide, Criteria Pollutants, Methane, and Total Suspended Particulate

[3] Table 15.1.15-1 Emission Factors for the Use of DODIC A143, M80 7.62-mm Ball Cartridge - Carbon Dioxide, Criteria Pollutants, Methane, and Total Suspended Particulate

Multi-Purpose Machine Gun Range Emissions

Ammunition Type	Annual Emissions (lb/year)						
	CO	NO_x	PM10	PM2.5	Lead	CO_2	Methane
0.50 cal	4,681.59	510.72	131.94	80.86	5.53	2,170.56	55.33
5.56-mm	766.08	23.83	16.17	13.62	5.53	425.60	5.53
7.62-mm	978.88	41.28	21.71	16.17	2.09	510.72	4.26
Total	**6,426.55**	**575.84**	**169.81**	**110.66**	**13.15**	**3,106.88**	**65.12**

Annual Emissions in lb/year for each ammunition type are estimated using the following equation:

Emissions (lb/year) = Number of Rounds (items/year) * Emission Factor (lb pollutant/item)

Ammunition Type	Annual Emissions (ton/year)						
	CO	NO_x	PM10	PM2.5	Lead	CO_2	Methane
0.50 cal	2.34	0.26	0.066	0.040	0.0028	1.09	0.028
5.56-mm	0.38	0.012	0.008	0.0068	0.0028	0.21	0.0028
7.62-mm	0.49	0.021	0.011	0.0081	0.0010	0.26	0.0021
Total	**3.21**	**0.29**	**0.085**	**0.055**	**0.0066**	**1.55**	**0.033**

Annual Emissions in tons/year for each ammunition type are estimated using the following equation:

Emissions (ton/year) = Emissions (lb/year) * (1 ton/2000 lbs)

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD)

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	200	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**550.885**	**548.393**	**4957.654**	**6.465**	**52.187**	**32.869**	**657409.409**
tons	**0.275**	**0.274**	**2.479**	**0.0032**	**0.0261**	**0.0164**	**328.705**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

R2. Construction of Light Demolition Range

Summary Summarizes total emissions by calendar year.

Combustion Estimates emissions from non-road equipment exhaust.

Fugitive Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.

Grading Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.

Construction Commuter Estimates emissions for construction workers commuting to the site.

AQCR Tier Report Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Emissions from Light Demolition Range

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	2.068	0.293	0.908	0.160	0.148	0.144	234.236
Construction Fugitive Dust	-	-	-	-	2.375	0.119	-
Construction Commuter	0.138	0.137	1.239	0.002	0.013	0.008	164.352
TOTAL	***2.206***	***0.430***	***2.148***	***0.161***	***2.536***	***0.271***	***398.588***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***361.519*** ***metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Emissions from Light Demolition Range Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Consruction Emissions	2.21	0.43	2.15	0.16	2.54	0.27
% of Regional	**0.007%**	**0.001%**	**0.002%**	**0.002%**	**0.014%**	**0.005%**

Combustion Emissions for Light Demolition Range

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	**Area Disturbed**		
Construct Light Demolition Structures	25,000	ft^2	
Install underground utility lines	10,000	ft^2	Assume 20 foot wide construction corridor
Grade Light Demolition Range Area	217,800	ft^2	
Total General Construction Area:	25,000	ft^2	
	0.6	acres	
Total Pavement Area:	0	ft^2	
	0	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	227,800	ft^2	
	0	acres	
Total Disturbed Area:	217,800	ft^2	
	5	acres	
Construction Duration:	5	months	
Annual Construction Activity:	100	days/yr	Assume 5 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			12.886					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	217,800	5.00	3	(from "Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	0	
Building Construction:	25,000	0.57	100	
Architectural Coating	25,000	0.57	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	124.92	7.73	47.13	2.50	7.64	7.41	14,825
Paving	-	-	-	-	-	-	0
Demolition	-	-	-	-	-	-	0
Building Construction	3,939.63	312.98	1,738.23	311.64	282.90	274.42	446,451
Architectural Coatings	71.48	265.19	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**4,136.04**	**585.90**	**1,816.67**	**319.16**	**296.73**	**287.83**	**468,471**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	4,136.04	585.90	1,816.67	319.16	296.73	287.83	468,471
Total Project Emissions (tons)	2.07	0.29	0.91	0.16	0.15	0.14	234.24

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	-	months
Area	-	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	5	months
Area	5.0	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	0.00	0.00	0.00	0.00
General Construction Activities	4.75	2.38	0.24	0.12
Total	**4.75**	**2.38**	**0.24**	**0.12**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United
EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions
MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 5.0 acres/yr (from Combustion Worksheet)

Qty Equipment: 3.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	5.00	0.63
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	5.00	2.44
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	2.50	2.52
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	2.50	1.03
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	5.00	1.75
TOTAL								8.38

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 8.38
Qty Equipment: 3.00
Grading days/yr: 2.79

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	100	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**275.442**	**274.196**	**2478.827**	**3.232**	**26.094**	**16.434**	**328704.704**
tons	**0.138**	**0.137**	**1.239**	**0.0016**	**0.0130**	**0.0082**	**164.352**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

R3. Construct Hand Grenade Familiarization Course

Summary Summarizes total emissions by calendar year.

Combustion Estimates emissions from non-road equipment exhaust.

Fugitive Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.

Grading Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.

Construction Commuter Estimates emissions for construction workers commuting to the site.

AQCR Tier Report Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Emissions from Hand Grenade Familiarization Course

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	1.259	0.118	0.553	0.097	0.091	0.088	142.475
Construction Fugitive Dust	-	-	-	-	0.713	0.036	-
Construction Commuter	0.083	0.082	0.744	0.001	0.008	0.005	98.611
TOTAL	***1.342***	***0.201***	***1.296***	***0.098***	***0.811***	***0.128***	***241.086***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***218.665*** ***metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Emissions from Hand Grenade Familiarization Course Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Construction Emissions	1.34	0.20	1.30	0.10	0.81	0.13
% of Regional	**0.004%**	**0.001%**	**0.001%**	**0.001%**	**0.004%**	**0.002%**

Combustion Emissions for Hand Grenade Familiarization Course

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Construct Hand Grenade Range Bays	500	ft^2	
Grade Hand Grenade Familiarization Course Area	108,900	ft^2	
Total General Construction Area:	500	ft^2	
	0.0	acres	
Total Pavement Area	0	ft^2	
	0.0	acres	
Total Demolition Area	0	ft^2	
	0.0	acres	
Total Disturbed Area:	108,900	ft^2	
	2.5	acres	
Construction Duration:	3	months	
Annual Construction Activity:	60	days/yr	Assume 3 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			1.822					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	108,900	2.50	2	(from "Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	0	
Building Construction:	500	0.01	60	
Architectural Coating	500	0.01	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	83.28	5.15	31.42	1.67	5.09	4.94	9,883
Paving	-	-	-	-	-	-	0
Demolition	-	-	-	-	-	-	0
Building Construction	2,363.78	187.79	1,042.94	186.98	169.74	164.65	267,871
Architectural Coatings	71.48	43.91	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**2,518.54**	**236.85**	**1,105.67**	**193.67**	**181.02**	**175.59**	**284,949**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	2,518.54	236.85	1,105.67	193.67	181.02	175.59	284,949
Total Project Emissions (tons)	1.26	0.12	0.55	0.10	0.09	0.09	142.47

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	-	months
Area	-	acres

General Construction Facilities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	3	months
Area	2.5	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	0.00	0.00	0.00	0.00
General Construction Activities	1.43	0.71	0.07	0.04
Total	**1.43**	**0.71**	**0.07**	**0.04**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 2.5 acres/yr (from Combustion Worksheet)

Qty Equipment: 3.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	2.50	0.31
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	2.50	1.22
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	1.25	1.26
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.25	0.52
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	2.50	0.88
TOTAL								4.19

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 4.19
Qty Equipment: 3.00
Grading days/yr: 1.40

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD)

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	60	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VO

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**165.265**	**164.518**	**1487.296**	**1.939**	**15.656**	**9.861**	**197222.823**
tons	**0.083**	**0.082**	**0.744**	**0.0010**	**0.0078**	**0.0049**	**98.611**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

C1. Construction and Operation of Equipment Concentration Site

Summary Summarizes total emissions by calendar year.

Combustion Estimates emissions from non-road equipment exhaust.

Fugitive Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.

Grading Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.

Construction Commuter Estimates emissions for construction workers commuting to the site.

Operational Emissions Estimates emissions natural gas boilers.

AQCR Tier Report Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Construction Emissions from Equipment Concentration Site

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	10.791	1.056	4.633	0.637	0.736	0.714	1,259.420
Construction Fugitive Dust	-	-	-	-	76.342	4.773	-
Construction Commuter	0.496	0.494	4.462	0.006	0.047	0.030	591.668
TOTAL	***11.287***	***1.549***	***9.095***	***0.643***	***77.125***	***5.517***	***1,851.089***

Note: Total CY2011 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***1,678.938*** ***metric tons***

Air Quality Operational Emissions from Equipment Concentration Site

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Operational Emissions	1.028	0.057	0.863	0.006	0.078	0.078	-
TOTAL	***1.028***	***0.057***	***0.863***	***0.006***	***0.078***	***0.078***	***-***

CO_2 emissions converted to metric tons = ***-*** ***metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Construction Air Emissions from Equipment Concentration Site Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Construction Emissions	11.29	1.55	9.09	0.64	77.13	5.52
% of Regional	**0.037%**	**0.005%**	**0.007%**	**0.008%**	**0.416%**	**0.106%**

Operational Air Emissions from Equipment Concentration Site Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Operational Emissions	1.03	0.06	0.86	0.01	0.08	0.08
% of Regional	**0.003%**	**0.0002%**	**0.001%**	**0.0001%**	**0.0004%**	**0.002%**

Combustion Emissions for Equipment Concentration Site

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Construct Vehicle Maintenance Facility	40,000	ft^2	
Construct Equipment Parking Area	1,322,480	ft^2	
Construct Organizational Storage Warehouse	75,000	ft^2	
Install underground utility lines	20,000	ft^2	Assume 20 foot wide construction corridor (included in grade construction area)
Grade Construction Area	1,437,480	ft^2	
Total General Construction Area:	115,000	ft^2	
	2.6	acres	
Total Pavement Area:	1,322,480	ft^2	
	30	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	1,457,480	ft^2	
	33	acres	
Construction Duration:	18	months	
Annual Construction Activity:	360	days/yr	Assume 18 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	3	124.924	7.731	47.130	2.498	7.637	7.407	14824.579
Paving Equipment	3	136.102	7.817	55.735	2.722	8.328	8.078	16871.871
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			27.638					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	1,457,480	33.46	6	(from "Grading" worksheet)
Paving:	1,322,480	30.36	48	
Demolition:	0	0.00	0	
Building Construction:	115,000	2.64	360	
Architectural Coating	115,000	2.64	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	749.54	46.39	282.78	14.99	45.82	44.44	88,947
Paving	6,578.26	377.83	2,693.87	131.57	402.53	390.46	815,474
Demolition	-	-	-	-	-	-	0
Building Construction	14,182.67	1,126.73	6,257.63	1,121.89	1,018.46	987.90	1,607,224
Architectural Coatings	71.48	560.22	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**21,581.95**	**2,111.17**	**9,265.59**	**1,273.46**	**1,473.00**	**1,428.81**	**2,518,841**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	21,581.95	2,111.17	9,265.59	1,273.46	1,473.00	1,428.81	2,518,841
Total Project Emissions (tons)	10.79	1.06	4.63	0.64	0.74	0.71	1,259.42

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	3	months
Area	30.4	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	18	months
Area	33.5	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	38.25	19.13	3.83	1.91
General Construction Activities	114.43	57.22	5.72	2.86
Total	**152.68**	**76.34**	**9.55**	**4.77**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 33.5 acres/yr (from Combustion Worksheet)
Qty Equipment: 11.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	33.46	4.18
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	33.46	16.36
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	16.73	16.87
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	16.73	6.92
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	33.46	11.73
TOTAL								56.06

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 56.06
Qty Equipment: 11.00
Grading days/yr: 5.10

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	360	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**991.592**	**987.107**	**8923.777**	**11.637**	**93.937**	**59.164**	**1183337**
tons	**0.496**	**0.494**	**4.462**	**0.0058**	**0.0470**	**0.0296**	**591.668**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

Operational Emission Calculation Methods

This analysis will compute emissions associated with natural gas boilers to be installed as a resullt of the Proposed Action

Fuel Usage Calculation

Size of Proposed Facilities (ft^2)	Estimated Heating Capacity[a] (MMBtu/hr)	Fuel Use[b] (ft^3/yr)
60,000	2.4	9,135,529
75,000	3.0	11,419,412

a. Estimated Heating Capacity calculations assume 40 Btus per square foot of heat capacity based on information found at
Source: http://reviews.ebay.com/How-many-Btu-s-do-I-need-to-heat-my-home_W0QQugidZ1000000000205425
b. Potential Fuel usage calculations assume 162 days per year at 100% rated heat capacity based on information found at
Source: http://www.worldclimate.com/cgi-bin/data.pl?ref=N36W121+1306+044555C

Average Heating Degree Days for King City, California (1961-1990)
Source: http://www.worldclimate.com/cgi-bin/data.pl?ref=N36W121+1306+044555C

Month	Heating Degree Days	Number of Days Boiler is Used
Jan	520	31
Feb	374	20
Mar	349	21
Apr	268	15
May	140	8
Jun	54	3
Jul	22	1
Aug	5	0
Sep	49	3
Oct	128	8
Nov	347	20
Dec	517	31
Total	2,773	162

Emission Factors and Potential Emissions

Emission Factors from USEPA FIRE Database version 6.24. Where necessary, emission factors expressed in units of lbs/MMBtu fuel oil were converted to lb/10^3 gal using a conversion factor of 140,000 Btu/gal
Where emission factors are listed as "Less than" (<) a numeric value, they are assumed to be present at that numeric value

Pollutant	CAS #	Natural Gas >= 0.3 MMBtu/hr	Emissions
		(lb/10^6 scf)	(tpy)
PM		7.6	0.0781
PM_{10}		7.6	0.0781
$PM_{2.5}$		7.6	0.0781
Carbon Monoxide	630-08-0	84	0.8633
NO_X		100	1.0277
SO_X		0.6	0.0062
Total Organic Compounds		11	0.1131
Precursor VOCs		5.5	0.0565
HAP Name		**Emission Factor (lb/10^6 scf)**	
Arsenic Compounds		0.00020	0.00000206
Beryllium Compounds		0.00001	0.00000012
Cadmium Compounds		0.00110	0.00001131
Chromium Compounds		0.00140	0.00001439
Cobalt Compounds		0.00008	0.00000086
Lead Compounds		0.00050	0.00000514
Manganese Compounds		0.00038	0.00000391
Mercury Compounds		0.00026	0.00000267
Nickel Compounds		0.00210	0.00002158
Selenium compounds		0.00002	0.00000025
Benzene	71-43-2	0.00210	0.00002158
Formaldehyde	50-00-0	0.07500	0.00077081
n-Hexane	110-54-3	1.80000	0.01849945
Naphthalene	91-20-3	0.00061	0.00000627
Toluene	108-88-3	0.00340	0.00003494
2-methylnapthalene	91-57-6	0.0000240	0.00000025
3-methylchloranthrene	56-49-5	0.0000018	0.00000002
7,12-dimethylbenz(a)anthracene	57-97-6	0.0000160	0.00000016
acenaphthene	83-32-9	0.0000018	0.00000002
acenaphthylene	208-96-8	0.0000018	0.00000002
anthracene	120-12-7	0.0000024	0.00000002
benz(a)anthracene	56-55-3	0.0000018	0.00000002
benzo(a)pyrene	50-32-8	0.0000012	0.00000001
benzo(b)flouranthene	205-99-2	0.0000018	0.00000002
benzo(g,h,I)perylene	191-24-2	0.0000012	0.00000001
benzo(k)fluoranthene	207-08-9	0.0000018	0.00000002
chrysene	218-01-9	0.0000018	0.00000002
dibenzo(a,h)anthracene	53-70-3	0.0000012	0.00000001
fluoranthene	206-44-0	0.0000030	0.00000003
fluorene	86-73-7	0.0000028	0.00000003
indeno(1,2,3-cd)pyrene	193-39-5	0.0000018	0.00000002
phenanathrene	85-01-8	0.0000170	0.00000017
pyrene	129-00-0	0.0000050	0.00000005
Total POM (other than Naphthalene)	POM	0.0000882	0.00000091
FIRE 6.24 SCC Codes		10300603	HAPs 10300501

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

C2. Construction of Consolidated Wash Rack

Summary Summarizes total emissions by calendar year.

Combustion Estimates emissions from non-road equipment exhaust.

Fugitive Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.

Grading Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.

Construction Commuter Estimates emissions for construction workers commuting to the site.

AQCR Tier Report Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Emissions from Consolidated Vehicle Wash Rack

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	3.799	0.836	1.666	0.287	0.271	0.263	431.817
Construction Fugitive Dust	-	-	-	-	10.699	0.564	-
Construction Commuter	0.248	0.247	2.231	0.003	0.023	0.015	295.834
TOTAL	***4.047***	***1.083***	***3.897***	***0.290***	***10.993***	***0.842***	***727.652***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***659.980*** ***metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Emissions from Consolidated Vehicle Wash Rack Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Construction Emissions	4.05	1.08	3.90	0.29	10.99	0.84
% of Regional	**0.013%**	**0.004%**	**0.003%**	**0.003%**	**0.059%**	**0.016%**

Combustion Emissions for Consolidated Vehicle Wash Rack

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Construct Consolidated Vehicle Wash Racks and restrooms	435,600	ft^2	
Pave Vehicle Wash Rack Area	40,000	ft^2	
Install underground utility lines (includes OWS)	80,000	ft^2	Assume 20 foot wide construction corridor
Grade Construction Area	435,600	ft^2	
Total General Construction Area:	435,600	ft^2	
	10.0	acres	
Total Pavement Area:	40,000	ft^2	
	1	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	515,600	ft^2	
	12	acres	
Construction Duration:	9	months	
Annual Construction Activity:	180	days/yr	Assume 9 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			53.790					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	515,600	11.84	5	(from "Grading" worksheet)
Paving:	40,000	0.92	5	
Demolition:	0	0.00	0	
Building Construction:	435,600	10.00	180	
Architectural Coating	435,600	10.00	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	208.21	12.88	78.55	4.16	12.73	12.35	24,708
Paving	226.84	13.03	92.89	4.54	13.88	13.46	28,120
Demolition	-	-	-	-	-	-	0
Building Construction	7,091.34	563.37	3,128.82	560.94	509.23	493.95	803,612
Architectural Coatings	71.48	1,083.26	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**7,597.86**	**1,672.54**	**3,331.57**	**574.67**	**542.02**	**525.76**	**863,635**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	7,597.86	1,672.54	3,331.57	574.67	542.02	525.76	863,635
Total Project Emissions (tons)	3.80	0.84	1.67	0.29	0.27	0.26	431.82

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	3	months
Area	0.9	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	9	months
Area	11.8	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
Demolition and New Runway Construction	1.16	0.58	0.12	0.06
Construction Activities	20.24	10.12	1.01	0.51
Total	**21.40**	**10.70**	**1.13**	**0.56**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 11.8 acres/yr (from Combustion Worksheet)

Qty Equipment: 4.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	11.84	1.48
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	11.84	5.79
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	5.92	5.97
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	5.92	2.45
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	11.84	4.15
TOTAL								19.83

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 19.83
Qty Equipment: 4.00
Grading days/yr: 4.96

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	180	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**495.796**	**493.554**	**4461.889**	**5.818**	**46.969**	**29.582**	**591668.468**
tons	**0.248**	**0.247**	**2.231**	**0.0029**	**0.0235**	**0.0148**	**295.834**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

C3. Storm Water Drainage System Expansion/Upgrade

Summary Summarizes total emissions by calendar year. Project would be ongoing from 2011-2014

Combustion Estimates emissions from non-road equipment exhaust.

Fugitive Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.

Grading Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.

Construction Commuter Estimates emissions for construction workers commuting to the site.

AQCR Tier Report Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Emissions from Storm Water Drainage System Expansion/Upgrade

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	19.029	1.908	8.391	1.500	1.366	1.325	2,156.446
Construction Fugitive Dust	-	-	-	-	24.873	1.244	-
Construction Commuter	1.322	1.316	11.898	0.016	0.125	0.079	1,577.783
TOTAL	***20.351***	***3.225***	***20.289***	***1.516***	***26.364***	***2.648***	***3,734.229***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***3,386.946*** ***metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Emissions from Storm Water Drainage System Expansion/Upgrade Compared to Regional Emissions Determination Significance (Significance Threshold = 10% of regional)

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
Construction Emissions	20.35	3.22	20.29	1.52	26.36	2.65
% of Regional	**0.066%**	**0.011%**	**0.015%**	**0.018%**	**0.142%**	**0.051%**

Combustion Emissions for Storm Water Drainage System Expansion/Upgrade

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Install storm water drainage pipes, culverts, and detension basins	237,600	ft^2	Assume 10 foot wide construction corridor, 4.5 miles long
Grade Drainage Area	237,600	ft^2	
Total General Construction Area:	0	ft^2	
	0.0	acres	
Total Pavement Area:	0	ft^2	
	0	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	237,600	ft^2	
	5	acres	
Construction Duration:	48	months	
Annual Construction Activity:	960	days/yr	Assume 48 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

	No. Reqd.[a]	NO_x	VOC[b]	CO	SO_2[c]	PM_{10}	$PM_{2.5}$	CO_2

Equipment	per 10 acres	(lb/day)	(lb/day)	(lb/day)		(lb/day)	(lb/day)	(lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			39.727					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994
Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	237,600	5.45	4	(from "Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	0	
Building Construction:	237,600	5.45	960	
Architectural Coating	237,600	5.45	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	166.56	10.31	62.84	3.33	10.18	9.88	19,766
Paving	-	-	-	-	-	-	0
Demolition	-	-	-	-	-	-	0
Building Construction	37,820.47	3,004.62	16,687.02	2,991.70	2,715.88	2,634.41	4,285,931
Architectural Coatings	71.48	801.99	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**38,058.51**	**3,816.92**	**16,781.17**	**3,000.05**	**2,732.25**	**2,650.28**	**4,312,893**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	38,058.51	3,816.92	16,781.17	3,000.05	2,732.25	2,650.28	4,312,893
Total Project Emissions (tons)	19.03	1.91	8.39	1.50	1.37	1.33	2,156.45

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006

$PM_{2.5}$ Emissions

$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	-	months
Area	-	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	48	months
Area	5.5	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	0.00	0.00	0.00	0.00
General Construction Activities	49.75	24.87	2.49	1.24
Total	**49.75**	**24.87**	**2.49**	**1.24**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 5.5 acres/yr (from Combustion Worksheet)

Qty Equipment: 3.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.

An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.

200 hp bulldozers are used for site clearing.

300 hp bulldozers are used for stripping, excavation, and backfill.

Vibratory drum rollers are used for compacting.

Stripping, Excavation, Backfill and Compaction require an average of two passes each.

Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	5.45	0.68
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	5.45	2.67
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	2.73	2.75
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	2.73	1.13
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	5.45	1.91
TOTAL								9.14

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 9.14

Qty Equipment: 3.00

Grading days/yr: 3.05

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	960	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 27 May 2009.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**2644.246**	**2632.286**	**23796.740**	**31.031**	**250.499**	**157.770**	**3155565.163**
tons	**1.322**	**1.316**	**11.898**	**0.0155**	**0.1252**	**0.0789**	**1577.783**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

Total Training Emissions for Proposed Action (2010 to 2014) Compared to Baseline Emissions (2009)

Summary	Summarizes total emissions by calendar year.
Training Emissions (2009 to 2014)	Estimates emissions from training mission vehicle and equipment exhaust for baseline year (2009) to 2014.
AQCR Tier Report	Summarizes total emissions for the Air Quality Control Region Tier Reports for 2001, to be used to compare project to regional emissions.

Air Quality Emissions (2009 - Baseline)

	Combustion	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
2099	Emissions	158.48	19.87	86.11	8.28	11.63	11.10	16,499.05

Air Quality Training Mission Emissions from Proposed Action (2010)

	Combustion	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
2010	Emissions	190.18	23.84	103.33	9.94	13.96	13.32	19,798.86
Delta Change from 2009		***31.70***	***3.97***	***17.22***	***1.66***	***2.33***	***2.22***	***3,299.81***

Air Quality Training Mission Emissions from Proposed Action (2011)

	Combustion	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
2011	Emissions	221.88	27.82	120.55	11.60	16.29	15.55	23,098.67
Delta Change from 2009		***63.39***	***7.95***	***34.44***	***3.31***	***4.65***	***4.44***	***6,599.62***

Air Quality Training Mission Emissions from Proposed Action (2012)

	Combustion	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
2012	Emissions	253.57	31.79	137.77	13.25	18.61	17.77	26,398.48
Delta Change from 2009		***95.09***	***11.92***	***51.66***	***4.97***	***6.98***	***6.66***	***9,899.43***

Air Quality Training Mission Emissions from Proposed Action (2013)

	Combustion	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
2013	Emissions	285.27	35.77	154.99	14.91	20.94	19.99	29,698.29
Delta Change from 2009		***126.79***	***15.90***	***68.89***	***6.63***	***9.31***	***8.88***	***13,199.24***

Air Quality Training Mission Emissions from Proposed Action (2014)

	Combustion	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
2014	Emissions	316.97	39.74	172.21	16.57	23.27	22.21	32,998.09
Delta Change from 2009		***158.48***	***19.87***	***86.11***	***8.28***	***11.63***	***11.10***	***16,499.05***

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate AQCR

	Point and Area Sources Combined					
Year	**NO_x (tpy)**	**VOC (tpy)**	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
2001	30,642	28,818	139,416	8,506	18,532	5,183

Determination Significance (Significance Threshold = 10%)

	Point and Area Sources Combined					
	NO_x (tpy)	**VOC (tpy)**	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
2009 (Baseline)	158.48	19.87	86.11	8.28	11.63	11.10
2009 (Baseline)%	**0.517%**	**0.069%**	**0.062%**	**0.097%**	**0.063%**	**0.214%**

	Point and Area Sources Combined					
	NO_x (tpy)	**VOC (tpy)**	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
2010	190.18	23.84	103.33	9.94	13.96	13.32
2010%	**0.621%**	**0.083%**	**0.074%**	**0.117%**	**0.075%**	**0.257%**

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
2011	221.88	27.82	120.55	11.60	16.29	15.55
2011%	**0.724%**	**0.097%**	**0.086%**	**0.136%**	**0.088%**	**0.300%**

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
2012	253.57	31.79	137.77	13.25	18.61	17.77
2012%	**0.828%**	**0.110%**	**0.099%**	**0.156%**	**0.100%**	**0.343%**

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
2013	285.27	35.77	154.99	14.91	20.94	19.99
2013%	**0.931%**	**0.124%**	**0.111%**	**0.175%**	**0.113%**	**0.386%**

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
2014	316.97	39.74	172.21	16.57	23.27	22.21
2014%	**1.034%**	**0.138%**	**0.124%**	**0.195%**	**0.126%**	**0.429%**

Training Combustion Emissions (2009 - Baseline)

Combustion Emissions of NO_x, VOC, CO, SO_2, PM_{10}, $PM_{2.5}$, and CO_2 due to Training Mission Operations

Emission Factors	NO_x lb/mi	VOC lb/mi	CO lb/mi	SO_2 lb/mi	PM_{10} lb/mi	$PM_{2.5}$ lb/mi	CO_2 lb/mi
HMWVV	0.0202	0.0028	0.0202	2.6790E-05	0.0008	0.0007	2.7233
HEMTT	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
HET	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
PLS	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 5 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 20 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks. March 2007.

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks. March 2007.

Notes:

HMWVV = High-Mobility Multipurpose Wheeled Vehicle

HEMTT = Heavy Expanded Mobility Tactical Truck

HET = Heavy Equipment Transporter

PLS = Paletized Load System

Delivery Trucks (GVW >8,500 lb) emission factor was used for HMWVV (Year 2009).

Heavy-heavy-Duty Diesel Trucks (GVW 33,001-60,000 lb) emission factor was used for HEMTT, HET, PLS, and dump trucks (5 and 20 ton) (Year 2009).

Emission Factors	NO_x g/hp-hr	VOC g/hp-hr	CO g/hp-hr	SO_2 g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO_2 g/hp-hr	Average HP
Road Motorized Grader	4.56	0.34	1.51	0.37	0.31	0.3	537	204.4
Scraper (14-18 CY)	4.98	0.3	2.13	0.37	0.31	0.30	536	409.4
Crane - 20 ton	5.47	0.38	1.37	0.37	0.29	0.28	533	230.9
Scoop Loader	7.08	1.55	6.64	0.46	1.07	1.03	662	93.5

Source: USEPA 2007. NONROAD2007 Air Quality Model Emission Factors.

Emission Factors

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
UH-60	T700-GE-700	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
Number of Engines:	2	8.0	6.8	6.8	7.0	133	589	706	500

	VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	56.67	0.49	0.39	0.37	53.18	3.75	3.09	5.25
pounds/sortie	2.01	0.07	0.06	0.04	1.89	0.50	0.49	0.61

	NO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	2.78	8.18	8.61	7.56	1.48	2.22	2.60	1.26
pounds/sortie	0.10	1.09	1.38	0.88	0.05	0.30	0.42	0.15

	SO_x Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle
	0.96	0.96	0.96	0.96
pounds/sortie	0.03	0.13	0.15	0.11

Example: SO_x emission factor calculated based on the average sulfur content of JP-8 fuel, Table 3-6 USAF IERA 2002.

SOx EF = 20 * wt % sulfur = 20 * 0.048 wt % = 0.96 lb/1000 lb fuel.

NO_x emissons for App = (6.8 min/(60 min/hr))*(589 lb/hr)*(8.18 lb/1000 lb)*(2 engines) = 1.09 lbs/sortie

Notes:

EPCpol,mode = (TIM/60)* (FFR/1000) *EF* NE

EPCpol,mode = Emissions per cycle for a particular pollutant during a particular mode (lb/cycle)

TIM = Time in Mode (min/cycle)

60 = Factor for converting minutes to hours (min/hr)

FFR = Fuel Flow Rate per engine (lb/hr)

1000 = Factor for converting lb/hr to 1000 lb/hr

EF = Emission Factor (lb/1000 lb)

NE = Number of Engines on the aircraft

Emission factors for $PM_{2.5}$ are conservatively assumed to be equivilent to PM_{10}.

Source: USAF IERA 2002. Air Emissions Inventory Guidance, Table 3-3 for Criteria Pollutant Emission Factors for Aircraft Engines. July 2002.

Total Baseline Training Combustion Emissions (2009)

Vehicle or Equipment Type	Number of Vehicles and Equipment	Operational Units	Units of Measure	Baseline Mission Emissions (Tons/Year)						
				NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HMWVV	750	2,812,500	miles/year	28.35	3.92	28.35	0.04	1.13	0.97	3,829.65
HEMTT	100	375,000	miles/year	7.85	0.62	2.40	0.01	0.37	0.33	789.53
HET	150	562,500	miles/year	11.77	0.93	3.61	0.01	0.56	0.49	1,184.29
PLS	20	75,000	miles/year	1.57	0.12	0.48	0.00	0.07	0.07	157.91
UH-60	8	6,000	sorties/year	10.35	6.54	10.48	1.28	2.74	2.74	-
Road Motorized Grader	18	21,600	hours/year	22.19	1.65	7.35	1.80	1.51	1.46	2,613.44
Scraper (14-18 CY)	18	21,600	hours/year	48.54	2.92	20.76	3.61	3.02	2.92	5,224.81
Dump Truck - 5 ton	27	101,250	miles/year	2.12	0.17	0.65	0.00	0.10	0.09	213.17
Dump Truck - 20 ton	36	135,000	miles/year	2.82	0.22	0.87	0.00	0.13	0.12	284.23
Crane - 20 ton	9	10,800	hours/year	15.04	1.04	3.77	1.02	0.80	0.77	1,465.14
Scoop Loader	9	10,800	hours/year	7.88	1.73	7.39	0.51	1.19	1.15	736.88
Total Emissions:				**158.48**	**19.87**	**86.11**	**8.28**	**11.63**	**11.10**	**16,499.05**

Assumptions:

1. Road Motorized Graders, Scrapers, Cranes, and Scoop Loaders would operate 8 hours per day, 150 days per year.
2. HMWVV and HEMTT would travel 25 miles per day, 150 days per year.
3. HET, PLS, and Dump Trucks would travel 25 miles per day, 150 days per year.
4. UH-60 helicopters - All flights would be below 3,000 feet above ground level. All sorties would last for 28.6 minutes. There would be five sorties per aircraft, 150 days per year.

Training Combustion Emissions (2010)

Combustion Emissions of NO_x, VOC, CO, SO_2, PM_{10}, $PM_{2.5}$, and CO_2 due to Training Mission Operations

Emission Factors	NO_x lb/mi	VOC lb/mi	CO lb/mi	SO_2 lb/mi	PM_{10} lb/mi	$PM_{2.5}$ lb/mi	CO_2 lb/mi
HMWVV	0.0202	0.0028	0.0202	2.6790E-05	0.0008	0.0007	2.7233
HEMTT	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
HET	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
PLS	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 5 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 20 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks. March 2007.

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks. March 2007.

Notes:

HMWVV = High-Mobility Multipurpose Wheeled Vehicle

HEMTT = Heavy Expanded Mobility Tactical Truck

HET = Heavy Equipment Transporter

PLS = Paletized Load System

Delivery Trucks (GVW >8,500 lb) emission factor was used for HMWVV (Year 2009).

Heavy-heavy-Duty Diesel Trucks (GVW 33,001-60,000 lb) emission factor was used for HEMTT, HET, PLS, and dump trucks (5 and 20 ton) (Year 2009).

Emission Factors	NO_x g/hp-hr	VOC g/hp-hr	CO g/hp-hr	SO_2 g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO_2 g/hp-hr	Average HP
Road Motorized Grader	4.56	0.34	1.51	0.37	0.31	0.3	537	204.4
Scraper (14-18 CY)	4.98	0.3	2.13	0.37	0.31	0.30	536	409.4
Crane - 20 ton	5.47	0.38	1.37	0.37	0.29	0.28	533	230.9
Scoop Loader	7.08	1.55	6.64	0.46	1.07	1.03	662	93.5

Source: USEPA 2007. NONROAD2007 Air Quality Model Emission Factors.

Emission Factors

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
UH-60	T700-GE-700	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
Number of Engines:	2	8.0	6.8	6.8	7.0	133	589	706	500

	VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	56.67	0.49	0.39	0.37	53.18	3.75	3.09	5.25
pounds/sortie	2.01	0.07	0.06	0.04	1.89	0.50	0.49	0.61

	NO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	2.78	8.18	8.61	7.56	1.48	2.22	2.60	1.26
pounds/sortie	0.10	1.09	1.38	0.88	0.05	0.30	0.42	0.15

	SO_x Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle
	0.96	0.96	0.96	0.96
pounds/sortie	0.03	0.13	0.15	0.11

Example: SO_x emission factor calculated based on the average sulfur content of JP-8 fuel, Table 3-6 USAF IERA 2002.
SOx EF = 20 * wt % sulfur = 20 * 0.048 wt % = 0.96 lb/1000 lb fuel.
NO_x emissons for App = (6.8 min/(60 min/hr))*(589 lb/hr)*(8.18 lb/1000 lb)*(2 engines) = 1.09 lbs/sortie

Notes: EPCpol,mode = (TIM/60)* (FFR/1000) *EF* NE
EPCpol,mode = Emissions per cycle for a particular pollutant during a particular mode (lb/cycle)
TIM = Time in Mode (min/cycle)
60 = Factor for converting minutes to hours (min/hr)
FFR = Fuel Flow Rate per engine (lb/hr)
1000 = Factor for converting lb/hr to 1000 lb/hr
EF = Emission Factor (lb/1000 lb)
NE = Number of Engines on the aircraft
Emission factors for $PM_{2.5}$ are conservatively assumed to be equivilent to PM_{10}.

Source: USAF IERA 2002. Air Emissions Inventory Guidance, Table 3-3 for Criteria Pollutant Emission Factors for Aircraft Engines. July 2002.

Total Training Combustion Emissions (2010)

Vehicle or Equipment Type	Number of Vehicles and Equipment	Operational Units	Units of Measure	Training Mission Emissions (Tons/Year)						
				NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HMWVV	750	3,375,000	miles/year	34.02	4.71	34.02	0.05	1.36	1.17	4,595.58
HEMTT	100	450,000	miles/year	9.42	0.74	2.89	0.01	0.45	0.39	947.43
HET	150	675,000	miles/year	14.12	1.11	4.33	0.01	0.67	0.59	1,421.15
PLS	20	90,000	miles/year	1.88	0.15	0.58	0.00	0.09	0.08	189.49
UH-60	8	7,200	sorties/year	12.42	7.85	12.58	1.54	3.28	3.28	-
Road Motorized Grader	18	25,920	hours/year	26.63	1.99	8.82	2.16	1.81	1.75	3,136.13
Scraper (14-18 CY)	18	25,920	hours/year	58.25	3.51	24.92	4.33	3.63	3.51	6,269.77
Dump Truck - 5 ton	27	121,500	miles/year	2.54	0.20	0.78	0.00	0.12	0.11	255.81
Dump Truck - 20 ton	36	162,000	miles/year	3.39	0.27	1.04	0.00	0.16	0.14	341.08
Crane - 20 ton	9	12,960	hours/year	18.04	1.25	4.52	1.22	0.96	0.92	1,758.17
Scoop Loader	9	12,960	hours/year	9.46	2.07	8.87	0.61	1.43	1.38	884.26
Total Emissions:				**190.18**	**23.84**	**103.33**	**9.94**	**13.96**	**13.32**	**19,798.86**

Assumptions:

1. Road Motorized Graders, Scrapers, Cranes, and Scoop Loaders would operate 8 hours per day, 180 days per year.
2. HMWVV and HEMTT would travel 25 miles per day, 180 days per year.
3. HET, PLS, and Dump Trucks would travel 25 miles per day, 180 days per year.
4. UH-60 helicopters - All flights would be below 3,000 feet above ground level. All sorties would last for 28.6 minutes. There would be five sorties per aircraft, 180 days per year.

Training Combustion Emissions (2011)

Combustion Emissions of NO_x, VOC, CO, SO_2, PM_{10}, $PM_{2.5}$, and CO_2 due to Training Mission Operations

Emission Factors	NO_x lb/mi	VOC lb/mi	CO lb/mi	SO_2 lb/mi	PM_{10} lb/mi	$PM_{2.5}$ lb/mi	CO_2 lb/mi
HMWVV	0.0202	0.0028	0.0202	2.6790E-05	0.0008	0.0007	2.7233
HEMTT	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
HET	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
PLS	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 5 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 20 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks. March 2007.

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks. March 2007.

Notes:

HMWVV = High-Mobility Multipurpose Wheeled Vehicle

HEMTT = Heavy Expanded Mobility Tactical Truck

HET = Heavy Equipment Transporter

PLS = Paletized Load System

Delivery Trucks (GVW >8,500 lb) emission factor was used for HMWVV (Year 2009).

Heavy-heavy-Duty Diesel Trucks (GVW 33,001-60,000 lb) emission factor was used for HEMTT, HET, PLS, and dump trucks (5 and 20 ton) (Year 2009).

Emission Factors	NO_x g/hp-hr	VOC g/hp-hr	CO g/hp-hr	SO_2 g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO_2 g/hp-hr	Average HP
Road Motorized Grader	4.56	0.34	1.51	0.37	0.31	0.3	537	204.4
Scraper (14-18 CY)	4.98	0.3	2.13	0.37	0.31	0.30	536	409.4
Crane - 20 ton	5.47	0.38	1.37	0.37	0.29	0.28	533	230.9
Scoop Loader	7.08	1.55	6.64	0.46	1.07	1.03	662	93.5

Source: USEPA 2007. NONROAD2007 Air Quality Model Emission Factors.

Emission Factors

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
UH-60	T700-GE-700	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
Number of Engines:	2	8.0	6.8	6.8	7.0	133	589	706	500

	VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	56.67	0.49	0.39	0.37	53.18	3.75	3.09	5.25
pounds/sortie	2.01	0.07	0.06	0.04	1.89	0.50	0.49	0.61

	NO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	2.78	8.18	8.61	7.56	1.48	2.22	2.60	1.26
pounds/sortie	0.10	1.09	1.38	0.88	0.05	0.30	0.42	0.15

	SO_x Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle
	0.96	0.96	0.96	0.96
pounds/sortie	0.03	0.13	0.15	0.11

Example: SO_x emission factor calculated based on the average sulfur content of JP-8 fuel, Table 3-6 USAF IERA 2002.
SOx EF = 20 * wt % sulfur = 20 * 0.048 wt % = 0.96 lb/1000 lb fuel.
NO_x emissons for App = (6.8 min/(60 min/hr))*(589 lb/hr)*(8.18 lb/1000 lb)*(2 engines) = 1.09 lbs/sortie

Notes: EPCpol,mode = (TIM/60)* (FFR/1000) *EF* NE
EPCpol,mode = Emissions per cycle for a particular pollutant during a particular mode (lb/cycle)
TIM = Time in Mode (min/cycle)
60 = Factor for converting minutes to hours (min/hr)
FFR = Fuel Flow Rate per engine (lb/hr)
1000 = Factor for converting lb/hr to 1000 lb/hr
EF = Emission Factor (lb/1000 lb)
NE = Number of Engines on the aircraft
Emission factors for $PM_{2.5}$ are conservatively assumed to be equivilent to PM_{10}.

Source: USAF IERA 2002. Air Emissions Inventory Guidance, Table 3-3 for Criteria Pollutant Emission Factors for Aircraft Engines. July 2002.

Total Training Combustion Emissions (2011)

Vehicle or Equipment Type	Number of Vehicles and Equipment	Operational Units	Units of Measure	Training Mission Emissions (Tons/Year)						
				NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HMWVV	750	3,937,500	miles/year	39.69	5.49	39.69	0.05	1.59	1.36	5,361.51
HEMTT	100	525,000	miles/year	10.98	0.86	3.37	0.01	0.52	0.46	1,105.34
HET	150	787,500	miles/year	16.48	1.30	5.05	0.02	0.79	0.69	1,658.01
PLS	20	105,000	miles/year	2.20	0.17	0.67	0.00	0.10	0.09	221.07
UH-60	8	8,400	sorties/year	14.49	9.16	14.67	1.80	3.83	3.83	-
Road Motorized Grader	18	30,240	hours/year	31.07	2.32	10.29	2.52	2.11	2.04	3,658.82
Scraper (14-18 CY)	18	30,240	hours/year	67.96	4.09	29.07	5.05	4.23	4.09	7,314.74
Dump Truck - 5 ton	27	141,750	miles/year	2.97	0.23	0.91	0.00	0.14	0.12	298.44
Dump Truck - 20 ton	36	189,000	miles/year	3.95	0.31	1.21	0.00	0.19	0.17	397.92
Crane - 20 ton	9	15,120	hours/year	21.05	1.46	5.27	1.42	1.12	1.08	2,051.20
Scoop Loader	9	15,120	hours/year	11.03	2.42	10.35	0.72	1.67	1.61	1,031.63
Total Emissions:				**221.88**	**27.82**	**120.55**	**11.60**	**16.29**	**15.55**	**23,098.67**

Assumptions:

1. Road Motorized Graders, Scrapers, Cranes, and Scoop Loaders would operate 8 hours per day, 210 days per year.
2. HMWVV and HEMTT would travel 25 miles per day, 210 days per year.
3. HET, PLS, and Dump Trucks would travel 25 miles per day, 210 days per year.
4. UH-60 helicopters - All flights would be below 3,000 feet above ground level. All sorties would last for 28.6 minutes. There would be five sorties per aircraft, 210 days per year.

Training Combustion Emissions (2012)

Combustion Emissions of NO_x, VOC, CO, SO_2, PM_{10}, $PM_{2.5}$, and CO_2 due to Training Mission Operations

Emission Factors	NO_x lb/mi	VOC lb/mi	CO lb/mi	SO_2 lb/mi	PM_{10} lb/mi	$PM_{2.5}$ lb/mi	CO_2 lb/mi
HMWVV	0.0202	0.0028	0.0202	2.6790E-05	0.0008	0.0007	2.7233
HEMTT	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
HET	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
PLS	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 5 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 20 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks. March 2007.

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks. March 2007.

Notes:

HMWVV = High-Mobility Multipurpose Wheeled Vehicle

HEMTT = Heavy Expanded Mobility Tactical Truck

HET = Heavy Equipment Transporter

PLS = Paletized Load System

Delivery Trucks (GVW >8,500 lb) emission factor was used for HMWVV (Year 2009).

Heavy-heavy-Duty Diesel Trucks (GVW 33,001-60,000 lb) emission factor was used for HEMTT, HET, PLS, and dump trucks (5 and 20 ton) (Year 2009).

Emission Factors	NO_x g/hp-hr	VOC g/hp-hr	CO g/hp-hr	SO_2 g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO_2 g/hp-hr	Average HP
Road Motorized Grader	4.56	0.34	1.51	0.37	0.31	0.3	537	204.4
Scraper (14-18 CY)	4.98	0.3	2.13	0.37	0.31	0.30	536	409.4
Crane - 20 ton	5.47	0.38	1.37	0.37	0.29	0.28	533	230.9
Scoop Loader	7.08	1.55	6.64	0.46	1.07	1.03	662	93.5

Source: USEPA 2007. NONROAD2007 Air Quality Model Emission Factors.

Emission Factors

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
UH-60	T700-GE-700	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
Number of Engines:	2	8.0	6.8	6.8	7.0	133	589	706	500

	VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	56.67	0.49	0.39	0.37	53.18	3.75	3.09	5.25
pounds/sortie	2.01	0.07	0.06	0.04	1.89	0.50	0.49	0.61

	NO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	2.78	8.18	8.61	7.56	1.48	2.22	2.60	1.26
pounds/sortie	0.10	1.09	1.38	0.88	0.05	0.30	0.42	0.15

	SO_x Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle
	0.96	0.96	0.96	0.96
pounds/sortie	0.03	0.13	0.15	0.11

Example: SO_x emission factor calculated based on the average sulfur content of JP-8 fuel, Table 3-6 USAF IERA 2002.
SOx EF = 20 * wt % sulfur = 20 * 0.048 wt % = 0.96 lb/1000 lb fuel.
NO_x emissons for App = (6.8 min/(60 min/hr))*(589 lb/hr)*(8.18 lb/1000 lb)*(2 engines) = 1.09 lbs/sortie

Notes: EPCpol,mode = (TIM/60)* (FFR/1000) *EF* NE
EPCpol,mode = Emissions per cycle for a particular pollutant during a particular mode (lb/cycle)
TIM = Time in Mode (min/cycle)
60 = Factor for converting minutes to hours (min/hr)
FFR = Fuel Flow Rate per engine (lb/hr)
1000 = Factor for converting lb/hr to 1000 lb/hr
EF = Emission Factor (lb/1000 lb)
NE = Number of Engines on the aircraft
Emission factors for $PM_{2.5}$ are conservatively assumed to be equivilent to PM_{10}.

Source: USAF IERA 2002. Air Emissions Inventory Guidance, Table 3-3 for Criteria Pollutant Emission Factors for Aircraft Engines. July 2002.

Total Training Combustion Emissions (2012)

Vehicle or Equipment Type	Number of Vehicles and Equipment	Operational Units	Units of Measure	Training Mission Emissions (Tons/Year)						
				NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HMWVV	750	4,500,000	miles/year	45.36	6.28	45.36	0.06	1.81	1.56	6,127.44
HEMTT	100	600,000	miles/year	12.55	0.99	3.85	0.01	0.60	0.53	1,263.24
HET	150	900,000	miles/year	18.83	1.48	5.77	0.02	0.90	0.79	1,894.86
PLS	20	120,000	miles/year	2.51	0.20	0.77	0.00	0.12	0.11	252.65
UH-60	8	9,600	sorties/year	16.56	10.47	16.77	2.05	4.38	4.38	-
Road Motorized Grader	18	34,560	hours/year	35.51	2.65	11.76	2.88	2.41	2.34	4,181.51
Scraper (14-18 CY)	18	34,560	hours/year	77.67	4.68	33.22	5.77	4.83	4.68	8,359.70
Dump Truck - 5 ton	27	162,000	miles/year	3.39	0.27	1.04	0.00	0.16	0.14	341.08
Dump Truck - 20 ton	36	216,000	miles/year	4.52	0.36	1.38	0.00	0.22	0.19	454.77
Crane - 20 ton	9	17,280	hours/year	24.06	1.67	6.03	1.63	1.28	1.23	2,344.22
Scoop Loader	9	17,280	hours/year	12.61	2.76	11.83	0.82	1.91	1.83	1,179.01
Total Emissions:				**253.57**	**31.79**	**137.77**	**13.25**	**18.61**	**17.77**	**26,398.48**

Assumptions:

1. Road Motorized Graders, Scrapers, Cranes, and Scoop Loaders would operate 8 hours per day, 240 days per year.
2. HMWVV and HEMTT would travel 25 miles per day, 240 days per year.
3. HET, PLS, and Dump Trucks would travel 25 miles per day, 240 days per year.
4. UH-60 helicopters - All flights would be below 3,000 feet above ground level. All sorties would last for 28.6 minutes. There would be five sorties per aircraft, 240 days per year.

Training Combustion Emissions (2013)

Combustion Emissions of NO_x, VOC, CO, SO_2, PM_{10}, $PM_{2.5}$, and CO_2 due to Training Mission Operations

Emission Factors	NO_x lb/mi	VOC lb/mi	CO lb/mi	SO_2 lb/mi	PM_{10} lb/mi	$PM_{2.5}$ lb/mi	CO_2 lb/mi
HMWVV	0.0202	0.0028	0.0202	2.6790E-05	0.0008	0.0007	2.7233
HEMTT	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
HET	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
PLS	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 5 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 20 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks. March 2007.

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks. March 2007.

Notes:

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Emission Factors	NO_x g/hp-hr	VOC g/hp-hr	CO g/hp-hr	SO_2 g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO_2 g/hp-hr	Average HP
Road Motorized Grader	4.56	0.34	1.51	0.37	0.31	0.3	537	204.4
Scraper (14-18 CY)	4.98	0.3	2.13	0.37	0.31	0.30	536	409.4
Crane - 20 ton	5.47	0.38	1.37	0.37	0.29	0.28	533	230.9
Scoop Loader	7.08	1.55	6.64	0.46	1.07	1.03	662	93.5

Source: USEPA 2007. NONROAD2007 Air Quality Model Emission Factors.

Emission Factors

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
UH-60	T700-GE-700	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
Number of Engines:	2	8.0	6.8	6.8	7.0	133	589	706	500

	VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	56.67	0.49	0.39	0.37	53.18	3.75	3.09	5.25
pounds/sortie	2.01	0.07	0.06	0.04	1.89	0.50	0.49	0.61

	NO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	2.78	8.18	8.61	7.56	1.48	2.22	2.60	1.26
pounds/sortie	0.10	1.09	1.38	0.88	0.05	0.30	0.42	0.15

	SO_x Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle
	0.96	0.96	0.96	0.96
pounds/sortie	0.03	0.13	0.15	0.11

Example: SO_x emission factor calculated based on the average sulfur content of JP-8 fuel, Table 3-6 USAF IERA 2002.
SOx EF = 20 * wt % sulfur = 20 * 0.048 wt % = 0.96 lb/1000 lb fuel.
NO_x emissons for App = (6.8 min/(60 min/hr))*(589 lb/hr)*(8.18 lb/1000 lb)*(2 engines) = 1.09 lbs/sortie

Notes: EPCpol,mode = (TIM/60)* (FFR/1000) *EF* NE
EPCpol,mode = Emissions per cycle for a particular pollutant during a particular mode (lb/cycle)
TIM = Time in Mode (min/cycle)
60 = Factor for converting minutes to hours (min/hr)
FFR = Fuel Flow Rate per engine (lb/hr)
1000 = Factor for converting lb/hr to 1000 lb/hr
EF = Emission Factor (lb/1000 lb)
NE = Number of Engines on the aircraft
Emission factors for $PM_{2.5}$ are conservatively assumed to be equivilent to PM_{10}.

Source: USAF IERA 2002. Air Emissions Inventory Guidance, Table 3-3 for Criteria Pollutant Emission Factors for Aircraft Engines. July 2002.

Total Training Combustion Emissions (2013)

Vehicle or Equipment Type	Number of Vehicles and Equipment	Operational Units	Units of Measure	Training Mission Emissions (Tons/Year)						
				NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HMWVV	750	5,062,500	miles/year	51.03	7.06	51.03	0.07	2.04	1.75	6,893.37
HEMTT	100	675,000	miles/year	14.12	1.11	4.33	0.01	0.67	0.59	1,421.15
HET	150	1,012,500	miles/year	21.18	1.67	6.49	0.02	1.01	0.89	2,131.72
PLS	20	135,000	miles/year	2.82	0.22	0.87	0.00	0.13	0.12	284.23
UH-60	8	10,800	sorties/year	18.63	11.78	18.87	2.31	4.92	4.92	-
Road Motorized Grader	18	38,880	hours/year	39.95	2.98	13.23	3.24	2.72	2.63	4,704.20
Scraper (14-18 CY)	18	38,880	hours/year	87.38	5.26	37.37	6.49	5.44	5.26	9,404.66
Dump Truck - 5 ton	27	182,250	miles/year	3.81	0.30	1.17	0.00	0.18	0.16	383.71
Dump Truck - 20 ton	36	243,000	miles/year	5.08	0.40	1.56	0.00	0.24	0.21	511.61
Crane - 20 ton	9	19,440	hours/year	27.07	1.88	6.78	1.83	1.43	1.39	2,637.25
Scoop Loader	9	19,440	hours/year	14.19	3.11	13.30	0.92	2.14	2.06	1,326.39
Total Emissions:				**285.27**	**35.77**	**154.99**	**14.91**	**20.94**	**19.99**	**29,698.29**

Assumptions:

1. Road Motorized Graders, Scrapers, Cranes, and Scoop Loaders would operate 8 hours per day, 270 days per year.
2. HMWVV and HEMTT would travel 25 miles per day, 270 days per year.
3. HET, PLS, and Dump Trucks would travel 25 miles per day, 270 days per year.
4. UH-60 helicopters - All flights would be below 3,000 feet above ground level. All sorties would last for 28.6 minutes. There would be five sorties per aircraft, 270 days per year.

Training Combustion Emissions (2014)

Combustion Emissions of NO_x, VOC, CO, SO_2, PM_{10}, $PM_{2.5}$, and CO_2 due to Training Mission Operations

Emission Factors	NO_x lb/mi	VOC lb/mi	CO lb/mi	SO_2 lb/mi	PM_{10} lb/mi	$PM_{2.5}$ lb/mi	CO_2 lb/mi
HMWVV	0.0202	0.0028	0.0202	2.6790E-05	0.0008	0.0007	2.7233
HEMTT	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
HET	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
PLS	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 5 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108
Dump Truck - 20 ton	0.0418	0.0033	0.0128	0.00004013	0.0020	0.0018	4.2108

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks. March 2007.

Source: SCAQMD 2007. Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks. March 2007.

Notes:

HMWVV = High-Mobility Multipurpose Wheeled Vehicle

HEMTT = Heavy Expanded Mobility Tactical Truck

HET = Heavy Equipment Transporter

PLS = Paletized Load System

Delivery Trucks (GVW >8,500 lb) emission factor was used for HMWVV (Year 2009).

Heavy-heavy-Duty Diesel Trucks (GVW 33,001-60,000 lb) emission factor was used for HEMTT, HET, PLS, and dump trucks (5 and 20 ton) (Year 2009).

Emission Factors	NO_x g/hp-hr	VOC g/hp-hr	CO g/hp-hr	SO_2 g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO_2 g/hp-hr	Average HP
Road Motorized Grader	4.56	0.34	1.51	0.37	0.31	0.3	537	204.4
Scraper (14-18 CY)	4.98	0.3	2.13	0.37	0.31	0.30	536	409.4
Crane - 20 ton	5.47	0.38	1.37	0.37	0.29	0.28	533	230.9
Scoop Loader	7.08	1.55	6.64	0.46	1.07	1.03	662	93.5

Source: USEPA 2007. NONROAD2007 Air Quality Model Emission Factors.

Emission Factors

Aircraft	Engine	Time in Mode (minutes)				Fuel Flow (lb/hr)			
UH-60	T700-GE-700	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
Number of Engines:	2	8.0	6.8	6.8	7.0	133	589	706	500

	VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	56.67	0.49	0.39	0.37	53.18	3.75	3.09	5.25
pounds/sortie	2.01	0.07	0.06	0.04	1.89	0.50	0.49	0.61

	NO_x Emission Index (lb/1000 lb)				PM_{10} Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle	Ground Idle	App	Climbout	Flight Idle
	2.78	8.18	8.61	7.56	1.48	2.22	2.60	1.26
pounds/sortie	0.10	1.09	1.38	0.88	0.05	0.30	0.42	0.15

	SO_x Emission Index (lb/1000 lb)			
	Ground Idle	App	Climbout	Flight Idle
	0.96	0.96	0.96	0.96
pounds/sortie	0.03	0.13	0.15	0.11

Example: SO_x emission factor calculated based on the average sulfur content of JP-8 fuel, Table 3-6 USAF IERA 2002.
SOx EF = 20 * wt % sulfur = 20 * 0.048 wt % = 0.96 lb/1000 lb fuel.
NO_x emissons for App = (6.8 min/(60 min/hr))*(589 lb/hr)*(8.18 lb/1000 lb)*(2 engines) = 1.09 lbs/sortie

Notes: EPCpol,mode = (TIM/60)* (FFR/1000) *EF* NE
EPCpol,mode = Emissions per cycle for a particular pollutant during a particular mode (lb/cycle)
TIM = Time in Mode (min/cycle)
60 = Factor for converting minutes to hours (min/hr)
FFR = Fuel Flow Rate per engine (lb/hr)
1000 = Factor for converting lb/hr to 1000 lb/hr
EF = Emission Factor (lb/1000 lb)
NE = Number of Engines on the aircraft
Emission factors for $PM_{2.5}$ are conservatively assumed to be equivilent to PM_{10}.

Source: USAF IERA 2002. Air Emissions Inventory Guidance, Table 3-3 for Criteria Pollutant Emission Factors for Aircraft Engines. July 2002.

Total Training Combustion Emissions (2014)

Vehicle or Equipment Type	Number of Vehicles and Equipment	Operational Units	Units of Measure	Training Mission Emissions (Tons/Year)						
				NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HMWVV	750	5,625,000	miles/year	56.70	7.84	56.70	0.08	2.27	1.95	7,659.30
HEMTT	100	750,000	miles/year	15.69	1.23	4.81	0.02	0.75	0.66	1,579.05
HET	150	1,125,000	miles/year	23.54	1.85	7.21	0.02	1.12	0.99	2,368.58
PLS	20	150,000	miles/year	3.14	0.25	0.96	0.00	0.15	0.13	315.81
UH-60	8	12,000	sorties/year	20.70	13.09	20.96	2.57	5.47	5.47	-
Road Motorized Grader	18	43,200	hours/year	44.38	3.31	14.70	3.60	3.02	2.92	5,226.89
Scraper (14-18 CY)	18	43,200	hours/year	97.09	5.85	41.53	7.21	6.04	5.85	10,449.62
Dump Truck - 5 ton	27	202,500	miles/year	4.24	0.33	1.30	0.00	0.20	0.18	426.34
Dump Truck - 20 ton	36	270,000	miles/year	5.65	0.44	1.73	0.01	0.27	0.24	568.46
Crane - 20 ton	9	21,600	hours/year	30.07	2.09	7.53	2.03	1.59	1.54	2,930.28
Scoop Loader	9	21,600	hours/year	15.76	3.45	14.78	1.02	2.38	2.29	1,473.76
Total Emissions:				**316.97**	**39.74**	**172.21**	**16.57**	**23.27**	**22.21**	**32,998.09**

Assumptions:

1. Road Motorized Graders, Scrapers, Cranes, and Scoop Loaders would operate 8 hours per day, 300 days per year.
2. HMWVV and HEMTT would travel 25 miles per day, 300 days per year.
3. HET, PLS, and Dump Trucks would travel 25 miles per day, 300 days per year.
4. UH-60 helicopters - All flights would be below 3,000 feet above ground level. All sorties would last for 28.6 minutes. There would be five sorties per aircraft, 300 days per year.

Military Training Mission Commuter Emissions

Emissions from military training mission personnel commuting to Fort Hunter Liggett are estimated in this spreadsheet. This includes round-trips from transporting troops using buses (assume 4,500 each training rotation using 112.5 busloads) and personal-owned vehicles (asume 500 each training rotation) for those commuting daily (assume coming from King City, California).

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used.

The average roundtrip commute for training personnel =	60	miles	assume commuting from King City, California to installation
Number of training days per rotation=	29	days	
Number of training personnel (daily) =	500	people	
Number of buses per rotation=	113	buses	assume 4,500 people @ 40 people per busload

Passenger Vehicles (<8,500 lbs) Emission Factors by Year (lbs/mile)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	Number of Training Roations	
2009	0.00100518	0.00099245	0.00968562	0.00001066	0.00008601	0.00005384	1.09755398	**5**	Baseline
2010	0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235	**6**	
2011	0.00084460	0.00085233	0.00826276	0.00001077	0.00008879	0.00005653	1.10235154	**7**	
2012	0.00077583	0.00079628	0.00765475	0.00001073	0.00008979	0.00005750	1.10152540	**8**	
2013	0.00071158	0.00074567	0.00709228	0.00001072	0.00009067	0.00005834	1.10087435	**9**	
2014	0.00065484	0.00070227	0.00660353	0.00001069	0.00009185	0.00005939	1.10257205	**10**	

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008.
Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 27 May 2009.

Notes:

The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 lbs) Emission Factors by Year (lbs/mile)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	Number of Training Roations	
2009	0.04184591	0.0032932	0.01282236	0.00004013	0.00199572	0.00175227	4.21080792	**5**	Baseline
2010	0.03822102	0.00304157	0.01195456	0.00004131	0.00183062	0.00160083	4.21120578	**6**	
2011	0.03455809	0.00279543	0.01111246	0.00003972	0.00166087	0.00144489	4.22045680	**7**	
2012	0.03092379	0.00252764	0.01021519	0.00004042	0.00149566	0.00129354	4.21590774	**8**	
2013	0.02742935	0.00226308	0.00931790	0.00004086	0.00133697	0.00114629	4.21518556	**9**	
2014	0.02418049	0.00201594	0.00846435	0.00004092	0.00118458	0.00100582	4.21279345	**10**	

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 27 May 2009.

Notes:

The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Training Personnel Commuter Emissions

	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2 (tpy)	
2009	2.995	2.291	22.017	0.025	0.229	0.152	2543.331	Baseline
2010	3.283	2.532	22.561	0.030	0.273	0.182	3046.952	
2011	3.509	2.753	26.300	0.035	0.320	0.214	3576.012	
2012	3.661	2.938	27.844	0.040	0.365	0.243	4083.769	
2013	3.748	3.091	29.018	0.045	0.409	0.272	4591.581	
2014	3.795	3.231	30.013	0.050	0.455	0.303	5109.313	

Example: NO_x emissions (Passenger Vehicles) = miles/day * NO_x emission factor (lb/mile) * number of training days * number of training personnel * number of training rotations * 1 ton/2,000 lbs

Example: NOx emissions (Buses) = miles/day * NOx emission factor (lb/mile) * number of training rotations * number of buses * 1 ton/2000 lbs

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

Total Air Quality Emissions for Proposed Action (2010 to 2014)

Summary	Summarizes total emissions for the Proposed Action by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
AQCR Tier Report	Summarizes total emissions for the North Central Coast Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Total Air Quality Emissions for Proposed Action (2010 to 2014)

CY2010

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	24.808	2.761	10.503	1.340	1.671	1.621	2,904.054
Construction Fugitive Dust	-	-	-	-	470.915	31.855	-
Construction Commuter	0.331	0.329	2.975	0.004	0.031	0.020	394.446
TOTAL CY2010	***25.139***	***3.090***	***13.478***	***1.344***	***472.618***	***33.496***	***3,298.500***

Note: Total CY2010 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***2,991.739*** ***metric tons***

CY2011

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	10.299	1.327	4.336	0.487	0.681	0.661	1,220.331
Construction Fugitive Dust	-	-	-	-	198.240	15.187	-
Construction Commuter	0.331	0.329	2.975	0.004	0.031	0.020	394.446
TOTAL CY2011	***10.630***	***1.656***	***7.311***	***0.491***	***198.953***	***15.867***	***1,614.777***

Note: Total CY2011 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***1,464.603*** ***metric tons***

CY2012

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	5.024	0.666	2.204	0.382	0.359	0.348	571.036
Construction Fugitive Dust	-	-	-	-	7.348	0.513	-
Construction Commuter	0.331	0.329	2.975	0.004	0.031	0.020	394.446
TOTAL CY2012	***5.355***	***0.995***	***5.179***	***0.386***	***7.738***	***0.880***	***965.481***

Note: Total CY2012 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***875.691*** ***metric tons***

CY2013

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	5.478	0.836	2.390	0.391	0.386	0.375	627.275
Construction Fugitive Dust	-	-	-	-	26.717	2.022	-
Construction Commuter	0.331	0.329	2.975	0.004	0.031	0.020	394.446
TOTAL CY2013	***5.809***	***1.165***	***5.365***	***0.395***	***27.135***	***2.416***	***1,021.721***

Note: Total CY2013 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***926.701*** ***metric tons***

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
CY2014	Construction Combustion	5.115	0.945	2.242	0.384	0.364	0.353	582.283
	Construction Fugitive Dust	-	-	-	-	18.764	1.181	-
	Construction Commuter	0.331	0.329	2.975	0.004	0.031	0.020	394.446
	TOTAL CY2014	***5.446***	***1.274***	***5.216***	***0.387***	***19.159***	***1.554***	***976.729***

Note: Total CY2014 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***885.893 metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

North Central Coast Intrastate Air Quality Control Region

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	30,642	28,818	139,416	8,506	18,532	5,183

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 7 August 2009.

Air Emissions from Equipment Concentration Site Compared to Regional Emissions
Determination Significance (Significance Threshold = 10% of regional)

CY2010

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
CY2010 Emissions	25.14	3.09	13.48	1.34	472.62	33.50
% of Regional	**0.082%**	**0.011%**	**0.010%**	**0.016%**	**2.550%**	**0.646%**

CY2011

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
CY2011 Emissions	10.63	1.66	7.31	0.49	198.95	15.87
% of Regional	**0.035%**	**0.006%**	**0.005%**	**0.006%**	**1.074%**	**0.306%**

CY2012

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
CY2012 Emissions	5.35	0.99	5.18	0.39	7.74	0.88
% of Regional	**0.017%**	**0.003%**	**0.004%**	**0.005%**	**0.042%**	**0.017%**

CY2013

	Point and Area Sources Combined					
	NO_x (tpy)	**VOC (tpy)**	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
CY2013 Emissions	5.81	1.16	5.36	0.39	27.13	2.42
% of Regional	**0.019%**	**0.004%**	**0.004%**	**0.005%**	**0.146%**	**0.047%**

CY2014

	Point and Area Sources Combined					
	NO_x (tpy)	**VOC (tpy)**	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
Regional Emissions	30,642	28,818	139,416	8,506	18,532	5,183
CY2014 Emissions	5.45	1.27	5.22	0.39	19.16	1.55
% of Regional	**0.018%**	**0.004%**	**0.004%**	**0.005%**	**0.103%**	**0.030%**

Total Combustion Emissions for Proposed Action (2010)

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Total of all Construction (Buildings/Facilities) for Proposed Action	1,518,167	ft^2	
Total of all Paved Surfaces for Proposed Action	2,872,742	ft^2	
Total of all Grade/Ground Disturbance for Proposed Action	11,643,649	ft^2	
Total General Construction Area:	1,518,167	ft^2	
	34.9	acres	
Total Pavement Area:	2,872,742	ft^2	
	66	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	11,643,649	ft^2	
	267	acres	
Construction Duration:	12	months	
Annual Construction Activity:	240	days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	27	1124.313	69.579	424.167	22.486	68.729	66.667	133421.211
Paving Equipment	7	317.571	18.240	130.049	6.351	19.433	18.850	39367.698
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	3	118.189	9.389	52.147	9.349	8.487	8.233	13393.535
Air Compressor for Architectural Coating	3	10.722	1.120	4.696	0.753	0.928	0.900	1079.320
Architectural Coating**			100.419					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994
Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	11,643,649	267.30	6	(from "Grading" worksheet)
Paving:	2,872,742	65.95	45	
Demolition:	0	0.00	0	
Building Construction:	1,518,167	34.85	240	
Architectural Coating	1,518,167	34.85	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	6,745.88	417.47	2,545.00	134.92	412.37	400.00	800,527
Paving	14,290.70	820.80	5,852.21	285.81	874.47	848.24	1,771,546
Demolition	-	-	-	-	-	-	0
Building Construction	28,365.35	2,253.46	12,515.26	2,243.77	2,036.91	1,975.80	3,214,448
Architectural Coatings	214.44	2,030.78	93.93	15.07	18.56	18.00	21,586
Total Emissions (lbs):	**49,616.37**	**5,522.51**	**21,006.40**	**2,679.57**	**3,342.31**	**3,242.04**	**5,808,108**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	49,616.37	5,522.51	21,006.40	2,679.57	3,342.31	3,242.04	5,808,108
Total Project Emissions (tons)	24.81	2.76	10.50	1.34	1.67	1.62	2,904.05

Construction Fugitive Dust Emissions (2010)

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	65.9	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	267.3	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	332.38	166.19	33.24	16.62
General Construction Activities	609.45	304.72	30.47	15.24
Total	**941.83**	**470.92**	**63.71**	**31.86**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule (2010)

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 267.3 acres/yr (from Combustion Worksheet)
Qty Equipment: 81.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	267.30	33.41
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	267.30	130.68
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	133.65	134.76
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	133.65	55.29
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	267.30	93.75
TOTAL								447.89

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 447.89
Qty Equipment: 81.00
Grading days/yr: 5.53

Total Combustion Emissions for Proposed Action (2011)

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Total of all Construction (Buildings/Facilities) for Proposed Action	587,675	ft^2	
Total of all Paved Surfaces for Proposed Action	1,823,571	ft^2	
Total of all Grade/Ground Disturbance for Proposed Action	3,543,806	ft^2	
Total General Construction Area:	587,675	ft^2	
	13.5	acres	
Total Pavement Area:	1,823,571	ft^2	
	42	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	3,543,806	ft^2	
	81	acres	
Construction Duration:	12	months	
Annual Construction Activity:	240	days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	8	333.130	20.616	125.679	6.663	20.364	19.753	39532.211
Paving Equipment	4	181.469	10.423	74.314	3.629	11.104	10.771	22495.827
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			62.478					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994
Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	3,543,806	81.35	6	(from "Grading" worksheet)
Paving:	1,823,571	41.86	50	
Demolition:	0	0.00	0	
Building Construction:	587,675	13.49	240	
Architectural Coating	587,675	13.49	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1,998.78	123.70	754.08	39.98	122.18	118.52	237,193
Paving	9,073.46	521.14	3,715.69	181.47	555.22	538.56	1,124,791
Demolition	-	-	-	-	-	-	0
Building Construction	9,455.12	751.15	4,171.75	747.92	678.97	658.60	1,071,483
Architectural Coatings	71.48	1,257.02	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**20,598.83**	**2,653.01**	**8,672.82**	**974.39**	**1,362.56**	**1,321.68**	**2,440,663**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	20,598.83	2,653.01	8,672.82	974.39	1,362.56	1,321.68	2,440,663
Total Project Emissions (tons)	10.30	1.33	4.34	0.49	0.68	0.66	1,220.33

Construction Fugitive Dust Emissions (2011)

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	41.9	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	81.4	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	210.99	105.50	21.10	10.55
General Construction Activities	185.49	92.74	9.27	4.64
Total	**396.48**	**198.24**	**30.37**	**15.19**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule (2011)

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 81.4 acres/yr (from Combustion Worksheet)

Qty Equipment: 25.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.

An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.

200 hp bulldozers are used for site clearing.

300 hp bulldozers are used for stripping, excavation, and backfill.

Vibratory drum rollers are used for compacting.

Stripping, Excavation, Backfill and Compaction require an average of two passes each.

Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	81.35	10.17
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	81.35	39.77
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	40.68	41.02
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	40.68	16.83
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	81.35	28.53
TOTAL								136.32

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 136.32

Qty Equipment: 25.00

Grading days/yr: 5.45

Total Combustion Emissions for Proposed Action (2012)

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Total of all Construction (Buildings/Facilities) for Proposed Action	110,548	ft^2	
Total of all Paved Surfaces for Proposed Action	50,304	ft^2	
Total of all Grade/Ground Disturbance for Proposed Action	169,564	ft^2	
Total General Construction Area:	110,548	ft^2	
	2.5	acres	
Total Pavement Area:	50,304	ft^2	
	1	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	169,564	ft^2	
	4	acres	
Construction Duration:	12	months	
Annual Construction Activity:	240	days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			27.098					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994
Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	169,564	3.89	6	(from "Grading" worksheet)
Paving:	50,304	1.15	6	
Demolition:	0	0.00	0	
Building Construction:	110,548	2.54	240	
Architectural Coating	110,548	2.54	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	249.85	15.46	94.26	5.00	15.27	14.81	29,649
Paving	272.20	15.63	111.47	5.44	16.66	16.16	33,744
Demolition	-	-	-	-	-	-	0
Building Construction	9,455.12	751.15	4,171.75	747.92	678.97	658.60	1,071,483
Architectural Coatings	71.48	549.42	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**10,048.65**	**1,331.67**	**4,408.79**	**763.39**	**717.09**	**695.57**	**1,142,071**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	10,048.65	1,331.67	4,408.79	763.39	717.09	695.57	1,142,071
Total Project Emissions (tons)	5.02	0.67	2.20	0.38	0.36	0.35	571.04

Construction Fugitive Dust Emissions (2012)

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	1.2	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	3.9	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	5.82	2.91	0.58	0.29
General Construction Activities	8.88	4.44	0.44	0.22
Total	**14.70**	**7.35**	**1.03**	**0.51**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule (2012)

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 3.9 acres/yr (from Combustion Worksheet)
Qty Equipment: 3.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	3.89	0.49
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	3.89	1.90
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	1.95	1.96
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.95	0.81
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	3.89	1.37
TOTAL								6.52

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 6.52
Qty Equipment: 3.00
Grading days/yr: 2.17

Total Combustion Emissions for Proposed Action (2013)

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Total of all Construction (Buildings/Facilities) for Proposed Action	259,231	ft^2	
Total of all Paved Surfaces for Proposed Action	237,231	ft^2	
Total of all Grade/Ground Disturbance for Proposed Action	496,462	ft^2	
Total General Construction Area:	259,231	ft^2	
	6.0	acres	
Total Pavement Area:	237,231	ft^2	
	5	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	496,462	ft^2	
	11	acres	
Construction Duration:	12	months	
Annual Construction Activity:	240	days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			41.496					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994
Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	496,462	11.40	6	(from "Grading" worksheet)
Paving:	237,231	5.45	26	
Demolition:	0	0.00	0	
Building Construction:	259,231	5.95	240	
Architectural Coating	259,231	5.95	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	249.85	15.46	94.26	5.00	15.27	14.81	29,649
Paving	1,179.55	67.75	483.04	23.59	72.18	70.01	146,223
Demolition	-	-	-	-	-	-	0
Building Construction	9,455.12	751.15	4,171.75	747.92	678.97	658.60	1,071,483
Architectural Coatings	71.48	837.37	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**10,955.99**	**1,671.74**	**4,780.36**	**781.53**	**772.61**	**749.43**	**1,254,550**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	10,955.99	1,671.74	4,780.36	781.53	772.61	749.43	1,254,550
Total Project Emissions (tons)	5.48	0.84	2.39	0.39	0.39	0.37	627.28

Construction Fugitive Dust Emissions (2013)

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	5.4	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	11.4	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	27.45	13.72	2.74	1.37
General Construction Activities	25.99	12.99	1.30	0.65
Total	**53.43**	**26.72**	**4.04**	**2.02**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule (2013)

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 11.4 acres/yr (from Combustion Worksheet)
Qty Equipment: 4.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	11.40	1.42
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	11.40	5.57
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	5.70	5.75
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	5.70	2.36
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	11.40	4.00
TOTAL								19.10

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 19.10
Qty Equipment: 4.00
Grading days/yr: 4.77

Total Combustion Emissions for Proposed Action (2014)

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

General Construction Activities	Area Disturbed		
Total of all Construction (Buildings/Facilities) for Proposed Action	447,055	ft^2	
Total of all Paved Surfaces for Proposed Action	84,073	ft^2	
Total of all Grade/Ground Disturbance for Proposed Action	531,128	ft^2	
Total General Construction Area:	447,055	ft^2	
	10.3	acres	
Total Pavement Area:	84,073	ft^2	
	2	acres	
Total Demolition Area:	0	ft^2	
	0	acres	
Total Disturbed Area:	531,128	ft^2	
	12	acres	
Construction Duration:	12	months	
Annual Construction Activity:	240	days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			54.493					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.
**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994
Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	531,128	12.19	6	(from "Grading" worksheet)
Paving:	84,073	1.93	10	
Demolition:	0	0.00	0	
Building Construction:	447,055	10.26	240	
Architectural Coating	447,055	10.26	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	249.85	15.46	94.26	5.00	15.27	14.81	29,649
Paving	453.67	26.06	185.78	9.07	27.76	26.93	56,240
Demolition	-	-	-	-	-	-	0
Building Construction	9,455.12	751.15	4,171.75	747.92	678.97	658.60	1,071,483
Architectural Coatings	71.48	1,097.32	31.31	5.02	6.19	6.00	7,195
Total Emissions (lbs):	**10,230.12**	**1,889.99**	**4,483.11**	**767.02**	**728.19**	**706.35**	**1,164,567**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	10,230.12	1,889.99	4,483.11	767.02	728.19	706.35	1,164,567
Total Project Emissions (tons)	5.12	0.94	2.24	0.38	0.36	0.35	582.28

Construction Fugitive Dust Emissions (2014)

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	1.9	acres

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	12	months
Area	12.2	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
New Road Construction	9.73	4.86	0.97	0.49
General Construction Activities	27.80	13.90	1.39	0.70
Total	**37.53**	**18.76**	**2.36**	**1.18**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Grading Schedule (2014)

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 12.2 acres/yr (from Combustion Worksheet)
Qty Equipment: 4.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	12.19	1.52
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	12.19	5.96
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	6.10	6.15
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	6.10	2.52
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	12.19	4.28
TOTAL								20.43

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 20.43
Qty Equipment: 4.00
Grading days/yr: 5.11

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

The average roundtrip commute for a construction worker =	60	miles
Number of construction days =	240	days
Number of construction workers (daily) =	50	people

Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00091814	0.00091399	0.00826276	0.00001077	0.00008698	0.00005478	1.09568235

updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 27 May 2009.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**661.061**	**658.072**	**5949.185**	**7.758**	**62.625**	**39.443**	**788891**
tons	**0.331**	**0.329**	**2.975**	**0.0039**	**0.0313**	**0.0197**	**394.446**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

North Central Coast Intrastate Air Quality Control Region

			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	CA	Monterey Co	1,461	1,011	342	248	39.6	291	78,225	16,735	9,575	2,461	5,427	16,572
2	CA	San Benito Co	150	41.5	25.4	11.5	1.11	86.7	10,420	4,336	3,529	781	636	2,534
3	CA	Santa Cruz Co	3,821	888	223	133	725	20.6	45,339	7,630	4,838	1,548	1,677	9,314
Grand Total			5,432	1,941	590	393	766	398	133,984	28,701	17,942	4,790	7,740	28,420

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 7 August 2009.

North Central Coast Intrastate AQCR (40 CFR 81.160)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monterey Co	79,686	17,746	9,917	2,709	5,467	16,863
Total	139,416	30,642	18,532	5,183	8,506	28,818

APPENDIX E

SAFETY DANGER ZONES

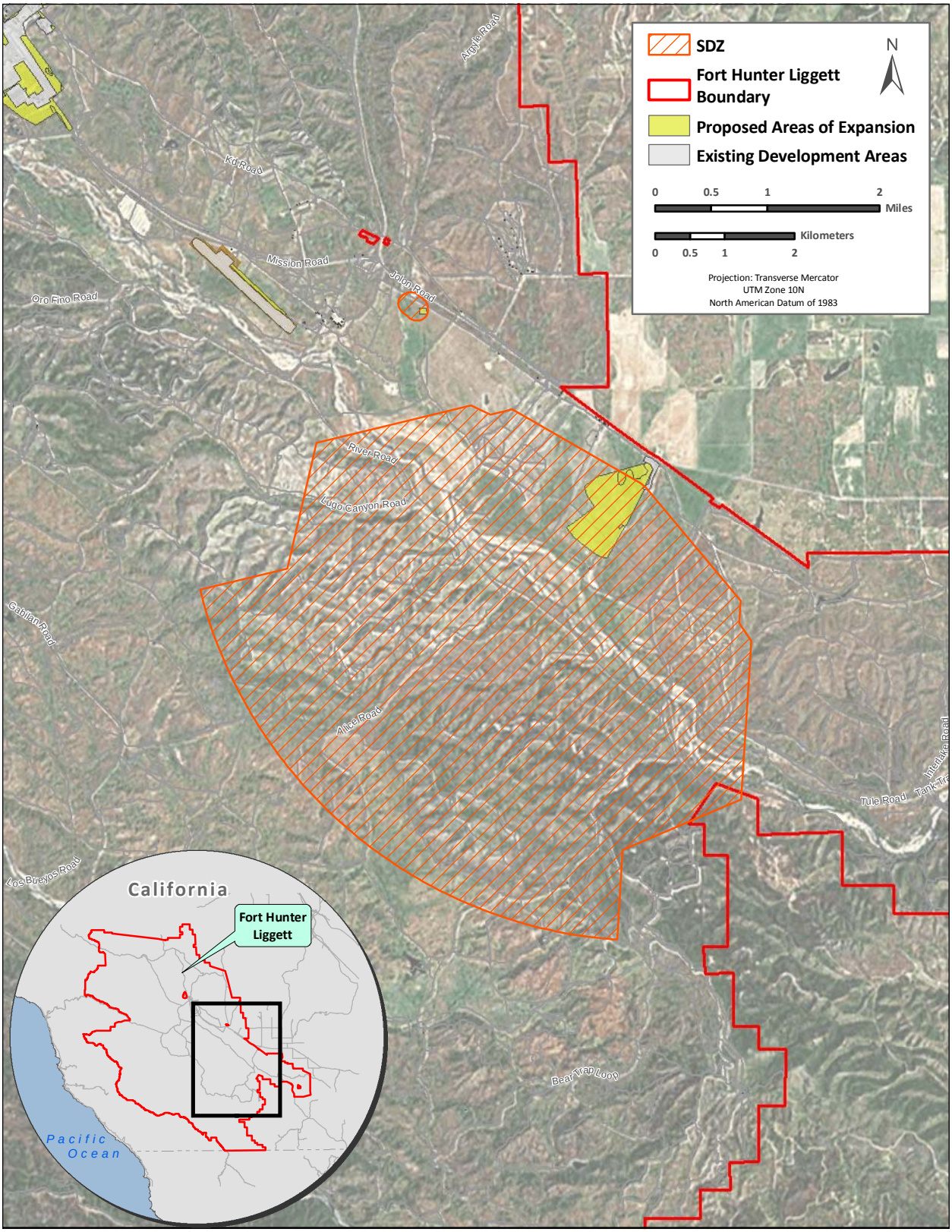

Figure E-1. SDZs Associated with the Proposed MPMG Range and Hand Grenade Familiarization Course

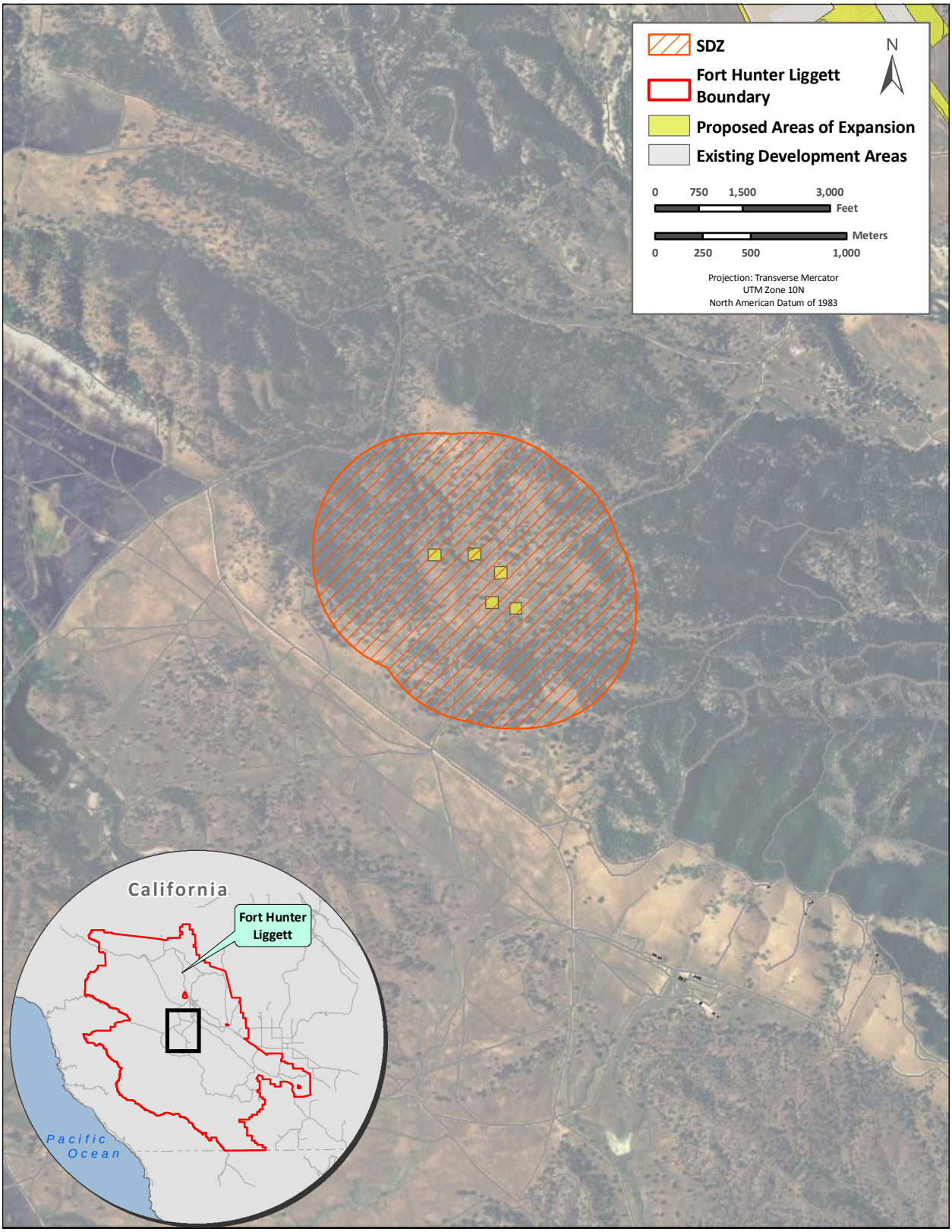

Figure E-2. SDZs Associated with the Proposed Light Demolition Range