FINAL SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT/ ENVIRONMENTAL IMPACT REPORT

Folsom Dam Safety and Flood Damage Reduction

Control Structure, Chute, and Stilling Basin Work

August 2010

Central Valley Flood Protection Board — Public Safety and Flood Management — State of California

US Army Corps of Engineers

SAFCA Sacramento Area Flood Control Agency

Final FONSI HERE

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ACRONYMS & ABBREVIATIONS

ADT	average daily trips
APE	area of potential effects
AQMD	air quality management district
BACT	best available control technologies
BMPs	best management practices
CARB	California Air Resources Board
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CCAA	California Clean Air Act
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CH_4	methane
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
Corps	U. S. Army Corps of Engineers
CVFPB	Central Valley Flood Protection Board
CVP	Central Valley Project
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
cy	cubic yards
dB	decibels
dBA	"A-weighted" decibel
DNL	day-night sound level
DS/FDR	Folsom Dam Safety and Flood Damage Reduction
EA	Environmental Assessment
EA/EIR	Environmental Assessment/Environmental Impact Report
EA/IS	Environmental Assessment/Initial Study
EFH	essential fish habitat
EGR	exhaust gas recirculation
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U. S. Environmental Protection Agency
°F	degrees Fahrenheit
FEIS/EIR	Final Environmental Impact Statement/Environmental Impact Report
FLSRA	Folsom Lake State Recreation Area
Folsom Facility	Folsom Dam and its associated facilities
FONSI	Finding of No Significant Impact
GCR	General Conformity Rule
GHG	greenhouse gas
HFC	hydrofluorocarbons

HOV lanes	bus/carpool lanes
HTRW	hazardous, toxic, and radiological wastes
JFP	Joint Federal Project
L_{50}	noise level exceeded more than 30 minutes per hour
L_{eq}	equivalent sound level
L_{max}	maximum sound level
LOS	level of service
µg/m3	micrograms per cubic meter
MIAD	Mormon Island Auxiliary Dam
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NOA	naturally-occurring asbestos
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
OPR	Governor's Office of Planning and Research
PAC	Post Authorization Change Report
Pb	lead
PFC	perfluorocarbons
PM	particulate matter
$PM_{2.5}$	fine particulate matter
PM_{10}	inhalable particulate matter
PMF	probable maximum flood
ppm	parts per million
RCNM	Road Construction Noise Model
Reclamation	United States Bureau of Reclamation
ROG	reactive organic gas
RWQCB	Regional Water Quality Control Board
SAFCA	Sacramento Area Flood Protection Agency
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SSC	California Species of Special Concern
STG	submerged tainter gate
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
USFWS	U. S. Fish and Wildlife Service
v/c	volume to capacity ratio
VELB	valley elderberry longhorn beetle
VOC	volatile organic compound

1.0 INTRODUCTION

1.1 Proposed Action

The Folsom Dam Safety/Flood Damage Reduction Project (DS/FDR), referred to as the Joint Federal Project (JFP), is a cooperative effort between the U.S. Department of Interior, Bureau of Reclamation (Reclamation), the U.S. Army Corps of Engineers (Corps), the State of California Central Valley Flood Protection Board (CVFPB), and the Sacramento Area Flood Protection Agency (SAFCA). The Final Folsom Dam Safety and Flood Damage Reduction Environmental Impact Statement/Environmental Impact Report (FEIS/EIR) was issued in March 2007 (Reclamation 2007). This document can be found on Reclamation's website or can be provided upon request. The JFP implements dam safety and security features along with flood damage reduction features at Folsom Dam and its associated facilities (Folsom Facility).

The flood damage reduction features of the JFP include the construction of a gated auxiliary spillway southeast of the main dam. Initial excavation of the spillway has been initiated by Reclamation and is expected to be completed in spring/summer of 2010. As part of the FEIS/EIR, the evaluation of the auxiliary spillway included the control structure, the lining of the spillway chute and stilling basin. These features were generally addressed and the potential effects, based on the level of design at the time, were analyzed. However, design refinements have indicated that additional analysis and documentation is needed. Therefore, design refinements evaluated in this Environmental Assessment/Environmental Impact Report (EA/EIR) include the construction of the control structure, installation of the six tainter gates (a feature of the control structure), the lining of the chute and stilling basin, and exploratory geotechnical borings.

1.2 Background and Need for the Project

The Corps' 2007 Post Authorization Change Report, American River Watershed Project, Folsom Dam Modifications and Folsom Dam Raise (PAC) (Corps 2007) summarizes the history of flood management, studies, and actions in the American River basin. The history begins with major flood damage reduction actions following the floods of February 1986 and extends through the authorization of the JFP in 2007. The project history in the PAC covers numerous reports, authorizations, and construction of flood damage reduction features in the American River basin.

The JFP is a multi-agency cooperative effort to expedite corrective action to: (1) address risks identified with the structural integrity of Folsom Dam and its associated structures; (2) incrementally improve the flood management capacity of the Folsom Facility to meet or exceed the 200-year recurrence level; and, (3) upgrade security at the Folsom Facility. This supplemental EA/EIR will be focused on the flood damage reduction portion of the JFP.

The Corps will be constructing an auxiliary spillway adjacent to the existing Folsom Dam downstream of the toe of the Left Wing Dam (Plate 3). The current spillway and outlets at the

Folsom Facility do not have sufficient discharge capacity for managing the predicted probable maximum flood (PMF) and lesser event flood inflows above a 100 year event (an event that has a 1% chance of occurring in any given year). Currently, the Folsom Facility can safely release flood flows between 115,000 cubic feet per second (cfs) and 160,000 cfs for a duration which provides a level of protection associated with a 100 year event from the downstream levees. Structural modifications associated with the JFP are proposed to address increasing discharge capability and/or increasing storage during extreme flood events above the 200 year event (an event that has a 0.5% chance of occurring in any given year) up to the PMF. Combined, the modifications would be able to safely release flood flows between 115,000 cfs and 160,000 cfs for a longer duration that would be equivalent to a 200 year event level. The new auxiliary spillway is a major feature that will address the need to safely pass part or the entire PMF event. A hydraulic analysis was completed for the new spillway and is included in the PAC. Increasing discharge capability and increasing storage would potentially achieve the goal of a greater than 200 year flood protection objective (Reclamation 2006).

The proposed auxiliary spillway consists of the following features:

- A 1,000 foot long approach channel into Folsom reservoir;
- A spur dike, which is an embankment designed to direct water into the approach channel;
- A gated control structure, including six tainter gates, which are submerged radial arm floodgates used in dams and canal locks to control water flow;
- A 3,000 foot long spillway chute; and,
- A stilling basin.

Flows from the auxiliary spillway will empty into the American River approximately 1,500 feet downstream from the main dam. When completed, this auxiliary spillway will provide the operational capability for improved hydrologic control around Folsom Overlook adjacent to the Left Wing Dam.

The design of the approach channel that was included in the PAC and the FEIS/EIR was preliminary and design refinements have been ongoing since the completion of those documents. As a part of analyzing these design refinements, it was discovered that assumptions used to analyze project-related effects needed to be modified. These changed assumptions resulted in a reanalysis of portions of the spillway construction. Specifically, these portions include the control structure, gate installation, and lining the chute and stilling basin.

The ongoing design refinements also include an analysis of various alternatives for the overall excavation and construction of the approach channel, including combinations of wet and dry excavation methods. Currently, three alternatives are being considered for the approach channel. As part of this ongoing design and analysis, exploratory borings are needed along the potential alignment of a cofferdam which would be used to facilitate in the dry construction. This EA/EIR will include the analysis of the potential environmental effects of the exploratory borings. A subsequent environmental analysis will be prepared analyzing the approach channel construction alternatives. The environmental document is estimated to be completed in the summer of 2011, and construction would begin in 2012.

1.3 Project Location

The American River Watershed covers about 2,100 square miles northeast of the city of Sacramento and includes portions of Placer, El Dorado, and Sacramento counties. The watershed includes Folsom Dam and Reservoir; inflowing rivers and streams, including the North, South, and Middle forks of the American River; and the American River downstream to its confluence with the Sacramento River in the city of Sacramento. During flood stages the American River watershed can have flood effects on areas outside of the watershed including the Sacramento River, Yolo Bypass, and Sacramento Bypass. Plate 1 illustrates the project area within the Sacramento River Watershed, and Plate 2 shows the Folsom Dam and Reservoir area.

Folsom Dam and Reservoir are located downstream from the confluence of the North and South Forks of the American River, near the City of Folsom. Folsom Dam is located about 20 miles northeast of Sacramento. Folsom Reservoir has a capacity of 977,000 acre-feet with a surface area of 11,450 acres. Folsom Dam was originally authorized in 1944 for flood control, but was reauthorized in 1949 as a multi-purpose facility. The Corps constructed Folsom Dam and transferred it to Reclamation for coordinated operation as an integral part of the Central Valley Project (CVP). Construction of the dam began in October 1948 and was completed in May 1956. Water was first stored in February 1955.

Folsom Dam is a concrete gravity dam 340 feet high and 1,400 feet long. The main section is flanked by two earthfill wing dams. The Right Wing Dam is 6,700 feet long and 145 feet high and the Left Wing Dam is 2,100 feet long and also 144 feet high. In addition to the main section and wing dams, there is one auxiliary dam and eight smaller earthfill dikes. All retention structures have a crest elevation of 480.5 feet above mean sea level. The concrete dam has a solid parapet wall with a top elevation of 484 feet. Folsom Reservoir's normal operating pool is 977,000 acre-feet with a reservoir water surface at elevation 466 feet. The design surcharge pool is 1,084,780 acre-feet at reservoir water surface elevation 475.4 feet, with 5.1 feet of existing freeboard.

The new auxiliary spillway is located on the left abutment of the main dam, immediately downstream of the existing left wing dam (Plate 3). For the purposes of this document, the "project area" consists of the site of the ongoing spillway construction including all haul routes, staging, and disposal areas. The staging areas, disposal areas, and haul roads that would be used for this project were previously evaluated in the FEIS/EIR. Therefore, the analysis of impacts in this EA/EIR will be limited to the site of the control structure construction, the lining of the chute and stilling basin and the location of exploratory borings.

1.4 Project Authority

The auxiliary spillway was authorized by Section 101(a)(6)(A) of the Water Resources Development Act of 1999 (1113 Stat. 274) and modified by Section 128 of the Energy and Water Development and Appropriations Act, 2006 (119 Stat. 2259). These Acts included language supporting the Corps' and Reclamation's collaboration in determining a joint dam safety and flood damage reduction project. Specifically, Section 128 of the Act authorizes the Secretary to construct the auxiliary spillway generally in accordance with the Post Authorization Change Report, American River Watershed Project (Folsom Dam Modifications and Folsom Dam Raise).

1.5 Previous Environmental Documents

Although there have been numerous planning and environmental documents completed related to flood management, studies, and actions in the American River basin, the major documents are listed below:

- 1991 American River Watershed Investigation and Environmental Impact Statement/Environmental Impact Report (EIS/EIR).
- 1996 Supplemental Information Report and EIS/EIR.
- 1998 SAFCA's Folsom Dam Modification Report.
- 2002 American River Watershed Long-Term Study and EIS/EIR.
- 2004 Folsom Dam Modification Limited Revaluation Report and Environmental Assessment/Initial Study (EA/IS).

In March of 2007, the Corps prepared the PAC for the American River Watershed Project which revaluated the Folsom Dam Raise project, along with the Folsom Modifications Project resulting in the recommendation of the JFP. The FEIS/EIR for the JFP was also issued in March 2007. The FEIS/EIR was prepared by Reclamation with the Corps as a Cooperating Agency. A Record of Decision was issued in May of 2007 by Reclamation for the Dam Safety and Dam Security authorities. A separate Record of Decision for the JFP, including authorities for the auxiliary spillway was jointly issued by the Corps and Reclamation in June of 2007.

In August of 2009, a Final Supplemental EA/IS was issued for the potential for early excavation of the approach channel. Since this current document is also supplement to the FEIS/EIR, this EA/EIR incorporates it by reference, summarizes existing conditions, and focuses on any changes since the preparation of that document. All of the documents referenced above are available upon request from the Corps.

1.6 Purpose of the Environmental Assessment/Environmental Impact Report

In the FEIS/EIR, the potential effects due to construction of the auxiliary spillway were evaluated. However, many of the design elements of the auxiliary spillway were preliminary in nature and the FEIS/EIR noted that design refinements would be needed prior to construction. This Supplemental EA/EIR describes the construction and evaluates the effects of the control structure, lining of the chute and stilling basin, and the exploratory borings for the approach channel construction.

This EA/EIR (1) describes the existing environmental resources in the project area; (2) evaluates the effects and significance of the action alternative on the resources; and (3) proposes measures to avoid, minimize, or mitigate any adverse effects to a less-than-significant level. This EA/EIR is in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), and provides full disclosure of the effects of the proposed action.

1.7 Decisions To Be Made

The District Engineer, commander of the Sacramento District, must decide whether or not the proposed action qualifies for a Finding of No Significant Impact (FONSI) under NEPA or whether an Environmental Impact Statement (EIS) must be prepared. In addition, CVFPB will consider certifying the Environmental Impact Report (EIR) and adopting its findings.

2.0 ALTERNATIVES

2.1 Introduction

The potential effects due to the construction of the auxiliary spillway were evaluated in the FEIS/EIR. However, the design for many of the features associated with the spillway were preliminary in nature and the FEIS/EIR noted that design refinements would occur and would be addressed, if necessary in subsequent NEPA/CEQA documentation. As the Corps' portion of the JFP design has progressed, there have been design refinements associated with the construction of the control structure and the lining of the spillway chute and stilling basin features. These design refinements have resulted in adjustments to project assumptions about noise, air quality, and traffic for construction of the control structure and lining of the spillway chute and stilling basin, including all associated work. The results of these adjustments have indicated that additional NEPA/CEQA work is needed. Furthermore, as part of the ongoing detailed design effort on the approach channel, additional geotechnical information is needed; therefore, an analysis on the potential effects associated with geotechnical borings in the reservoir is also included in this document.

2.2 Alternative 1 - No Action

Under the no action alternative, the Corps and the CVFPB would not undertake construction of the control structure, nor complete concrete lining of the spillway chute or stilling basin. As a result, the continuing construction effort of the JFP would cease, and completion of the project would not be possible. The control structure, spillway chute, and stilling basin are essential, vital elements to the overall function of the spillway. Consequently, dam safety and flood damage reduction improvements to the Sacramento area would not be implemented and increased public safety would not be realized. In addition, features such as the partially constructed spillway, would not be connected to the reservoir and therefore not able to convey flood flows. The reduction in flood risk associated with the JFP would not be realized.

2.3 Alternative 2 - Design Refinements (Preferred Action)

The JFP includes a gated auxiliary spillway containing six submerged tainter gates (STGs). The spillway would be located southeast of the existing main Folsom Dam, (Plate 3). Principal features of the new auxiliary spillway include an approximately 1,100 foot-long approach channel, which would begin in Folsom Reservoir; a concrete control structure that regulates releases through the STGs; a 2,782 foot long concrete-lined spillway chute (of which the last 682 feet is a stepped concrete chute); and a concrete-lined stilling basin. Flows will discharge onto a rock exit channel before emptying directly into the American River channel downstream of the main Folsom Dam, converging with releases from the main dam.

The total amount of area already disturbed and evaluated in the FEIS/EIR prior to this latest stage of work includes approximately 50 acres. This area will be used in the latest stage of the Corps' ongoing effort to complete the JFP, and involves three elements: (1) construction of the control structure, (2) concrete lining of the spillway chute and stilling basin, and (3) exploratory borings for the approach channel cofferdam walls (Plate X). The construction of these features is evaluated in this EA/EIR. The control structure, spillway chute, and stilling basin are each major, permanent features of the JFP; while the borings for the approach channel cofferdam are temporary actions. These borings are to be drilled solely for the purpose of gathering geotechnical information for construction of the cofferdam, which can then be used to hold lake water back during excavation efforts for the approach channel. The excavation of the approach channel is not covered under the scope of this EA/EIR and will be covered under future documentation, as discussed in Chapter 1. The approach channel document is expected to be completed in 2012.

Since the development of the FEIS/EIR, additional information has become available through the detailed design of the control structure, spillway chute, and stilling basin, including boring locations for the approach channel cofferdam walls. Details on aspects such as the design features, construction methods (batch plant, access, and staging), site preparation, restoration and cleanup, borrow and disposal sites and construction personnel schedules are discussed below.

2.3.1 Control Structure

Initial excavation of the spillway has been initiated by Reclamation (Phase I and Phase II excavation contracts); this work is expected to be completed in spring/summer 2010. The Corps' work on the control structure is expected to begin in 2011. The control structure feature of the auxiliary spillway is the initial Corps' major construction contract as part of its flood risk management objective. The control structure serves to both hold back lake water and control water releases into the spillway chute system downstream during high water level periods. Construction activities would include the excavation of the remainder of the earth and rock for the foundation of the control structure followed by mass concrete placement in order to build up the structure.

Features

The auxiliary spillway control structure is a large, vertical, reinforced concrete gravity structure having a top of dam elevation of approximately 483 feet (elevation 480.5 feet National Geodetic Vertical Datum [NGVD] 29). The control structure would be founded on bedrock, comprised of two approximately 89 foot wide independent flow-through monoliths flanked by three non-flow-through monoliths. The non-flow-through monoliths will provide access to the various equipment and inspection galleries in the dam, while also containing a mechanical/electrical equipment room. Each of the two flow-through monoliths house three STGs, totaling six in all to control flow releases. Each tainter gate would be approximately 22 feet wide by 36 feet tall. The minimum height of each of the 23-foot wide conduits would be approximately 34 feet. The invert elevation at the upstream face of the control structure would be approximately 370 feet (elevation 368.0 feet NGVD29).

The six STGs will each have one dedicated steel bulkhead gate and hoist assembly for safety and security purposes. Each of the six bulkhead gates would be approximately 24 feet wide by 39 feet tall and would be operated by a wire rope hoist system. The bulkhead gates are intended as redundant security features to protect the tainter gates from waterborne threats. Also, the bulkheads are designed to ensure the closure capability under emergency conditions for pool elevations up to approximately 420 feet (elevation 420.34), in accordance with direction from Reclamation.

After construction, the top of the control structure will have a permanent two-lane roadway, designed to meet all Reclamation's security, maintenance, and operational needs. The structure will be capable of supporting a mobile crane for maintenance. During construction of the control structure, access from the Folsom Lake Crossing Road to the Left Wing Dam area will be maintained through the overlook area, upstream of the control structure.

Construction Methods

The scope of the control structure work element includes the excavation to final grade; preparation of the foundation; drainage and seepage controls; mass concrete placement; procurement, delivery, and installation of the STGs and bulkhead gates; internal and external access; and mechanical, electrical, and instrumentation controls.

The initial construction would include excavating the remainder of the earth and rock for the control structure and a portion of the approach channel for a distance of approximately 90 feet upstream of the control structure. The control structure excavation is estimated to consist of approximately 20,000 cubic yards (cy) of common material and 300,000 cy of rock excavation. The rock excavation would include blasting activities causing the temporary closure of some roads. The blasting would not be permitted to interfere with peak traffic flow, would occur at consistent time(s), and would require an encroachment permit from the City of Folsom. It is likely that blasting would occur once a day between 1:30 p.m. and 2:30 p.m over five to seven months of the construction effort (estimated March 2011 to October 2011), as needed. There would be additional provisions for a second blast in the morning between 10:00 a.m. and 11:00 a.m. This second blast would occur about one half of the time over the five to seven months.

The contractor would coordinate with the city of Folsom and provide adequate notification to the public, including signage, prior to beginning blasting.

The blasting would be accomplished by using track-mounted drills to drill the blast holes. The holes would be loaded with cartridge blasting agents and fitted with primers, boosters, detonators, and timed initiators as necessary. Finally the holes would be filled with stemming material and covered with blast mats or soil cover. The area will be cleared and roads would be closed for the duration of the blasting and post-blasting inspection.

The 120-foot deep, open cut excavation for the control structure would be protected during construction by a rock plug section upstream of the control structure that serves as a natural cofferdam during high reservoir storage conditions. This rock plug is temporary, and would be removed after completion of the auxiliary spillway system.

Beneath the control structure, a grout curtain would be established to block potential seepage paths. Foundation drains would be installed to reduce uplift pressures beneath the structure. Both will be accessible from the grout gallery internal to the auxiliary spillway dam. The mass concrete placement would then occur for the control structure. The control structure would be formed and the concrete would be placed in lifts until the structure tops out. The mechanical and electrical work would then take place and then the gates would be installed. It is estimated that the gates would take approximately five months to install.

Batch Plant Operation

The construction of the new control structure, spillway chute, and stilling basin would require large quantities of temperature controlled concrete. This will necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. The batch plant would be powered by electricity from overhead Sacramento Municipal Utility District lines. The batch plant would be located either on the expanded Overlook area or inside the excavated spillway chute area. A picture of a typical batch plant is shown in Figure 1 below.

A total of about 120,000 cy of concrete would be needed for the control structure. The batch plant would produce concrete for the control structure's one year construction period. A plant capacity between 100 to 150 yards per hour would be appropriate for these placement sizes.

The concrete batch plant area would consist of the aggregate storage system, aggregate rescreen system (if needed), rewashing facility (if needed), the batching system, cement storage, ice manufacturing, and the concrete mixing and loading system. The aggregate storage system is design to have sufficient storage on-hand of input materials to produce about 3,000 cy of concrete. The aggregate storage system consists of three course aggregate piles and a fine blended sand pile. The aggregate would be transported to the project in belly type trucks. The trucks would dump the aggregate into a truck unloading hopper, after which it would be conveyed up to an overhead shuttle conveyer, and dropped into respective storage piles. To accommodate the requirement of 3,000 cy of batching capacity, the storage area will need to accommodate the materials listed in Table 2-1 below. The material would be primarily stored in containers on approximately two acres of the Folsom Point Overlook staging area.

Table 2-1. Batch Plant Stockpile Requirements.

Aggregate Source	Stockpile Requirements
Sand	1500 Tons
¾" Coarse Rock	1300 Tons
1 ½" Coarse Rock	1100 Tons
3" Coarse Rock	600 Tons
Cement	700 Tons
Fly Ash	250 Tons

The sand and the aggregate would be loaded out of the storage piles with a front end loader, placed into bin hoppers, and conveyed to the batching day hoppers. The aggregates would then be mixed and transported into transit agitator trucks or mixer trucks. Once ready for placement, the concrete would be transported by truck or conveyer from the batch plant site across the spillway access road to the concrete conveyor or truck unloading hopper. Two or three 10 cy agitator trucks would be needed depending on contractor production rates. After delivery of the mix to the unloading hopper, the concrete would be conveyed by a crane for targeted placement.

It is estimated that about 97,000 cy of aggregate material would be needed to provide concrete for the construction of the control structure. It is anticipated that the aggregates needed for the concrete would come from existing local commercial off-site sources and delivered to the site.

Generally, work associated with the batch plant operations would occur during the hours of 7:00 a.m. to 7:00 p.m., however, it is likely that some batching and placements would have to occur in the very early morning or night-time hours. This is especially true for large volume placements and placements that occur in the hot summer season. Early morning or night-time placements would be subject to traffic and noise limitations of the city of Folsom's ordinances and would have to be coordinated with the city by the contractor.

The description of the batch plant operation would be the same for the spillway chute and stilling basin elements, however the overall production rates would likely be less than those for the control structure.

Figure 2-1. Typical Batch Plant.

Access and Staging

All of the existing access to the site, including on site haul roads and staging for the construction of the control structure chute and stilling basin work would be as described in the FEIS/EIR and will not be re-evaluated in this document. No new areas would be disturbed for access and staging for the control structure work. Off-site access for delivering of aggregate materials at Dike 7 not included in the FEIS/EIR will be evaluated in this document. A complete discussion of the access and staging is included for information.

General access to the site would be from the southeast by way of the newly opened Folsom Lake Crossing road. A turnoff at the south end of the expanded Overlook area would allow connection to the main haul road and other construction access roads. The expanded Overlook area will be the hub of all site traffic and controls would be required during construction. The contractor will also have the option to construct and use a second site access off Green Valley Road. The area required for access from Green Valley Road to the project site was included as part of the project in the FEIS/EIR. Any required improvements associated with this access would be coordinated by the contractor with Reclamation and City of Folsom. Any necessary permits associated with this access would also be secured by the contractor. Access roads to the site, as well as on site haul roads, would be used to transport materials, supplies, equipment, and personnel for the JFP construction, dam safety operations, and other ongoing Reclamation projects.

Staging areas would likely be located at Dike 7 and upstream of Dike 7; an area that has been recently expanded by Reclamation's Phase II work. The Dike 7 area is currently being used by Reclamation's contractor for office/trailer space and the area is sufficient for office/trailer space for the Control Structure work. Stockpiling of materials for the batch plant would likely occur in the recently expanded area upstream of Dike 7 and at Mormon Island Auxiliary Dam (MIAD). Additional stockpiling areas could be located at the downstream toe area of the Left Wing Dam.

The procedures for access and staging areas would be the same for the spillway chute, stilling basin, and cofferdam wall borings elements.

Excavation, Hauling, and Disposal Sites for Control Structure Foundation

Most of the disposal material from the excavation of the control structure foundation would be hauled to the disposal sites near MIAD (Plate 2). This haul road between the construction site and the MIAD disposal area is an existing feature and is in use for Reclamation's current excavation activities. About 150,000 cy of material would be taken to the disposal site at Dike 7 for future use in the approach channel construction. The disposal material from the control structure excavation is estimated to be 320,000 cy. This disposal would translate into approximately 6,400 on-site truck trips.

There is also an existing haul road that extends from the Overlook to the spillway chute construction site and extends the length of the spillway to the stilling basin. This road is currently being used by Reclamation for their Phase II construction work and would continue to be used during construction of the control structure and the lining of the chute and stilling basin. This haul road will become a permanent access road from the overlook area to both the auxiliary spillway stilling basin and the main dam stilling basin.

Aggregate and other materials for the concrete batch plant would be brought onsite via two routes, identified below. One route would access the project area from I-80 and the other from Highway 50. The routes are consistent with the various city and county identified truck routes. These routes will be the same for weighted and empty trucks. Coordination by the contractor with the local entities would be necessary.

Potential routes were identified based on existing sources of aggregate and other materials needed for concrete production. Two primary sources of aggregate were identified as the Cool Cave quarry near Auburn and the Perkins Plant south of Hwy 50 east of Sacramento. The ultimate source of aggregate and other materials would be determined by the contractor. The potential routes are shown on Plate 4a and 4b.

The assumed route(s) from the Cool Cave quarry would be: Highway 49 south to Lotus Road, to Green Valley Road then to Folsom Lake Crossing or Green Valley Road access. An alternate route via I-80 would be Sierra College Boulevard south to Douglas to Auburn-Folsom Road (no trucks shall use Auburn-Folsom north of Douglas). The assumed route from the

Perkins Pit would be Highway 50, to East Bidwell Street to Oak Avenue, to Blue Ravine Road, to East Natoma Street.

In the city of Folsom, no vehicles in excess of five tons would be allowed on city streets between 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. No lane closures would be allowed during these hours and all potential lane closures would be coordinated with the city of Folsom. Additionally, trucks shall not exit I-80 via Douglas Boulevard; the only alternative to Sierra College Boulevard is Eureka Boulevard. It is estimated that for approximately 1 to 2 years out of the total construction period, up to 6,400 truck trips could occur.

Site Preparation

Site preparation would include efforts to ensure that the foundation for the control structure is in appropriate condition prior to construction. The control structure would require a sound bedrock foundation with adequate strength and suitable deformation characteristics to withstand bearing and shear stresses associated with the structure and reservoir loads as well as any uplift, erosion, or seepage stresses associated with reservoir seepage through the foundation. Anomalies in the foundation would require remedial work to provide a uniform foundation. This work could include removal, concrete backfill, and consolidation grouting to fill joints and fracture zones.

Shaping and cleaning of the foundation to remove large loose rocks, overhangs, and projecting knobs, followed by light pressure washing, would be done in advance of some form of dental treatment to fill cracks, joints, and crevices. Dental concrete would be used sparingly in filling depressions so as to preserve the natural roughness of the excavated surface. High pressure washing of the foundation surface and dry brooming to remove loose residue are generally the last steps in foundation preparation.

The majority of the control structure excavation is expected to be below the groundwater table. Most of the groundwater flow is expected to emanate from individual discontinuities in the excavation. A Limited-Threat Discharge Permit would be obtained from the Regional Water Quality Control Board prior to the start of construction. The contractor will comply with all terms and conditions regarding the sampling, treatment, and discharge of groundwater from the site.

A sump and pump system would likely be required during excavation for the portions of the control structure below the elevation of the chute invert. Water would be pumped from the foundation, tested for water quality conditions, and, if needed, would be properly treated as described in the permit before it is discharged back into Folsom Lake.

Restoration and Cleanup

Once construction of the control structure is complete, all equipment and excess materials would be transported offsite via the haul routes discussed above. The access roads and staging areas not used as permanent features of the project would also be restored to pre-project conditions. The work sites and staging areas would be cleaned of all rubbish, and all parts of the work area would be left in a safe and neat condition suitable to the setting of the area. The procedures for restoration and clean-up are the same for the spillway chute and stilling basin elements.

Construction Workers and Schedule

Although the numbers of workers on site would vary during construction, up to approximately 70 workers could be onsite each day during construction. These workers would access the area via regional and local roadways and would park their vehicles at the northwest corner staging area.

Construction hours would be limited to the hours from 7 a.m. to 6 p.m. weekdays and from 8:00 a.m. to 5:00 p.m. on weekends. Any changes in the construction work hours would be subject to the city of Folsom's traffic and noise ordinances and would have to be coordinated with the city by the contractor.

The excavation portion of the control structure would begin approximately in January 2011 and would last for about nine months. The aggregate stockpiling and concrete placement would begin in approximately July 2011 and would take about 24 months. The installation of the gates would take about nine months beginning in December 2013 and extending to about 2014. The total construction period for the Control Structure effort would be about 3 and ¾ years or 42 months.

2.3.2 Spillway Chute and Stilling Basin

Features

The spillway chute and stilling basin together will comprise a concrete-lined conduit system designed to transmit outflows from the control structure's STGs. Water will flow down the spillway chute and into a stilling basin before entering the confluence zone with outflows from Folsom Dam, and finally entering the American River.

The spillway chute work, including the stepped chute portion and the stilling basin, will include the final foundation preparation for the chute slab, installation of the drainage and slab anchorage systems, reinforced concrete placement, and backfill behind the chute walls. Additionally, the stilling basin work will include baffle block anchorage and concrete placement, end sill concrete placement, and any required backfill behind the stilling basin walls.

Spillway Chute

The rectangular spillway chute will consist of a reinforced concrete slab and side walls. The chute will have a clear width of 169 feet and will be approximately 2,100 feet in length on a constant 1.98 percent slope. The side walls will be vertical on the water side and will be one-foot thick over the top several feet, then taper outward on the land side. The height of the chute walls will vary along the length of the chute due to the changing water depth. Nearest to the control structure, the wall height will be 35 feet for a length of 150 feet to accommodate a staging area for future maintenance equipment. The wall height will then taper in one-foot increments from 32 feet tall to 28 feet tall at the top of the stepped chute, about 1,950 feet further downstream. The slab thickness will vary with the wall height and will be thicker beneath the wall sections and thinner toward the center of the chute. The slab will be anchored to the rock foundation with grouted rock anchors. Drainage will be provided behind the backfilled chute walls and beneath the slab.

The spillway chute will transition into a 682-foot stepped chute at the downstream end, serving to partially dissipate energy before flows enter the stilling basin. Together, the spillway chute and stepped chute combine for a total of 2,782 feet in length. The stepped chute would have the same 169-foot internal width as the spillway chute and consists of 68 individual steps ranging in height from approximately one to three feet. The vertical walls lining the channel will be similar to those of the chute. The slab section will also be similar to the chute slab, as will be the anchorage and drainage systems. The side walls of the stepped chute will be backfilled, at least to the height necessary to prevent erosion of the cut slopes adjacent to the foundation. Any backfill material will be lean mix concrete.

Stilling Basin

The rectangular stilling basin will have a clear width of 169 feet and will be 250 feet long. The vertical walls will be 66 feet tall and were designed to contain a flow of 160,000 cfs with minimal splash over the walls. The walls will be overtopped during higher release events. The vertical side walls will be one-foot thick at the top; the interior face of the wall will be plumb; and the exterior face will be battered. The slab will be thickened beneath the wall sections and typically thinner toward the center of the basin. The slab will be anchored to the rock foundation with grouted rock anchors. Drainage will be provided beneath the slab. The side walls of the stilling basin will be backfilled, at least to the height necessary to prevent erosion of the cut slopes adjacent to the foundation. Any backfill material will be lean mix concrete.

Construction Methods

The preparation of the foundation for the lining of the chute and stilling basin includes correcting any anomalies to provide a uniform foundation. This work could include removal of material and concrete backfill. Cleaning of the foundation followed by pressure washing would be done in advance of some form of dental treatment to fill cracks, joints, and crevices. The installation of drains and anchors under the spillway invert would then occur. The chute and spillway and stilling basin would then be lined with reinforced concrete and the spillway walls would be backfilled with lean mix concrete.

Batch Plant

The description of the batch plant operation would be the same as described for the control structure. See the description for Batch Plant under Section 2.3.1, Control Structure. However, the rate and amount of concrete produced will be less than for the control structure construction. There would be 99,625 cy of concrete produced for the lining of the chute and 28,295 cy of concrete produced for the stilling basin work. This concrete production would use about 170,000 cy of aggregate. The batch plant would operate for three years for the lining of the chute and stilling basin for a total of four years of operation.

Access and Staging

The routes for access and staging area would be the same as described for the control structure. See the description of Access and Staging under Section 2.3.1.

Excavation, Hauling, and Disposal Sites for Chute and Stilling Basin

There would be no excavation associated with the lining of the chute and stilling basin work and therefore, there would be no transport of material to the disposal site at MIAD for this action.

Aggregate needed for the production of concrete at the batch plant would be transported via the same haul routes described for the control structure. It is estimated that over the 3-year construction period, up to 17,000 truck trips could occur.

Site Preparation

The site preparation would be similar to that described for the control structure in Section 2.3.1. There would be no consolidation grouting to fill joints and fracture zones. There would likely be groundwater seepage into the existing chute and stilling basin work area. A Limited-Threat Discharge Permit would be obtained from the Regional Water Quality Control Board prior to the start of construction. The contractor will comply with all terms and conditions regarding the sampling, treatment, and discharge of groundwater from the site.

Restoration and Cleanup

The procedures for restoration and clean-up would be the same as described for the control structure. See the description of Restoration and Cleanup under Section 2.3.1, Control Structure.

Construction Workers and Schedule

Although the numbers of workers on site would vary during construction, approximately 70 workers could be onsite each day during construction. These workers would access the area via regional and local roadways and would park their vehicles at the northwest corner staging area.

Construction hours would be limited to the hours from 7 a.m. to 6 p.m. weekdays and from 8:00 a.m. to 5:00 p.m. on weekends. Any changes in the construction work hours would be subject to traffic and noise limitations of the city of Folsom's ordinances and would have to be coordinated with the city by the contractor.

The work on the chute and stilling basin would begin in the fall of 2013 and would extend until the end of 2016. The total estimated construction period for the chute and stilling basin effort would be about three years.

2.3.3 Borings for the Approach Channel Cofferdam

Features

As part of the auxiliary spillway, there is a 1,000 foot long approach channel into Folsom Lake to allow water to enter the spillway. The design of the approach channel that was included in the PAC and the FEIS/EIR was very preliminary and design refinements have been ongoing since the completion of those documents. The design refinements include an analysis of various alternatives for the overall excavation and construction of the approach channel, including combinations of wet and dry excavation methods. Currently, three alternatives are being considered. A subsequent environmental analysis will be prepared analyzing those alternatives. This document will be completed in 2011 and construction on the approach channel will begin in 2014.

As a part of the approach channel design, cofferdams are being considered to keep part of the site dry during construction. Therefore, exploratory borings are needed along the proposed cofferdam alignment to gather information on the location of supportive rods that will keep the cofferdam in place and help it to withstand water pressure from the upstream side of the dam. It is estimated that up to 25 borings would be needed. The borings would be drilled within the 410 to 420 foot elevation contour range of the lakebed. The holes would be spaced an average of around 100 feet apart as demonstrated in Plate 3. The borings would be cylindrical borings that would consist of a four inch diameter hole extending a minimum of 25 feet into moderately weathered rock.

The borings are expected to be conducted from November 2010 to January 2011. The estimated water elevation during this time of year is expected to be approximately 390 feet. Therefore, it is anticipated that most of the borings would be able to be done in the dry. However, some may have to be done in the wet.

Access and Staging

Generally, the procedures for access and staging are the same as described for the control structure in Section 2.3.1. Access of the drill rig to the boring locations would be via the Folsom Point boat ramp. The Folsom Point boat ramp closes once the water elevation reaches 405 feet. Therefore, if the borings are conducted in the dry at elevation 390 feet, no interruption of boat launch activities would be anticipated. When drilling is done in the dry, the drill rig would be located on the lake bottom. If drilling is done in the wet, the drill rig would be mounted to a barge.

Site Preparation

Since the equipment needed for the borings needs a relatively level surface, some minor soil reshaping might be needed, if the borings would occur in the dry. If the borings are done from a barge, no site preparation would be needed.

Restoration and Cleanup

At the completion of the boring effort, the site, including all staging and access areas, would be returned to its pre-project condition. All equipment and excess materials would be transported offsite via the haul routes discussed above. The work sites and staging areas would be cleaned of all rubbish, and all parts of the work area would be left in a safe and neat condition suitable to the setting of the area.

Construction Workers and Schedule

The drilling associated with the cofferdam borings would take place intermittently, as needed between November 2010 and January 2011. Drilling would occur during the weekdays and during the daytime hours (7:00 a.m. to 5:00 p.m.). The crew would likely consist of four workers. There would be one drill rig and one hole would be drilled at a time.

CHAPTER 3.0 AFFECTED RESOURCES AND ENVIRONMENTAL EFFECTS

3.1 Introduction

This section describes both the environmental components (resources) of the project area and the potential effects of the preferred alternative on those resources. In this document, “affected resources” refers to the present-day, existing environmental conditions of the project area.

Many resources described here were initially analyzed in the FEIS/EIR, in terms of the projected, overall effects. The FEIS/FEIR addressed all appropriate measures to avoid, minimize, or mitigate potential adverse effects to environmental resources for the defined project area. However, as each phase of construction is completed for the JFP, the existing environmental conditions of the area have changed.

With the exception of the cofferdam borings, this is the case for the actions being analyzed in this Supplemental EA/EIR, since the immediate area of the control structure, spillway chute, and stilling basin has already been disturbed (see Plate 5). Prior to commencement of this project, Reclamation will have completed its work excavating and shaping the spillway chute and stilling basin to near-final grade, while also initiating the excavation of the control structure foundation. Analyses in this document are based on the current conditions that exist subsequent to the Bureau of Reclamation's excavation and grading efforts, which will be completed in summer 2010.

Both beneficial and adverse effects are considered, including direct effects during construction and indirect effects resulting from the project implementation. Where necessary, each section contains a discussion of the methods used to analyze effects. In addition, the basis of significance (criteria) for each resource is identified to evaluate the significance of any adverse effects. When necessary, measures are proposed to avoid, minimize, or mitigate any significant adverse effects for each resource.

The bases of significance are established from NEPA and CEQA requirements. The Corps has integrated NEPA requirements into its regulations, policies, and guidance. Engineering Regulation 1105-2-100, "Planning Guidance Notebook," April 2000, establishes the following significance criteria:

- Significance based on institutional recognition means that the importance of the effects is acknowledged in the laws, adopted plans, and other policy statements of public agencies and private groups. Institutional recognition is often in the form of specific criteria.

- Significance based on public recognition means that some segment of the general public recognized the importance of the effect. Public recognition may take the form of controversy, support, conflict, or opposition expressed formally or informally.

- Significance based on technical recognition means that the importance of an effect is based on the technical or scientific criteria related to critical resource characteristics.

For this EA/EIR, these three NEPA criteria apply to all resources and are not repeated for each resource. The CEQA requirements are more specific to the resource and are listed in Appendix G of the CEQA Guidelines (State of California 2007). The CEQA criteria relevant to the project area, as well as other agency criteria and threshold of significance that apply to each resource, are identified under the appropriate resource.

3.2 Resources Not Considered in Detail

Initial evaluation of the effects of the project alternatives indicated there would likely be little to no direct, indirect, or cumulative effects on several resources. These resources are discussed in Sections 3.2.1 through 3.2.10 to add to the overall understanding of the environmental setting.

3.2.1 Local Climatic Conditions

In general, the climates of California formed due to topography and the position of the semi-permanent subtropical cell, a center of high atmospheric pressure in the Pacific Ocean off the California coast. During the summer, the cell moves over northern California and Nevada and effectively blocks the movements of the Pacific storm systems into California, creating drought-like conditions. During the winter, the cell retreats to the southwest, allowing storms and frontal systems to move into northern and central California. As a result, California has a Mediterranean, semi-arid climate that is typically characterized by cool, wet winters and hot, dry summers.

During the summer months the project area (in the vicinity of Folsom Reservoir) normally experiences cloudless, warm-to-hot dry days, and mild, pleasant nights. Summer temperatures average approximately 90 degrees Fahrenheit (ºF) during the day and 60 ºF at night. Summer average rainfall amount in the area is generally around 1.05 inches. The winter "rainy season" is from November through March when periodic storms move in from the Pacific Ocean. The average rainfall during these months is 19.96 inches. Winter daytime temperatures average in the upper 50's, and nighttime temperatures average in the lower 40's. Moist winds are predominately from the southwest, building strength from the Delta region, while occasional dry winds originate from the north.

The proposed project does not include any features or activities that would change the regional climate conditions. Therefore, there would be no effect on the local climate as a result of construction of the proposed project.

3.2.2 Geology and Seismicity

The project area is located between the Central Sierra Nevada and the Central Valley geomorphic provinces. The Sierra Nevada geomorphic region is characterized by a north-northwest trending mountain belt with extensive foothills on the western slope. Folsom Reservoir is situated within this foothill setting, a geomorphic region primarily consisting of rolling hills and upland plateaus between major river canyons.

The western side of Folsom Reservoir is bound by igneous rocks, primarily granodiorite intrusive rocks. Granodiorite intrusive rocks are similar to granite. They are composed of a coarse grained crystalline matrix with slightly more iron and magnesium-bearing minerals and less quartz than granite. The feldspar and hornblende of the granodiorite are less resistant than the quartz crystals and weather more readily. When weathering occurs, the remaining feldspars separate from the quartz resulting in decomposed granite. Although this geology supports the formation of naturally-occurring asbestos (NOA), ultramafic rock specifically, no NOA has been located within the confines of the project area from previous studies associated with the JFP project overall (URS 2009). As a result, the likelihood of NOA suspension within the project area is minimal.

Near MIAD in the southeast corner of Folsom Reservoir are the Laguna and Merhten Formations. The Merhten Formation is a complex unit of volcanic sediments mixed with volcanic mudflows (or lahars). It contains volcanic conglomerate, sandstone, and siltstone, all derived from andesitic sources. Portions of the Merhten are gravels deposited by ancestral streams. The Laguna Formation, deposited on the Merhten Formation is a sequence of gravel, sand, and silt derived from granitic sources. It was deposited as debris flows.

The project area is in the Foothills Fault system which is located in the metamorphic belt. This system consists of northwest trending vertical faults and is divided into two zones, the western Melones Fault zone and the western Bear Mountains Fault zone. The west trace of the Bear Mountains Fault zone transects the upper reaches of the North Fork arm near Manhattan Bar Road, and crosses the South Fork arm in the region of New York Creek. The last major movement of this system occurred 140 million years ago. Faults 11 to 102 miles away could potentially generate earthquakes with a magnitude of 6.5 to 7.9. However, the risk of shaking at the project area is relatively low given the distance, hard bedrock, and thin soil cover (Reclamation 2006). Therefore, the existing geology and seismicity of the area would not pose a threat to the project alternative. This is further evident by the fact that the site was chosen to build Folsom Dam back in 1955, which is now 55 years old. The proposed project also would not change the geologic characteristics or seismic conditions in the project area.

The exploratory cofferdam borings will be drilled within the boundaries of Folsom Reservoir, between elevation 410 and 420 feet. The purpose of the borings is to provide information on the geological and structural characteristics of the underlying rock layers, in order to make decisions on how to properly design and construct the cofferdam. An estimated 25 cylindrical borings are planned, each four inches in diameter that extend a minimum of 25 feet into moderately weathered rock. Due to the limited size and depth of these borings, no significant effect is anticipated to occur in regards to the underlying geology or seismicity of the project area.

3.2.3 Topography and Soil Types

Topography

The project area is located in the American River watershed, which ranges in elevation from 10 feet above mean sea level at the confluence with the Sacramento River to 10,000 feet in the Sierra Nevada Mountains. Folsom Reservoir is in the foothills of the Sierra Nevada Mountains, set within the valley created by the confluence of the North and South Forks of the

American River. The proposed project would have no effects on the major topographic features of the project area.

The proposed construction of the control structure, lining of the spillway chute and stilling basin, as well as the cofferdam borings would not change the general topography of the area. Some excavation to the final grade and foundation preparation to the control structure foundation area would be done prior to the concrete placement for the control structure. As a result, the project would have no significant effect on the topographic features in the area over what was described in the FEIS/EIR. The exploratory cofferdam borings will take place within the boundaries of Folsom Reservoir, and will therefore have no effect on topography within the project area.

Soils

Soils in higher elevations of the study area are generally thin and have numerous outcroppings of igneous and metamorphic rock (NRCS 2009). Loose soils of decomposed granite are found on the north and west portions of Folsom Reservoir. These soils are highly erodible and excessive erosion has been observed along the north shore. Denser soils, such as clays, are concentrated on the south end. Generally, all soils within the study are of low shrink-swell potential. Serpentine soil and rock are located on the Peninsula between the North and South Forks of the American River and south of the South Fork at Iron Mountain. These soils are high in nickel, chromium, and manganese which limit the variety of plant species that can grow. This soil is also corrosive and generally is not suitable for leach fields (Reclamation, 2006). Soils in the vicinity of the project area that border Folsom Reservoir are not utilized for any agricultural benefit. Instead, the area is designated as the Folsom Lake State Recreation Area (FLSRA), and consists of hiking/biking trails and picnic areas.

Localized areas of the project area would be disturbed during construction due to excavation and stockpiling activities. These activities are associated with final grade excavation and foundation preparation at the control structure foundation area, and minor excavation in the chute.   The contractor would be required to design and implement a Storm Water Pollution Prevention Plan (SWPPP) and an Erosion and Sediment Control Plan, both of which identify specific Best Management Practices (BMPs) to avoid or minimize soil erosion. All suitable material from excavation would be temporarily stored within staging area(s) designated for each Phase and would be reused in the project area to the extent feasible. For example, some of this soil material may be reused for back-filling areas along the spillway chute and/or stilling basin. All disposal material would be temporarily stockpiled at the staging area(s) and then disposed of at a commercial site or facility.

The exploratory borings for the cofferdam are planned to occur within the boundaries of Folsom Reservoir; therefore, soils on land within the project area will not be disturbed. The general soil composition in the project area is not expected to change due to construction activities with the implementation of BMPs and reuse of soil materials from the area.

3.2.4 Land Use and Prime/Unique Farmland

There are no prime or unique farmlands within the project area. The land located west of the control structure, chute, and stilling basin area is within the city of Folsom and is zoned as an Open Space Conservation District. This zoning district was established to maintain these properties as open or undeveloped, or developed as permanent open uses such as parks or greenbelts. This zoning district also includes Folsom State Prison. East of the prison, the land is zoned as an Agricultural Reserve District. This area provides a buffer between Folsom Lake and developed areas to the south. This zoning district is intended to provide for interim agricultural and livestock grazing uses until community services are available for urban development (Reclamation 2006). It is anticipated that the uses of land adjacent to the project area would remain unchanged after implementation of the proposed action.

3.2.5 Socioeconomics and Environmental Justice

In 2006, the City of Folsom had a population of about 69,445. This is a 5.9 percent increase in population since 2004. In 2005, Folsom's population was 80 percent white, 3 percent African American, 0.1 percent Native American, 9 percent Asian, and 0.2 percent Pacific Islander, with the remaining classified as other or more than one race. In 2005, the median family income was $78,317 (City of Folsom 2008). There are no minority or low-income populations adjacent to the project area.

The proposed action would have no effect on socioeconomics because it would not limit either current or future opportunities for agriculture, business, employment, or housing opportunities. The proposed action would not affect employment for minorities or low income populations. No relocations would be associated with this project and no populations would be displaced as a result of the construction of this project. Furthermore, any minority, low-income, or other populations located downstream of the project area along the American River would benefit by the construction of this project as a result of the improved flood protection.

The cofferdam exploratory borings are a temporary activity taking place within the confines of Folsom Reservoir. This activity does not include any long-term, permanent features that could affect residential areas or nearby human populations, regardless of social class. Therefore, the exploratory borings will have no effect on socioeconomics or environmental justice within or near the project vicinity.

3.2.6 Hazardous, Toxic, and Radiological Waste

An environmental site assessment for the JFP was conducted in 2005 to determine the location of hazardous, toxic, and radiological waste (HTRW) sites. The assessment included field surveys, a records search, and interviews within a 1.5-mile radius of Folsom Dam. A one-mile buffer was added for the records search to account for potential groundwater migration and contaminant transport. HTRW sites closest to the project area are found at Folsom State Prison. No HTRW site is located within the project area (Reclamation 2006). Based on the records search, and on information gathered during the field surveys and interviews conducted, there is no apparent HTRW contamination in the project area or future contamination potential due to project activities.

While the construction of the control structure, chute, and stilling basin would not require long-term storage or use of hazardous materials, there are potential health and safety hazards that include possible accidental spills or leaks involving fuels, lubricants, or explosives. BMPs and the preparation of a hazardous materials control and response plan would be required of the contractor prior to the start of construction. So long as these efforts are adhered to and carried out effectively, no adverse effects resulting from HTRW should occur.

Any explosive material required for blasting of rock would be stored offsite and transported to the site on the day blasting is scheduled to occur. All explosive materials would be stored and transported according to local, State, and Federal laws and regulations. All blasting plans and procedures would be designed and phased by California-licensed professional civil and structural engineers and the blasting performed by licensed professionals. The location and daily level of the blasting would be of a limited scope. The blasting area is a small, localized area of the project footprint (the control structure foundation). Blasting periods are not to exceed one hour. Normally, one blasting period would occur each day, although in some cases a maximum of two periods may occur. A blast plan, and all appropriate, preventative BMPs, would be implemented and adhered to in order to preclude any HTRW contamination from occurring that is linked to explosive materials. It is not anticipated that any HTRW contamination would occur as a result of blasting activities. In addition, there would be no effects to Folsom Dam resulting from the blasting activities as the dam is a significant and safe distance away from the blasting zone, and separated by solid bedrock.

As the exploratory borings for the cofferdam will be drilled into bedrock within the boundaries of Folsom Reservoir, it is not expected that any adverse effect relating to HTRW sites will occur. Furthermore, appropriate BMPs will be implemented to insure that no accidental spills of fuel, oil, or lubricants associated with the boring effort occurs.

3.2.7 Aesthetics/Visual Resources

An area's visual character is determined by the variety of the visual features present, the quality of those features, and the scope and scale of the scene. The visual components of a particular area consist of features such as landforms, vegetation, manmade structures, and land use patterns. The quality of these features depends on the relationship between them and their scale in the overall scene.

The primary aesthetic resource located within the project area is Folsom Lake itself, as well as the surrounding foothills, which include open space preserves and/or recreational areas). The hills within the project area are of lesser quality than those surrounding the lake, due to the presence of Folsom Dam and its earthen wing dams. Folsom Lake experiences seasonal water fluctuations. The highest reservoir levels in Folsom Lake occur in late winter or early spring when storm and snowmelt runoff fill the reservoir. The lowest reservoir levels occur in the late fall or early winter following the dry season. The resulting fluctuations cause a "bathtub ring" effect which is common to California reservoirs (Reclamation 2006). The exposed, barren nature of the shoreline makes this area low in its visual quality. Additionally, the construction of the JFP and associated features over the past few years has added a highly disturbed quality to the view from residences, boaters/recreationists and motorists. The overall project effects on aesthetics were evaluated in the FEIS/EIR.

The primary visual receptors would consist of commuters and other motorists driving across Folsom Lake Crossing (bridge) and boaters and other recreationists in the FLSRA. Although there are no residences located in the project area itself, there are a few residences adjacent to the project area.

Construction of the control structure portion of the project would be most visible to boaters. Though this effort would alter the physical character of the reservoir's shoreline to a degree, there would be little impact on its overall aesthetic value because of the existing low visual quality. The control structure effort would also be visible to motorists, cyclists, and/or pedestrians using the Folsom Lake Crossing Bridge, although to a lesser extent than that observed by boaters. Excavation of the foundation for the control structure would likely be invisible to commuters using the bridge, as this work will be hidden by the existing topography (i.e. excavation will take place at lower elevations than that of the average elevation for the area). However, construction vehicles would be visible during the control structure effort.

Most visible to commuters using the Folsom Lake Crossing Bridge would be the concrete lining effort for the spillway chute and stilling basin located downhill of the control structure and closer in proximity to the bridge. Nearly all activities associated with the lining of the chute and stilling basin would be visible to these commuters. However, these two features have already been recently excavated and graded during the previous phase of work by Reclamation; thus, there would not be a significant change from the current, existing conditions. Essentially, the physical foundation for these two features already exists, as it has been prepared for concrete lining. For this reason and others mentioned above, the project would have no significant effects on the overall aesthetic value or visual resources of the area.

Potential aesthetic affects resulting from the exploratory cofferdam borings would be applicable to boaters and/or swimmers only. Such effects would be minimal however, as the existing and expected overall aesthetic scene in the immediate project area will already be of low quality. This is due to the presence of the existing dam, and current/planned construction activities. Furthermore, boaters and swimmers will not be allowed to access the immediate shoreline area adjacent to the boring effort, and Folsom Reservoir is a large lake offering numerous alternative locations to boat or swim along shoreline areas. Thus, the exploratory borings are not expected to significantly impact aesthetics or visual resources in the project area.

3.2.8 Vegetation and Wildlife

Potential affects to terrestrial wildlife and vegetation within the JFP footprint were previously evaluated in the FEIS/FEIR. The majority of the area within this footprint has already been disturbed by activities such as haul road use and borrow, staging, or storage of materials (see Plate 5).

The general excavation of the foundation of the control structure, spillway chute, and stilling basin would have already been completed at the start of this effort. As a result, the area comprising these two features is currently in a highly disturbed state and devoid of vegetation or habitat for terrestrial wildlife species. Similarly, there are no wetlands or vernal pool habitats located within the project area

Wildlife effects associated with the construction of the control structure and concrete lining of the spillway chute and stilling basin are expected to be minimal to none. The project area lacks any cover and the vegetation structure is not conducive for wildlife use such as nesting. This is especially true in the immediate vicinity of the excavated and graded foundations for the spillway chute and stilling basin. Effects to wildlife species that use the shoreline area of Folsom Reservoir when the water has receded near areas within the overall JFP footprint are expected to be minimal. Such species are highly mobile and would most likely leave the area during construction efforts (e.g. wading birds). At best, the shoreline area is used for transient forage, especially by wading birds such as the Great Egret (*Ardea alba*) and Great Blue Heron (*Ardea herodias*). Furthermore, little activity is anticipated along the shoreline of Folsom Reservoir during this project, and ample shoreline exists in other areas of Folsom Reservoir.

Migratory birds and their habitats are protected under the Migratory Bird Treaty Act, as amended (16 U.S.C 703 et seq.). The project area is of low habitat quality to migratory birds and lacks suitable nesting areas. To ensure that there would be no effect to migratory birds, preconstruction surveys would be conducted, if needed, in and around the project area. If any migratory birds are found, a protective buffer would be delineated, and the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) would be consulted for further actions. The proposed action would have no significant effects on migratory birds or potential migratory bird habitat and no mitigation would be required.

The Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), as amended, ensures that fish and wildlife resources receive consideration equal to that of other project features for projects that are constructed, licensed, or permitted under Federal agencies. This consultation is intended to promote the conservation of wildlife resources by preventing loss or damage to fish and wildlife resources and to provide for the development and improvement of these resources in connection with water resource projects. USFWS and CDFG have participated in evaluating the existing project area during development of the FEIS/EIR. USFWS has provided a Coordination Act Report, which is included in Appendix A. Due to the lack of significant suitable habitat, the project would have no significant effects on vegetation or wildlife.

The exploratory cofferdam borings will take place within the confines of Folsom Reservoir. Access to the location for the boring effort would be via the existing boat ramp near Folsom point, or along the exposed barren shoreline during the late fall and winter months. No vegetation exists along this route. Thus, no significant effect to terrestrial vegetation or wildlife species is expected as a result of the exploratory boring effort.

3.2.9 Special Status Species

This section discusses the special-status species that either occur or have the potential to occur (i.e. suitable habitat exists) in or near the project area and could be potentially impacted by the project. Special-status species are those plants and animals that are protected by or are a concern to Federal and/or State governments, and which deserve special consideration because of their rarity or vulnerability to extinction due to habitat loss or population decline. The Federal Endangered Species Act of 1973, as amended, (16 U.S.C. 1531, et seq.) provides legal protection for species in danger of extinction. The California Endangered Species Act (CESA) of 1977 parallels the Federal Act and is administered by CDFG.

Pursuant to these Acts, a listing of Federally proposed, candidate, threatened, or endangered species (listed species) and their associated critical habitat was reviewed for the Folsom and Clarksville 7.5 Minute USGS. Quadrangles (USFWS 2010). In addition, records from the California Natural Diversity Database (CNDDB) were reviewed for State Endangered or Threatened Species (CDFG 2010). A compiled list from both the USFWS and CNDDB searches are presented in Appendix B. There are currently 19 listed species that have the potential to occur within the proposed project area. All of these species are not expected to occur in the project area due to the lack of suitable habitat.

The project area is largely devoid of vegetation with the exception of a few annual grasses and forbs. The project area is highly disturbed, and lacks cover or vegetative structure that is conducive for wildlife use such as nesting (see Plate 5). Of the 12 animal species shown to have the potential to occur within the project area, further investigations indicated that the habitat within the project area only has the potential to support three of those species. Summary descriptions for these species are provided in the "Animal Species" sub-section below, and are summarized in Appendix B.

Animal Species

<u>Valley Elderberry Longhorn Beetle</u>

The Federally-listed as threatened valley elderberry longhorn beetle (*Desmocerus californicus*) (VELB) is endemic to riparian habitats in the Sacramento and San Joaquin Valleys, where it is associated with elderberry (*Sambucus spp*.) shrub host plants. VELB mate in May, and females lay eggs on living elderberry shrubs. Larvae bore through the stems of the shrubs to create an opening in the stem, within which they pupate. After metamorphosis, the beetle chews a circular exit hole, through which it emerges (Barr 1991). Adults can be found on elderberry foliage, flowers, or stems, or on associated plants. Adult VELB feed on foliage and are active from early March through early June. The VELB requires established elderberry plants with a one inch in basal stem diameter at ground level. The presence of exit holes in elderberry stems is evidence of previous beetle use.

Although habitat for VELB (elderberry shrubs) occurs throughout the Folsom Facility, there are no elderberry shrubs located within the JFP project area. There were numerous shrubs that were fully analyzed and compensated for as part of the FEIS/EIR. Since there are no shrubs remaining, the work for the control structure, chute, and stilling basin would have no effect on VELB. In the area of the cofferdam borings, there are no elderberry shrubs located along the barren beach on the reservoir-side of the project site, or along any haul roads or the boat ramp which would provide access to the boring effort location. Thus the exploratory borings effort will have no effect on VELB.

Hardhead Minnow

Hardhead minnow (*Mylopharlodon conocephalus*), a large, native cyprinid, is listed as a California species of special concern. No Federal designation has been made for this species. Hardhead were once thought to be relatively widespread and abundant throughout the Sacramento and San Joaquin river systems, although recent declines have raised concern. Reasons for the decline are thought to be primarily due to habitat loss/alteration degradation and predation from non-native fish species (e.g. smallmouth and largemouth bass) (Moyle et al. 1995). Hardhead occur in low- to mid-elevation streams and lakes although generally prefer clear, deep streams with a slow but present flow (Moyle 2002). As such, the tributary arms of Folsom Lake might be potential areas that could provide suitable habitat for the rare Hardhead minnow. However, no record of Hardhead minnow occurring within the boundaries of Folsom Lake exists, though they have been recorded much further upstream within the South Fork American River around the Coloma area (Thomas 2010). Furthermore, because hardhead do not tolerate the presence of bass or sunfish, which engender predatory and competitive pressures (Moyle 2002), they are unlikely to be found in the tributary arms or the main body of Folsom Lake. Due to the unsuitable habitat conditions of the waters near Folsom Dam and the high population numbers of introduced, predatory fishes such as bass and sunfish, the project would not have any adverse effects on hardhead minnows.

As Hardhead minnow are highly unlikely to occur in Folsom Lake within the vicinity of Folsom Dam, no negative effects are foreseen due to drilling. Furthermore, the exploratory borings for the cofferdam are most likely to be conducted in the dry, or at very shallow depths if in the wet. Thus, impacts to Hardhead minnow would be highly improbable.

Bald Eagle

The bald eagle has been Federally delisted although it remains State-listed as endangered. The bald eagle (*Haliaeetus leucocephalus*) typically nests and roosts in coniferous forests near a lake, reservoir, or along river systems throughout most of central and northern California. Nesting near water bodies help provide a nearby sufficient prey base. Bald eagles are also known to winter around lakes, reservoirs, or river systems throughout most of central and northern California. Current bald eagle breeding distribution is limited to mountainous habitats in the northern quarter of the state, primarily in the northern Sierra Nevada, Cascade, and North Coast Ranges. There is one bald eagle known to be nesting near Folsom Reservoir. The bald eagle nest is located approximately six miles away from the project area. It is assumed that parts of Folsom Reservoir would be included in the eagle's foraging area; however, since the project area has already been highly disturbed (see Plate 5) and active construction site, the eagle would be likely to avoid the construction area. This is also assumed to be true as bald eagles are a highly wary animal. Therefore, the project would have no effect on the bald eagle.

The exploratory borings for the cofferdam walls are planned to occur between October and February of 2011, during construction of the control structure. As stated above, an active construction site would most likely prevent the nearby nesting bald eagle from approaching the project area, as this species is very wary.

Plant Species

Based on the CNDDB and USFWS database searches, six plant species have the potential to occur within the project area. However, research indicated that there is no suitable habitat for any of these six species (Appendix B). In summary, the required soil type (gabbroic and serpentinite) and/or elevational conditions where five of the six listed species are known to occur, are not present within the immediate project area (Appendix B). The remaining listed plant species (Sacramento Orcutt grass) requires vernal pool habitat, which is not present within the project area. This conclusion is further supported by information gathered indicating that no special-status plant species have historically been found near the project area (Corps 2006). Due to the lack of suitable habitat conditions in the project area, the project would have no effects on any special-status plant species.

The exploratory borings for the cofferdam walls planned to occur between October and February of 2011 would have no effect on any special status plant species. The borings would either take place in the dry along the exposed, barren beach of the reservoir, or would occur in very shallow depths in the wet. All equipment would be transported via haul roads and the boat ramp. Therefore, no vegetation of any kind would be encountered or disturbed by the equipment used to conduct the exploratory borings.

3.2.10 Recreation

The project area is located within the boundaries of the Folsom Lake State Recreation Area (FLSRA). This area includes Folsom Lake and the surrounding landscapes that provide a variety of land- and water-based activities such as camping, hiking, marinas, and boating. The FLSRA is an important recreational facility that attracted more than 1.5 million visitors in 2000 (Reclamation 2007). Approximately 78 percent of visitation occurs between May and September (Reclamation 2007). The most popular water-based activity within the immediate vicinity of the project area is fishing from a boat.

All activities associated with carrying out the construction of the control structure, and lining of the spillway chute and stilling basin, would occur on dry land above the reservoir's water line. The closest recreational area to the project site, “Observation Point Overlook”, was once a popular fishing, swimming, and sightseeing point. However, the Overlook has been closed since September 11, 2001 for security reasons. An informal trail located along the eastside of the Overlook is also closed to public use. The Overlook is presently used as a staging area for JFP construction activities (Reclamation 2006). All other land-based recreational areas surrounding the reservoir (e.g. hiking or picnicking) are located a significant distance away from the project area. The project would have no effect on land-based recreation as the Observation Point is not open to the public.

Construction of the control structure, and concrete lining of the spillway chute and stilling basin would have no effect on water-based activities as all work would be conducted from land. In particular, activities involved with the spillway chute and stilling basin portion of the work will be visibly concealed from boaters by the natural topographic setting, as the work will take place on the downhill side opposite Folsom Dam. The rock excavation portion of the control structure foundation effort may involve controlled blasting. Blasting will most likely take place sporadically from March to October of 2011. Blasting is not anticipated to occur every day, although, when necessary, it is scheduled to take place during weekdays only (Monday – Friday), from either 10 to 11 a.m. or 1:30 to 2:30 p.m. The rate of water-based recreational activities is significantly lower during weekdays, which will lesson potential impacts on recreation in the area. In order to further ensure the safety of the public and prevention of disruption to recreational activities, boaters, swimmers, fisherman, and the general public will be prohibited access within 2,500 feet of the blasting area during the aforementioned blasting times. This prohibition will be enforced by a sentinel boat, to prevent boaters or swimmers from entering the blasting area. The Corps would coordinate all anticipated closures with FLSRA. Such closures would be temporary and short-term and would potentially preclude recreational activities adjacent to the blasting area. Due to (1) the lack of public recreational activities near the project area, (2) the fact that construction will only take place during weekdays, and (3) the established prohibition boundary during blasting times, the project is not expected to have a significant effect on recreational opportunities or the safety of the general public.

Potential effects of the exploratory cofferdam borings would be applicable to boaters and/or swimmers only. As drilling will most likely occur in the dry or at shallow depths a short distance from the shore, only a small area of the water would not be accessible to boaters or swimmers. Noise generated by drilling presents a potential negative effect to boaters and swimmers. However, similar to the blasting requirements, boaters and swimmers will not be allowed near the area where drilling is occurring, thus limiting affects from noise. Furthermore, although boaters and swimmers will not be allowed to access the immediate shoreline area adjacent to the drilling effort, Folsom Reservoir is a large lake offering numerous alternative locations to fish or swim along shoreline areas. Thus, the exploratory borings are not expected to impact recreational fishing or swimming opportunities.

3.3 Resources Considered in Detail

Initial evaluation of the effects of the project indicates that there could be an effect on five resources. Sections 3.3.1 through 3.3.5 describe the existing conditions, effects, and proposed mitigation for the resources that may be significantly affected by implementation of the proposed action. Short-term, long-term, and cumulative effects are relevant, whether analyzed directly or indirectly.

According to the NEPA Regulations adopted by the President's Council on Environmental Quality (40 CFR 1500-1508), the term "significantly" is based on the criteria of context and intensity (40 CFR 1508.27). Context means the affected environment in which a proposed action would occur; it can be local, regional, national, or all three, depending upon the circumstances. Significance varies with the setting of the proposed action, considering the effects in relation to the locale rather than in the world as a whole (40 CFR 1508.27). Intensity refers to the severity of impact. The following should be considered in evaluating intensity:

- Adverse effects associated with "beneficial projects";
- Effects on public health or safety;
- Unique characteristics of the geographic area such as historic or cultural resources, park lands, prime farmland, wetlands, wild and scenic rivers, and ecologically critical areas;
- Degree of controversy, highly uncertain effects, or unique or unknown risks;
- Precedent-setting effects;
- Cumulative effects;
- Adverse effects on scientific, cultural, or historical resources;
- Adverse effects to an endangered or threatened species or its habitat (Endangered Species Act of 1973); and,
- Violations of Federal, State, or local environmental law.

CEQA defines a significant effect on the environment as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant (CEQA Guidelines Section 15282). CEQA Guidelines Section 15064(b) states that "the determination…calls for careful judgment on the part of the public agency involved…" and that "an ironclad definition of significant effect is not possible because the significance of an activity may vary with the setting." CEQA encourages lead agencies to develop and publish their own thresholds of significance for the purpose of determining the significant effects of their projects.

3.3.1 Air Quality

This section describes the existing conditions for air quality, regulatory background, significance thresholds, impact analysis, and mitigation measures for construction of the control structure and lining of the spillway chute and stilling basin at Folsom Dam. This section also includes a discussion of the regulatory background, significance thresholds and a qualitative analysis of impacts.

Regulatory Background

Air quality management responsibilities exist at Federal, State, and local levels of government. The primary statutes that establish ambient air quality standards and the regulatory authorities necessary to enforce the regulations designed to attain those standards are the Federal Clean Air Act (CAA) and California Clean Air Act (CCAA). The enforcement of Federal and state air statutes and regulations is complex and the various agencies have different, but interrelated responsibilities.

The U.S. Environmental Protection Agency (EPA) is responsible for establishing the National Ambient Air Quality Standards (NAAQS); setting minimum New Source Review permitting and Operating Permit requirements for stationary sources; establishing New Source Performance Standards, National Emission Standards for Hazardous Pollutants and the Acid Deposition Control program; and administering regional air quality initiatives.

The California Air Resources Board's (CARB's) role includes development, implementation, and enforcement of California's motor vehicle pollution control program; administration of the State's air pollution research program; adoption and updating, as necessary, of California Ambient Air Quality Standards (CAAQS); review of local air quality management district (AQMD) activities, and coordination of the development of the State Implementation Plan (SIP) for achievement of the national ambient standards.

Local AQMDs are responsible for implementing Federal and State regulations at the local level, permitting stationary sources of air pollution, and developing the local elements of the SIP. Emissions from indirect sources, such as automobile traffic associated with development projects, are addressed through the AQMD's air quality plans, which are each air quality district's contribution to the SIP. The Sacramento Metropolitan Air Quality Management District (SMAQMD) is responsible for the region that includes the Folsom Dam.

Federal

As required by the Federal CAA, the EPA has established and continues to update the NAAQS for specific "criteria" air pollutants: carbon monoxide (CO), lead (Pb), ozone (O_3), nitrogen dioxide (NO_2), inhalable particulate matter with an aerodynamic size less than or equal to 10 microns (PM_{10}), fine particulate matter with an aerodynamic size less than or equal to 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2). National primary ambient air quality standards define levels of air quality which the EPA has determined as necessary to provide an adequate margin of safety to protect public health, including the health of "sensitive" populations such as children and the elderly. National secondary ambient air quality standards define levels of air quality which are deemed necessary to protect the public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

In 2005, the EPA approved changes to the O_3 and PM_{10} NAAQS. In place of a 1-hour O_3 standard, the EPA approved an 8-hour standard of 0.08 parts per million (ppm). In 2008, the 8-hour standard was lowered to 0.075 ppm. In addition to the PM_{10} standard, the EPA approved a standard for $PM_{2.5}$. Although these changes have been approved, implementation of the new standards and monitoring of ambient conditions relative to these new standards is an ongoing process.

Table 3-1 lists the NAAQS for each criteria pollutant. There are no ambient standards for volatile organic compounds (VOCs), although VOCs and nitrogen oxides are considered to be precursor emissions responsible for the formation of O_3 in the atmosphere. In addition, California has adopted its own ambient air quality standards (CAAQS) that are not to be exceeded.

State Implementation Plans

The Federal CAA requires states to classify air basins (or portions thereof) as either "attainment" or "nonattainment" with respect to criteria air pollutants, based on whether the NAAQS have been achieved for the air basins. Counties or regions that are designated as Federal nonattainment areas for one or more criteria air pollutants prepare a plan that demonstrates how the area will achieve attainment of the standards by the Federally mandated deadlines. In addition, those areas that have been redesignated as attainment will have maintenance plans that demonstrate how the area will maintain the standard. These regional plans, prepared by local air districts, go into the SIP, which is compiled by the CARB and eventually approved by the EPA. SIPs are not single documents; rather, they are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and Federal controls.

State

The CCAA substantially increased the authority and responsibilities of the State's AQMDs. The CCAA established an air quality management process that generally parallels the Federal process. The CCAA, however, focuses on attainment of the CAAQS that, for certain pollutants and averaging periods are more stringent than the comparable NAAQS. The CAAQS are included in Table 3-1 alongside the NAAQS.

The CCAA requires that air districts prepare a clean air plan or air quality attainment plan if the district violates CAAQS for CO, SO_2, NO_2, or O_3. The plan is to show strategies for and progress toward attaining the CAAQS for those criteria pollutants in which the district is in nonattainment. The plans are required to be updated triennially. The SMAQMD prepared and submitted the 1991 Air Quality Attainment Plan to mainly address Sacramento County's nonattainment status for O_3, CO, and PM10. The 1991 Air Quality Attainment Plan was designed to make expeditious progress toward attaining the state O_3 standard and contained preliminary implementation schedules for control programs on stationary sources, transportation, and indirect sources. The 2003 Triennial Report was adopted April 28, 2005, and identifies "all feasible measures" that the AQMD will study or adopt before the next report. Progress reports are required thereafter and were completed in 2006 through 2009.

Table 3-1. National and California Ambient Air Quality Standards.

Pollutant	Averaging Time	National Primary Standard[a]	California Standard[b]	Violation Criteria	
				National	California
CO	8 Hour	9 ppm	9 ppm	Not to be exceeded more than once per year	If exceeded
	1 Hour	35 ppm	20 ppm	Not to be exceeded more than once per year	If exceeded
	8 Hour (Lake Tahoe)	NA	6 ppm	NA	If exceeded
NO_2	Annual	0.053 ppm	0.030 ppm	If exceeded	If exceeded
	1 Hour	0.100 ppm	0.18 ppm	The 3-year average of 98th percentile of the daily maximum 1-hour average must not exceed	If exceeded
O_3	8 Hour (2008 standard)	0.075 ppm	0.070 ppm	The 3-year average of 4th-highest daily maximum 8-hour average must not exceed	If exceeded
	1 Hour	NA	0.09 ppm	NA	If exceeded
PM_{10}	Annual	NA	20 µg/m3	NA	If exceeded
	24 Hour	150 µg/m3	50 µg/m3	Not to be exceeded more than once per year on average over 3 years	If exceeded
$PM_{2.5}$	Annual	15.0 µg/m3	12 µg/m3	The 3-year average of the weighted annual mean must not exceed	If exceeded
	24 Hour	35 µg/m3	NA	The 3-year average of 98th percentile of the 24-hour concentration must not exceed	NA
SO_2	Annual	0.03 ppm	NA	If exceeded	NA
	24 Hour	0.14 ppm	0.04 ppm	Not to be exceeded more than once per year	If exceeded
	3 Hour	NA[c]	NA	NA	NA
	1 Hour	NA	0.25 ppm	NA	If exceeded

[a] 40 CFR 50.4 through 50.13
[b] California Code of Regulations, Table of Standards, Section 70200 of Title 17
[c] No National Primary 3 hour Standard for SO2. National Secondary 3hour standard for SO2 is 0.5 ppm
µg/m3 micrograms per cubic meter
ppm parts per million

The CCAA requires that the CAAQS be met as expeditiously as practicable, but does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards. The air quality attainment plan requirements established by the CCAA are based on the severity of air pollution problems caused by locally generated emissions. Upwind AQMDs are required to establish and implement emission control programs based on the extent of pollutant transport to downwind districts. Air pollution problems in Sacramento County are primarily the result of locally generated emissions. However, Sacramento's air pollution occasionally includes contributions from the San Francisco Bay Area or the San Joaquin Valley. In addition, Sacramento County has been identified as a source of O_3 precursor emissions that occasionally contribute to air quality problems in the San Joaquin Valley Air Basin and the Northern Sacramento Valley Air Basin. Consequently, the air quality planning for Sacramento County must not only correct local air pollution problems, but must also reduce the area's effect on downwind air basins.

Local

Sacramento Metropolitan Air Quality Management District (SMAQMD). SMAQMD is responsible for granting permits for construction and operation of new sources of air pollution. In addition, SMAQMD establishes rules and regulations for limiting pollution emissions. Folsom Dam is located in the SMAQMD, but is also adjacent to the Placer County Air Pollution Control District, El Dorado County AQMD, and Feather River AQMD. These districts could be affected by emissions from the Folsom Dam project. The SMAQMD manages air quality in Sacramento County and coordinates with the other districts to develop SIP updates.

Criteria Pollutants

As described, the EPA has established the following as "criteria" air pollutants: CO, Pb, O_3, NO_2, PM_{10}, $PM_{2.5}$, and SO_2. The EPA has established the NAAQS to define levels of air quality which the EPA has determined as necessary to provide an adequate margin of safety to protect public health. The NAAQS is shown in Table 3-1.

Toxic Air Contaminants (TACs)

In addition to the Federal and State criteria pollutants, the Federal CAA and CCAA have identified another class of pollutants. Hazardous air pollutants is a term used by the Federal CAA that includes a variety of pollutants that are known or suspected carcinogens and are generated or emitted by a wide variety of industries. Called TACs under the CCAA, ten have been identified through ambient air quality data as posing the greatest health risk in California. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to brain and nervous system and respiratory disorders. The TAC of interest to this project is diesel particulate matter.

TACs do not have ambient air quality standards because often no safe levels of TACs have been determined. Instead, TAC effects are evaluated by calculating the health risks associated with a given exposure. The requirements of the Air Toxic "Hot Spots" Information and Assessment Act apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of the Act must prepare and submit toxic emission inventory plans and reports, and periodically update those reports. The Folsom facility is not identified as a TAC emitting facility by the SMAQMD.

Diesel Particulate Matter. Diesel particulate matter is emitted from both mobile and stationary sources. In California, diesel exhaust particles have been identified as a carcinogen. Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde, and nickel) have the potential to contribute to mutations in cells that can lead to cancer. Long-term exposure to diesel exhaust particles poses the highest cancer risk of any toxic air contaminant evaluated by the California Office of Environmental Health Hazard Assessment. CARB estimates that about 70 percent of the cancer risk that the average Californian faces from breathing toxic air pollutants stems from diesel exhaust particles (COEHHA 2010).

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks (COEHHA 2010).

Diesel engines are a major source of $PM_{2.5}$. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems. Because children's lungs and respiratory systems are still developing, they are more susceptible than healthy adults to fine particles. Exposure to $PM_{2.5}$ is associated with increased frequency of childhood illnesses and can also reduce lung function in children (COEHHA 2010).

Naturally Occuring Asbestos. The project area has been identified as within an area where the local geology supports the formation of NOA. Asbestos is a term used for several types of naturally fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Serpentinite may contain chrysotile asbestos. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos is classified as a known human carcinogen by State, Federal, and international agencies and was identified as a TAC by the CARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

As stated above, the Folsom Dam area has been identified as within an area where the local geology supports the formation of NOA, specifically ultramafic rock. However, no NOA has been located within the project area.

Greenhouse Gases (GHG)

The six principal GHGs of concern are CO_2, methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFC), and perfluorocarbons (PFC). The EPA does not currently regulate the GHG pollutants that could contribute to global warming. However, on

December 7, 2009, the Administrator of the EPA signed two findings regarding the threat to public health and welfare from GHGs under section 202(a) of the Federal CAA. Accordingly, in the future, the EPA can promulgate regulations pertaining to emissions of GHGs under the authority of the Federal CAA.

While the Federal Government has not regulated emissions of GHG, the State of California has been proactive in the study of effects of climate change with a 20-year history of doing so. State actions to address global climate change target automobile emissions, stationary sources and power generation, land-use planning, and the development of sustainable communities.

California is a substantial contributor of global GHG as it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC 2006). While California has a high amount of GHG emissions, it has low emissions per capita. The major sources of GHG in California are transportation, electricity generation, and emissions from fuel use (CEC 2006).

GHG emissions are now being considered as a relatively new issue in CEQA documents because of their effects to climate change. Historically, there have been no standard, widely used methodologies or significance criteria to address climate change effects from GHG emissions. Air districts have generally provided guidance on analysis methodologies and significance criteria for criteria pollutant and toxic air contaminant effects, but they have not established guidelines for GHG emissions and their effects.

To assist lead agencies with this new impact area, the California Air Pollution Control Officer's Association prepared a "white paper" reviewing policy choices, analytical tools, and mitigation strategies (CAPCOA 2008). This paper considers the application of thresholds (there are currently no widely-accepted significance thresholds or criteria) and offers three alternative programmatic approaches towards determining whether GHG emissions are significant.

Recently, CARB prepared proposed draft GHG significance thresholds, which are sector-specific in terms of what types of activities generate the GHG emissions. The CARB is still conducting workshops and soliciting comments regarding the proposed thresholds for these two sectors.

Until a statewide standard or threshold of significance for GHG emissions is completed, the Office of Planning and Research (OPR) advises that each lead agency should develop its own approach to performing an analysis for projects that generate GHG emissions, consistent with available guidance and current CEQA practice (OPR 2008).

OPR sets out the following process for evaluating GHG emissions.

(1) Agencies should determine whether GHG emissions would be generated by a proposed project, and if so, quantify or estimate the emissions by type or source. Calculation, modeling, or estimation of GHG emissions should include the emissions associated with vehicular traffic, energy consumption, water usage, and construction activities.

(2) Agencies should assess whether the GHG emissions are individually or cumulatively significant. When accessing whether a project's effects on climate change are "cumulatively considerable" even though a project's GHG emissions may be individually limited, the lead agency must consider the impact of the project in connection with the effects of past, current, and probable future projects.

(3) If the lead agency determines that the GHG emissions are potentially significant, then it must investigate and implement ways to mitigate the emissions (OPR 2008).

Existing Conditions

This section describes the existing air quality conditions at and surrounding Folsom Dam. The Sacramento County attainment status is discussed first followed by the General Conformity rule (GCR) de minimus levels, emission inventory, and monitored air quality in the area of the project.

The project area experiences episodes of poor atmospheric mixing caused by inversion layers. Inversion layers form when temperature increases with elevation above ground or when a mass of warm dry air settles over a mass of cooler air near the ground. Surface inversions (0 to 500 feet) occur most frequently during the winter, while subsidence inversions (1,000 to 2,000 feet) occur most frequently during the summer. Inversion layers limit vertical mixing in the atmosphere, trapping pollutants near the surface.

Attainment Status

The Federal CAA requires states to classify air basins (or portions thereof) as either "attainment" or "nonattainment" with respect to criteria air pollutants, based on whether the NAAQS have been achieved for the air basins. States are then required to prepare air quality plans containing emission reduction strategies for those areas designated as "nonattainment." Sacramento County, in which Folsom Dam is located, is designated as a "serious" nonattainment area for O_3, as a moderate nonattainment area for PM_{10}, and as a nonattainment area for $PM_{2.5}$. The Sacramento County attainment status for all criteria pollutants is listed in Table 3-2.

The currently approved Sacramento Valley plan for the ozone nonattainment area was published in 1994 for the 1-hour O_3 NAAQS. Progress updates have been published since then. A formal request for voluntary reclassification from "serious" to "severe" for the 8-hour ozone nonattainment area, with an associated delayed attainment deadline of June 15, 2019, was submitted from the Air Resources Board to the EPA on February 14, 2008. EPA action to approve the reclassification request is pending. The extent of the nonattainment area for the 8-hour O_3 NAAQS includes all of Sacramento and Yolo Counties, and parts of El Dorado, Placer, Solano, and Sutter Counties.

Table 3-2. Sacramento County State and Federal Attainment Status.

Criteria Air Pollutant	State Status	Federal Status
O_3	Nonattainment; Serious for 1-hour and 8-hour standards	Nonattainment; Serious for 8-hour standard
PM_{10}	Nonattainment for 24-hour standard and annual mean	Nonattainment; Moderate for 24-hour standard
$PM_{2.5}$	Nonattainment for annual standard	Nonattainment for 24-hour standard and annual mean
CO	Attainment for 1-hour and 8-hour standards	Attainment for 1-hour and 8-hour standards
NO_2	Attainment for 1-hour standard	Attainment for annual standard
SO_2	Attainment for 1-hour and 24-hour standards	Attainment for 3-hour, 24-hour, and annual standards

Source: SMAQMD 2010

Although the area is designated as nonattainment for the PM_{10} NAAQS, no approved SIP for PM_{10} currently exists. The area has achieved the PM_{10} NAAQS, but the SMAQMD must request redesignation to attainment and submit a maintenance plan to be formally designated as attainment.

<u>General Conformity Rule and de minimis Levels</u>

Federal actions need to demonstrate conformity to any SIPs of the regional air basin. Each action must be reviewed to determine whether it 1) qualifies for an exemption listed in the GCR, 2) results in emissions that are below GCR de minimis emissions thresholds, or 3) would produce emissions above the GCR de minimis thresholds applicable to the specific area, requiring a detailed air quality conformity analysis. The GCR de minimis levels are based on the nonattainment classification of the air basin. The Sacramento Valley Air Basin is an O_3 nonattainment area, classified as serious. The request for reclassification of the 8-hour ozone nonattainment area from “serious” to “severe” was granted by the EPA on June 1, 2010, therefore, the General Conformity Rule *de minimis* thresholds for ozone, VOC, and NO_x will be reduced from 50 tons per year to 25 tons per year.

As such, the GCR de minimis thresholds for the Folsom Dam area are set as follows:

- O_3 – 25 tons per year
- VOC - 25 tons per year
- Oxides of Nitrogen (NO_X) - 25 tons per year
- CO -100 tons per year for all maintenance areas
- PM_{10} - 100 tons per year for moderate nonattainment area

The existing air quality conditions for the project area are the result of meteorological conditions and existing emission sources in the area. Estimates of existing emissions in

Sacramento County are presented in Table 3-3.

Table 3-3. Sacramento County 2008 Emissions Inventories.

Source Type	Category	Average Emissions (Tons Per Day)					
		VOC/ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Stationary	Fuel Combustion	0.35	3.73	3.62	0.07	0.42	0.41
Stationary	Waste Disposal	0.34	0.05	0.05	0.00	0.01	0.01
Stationary	Cleaning and Surface Coatings	3.99	NA	NA	NA	NA	NA
Stationary	Petroleum Production and Marketing	2.49	0.01	0.00	NA	NA	NA
Stationary	Industrial Processes	0.91	0.27	0.23	0.07	1.07	0.47
Area-wide	Solvent Evaporation	13.23	NA	NA	NA	0.01	0.01
Area-wide	Miscellaneous Processes	4.04	40.26	3.10	0.12	39.37	10.12
Mobile	On-Road Motor Vehicles	22.69	209.32	44.06	0.18	2.04	1.45
Mobile	Other Mobile Sources	12.94	86.01	24.91	0.19	1.51	1.34
	TOTALS	60.97	339.65	75.97	0.63	44.43	13.81

Source: CARB 2010a
NA Not Applicable
ROG Reactive Organic Gas

There are two main categories of emission sources; stationary and mobile. On-road vehicles (mobile) are the major source of VOC, CO, and NO_X emissions in Sacramento County. Other mobile (off-road) sources are the major source of SO_2, and contribute substantially to VOC, CO, and NO_X emissions. Fugitive dust (primarily from construction sites, paved and unpaved roadways, and farming operations) is the major source of PM_{10} and $PM_{2.5}$, with substantial contributions from residential fuel combustion. All of these sources of particulate matter are summarized in the Area-wide Miscellaneous Processes category of Table 3-3.

Air quality data from the Del Paso monitoring station near the area of analysis is summarized in Table 3-4. The Del Paso monitoring station is located approximately 11 miles from the project site. It was selected to best represent the regional conditions of the area of analysis and because relevant pollutants are sampled there.

Monitored CO levels have been trending downward over the last several years. The downward trend is primarily the result of the use of oxygenated gasoline during the winter CO season. The 8-hour CO CAAQS and NAAQS were last exceeded in the early 1990s. The area has attained the standards since then, and Sacramento County was re-designated an attainment/maintenance area for the CO NAAQS in March 1998.

Table 3-4. Summary of Pollutant Monitoring Data in Sacramento Del Paso Manor Monitoring Station.

Criteria Air Pollutant	Yearly Monitoring Data		
	2006	2007	2008
CO			
Highest 8-hour concentration (ppm)	3.49	2.90	2.49
Days above CAAQS	0	0	0
Days above NAAQS	0	0	0
Nitrogen Dioxide (NO_2)			
Highest 1-hour concentration (ppm)	0.056	0.051	0.058
Annual arithmetic mean (ppm)	0.012	0.011	0.011
Days above CAAQS	0	0	0
O_3 – 1 hour			
Highest concentration (ppm)	0.125	0.138	0.113
Days above CAAQS	18	6	17
Days above NAAQS	1	1	0
O_3 – 8 Hour			
Highest concentration (ppm)	0.102	0.116	0.097
Days above CAAQS	35	16	23
Days above NAAQS	24	10	18
PM_{10}			
Highest 24-hour concentration (µg/m3)	67	75	72
Annual arithmetic mean (µg/m3)	24.6	20.7	23.2
Days above CAAQS	7	5	2
Days above NAAQS	0	0	0
$PM_{2.5}$			
Highest 24-hour concentration (µg/m3)	78	61	93.1
Annual arithmetic mean (µg/m3)	15.2	12.3	18.9
Days above NAAQS	19	22	8

Source: CARB 2010 b

Monitored NO_2 levels have remained fairly constant over the last several years. Neither the CAAQS nor the NAAQS have been exceeded during the monitoring period shown in Table 3-4. The 1-hour O_3 CAAQS was exceeded 18 times in 2006 and 17 times in 2008 at the Del Paso Manor monitoring station shown on Table 3-4. The recorded 8-hour O_3 concentrations exceeded the NAAQS up to 24 times in 2006. Substantial year-to-year variations in monitored O_3 levels are common. However, no clear trend in O_3 levels is demonstrated by monitoring results from the 1990s through 2008.

The CAAQS for 24-hour and annual PM_{10} and annual $PM_{2.5}$ were exceeded during the monitoring period as shown in Table 3-4. The NAAQS PM_{10} was not exceeded during that monitoring period, while the NAAQS $PM_{2.5}$ was exceeded every year.

Naturally-Occurring Asbestos (NOA)

The project area has been identified as within an area where the local geology supports the formation of NOA. Asbestos is a term used for several types of naturally fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Serpentinite may contain chrysotile asbestos. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos is classified as a known human carcinogen by state, Federal, and international agencies and was identified as a TAC by the CARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

As stated above, the Folsom Dam area has been identified as within an area where the local geology supports the formation of NOA, specifically ultramafic rock. However, no NOA has been located within the project area.

Sensitive Receptors

Some locations are considered more sensitive to adverse effects from air pollution than others. These locations are termed sensitive receptors. For CEQA purposes, a sensitive receptor is generically defined as a location where human populations are found, and there is reasonable expectation of continuous human exposure according to the averaging period for the ambient air quality standard (e.g., 24-hour, 8-hour, and 1-hour). These typically include residences, hospitals, and schools. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, with associated greater exposure to ambient air quality. Hospitals, schools, and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Recreational uses are also considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with recreation can place a high demand on the respiratory system.

Locations of sensitive receptors may or may not correspond with the location of the maximum offsite concentration of emissions. Generally, an air quality analysis evaluates effects at the worst-case location, typically adjacent to the source of emissions, regardless of the presence of a sensitive receptor. Figure 3.2-1 shows the land uses and sensitive receptors in the vicinity of the project site.

Environmental Effects

Significance Criteria

Air quality effects would be considered significant if the proposed action would violate any of the air quality standards described in the regulatory setting, including the GCR de minimis levels. Additionally, the project cannot contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

Original Source: URS Corporation, 2009. Joint Federal Project Early Approach Channel Excavation Air Analysis Technical Report. Prepared for Sacramento District U.S. Army Corps of Engineers.

Note: Some project features are graphically represented and are not to scale. The image is for the purpose of illustration only.

Figure 3.2-1. Air Quality Sensitive Receptors

The CEQA thresholds of significance were obtained from the SMAQMD CEQA Guide to Air Quality Assessment (SMAQMD 2009), which lists only a NO_X threshold of 85 pounds per day for construction emissions. For PM_{10} from construction, in areas where the maximum daily disturbed land (i.e., grading, excavation, cut and fill) would not exceed 15 acres, the SMAQMD CEQA guidelines require implementing emission control practices for impacts to be considered less than significant.

Information on significance criteria for TACs was found in the Sacramento Metropolitan Air Quality Management District CEQA Guide, December 2009. TACs can cause long-term health effects such as cancer, birth defects, or neurological damage, or short –term acute affects such as eye watering, respiratory irritation, or running nose. Although it is important to regulate TACs, they are not classified as criteria air pollutants and no ambient air quality standards have been established for them. The effects of various TACs are very diverse and their health impacts tend to be local rather than regional; consequently uniform standards for these pollutants have not been established.

TACs can be separated into carcinogens and non-carcinogens based on the nature of the physiological degradation associated with exposure to the pollutant. The TAC of concern on this project, diesel particulate matter, is considered a carcinogen and the qualitative recommended significance threshold would be that the lifetime probability of contracting cancer is greater than 10 in 1 million. This threshold is based on long-term (70-year) exposure to TACs. There are no known non-carcinogenic TACs associated with the proposed project.

The SAQMD has not established a quantitative threshold of significance for construction-related TAC emissions. Therefore, the SAQMD recommends that lead agencies address this issue on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and its proximity of receptors.

Methodology

The construction emissions for this project were estimated from various emission models and spreadsheet calculations, depending on the source of the emission and data availability. Emissions were calculated from appropriate emission factors, project features being constructed, associated schedules, and an estimate of the equipment that would be used.

The effects described in this air quality analysis were determined based on annual emissions during the construction period. The major stages of the construction project; control structure, chute and stilling basin, and borings for the approach channel, do not significantly overlap, so the maximum annual emissions can be calculated for each of the different construction stages. This method was selected as the basis of analysis because it predicted the worst case scenario for the resources being analyzed. Additionally, the analysis evaluates effects at the worst-case location, typically adjacent to the source of emissions, regardless of the location of any sensitive receptors. Air quality calculations are summarized in Appendix D

For TACs the SAQMD suggests that the impact discussion include the following as they relate to the construction activity:

- Types of off-site receptors and their proximity to construction activity – there are residential and non-residential receptors; the closest non-residential receptor is over 1,000 feet from construction activity, while the closest residential receptor is over 2,000 feet from construction activity.
- The duration of construction period is 5 years.
- The estimated quantity and types of diesel-powered equipment along with the estimated hours of operation are included in the air quality analysis below and in Appendix D.
- The location of the staging area is included in the project description.
- The predominant wind direction is from the south.
- The estimated amount of diesel-generated PM exhaust is included in the analysis below and in Appendix D.

Currently, there is no adequate methodology to assess TACs from mobile sources because the existing models and procedures are based on stationary sources that emit at a constant rate and do not model construction-related mobile sources operating intermittently over a large area.

Emissions from construction equipment were based on exhaust emissions during operation of the equipment, but did not account for emissions during mobilization and demobilization of the equipment. Because the construction contract has not been awarded and it is unknown where the contractor's equipment would be based, an estimate of the distance that the equipment would travel is too speculative at this time. Without this estimate, it is difficult to quantify the mobilization and demobilization emissions. The exhaust emissions were primarily based on emission factors from the El Dorado County AQMD, Guide to Air Quality Assessment. These emission factors were used in the FEIS/EIR.

The following construction sources and activities were analyzed for emissions:

- On-site construction equipment and construction truck engine emissions (all pollutants) – based on El Dorado AQMD CEQA guideline emission factors, SMAQMD emission factors, and estimated equipment schedules.

- On-site and off-site haul truck engine emissions (all criteria pollutants and CO_2) – based on the on-road vehicle emission factor model and estimated vehicle miles traveled.

- Off-site worker commuter vehicle trips to and from the site (all pollutants) – based on the on-road vehicle emission factor model and estimated vehicle miles traveled.

- On-site demolition and grading (cut/fill) fugitive dust – from the urban emission software model.

- On-site and off-site haul truck entrained fugitive dust emissions for paved and unpaved road travel – based on AP-42 methodology and estimated vehicle miles traveled.

- On-site material storage piles – based on AP-42 methodology, volume, and surface area of storage pile, wind speed and moisture content.

- On-site blasting emissions – based on methodology provided in the Blue Rock Quarry Draft Environmental Impact Report (Sonoma County 2005), number of blasts, and approximate size of area subject to blasting activity.

- Concrete batch plants fugitive dust – based on AP-42 methodology and amount of concrete processed.

No Action

Under the no action alternative, construction of the control structure, and concrete lining of the spillway chute and stilling basin, and borings for the approach channel would not take place. Therefore, there would be no potential air quality effects associated with construction activities such as construction vehicles and equipment, concrete batch plant operation, concrete lining work, mass concrete placement, or the cofferdam borings effort. The air quality and sensitive receptors would be the same as described for the existing conditions.

Proposed Action

The major stages of the construction project; control structure, chute and stilling basin, and borings for the approach channel, do not significantly overlap, so the maximum annual emissions were calculated separately for the different construction stages.

Emissions from borings for the approach channel cofferdam are not listed in a separate table due to the small amount of criteria pollutant emissions when compared to the other two stages. For the boring work, all criteria pollutants have unmitigated emissions less than 0.60 ton due to exhaust emissions from construction equipment and commuter traffic. Fugitive dust PM_{10} emissions from drilling are less than 0.0098 tons.

Table 3-5 summarizes unmitigated emissions for ROG, CO, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ from activities during construction of the control structure in tons per year. Since the control structure work includes both excavation and concrete placement and these activities have varying emissions levels, this table shows the emissions for the year with the maximum emissions, 2011. The activities in this year would include excavation and a partial year of concrete placement. Emissions in Table 3-5 are compared to both the GCR de minimis thresholds and the SMAQMD CEQA NO_X threshold for determination of significance of impacts. Based on Table 3-5, unmitigated PM_{10} would exceed the GCR de minimis thresholds during construction of the control structure. This assumes the worst case scenario that PM_{10} emissions from excavation and its associated unpaved road dust emissions from haul trucks occur during the same year as the PM_{10} emissions from concrete batch plants. The current construction schedule is for about half of the concrete batch PM_{10} emissions to be the following year. NO_X emissions are estimated to be 154 pounds per day and would likely exceed the SMAQMD threshold of 85 pounds per day. There is no SMAQMD threshold for PM_{10} emissions; these emissions are considered less than significant with mitigation.

Table 3-5. Maximum Unmitigated Emissions: Control Structure (Tons/year[1]).

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Construction Equipment	2.30	17.96	15.19	NC	0.56	0.56
On-site Haul Truck Engine Emissions	0.071	0.35	0.43	0.00042	0.025	0.022
Off-site Haul Truck Engine Emissions	0.18	0.67	2.66	0.0020	0.10	0.088
Off-site Worker Commute Engine Emissions	0.22	2.05	0.21	0.0020	0.017	0.010
On-site Cut and Fill	-	-	-	-	18.36	3.8
Paved Road – Haul Truck	-	-	-	-	2.54	0.35
Paved Road – Commuter	-	-	-	-	0.084	0.0060
Unpaved Road – Haul Truck	-	-	-	-	20.0	2.0
On-site Material Storage Pile Handling – Excavated Material	-	-	-	-	0.025	0.0038
On-site Material Storage Pile Handling – Aggregate	-	-	-	-	0.0038	0.00057
Stockpile Wind Erosion – Excavated Material	-	-	-	-	17.9	2.7
Stockpile Wind Erosion – Aggregate	-	-	-	-	3.6	0.54
On-site Blasting and Drilling	-	-	-	-	20.4	NC
Concrete Batch Plants	-	-	-	-	97.0	NC
TOTALS	2.77	21.03	18.49[2]	0.0044[3]	180.61	10.08
General Conformity *De Minimis* Levels	50	N/A	50	N/A	100	N/A

[1] Unmitigated emissions for year with maximum emissions.

[2] Average annual NO_x emissions for Control Structure during years after excavation is 7.91 tons.

[3] Does not include SO_x emissions from construction equipment.

N/A Not Applicable

NC Not Calculated

Table 3-6 summarizes unmitigated emissions for ROG, CO, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ from activities during construction of the control structure in pounds per day.

Table 3-6. Maximum Unmitigated Emissions: Control Structure (Pounds per day)[1].

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Construction Equipment	19.17	149.66	126.58	NC	4.67	4.67
On-site Haul Truck Engine Emissions	0.59	2.92	3.58	0.003	0.21	0.18
Off-site Haul Truck Engine Emissions	1.50	5.58	22.17	0.017	0.83	0.73
Off-site Worker Commute Engine Emissions	1.83	17.1	1.75	0.017	0.14	0.083
On-site Cut and Fill	-	-	-	-	153	31.7
Paved Road – Haul Truck	-	-	-	-	21.17	2.92
Paved Road – Commuter	-	-	-	-	0.70	0.050
Unpaved Road – Haul Truck	-	-	-	-	166.7	16.7

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Material Storage Pile Handling – Excavated Material	-	-	-	-	0.21	0.032
On-site Material Storage Pile Handling – Aggregate	-	-	-	-	0.032	0.0047
Stockpile Wind Erosion – Excavated Material	-	-	-	-	149.16	22.5
Stockpile Wind Erosion – Aggregate	-	-	-	-	30.0	4.5
On-site Blasting and Drilling	-	-	-	-	170	NC
Concrete Batch Plants	-	-	-	-	808.3	NC
TOTALS	23.09	175.24	154.08	0.037[2]	1,505.06	84.0

[1] Unmitigated emissions calculated for year with maximum emissions.

[2] Does not include SO_x emissions from construction equipment

Notes: Numbers are rounded; therefore, totals might differ from sums.

Pounds per day calculations assume 2,000 pounds per ton and 240 work days per year.

N/A Not Applicable

NC Not Calculated

Table 3-7 summarizes unmitigated emissions for ROG, CO, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ from all activities during construction of the chute and stilling basin in tons per year. Emissions in Table 3-7 are compared to both the GCR de minimis thresholds and the SMAQMD CEQA NO_X threshold for determination of significance of impacts. Based on Table 3-7, unmitigated NO_X would not exceed the GCR de minimis thresholds during construction work on the chute and stilling basin. NO_X emissions are estimated to be 93 pounds per day and would likely exceed the SMAQMD threshold of 85 pounds per day. There is no SMAQMD threshold for PM_{10} emissions; these emissions are considered less than significant with mitigation.

Table 3-7. Unmitigated Emissions: Chute and Stilling Basin (Tons/year[1]).

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Construction Equipment	1.29	10.42	7.77	NC	0.25	0.25
Off-site Haul Truck Engine Emissions	0.21	0.79	3.16	0.0024	0.12	0.10
Off-site Worker Commute Engine Emissions	0.22	2.05	0.21	0.0020	0.017	0.010
Paved Road – Haul Truck	-	-	-	-	3.02	0.42
Paved Road – Commuter	-	-	-	-	0.084	0.0060
On-site Material Storage Pile Handling – Excavated Material	-	-	-	-	0.025	0.0038
On-site Material Storage Pile Handling – Aggregate	-	-	-	-	0.0055	0.00083
Stockpile Wind Erosion – Excavated Material (not disturbed)	-	-	-	-	0	0
Stockpile Wind Erosion – Aggregate	-	-	-	-	5.2	0.79
Concrete Batch Plants	-	-	-	-	84.9	NC
TOTALS	1.72	13.26	11.14	0.0044[2]	93.6	1.58
General Conformity *De Minimis* Levels	50	N/A	25	N/A	100	N/A

[1] Unmitigated emissions for year with maximum emissions.

[2] Does not include SO_x emissions from construction equipment

Table 3-8 summarizes unmitigated emissions for ROG, CO, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ from all activities during construction of the chute and stilling basin in pounds per day.

Table 3-8. Unmitigated Emissions: Chute and Stilling Basin (pounds per day[1]).

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Construction Equipment	10.75	86.8	64.75	NC	2.08	2.08
Off-site Haul Truck Engine Emissions	1.75	6.58	26.33	0.020	1.00	0.83
Off-site Worker Commute Engine Emissions	1.83	17.08	1.75	0.017	0.14	0.083
Paved Road – Haul Truck	-	-	-	-	25.17	3.50
Paved Road – Commuter	-	-	-	-	0.70	0.050
On-site Material Storage Pile Handling – Excavated Material	-	-	-	-	0.21	0.032
On-site Material Storage Pile Handling – Aggregate	-	-	-	-	0.046	0.0069
Stockpile Wind Erosion – Excavated Material (not disturbed)	-	-	-	-	0	0
Stockpile Wind Erosion – Aggregate	-	-	-	-	43.33	6.58
Concrete Batch Plants	-	-	-	-	707.47	NC
TOTALS	14.33	110.5	92.83	0.037[2]	780.0	13.17

[1] Unmitigated emissions calculated for year with maximum emissions.

[2] Does not include SO_x emissions from construction equipment

Notes: Numbers are rounded; therefore, totals might differ from sums.

Pounds per day calculations assume 2,000 pounds per ton and 240 work days per year.

The Folsom Dam area has been identified as an area where the local geology supports the formation of NOA, ultramafic rock specifically. However, no NOA has been located within the confines of the control structure and chute and stilling basin project. Nevertheless, dust minimization measures discussed below would also minimize any potential exposure to NOA if at any point it was found in the immediate project area.

Almost all criteria pollutant emissions from the proposed action would be classified as direct effects. These are emissions created directly by construction activities of the proposed action. The sources of emissions include on-site construction equipment, haul truck emissions, paved and unpaved road fugitive dust emissions from construction trucks, material storage pile handling, stockpile wind erosion, cut and fill operations, on-site blasting, and concrete batch plants.

During construction of the control structure and related activities, the emissions of unmitigated PM_{10} would exceed the GCR de minimis threshold of 100 tons per year and would require mitigation. Unmitigated NO_X emissions for the control structure would not exceed the GCR threshold of 25 tons per year and are less than significant. However, Unmitigated NO_X emissions for the control structure are estimated to be 154 pounds per day and would likely exceed the SMAQMD threshold of 85 pounds per day. Mitigation measures would therefore need to be applied to the emission sources to reduce the effects to less than significant relative to the SMAQMD threshold for the control structure and related activities.

During construction of the chute and stilling basin and related activities, the emissions of unmitigated NO_X would not exceed the GCR threshold of 25 tons per year, though these emissions would exceed the SMAQMD threshold of 85 pounds per day. Mitigation measures would need to be applied to the emission sources in order to reduce effects to less than significant relative to the SMAQMD threshold for NO_X.

Mitigation

Unmitigated PM_{10} emissions are estimated to exceed the General Conformity de minimis threshold for the control structure construction period (shown in Table 3-5). Unmitigated NO_X emissions, primarily from off-road construction equipment, are estimated to be above the CEQA significance threshold for construction. Therefore additional mitigation would need to be applied to the PM_{10} and NO_X emission sources during excavation and construction of the control structure.

The emissions of unmitigated NO_X, primarily from off-road construction equipment, would be above the CEQA significance threshold during chute and stilling basin construction. Additional mitigation would need to be applied to NO_X emission sources during construction activity for the chute and stilling basin.

Basic Construction Emission Control Practices

Due to the nonattainment status of Sacramento County with respect to O_3, PM_{10}, and $PM_{2.5}$, SMAQMD (2009) recommends that projects within the basin implement a set of Basic Construction Emission Control Practices as best management practices regardless of the significance determination. The Basic Construction Emission Control Practices that would be implemented during the construction project are the following:

- Water all exposed surfaces two times daily. Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads.

- Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered.

- Use wet power vacuum street sweepers to remove any visible trackout mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited.

- Limit vehicle speeds on unpaved roads to 15 miles per hour (mph).

- All roadways, driveways, sidewalks, parking lots to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to five minutes (as required by the state airborne toxics control measure

[Title 13, Section 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.

- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated.

Use of these practices can result in a 55 percent reduction of fugitive PM_{10} dust emissions from soil disturbance areas and a 44 percent reduction of fugitive PM dust emissions from entrained PM_{10} road dust from unpaved roads.

Enhanced Construction Emission Control Practices

For projects that would generate maximum daily NOx emissions that exceed the SMAQMD's threshold of significance, even with implementation of the Basic Construction Emissions Control Practices, SMAQMD recommends implementation of the Enhanced Exhaust Control Practices for off-road construction equipment. The SMAQMD considers implementation of these control practices to achieve a 20 percent reduction for NO_X and a 45 percent reduction for PM_{10} from off-road construction equipment exhaust when compared to the state fleet average. The Enhanced Construction Emission Control Practices that would be implemented during the construction project are the following (SMAQMD 2009):

- The project shall provide a plan for approval by SMAQMD demonstrating that the heavy-duty (50 horsepower or more) off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet-average 20 percent NO_X reduction and 45 percent particulate reduction compared to the most recent CARB fleet average, (off-road equipment only). Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after- treatment products, and/or other options as they become available. SMAQMD's Construction Mitigation Calculator can be used to identify an equipment fleet that achieves this reduction.

- The project shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately, and the lead agency and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this section shall supersede other SMAQMD or State rules or regulations.

- If at the time of construction, SMAQMD has adopted a regulation applicable to construction emissions, compliance with the regulation may completely or partially replace this mitigation. Consultation with SMAQMD prior to construction will be necessary to make this determination.

Additional NO_X Mitigation Options

In addition, the following mitigation measures may be implemented to further reduce NO_X emissions from construction equipment engines. The specific measures to be employed would be based on discussions with the SMAQMD.

- Use of emulsified or aqueous diesel fuel. Use of emulsified or aqueous diesel fuel could theoretically be applied to all diesel equipment operating at the site by making this the only diesel fuel purchased for the Folsom construction. It is assumed that aqueous diesel fuel would provide a 14 percent reduction NO_X emissions as well as a 63 percent reduction of engine exhaust PM_{10} emissions, consistent with the control efficiencies incorporated in the on-road vehicle emission factor model.

- Use of equipment with engines that incorporate exhaust gas recirculation (EGR) systems. EGR systems would need to be part of the engine design for a substantial portion of the existing construction equipment fleet in the region to be effective. While EGR systems can provide reductions of NO_X, PM_{10}, CO, and VOC emissions, it is not likely that enough available construction equipment have EGR engines to provide any real reductions for the Folsom construction. However, the availability of construction equipment with EGR systems would need to be reviewed in detail prior to the final decision to incorporate or drop this option from the proposed action.

- Installation of a lean NO_X catalyst in the engine exhaust system. Lean NO_X catalyst filters may be available for construction equipment exhaust. However, these units would need to be certified by CARB before being installed on specific construction equipment engines. In addition, other add-in exhaust filters are not compatible with aqueous diesel fuel. Therefore, aqueous fuel use and lean NO_X catalysts may be mutually exclusive mitigation options. A detailed review of applicable catalysts and compatibility with different fuels will need to be conducted before a final decision can be made to incorporate or drop this option from the proposed action.

Additional Diesel Particulate Matter Mitigation Options.

Implementation of the SAQMD's Basic Construction Emission Control Practices would result in the reduction of diesel particulate matter exhaust emissions, particularly the measures to minimize engine idling time and maintain manufacture's specifications. This is also true for the SAQMD's Enhanced Exhaust Control Practices for off-road construction equipment which reduce particulate exhaust emissions by 45% and regulate the opacity of exhaust from all off-road diesel powered equipment. In addition, SAQMD provides additional measures to reduce the exposure of sensitive receptors to diesel particulate matter exhaust emissions associated with construction activity. Options that could apply to the proposed project are included below:

- Install diesel particulate filters or implement other ARB-verified diesel emission control strategies on construction equipment.

- Establish staging areas for the construction equipment that are as distant as possible from off-site receptors.

- Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

- Use haul trucks with on-road engines instead of off-road engines even for on-site hauling.

The emissions for diesel particulate matter have been evaluated in accordance with the SAQMD's suggestions. A qualitative analysis of emissions was completed for the proposed project and other project-related issues were considered including the receptors (1,000 to 2,000 feet from the project), timing of the work (5 years) and the intermittent nature of the work (construction). Additionally, the significance thresholds are based on long-term (70-year) exposure to TACs Therefore, based on the analysis above and the mitigation measures implemented for the project, as shown on the tables below, it was determined that the potential impacts due to diesel particulate matter would be less than significant.

Mitigated Emissions Summary

The estimated mitigated emissions for the control structure are presented in Table 3-9 and for the chute and stilling basin in Table 3-11 in tons per year. The mitigated emissions assume that NO_X emissions from off-road construction equipment are reduced by 20 percent, those fugitive PM_{10} emissions from soil disturbance (cut and fill) activities are reduced by 55 percent, and PM_{10} dust emissions from unpaved roads are reduced by 44 percent. Note that the 20 percent reduction in NO_X applies only to on-site construction equipment and on-site haul trucks. Off-site haul trucks and employee vehicle NO_X emissions could not feasibly be controlled by the project. The mitigated emissions also assume that the concrete batch plant PM emissions will be controlled.

As shown in Tables 3-9 and 3-11, mitigated NO_X and mitigated PM_{10} are not estimated to exceed the GCR de minimis thresholds. Tables 3-10 and 3-12 show the estimated mitigated emissions in pounds per day. Therefore, with mitigation measures the project-related effects would be less than significant.

Table 3-9. Mitigated Emissions: Control Structure (Tons/year[1]).

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Construction Equipment	2.30	17.96	12.15	NC	0.305	0.305
On-site Haul Truck Engine Emissions	0.071	0.35	0.34	0.00042	0.014	0.012
Off-site Haul Truck Engine Emissions	0.18	0.67	2.66	0.0020	0.10	0.088
Off-site Worker Commute Engine Emissions	0.22	2.05	0.21	0.0020	0.017	0.010
On-site Cut and Fill	-	-	-	-	8.3	1.7
Paved Road – Haul Truck	-	-	-	-	2.54	0.35
Paved Road – Commuter	-	-	-	-	0.084	0.0060
Unpaved Road – Haul Truck	-	-	-	-	9.0	0.91
On-site Material Storage Pile Handling – Excavated Material	-	-	-	-	0.0025	0.00038
On-site Material Storage Pile Handling – Aggregate	-	-	-	-	0.00038	0.000057
Stockpile Wind Erosion – Excavated Material	-	-	-	-	1.79	0.27
Stockpile Wind Erosion – Aggregate	-	-	-	-	0.36	0.054
On-site Blasting and Drilling	-	-	-	-	11.0	NC
Concrete Batch Plants	-	-	-	-	1.6	NC
TOTALS	2.77	21.03	15.36[2]	0.0044[3]	35.11	3.71
General Conformity De Minimis Levels	50	N/A	25	N/A	100	N/A

[1] Mitigated emissions for year with maximum emissions.
[2] Average annual mitigated NO_x emissions for Control Structure during years after excavation is 6.9 tons.
[3] Does not include SO_x emissions from construction equipment
N/A Not Applicable
NC Not Calculated

Table 3-10. Mitigated Emissions: Control Structure (Pounds per day[1]).

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Construction Equipment	19.17	149.66	101.25	NC	2.54	2.54
On-site Haul Truck Engine Emissions	0.59	2.92	2.83	0.0035	0.12	0.10
Off-site Haul Truck Engine Emissions	1.50	5.58	22.17	0.017	0.83	0.73
Off-site Worker Commute Engine Emissions	1.83	17.08	1.75	0.017	0.14	0.083
On-site Cut and Fill	-	-	-	-	69.16	14.17
Paved Road – Haul Truck	-	-	-	-	21.17	2.92
Paved Road – Commuter	-	-	-	-	0.70	0.050
Unpaved Road – Haul Truck	-	-	-	-	75.0	7.58
On-site Material Storage Pile Handling – Excavated Material	-	-	-	-	0.021	0.0032
On-site Material Storage Pile Handling – Aggregate	-	-	-	-	0.0032	0.00047
Stockpile Wind Erosion – Excavated Material	-	-	-	-	14.92	2.25
Stockpile Wind Erosion – Aggregate	-	-	-	-	3.0	0.45
On-site Blasting and Drilling	-	-	-	-	91.66	NC
Concrete Batch Plants	-	-	-	-	13.33	NC
TOTALS	23.08	175.24	128.0	0.037[2]	292.6	30.9

[1] Mitigated emissions calculated for year with maximum emissions.

[2] Does not include SO_x emissions from construction equipment

Notes: Numbers are rounded; therefore, totals might differ from sums.

Pounds per day calculations assume 2,000 pounds per ton and 240 work days per year.

N/A Not Applicable

NC Not Calculated

Table 3-11. Mitigated Emissions: Chute and Stilling Basin (Tons/year[1]).

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Construction Equipment	1.29	10.42	6.22	NC	0.14	0.14
Off-site Haul Truck Engine Emissions	0.21	0.79	3.16	0.0024	0.12	0.10
Off-site Worker Commute Engine Emissions	0.22	2.05	0.21	0.0020	0.017	0.010
Paved Road – Haul Truck	-	-	-	-	3.02	0.42
Paved Road – Commuter	-	-	-	-	0.084	0.0060
On-site Material Storage Pile Handling – Excavated Material	-	-	-	-	0.0025	0.00038
On-site Material Storage Pile Handling – Aggregate	-	-	-	-	0.00055	0.000083
Stockpile Wind Erosion – Excavated Material (not disturbed)	-	-	-	-	0	0
Stockpile Wind Erosion – Aggregate	-	-	-	-	0.52	0.079
Concrete Batch Plants	-	-	-	-	1.4	NC
TOTALS	1.72	13.26	9.59	0.0044[2]	5.30	0.76
General Conformity De Minimis Levels	50	N/A	50	N/A	100	N/A

[1] Mitigated emissions for year with maximum emissions.

[2] Does not include SO_x emissions from construction equipment

N/A Not Applicable

NC Not Calculated

Table 3-12. Mitigated Emissions: Chute and Stilling Basin (Pounds/day[1]).

Activity	VOC/ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
On-site Construction Equipment	10.75	86.83	51.83	NC	1.17	1.17
Off-site Haul Truck Engine Emissions	1.75	6.58	26.33	0.020	1.0	0.83
Off-site Worker Commute Engine Emissions	1.83	17.08	1.75	0.017	0.14	0.083
Paved Road – Haul Truck	-	-	-	-	25.17	3.50
Paved Road – Commuter	-	-	-	-	0.70	0.050
On-site Material Storage Pile Handling – Excavated Material	-	-	-	-	0.021	0.0032
On-site Material Storage Pile Handling – Aggregate	-	-	-	-	0.0046	0.00069
Stockpile Wind Erosion – Excavated Material (not disturbed)	-	-	-	-	0	0
Stockpile Wind Erosion – Aggregate	-	-	-	-	4.33	0.66
Concrete Batch Plants	-	-	-	-	11.7	NC
TOTALS	14.33	110.5	79.91	0.037[2]	44.16	6.3

[1] Mitigated emissions calculated for year with maximum emissions.

[2] Does not include SO_x emissions from construction equipment

Notes: Numbers are rounded; therefore, totals might differ from sums.

Pounds per day calculations assume 2,000 pounds per ton and 240 work days per year.

Prior to construction, the contractor must apply for a permit with SMAQMD. The permit requirements include submitting a list of equipment to be used on the proposed project, and a plan indicating how the activities would, or would not, meet agency standards. If the project air emissions calculations indicate that the project would not meet SMAQMD thresholds, the contractor would be required to follow the requirements of SMAQMD's standard mitigation program. As discussed, if mitigated NO_X emissions still exceed 85 lbs/day, SMAQMD's policy is to charge a mitigation fee for excess (greater than 85 lbs/day) NO_X emissions to control other emission sources in the proposed action area. The NO_X mitigation fee would be calculated for all construction sources that emit NO_X above the 85 pounds per day threshold (e.g. including construction equipment, worker vehicles, on-site haul trucks, and off-site haul trucks, etc). The current mitigation fee rate is $16,400 per ton of NO_X emissions.

Table 3-13 presents the calculated fee for the excess NO_X emissions for this project. These calculations are based on the average annual NO_X emission values shown in Tables 3-9 and 3-11.

Table 3-13. Construction Mitigation Fee Calculation.

Parameter	Control Structure Construction Emissions during Excavation (2011)	Control Structure Construction Emissions following Excavation[1]	Chute and Stilling Basin Construction Emissions
Total mitigated NO_x emissions (tons/year)	15.36	6.9	9.59
Total mitigated NO_x emissions (pounds/year)	30,720	13,800	19,180
Average daily NO_x emissions (pounds)[2]	128.0	57.5	79.9
Total over 85 pound threshold (pounds per day)	43.0	Not over Threshold	Not over Threshold
Total days of construction	240 (12 months)	600 (30 months)	720 (3 years)
Total mitigated pounds over threshold	10,320	0	0
Total mitigated tons over threshold	5.16	0	0
Mitigation fee ($16,400 per ton)[3]	$84,624	0	0
Administrative fee (5 percent)[4]	$4,231.20	0	0
TOTAL FEE	$88,855.20	0	0

[1] Excludes the emissions from construction equipment and haul trucks used during the excavation portion of Control Structure.
[2] Assume 240 work days per year.
[3] On March 25, 2010, the California Air Resources Board approved a cost update from $16,000 to $16,400 per ton.
[4] The March 25 change in mitigation fee did not specify a change in administrative fee. Therefore, the fee is assumed to remain at five percent.

Conformity Determination

The Federal CAA requires Federal agencies to ensure that their actions conform to applicable implementation plans for the achievement and maintenance of the NAAQS for criteria pollutants. To achieve conformity, a Federal action must not contribute to new violations of NAAQS, increase the frequency or severity of existing violations, or delay timely attainment of standards in the area of concern (for example, a state or a smaller air quality region). Federal agencies prepare written Conformity Determinations for Federal actions that are in or that affect NAAQS nonattainment or maintenance areas when the total direct or indirect emissions of nonattainment pollutants (or their precursors in the case of O_3) exceed specified thresholds. Conformity with the EPA-approved SIP is demonstrated if the project emissions fall below the threshold value GCR de minimus emissions. The proposed action is located in an area whose Federal status is designated as serious nonattainment for O_3 (8-hour standard), moderate nonattainment for PM_{10}, and nonattainment for $PM_{2.5}$. The Federal CAA conformity threshold values for this area are 25 tons per year for the O_3 precursor NO_X, 50 tons per year for the O_3 precursor VOC, and 100 tons per year for PM_{10} (40 CFR 93.153). $PM_{2.5}$ is a subset of PM_{10} and, by definition, a source is considered to be major for $PM_{2.5}$ if it emits or has the potential to emit 100 tons per year of PM_{10}.

As shown in Table 3-9 and Table 3-11, the proposed action would not produce emissions that are greater than the GCR *de minimus* values for criteria pollutants. Therefore, the proposed action falls into conformity with the EPA-approved SIP and a written Conformity Determination is not required. The reclassification of the 8-hour ozone nonattainment area from “serious” to “severe” by the EPA, changes the General Conformity Rule *de minimis* thresholds for ozone, VOC, and NO_x from 50 tons per year to 25 tons per year. As shown in Table 3-9 and Table 3-11, the Proposed Action would not produce emissions greater than the revised *de minimis* thresholds.

3.3.2 Climate Change

Global climate change is the name given to the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to be unequivocal (IPCC 2007) with global surface temperature increasing approximately 1.33°F over the last 100 years. Continued warming is projected to increase global average temperature between 2 and 11°F over the next 100 years.

Increases in GHG concentrations in the Earth’s atmosphere are thought to be the main cause of human induced climate change. GHGs naturally trap heat by impeding the exit of solar radiation that has hit the Earth and is reflected back into space. Some GHGs occur naturally and are necessary for keeping the Earth’s surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

The principal GHGs are CO_2, CH_4, N_2O, sulfur hexafluoride (SF_6), PFC, HFC, and water vapor. Each of the principal GHGs has a long atmospheric lifetime (one year to several thousand years). In addition, the potential heat trapping ability of each of these gases vary significantly from one another. CH_4 is 23 times as potent as CO_2, while SF_6 is 22,200 times more potent than CO_2. Conventionally, GHGs have been reported as carbon dioxide equivalents (CO_2e). CO_2e takes into account the relative potency of non-CO_2 GHGs and converts their quantities to an equivalent amount of CO_2 so that all emissions can be reported as a single quantity.

The primary manmade processes that release GHGs include the following: burning of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release CH_4, such as livestock grazing and crop residue decomposition; and industrial processes that release smaller amounts of high global warming potential gases such as SF_6, PFCs, and HFCs. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the Earth's capacity to remove CO_2 from the air and altering the Earth's albedo, or surface reflectance, allowing more solar radiation to be absorbed.

Regulatory Background

Federal Law, Policies, and Plans

Mandatory Greenhouse Gas Reporting Rule. On September 22, 2009, EPA released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110-161), that required EPA to develop "… mandatory reporting of greenhouse gases above appropriate thresholds in all sectors of the economy…." The Reporting Rule would apply to most entities that emit 25,000 metric tons of CO_2e or more per year. Starting in 2010, facility owners are required to submit an annual GHG emissions report with detailed calculations of facility GHG emissions. The Reporting Rule would also mandate recordkeeping and administrative requirements in order for EPA to verify annual GHG emissions reports.

Environmental Protection Agency Endangerment and Cause and Contribute Findings. On December 7, 2009, the EPA signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6)-in the atmosphere threaten the public health and welfare of current and future generations.

- Cause or Contribute Finding: the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

State Laws, Policies, and Plans

California laws and executive orders that address GHGs and climate change are summarized in Table 3-14.

Table 3-14. Summary of State Laws and Executive Orders that Address Climate Change.

Legislation Name	Signed into Law/ Ordered	Description	CEQA Relevance
SB 1771	09/2000	Establishment of California Climate Registry to develop protocols for voluntary accounting and tracking of GHG emissions.	In 2007, DWR began tracking GHG emissions for all departmental operations.
AB 1473	07/2002	Directs CARB to establish fuel standards for noncommercial vehicles that would provide the maximum feasible reduction of GHGs.	Reduction of GHG emissions from noncommercial vehicle travel.
SB 1078, 107, EO S-14-08	09/2002, 09/2006, 11/2008	Establishment of renewable energy goals as a percentage of total energy supplied in the State.	Reduction of GHG emissions from purchased electrical power.
EO S-3-05, AB 32*	06/2005, 09/2006	Establishment of statewide GHG reduction targets and biennial science assessment reporting on climate change impacts and adaptation and progress toward meeting GHG reduction goals.	Projects required to be consistent with statewide GHG reduction plan and reports will provide information for climate change adaptation analysis.
SB 1368	9/2006	Establishment of GHG emission performance standards for base load electrical power generation.	Reduction of GHG emissions from purchased electrical power.
EO S-1-07	01/2007	Establishment of Low Carbon Fuel Standard.	Reduction of GHG emissions from transportation activities.
SB 97*	08/2007	Directs OPR to develop guideline amendments for the analysis of climate change in CEQA documents.	Requires climate change analysis in all CEQA documents.
SB 375	09/2008	Requires metropolitan planning organizations to include sustainable communities strategies in their regional transportation plans.	Reduction of GHG emissions associated with housing and transportation.
EO S-13-08 *	11/2008	Directs the Resource Agency to work with the National Academy of Sciences to produce a California Sea Level Rise Assessment Report, and directs the Climate Action Team to develop a California Climate Adaptation Strategy.	Information in the reports will provide information for climate change adaptation analysis.

*Significant laws and orders.

Environmental Effects

Significance Criteria

It is unlikely that any single project by itself could have a significant impact on the environment with respect to GHGs. However, the cumulative effect of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which in turn have been shown to be the main cause of global climate change (IPCC 2007). Therefore, the analysis of the environmental effects of GHG emissions from this project will be analyzed based on total project emissions.

The CVFPB has not established a quantitative significance threshold for GHG emissions; instead each project is evaluated on a case by case basis using the most up to date calculation and analysis methods. The proposed project could result in a significant impact if it would generate GHG emissions either directly or indirectly that:

- May have a significant cumulative impact on the environment; or,
- Would conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs, including the state goal of reducing GHG emissions in California to 1990 levels by 2020, as set forth by the timetable established in AB 32, California Global Warming Solutions Act of 2006.

The following significance criteria will be used to determine the significance of GHG emissions from this project:

- Whether the relative amounts of GHG emissions over the life of the proposed project are small in comparison to the amount of GHG emissions for major facilities that are required to report GHG emissions (25,000 metric tons of CO_2e/year);
- Whether all applicable best management practices that would reduce GHG emissions are incorporated into the proposed project design; and,
- Whether the proposed project implements or funds its fair share of a mitigation strategy designed to alleviate climate change.

No Action

Under the no action alternative, construction of the control structure, and concrete lining of the spillway chute and stilling basin would not take place. Therefore, there would not be additional generation of GHGs associated with construction activities such as construction vehicles and equipment, concrete batch plant operation, concrete lining work, mass concrete placement, or the cofferdam borings effort.

Proposed Action

Calculation of GHG Emissions. CO_2 is produced during the burning of fossil fuels and is the predominant GHG generated during this project. Because no major sources exist for the other GHGs during the construction process, the other GHGs are not considered to be significant and no quantitative emission calculations were made for them.

Methodology. CO_2 emissions (the GHG of significance for this project) were estimated from various emission models and spreadsheet calculations, depending on the source of the emission and data availability. GHG emissions were calculated from appropriate emission factors, project features being constructed, and estimated equipment and schedules.

CO_2emissions from construction equipment were based on exhaust emissions during operation of the equipment estimated. The emissions were calculated from CO_2 emission factors from Appendix B of the Early Approach Channel Excavation Final EA/IS (Corps 2009), which in turn used SMAQMD/El Dorado County AQMD CEQA guidelines.

The manufacture of concrete requires large amounts of energy to produce and results in substantial GHG emissions. Calculating these emissions would be more indicative of a "life-cycle" emissions analysis and can go beyond the analysis suggested by the California Attorney General's Office. However, the Corps estimated CO_2 emissions from the production of concrete during this project based on published emission factors. Studies have shown that CO_2 emissions generated by typical normal strength concrete mixes were found to range between 0.29 and 0.32 metric tons of CO_2 equivalent per cubic meter of concrete (Flowers and Sanjayan 2007). In order to be conservative, this study assumed 0.32 metric tons (320 kilograms) of CO_2 would be created per cubic meter of concrete produced. This calculates as 244.7 kilograms of CO_2 per cubic yard of concrete produced.

CO_2 emissions are presented in both tons and metric tons in this EA/EIR because GHG is often calculated and described in metric tons.

Estimated Emissions. The major stages of the construction project: control structure, chute and stilling basin, and borings for approach channel, do not significantly overlap, so the maximum annual CO_2 emissions were calculated separately for the different construction stages.

Emissions from borings for the approach channel cofferdam are not listed in a separate table due to the small amount of CO_2 emissions, as compared to the other two stages. The total unmitigated CO_2 emissions from the combination of worker travel and construction equipment exhaust is estimated to be about 65 tons (59 metric tons).

Table 3-15 summarizes unmitigated annual CO_2 emissions from activities undertaken during construction of the control structure. The CO_2 emissions occur during the burning of fossil fuels and the manufacture of concrete. The concrete batch plant produces the majority of CO_2 emissions during construction of the control structure. The amount of CO_2 emissions is estimated to be less than the 25,000 metric ton reporting threshold.

Table 3-15. Unmitigated Annual CO_2 Emissions: Control Structure[1].

Activity	CO_2	CO_2
	Tons	Metric tons
On-site Construction Equipment - Excavation	3,400	3,100
On-site Haul Truck Engine Emissions	53	48
Off-site Haul Truck Engine Emissions	280	250
Off-site Worker Commute Engine Emissions	200	180
Concrete Batch Plants	13,000	12,000
TOTALS	17,000	15,000

[1] Unmitigated emissions for year with maximum emissions.

Note: Numbers are rounded to two significant figures; therefore, totals might differ from sums.

Table 3-16 summarizes unmitigated annual CO_2 emissions from activities undertaken during construction of the chute and stilling basin. The CO_2 emissions occur during the burning of fossil fuels and the manufacture of concrete.

Table 3-16. Unmitigated Annual CO_2 Emissions: Chute and Stilling Basin[1].

Activity	CO_2	CO_2
	Tons	Metric tons
On-site Construction Equipment	2,600	2,400
On-site Haul Truck Engine Emissions	330	300
Off-site Worker Commute Engine Emissions	200	180
Concrete Batch Plants	11,000	10,000
TOTALS	15,000	13,000

[1] Unmitigated emissions for year with maximum emissions.

Note: Numbers are rounded to two significant figures; therefore, totals might differ from sums.

As was the case during construction of the control structure, the concrete batch plant would produce the majority of CO_2 emissions during construction of the chute and stilling basin. The amount of CO_2 emissions is estimated to be less than the 25,000 metric ton reporting threshold for major facilities.

Mitigation

The following measures are considered best management practices providing options for reducing GHG emissions from construction projects (SMAQMD 2009).

- Improve fuel efficiency from construction equipment by minimizing idling time either by shutting equipment off when not in use or reducing the time of idling to no more than three minutes (five minute limit is required by the state airborne toxics control measure [Title 13, Section 2485 of the California Code of Regulations]).

- Provide clear signage that posts this requirement for workers at the entrances to the site.

- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.

- Train equipment operators in proper use of equipment.

- Use the proper size of equipment for the job.

- Use equipment with new technologies (repowered engines, electric drive trains).

- Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).

- Use alternative fuels for generators at construction sites such as propane or solar, or use electrical power.

- Use a CARB approved low carbon fuel for construction equipment.

- Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.

- Reduce electricity use in the construction office by using compact fluorescent bulbs, powering off computers every day, and replacing heating and cooling units with more efficient ones.

- Recycle or salvage non-hazardous construction and demolition debris (goal of at least 75 percent by weight).

- Use locally sourced or recycled materials for construction materials (goal of at least 20 percent based on costs for building materials, and based on volume for roadway, parking lot, sidewalk and curb materials). Wood products utilized should be certified through a sustainable forestry program.

- Minimize the amount of concrete for paved surfaces or utilize a low carbon concrete option. Low carbon concrete involves the addition of blending materials such as fly ash or slag to replace some to the clinker in the production of Portland cement. Studies have shown that fly ash was found to be capable of reducing concrete CO_2 emissions by 13 to 15 percent in typical concrete mixes (Flowers and Sanjayan, 2007). The proposed project will be using fly ash in its concrete mixture.

- Produce concrete on-site if determined to be less emissive than transporting ready mix.

- Use SmartWay certified trucks for deliveries and equipment transport.

- Develop a plan to efficiently use water for adequate dust control.

With the implementation of these mitigation measures, the CO_2 emissions would likely be reduced. It is estimated that these reductions would bring the emissions further below the 25,000 metric ton reporting requirement for major facilities. Therefore, due to the CO_2 emission analysis results that are below the reporting requirements prior to mitigation, the application of best management practices would reduce these emissions further, and the temporary and intermittent nature of the emissions, it was determined that the effects on climate change would be less than significant

3.3.3 Noise

Potential noise effects from construction of the control structure, lining of the spillway chute and stilling basin, and the cofferdam exploratory borings at 15 sensitive receptors were assessed in a Noise Technical Report (Appendix E), which provides quantitative nose modeling and impact analysis for the proposed project. For consistency, this section was prepared based on the analysis methods and techniques from the Technical Noise Report prepared in support of the JFP Early Approach Channel Excavation Supplemental EA/IS (Corps 2009). The effects of vibration on buildings are also considered.

Noise generated from project activities that were assessed include: traffic, construction equipment operation, blasting, batch plant operation, and the cofferdam exploratory borings. Potential noise-sensitive human receptors within the city of Folsom, Sacramento County, Placer County, and El Dorado County were considered. Sensitivity receptor locations include FLSRA parks and campgrounds, local residences, and Folsom State Prison. The noise sensitive receptors of the project areas are shown in Plate 6.

Existing Conditions

<u>Fundamental Concepts of Environmental Noise</u>

Environmental noise sources are segregated into four categories: single event, mobile, stationary-temporary, and stationary-permanent. Examples of noise sources in each of the two categories with A-weighted sound levels are presented in Table 3-17 below. A-weighting is defined under "Sound" below.

Perceptible acoustical sensations can also be classified into two broad categories: sound and vibration, which are described below.

Sound

Sound is a disturbance in an elastic medium resulting in an audible sensation. Sound is also defined as mechanical energy transmitted from a vibrating or flowing source by longitudinal (or compression) waves through a compressible medium such as air. The term "noise" is both qualitative and quantitative, and is typically referred to as "unwanted" sound.

Table 3-17. Typical Stationary and Mobile Noise Source Sound Levels in dBA.

Noise Source	Sound Level in dBA	Category
Noise at ear level from rustling leaves	20	STATIONARY-TEMPORARY
Room in a quiet dwelling at midnight	32	STATIONARY
Soft whisper at 5 feet	34	STATIONARY-TEMPORARY
Large Department Store	50 to 65	STATIONARY-TEMPORARY*
Room with window air conditioner	55	STATIONARY-PERMANENT
Conversational Speech	60 to 75	STATIONARY
Pump Station Equip. with Noise Abatement	62	STATIONARY-PERMANENT
Passenger Car at 50 feet	69	MOBILE
Vacuum cleaner in private home at 10 feet	69	STATIONARY
Ringing alarm at 2 feet	80	STATIONARY
Roof-top Air Conditioner	85	STATIONARY-PERMANENT
Bulldozer at 50 feet	87	MOBILE
Heavy city traffic	90	MOBILE
Home lawn mower	98	MOBILE
Jet aircraft at 500 feet overhead	115	MOBILE
Human pain threshold	120	NA
Construction Blast	120 to 145 at 50 feet	SINGLE EVENT

* Time-of-day dependent
Source: Noise Control Reference Handbook, Industrial Acoustics Company (date)

The dB scale is used to quantify sound intensity. Because sound pressure levels can vary by over one million times within the range of human hearing, a logarithmic loudness scale (similar to the Richter Scale used for earthquake intensity) is used to keep sound intensity numbers within a manageable range. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity (middle A and its higher harmonics) in a process called "A-weighting," written as dBA.

Other noise measurement metrics used in this analysis are as follows, and are described in greater detail below:

- Equivalent Sound Level (L_{eq}), the average sound level calculated from instantaneous measurements recorded over a specific period of time.

- Maximum sound level (L_{max}) reached during a sampling period is the peak noise level that occurred during the measurement period.

- Minimum sound level (L_{min}) reached during a sampling period at a particular monitoring location typically reflects ambient conditions.

- Percentile sound levels (L_{90}, L_{50}, and L_{10}) are sound levels that exceed the percentile value during the measurement period.

- Community Noise Equivalent (CNEL) is the average of the daytime measurement, evening measurement +5 dBA, and the night measurement +10 dBA.

- Single Event Level is used for blasting events that are less than a minute in duration, when energy average noise values do not provide accurate depiction of the maximum noise levels produced by the single event.

- Peak Noise Level is the unweighted peak sound level or maximum sound level that assesses maximum noise level during single-noise events. This is necessary when the day-night sound level (DNL) average noise measurements might understate the severity of a single-noise event. Sometimes annoying noise peaks can be "averaged out." Unweighted peak measurements, with no time averaging, are a good predictor of complaints.

- Day Night Level (Ldn): The DNL evaluator is recommended by the EPA and used by most Federal agencies as a land-use planning tool. It describes the average daily acoustic energy over the period of one year—meaning that moments of quiet are averaged together with moments where loud noises can be heard. The Department of Defense uses DNL because it incorporates a "penalty" for nighttime noise (normally 10:00 p.m. to 7:00 a.m.) when loud sounds are more annoying.

Community noise levels depend on the intensity of nearby human activity. Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. In rural and undeveloped areas, Ldn can be below 35 dBA, while levels above 75 to 80 dBA are more common near major freeways and airports. Although people often accept the higher levels associated with very noisy urban areas, they nevertheless are considered to be adverse to public health. California uses a stricter equivalent sound level definition, which uses the Ldn and adds a 5-dB penalty to sound measurements between 10:00 p.m. and 7:00 a.m.

Surrounding land uses and the existing noise environment dictate what noise levels would be considered acceptable or unacceptable. In rural and undeveloped areas away from roads and other human activity, the day-to-night difference is normally small. In urban environments, nighttime ambient levels are about 7 dB lower than the corresponding daytime levels. Nighttime noise is a concern because of the likelihood of disrupting sleep. Noise levels above 45 dBA at night can result in the onset of sleep interference. At 70 dBA, sleep interference effects become considerable (EPA 1974).

The difficulty in relating noise exposure to public health and welfare is one of the major obstacles in determining appropriate maximum noise levels. Although there has been some dispute in the scientific community regarding the detrimental effects of noise, a number of general conclusions have been reached, including the following:

- Noise of sufficient intensity can cause irreversible hearing damage;
- Noise can be a major source of annoyance by disturbing sleep, rest, and relaxation;
- Noise can interfere with speech and other communication; and
- Noise can produce physiological changes in humans and wildlife.

In most areas, transportation sources, such as automobiles, trucks, trains, and aircraft, are the principal sources of ambient noise. Industrial and commercial equipment and operations also contribute to the ambient noise environment in their vicinities.

Vibration

Vibration is a disturbance in a solid elastic medium, which may produce a detectable motion. This differentiation between sound and vibration is most relevant for environmental noise studies when industrial or construction noise sources produce high energy waves at low frequencies that are below human audible thresholds but match the frequency response of nearby structures (less than 31 Hz). This energy causes vibrations similar to earthquakes. Sources with audible components in addition to the vibrational energy are typically heard after initial vibrations start and sometimes end depending on distance from the source. This has a well-documented annoyance factor on nearby human receptors. The percentage of annoyed listeners is dependent on total energy of the source, distance from receptor to source, and hourly frequency of each event.

Existing Noise Conditions

Currently, construction equipment around Folsom Dam and vehicular traffic on area roadways is the dominant source of noise affecting noise-sensitive land uses in the project area. Existing construction noise monitoring data were not available during the preparation of this report. Occasional aircraft overflights and natural background sound sources are also part of the existing noise environment, but are not significant contributors to the overall noise levels.

Extensive ambient noise data were obtained by URS in March 2009 to characterize existing noise conditions as part of the Early Approach Channel Excavation Supplemental EA/IS (Corps, 2009). The coverage of that ambient data monitoring included the areas of the Control Structure and includes the Spillway Chute, Stilling Basin, Dike 7, MIAD, and the various import haul routes. The recent, completeness, quality, and overall coverage of these monitoring data make them applicable to this analysis. These data are included in this noise evaluation and are considered baseline ambient noise conditions. The remainder of this section is directly quoted from the Early Approach Channel Excavation Supplemental EA/IS (Corps 2009).

The survey consisted of five long-term (24-hours) and eight short-term (l0 minutes) measurements at noise-sensitive receptors, as shown in Figure 5-1 (of the 2009 EA/IS), found in the Noise Technical Report (Appendix A, of the 2009 EA/IS). Weather conditions were very consistent over the three days of noise monitoring. The temperature ranged from 55 degrees Fahrenheit at night to 75 degrees Fahrenheit during the day. Winds were mild and gusted to six or seven miles per hour during noise monitoring. The long-term measurements were conducted using three Larson Davis Model 820 American National Standards Institute (ANSI) Type 1 Integrating Sound Level Meters (Serial Numbers 1527, 1528 and 1598). The sound level meters were bolted to trees, telephone poles or fences approximately five feet above the ground in order to approximate the height of the human ear. Short-term monitoring was conducted using a Bruel and Kjaer Model 2250 ANSI Type 1 Integrating Sound Level Meter (Serial Number 2672071). All sound level meters were calibrated before and after the measurement periods with a Larson Davis Model CAL200 calibrator (Serial Number 2794). All sound level measurements conducted by URS were in accordance with the International Standards of Organization.

Long-term data were not collected at the Folsom State Prison for security reasons. Table 3-18 summarizes the long-term measurement data from the remaining five sites. The raw data for each long-term measurement site are provided in Appendix A of the Early Approach Channel Excavation Supplement EA/IS (Corps 2009). Only the long-term measurement data are provided in this section because those are the only noise values used in the impacts analysis to compare to noise sources and sound levels associated with the proposed project and to Federal, State, and local ordinances and regulations to determine whether proposed project activities would exceed established noise criteria.

Table 3-18. Long-Term Ambient Measurement Site Data.

Site ID	Location	Start Date	Start Time	Hourly L_{eq} Range (dBA)	CNEL (dBA)
LT-1*	Folsom State Prison	N/A	N/A	N/A	N/A
LT-2	Tacana Drive and East Natoma Street	3/25/2009	17:00:00	51.5 - 69.4	71
LT-3	Mountain View Drive	3/25/2009	15:00:00	32.8 - 50.9	50
LT-4	East Natoma Street. and Green Valley Road	3/24/2009	14:00:00	58.0 - 75.2	76
LT-5	Shadowfax Court	3/24/2009	13:00:00	34.1 - 57.5	51
LT-6	East of Folsom Auburn Road. and Pierpoint Circle	3/24/2009	15:00:00	31.7 - 56.8	50

* No measurements were recorded at LT-1 for security reasons.

Critical and Sensitive Receptors

Some land uses are generally regarded as being more sensitive to noise than others due to the types of population groups or activities involved. The definition of sensitive receptors varies by jurisdiction, but in general sensitive population groups include children and the elderly while sensitive land uses include residential (single- and multifamily, mobile homes, dormitories, and similar uses), guest lodging, parks and outdoor recreation areas, hospitals, nursing homes and other long-term medical care facilities, and educational facilities, including schools, libraries, churches, and places of public assembly.

A critical receptor assessment was conducted for the noise and air quality impact assessments and is summarized in this section. Critical receptors are identified as essential public services, public administration facilities, medical facilities and nursing homes, and schools.

There were no hospitals or other medical facilities, police stations, fire stations, government administration buildings, nursing homes, schools, or day care centers located in the vicinity of the project area. Therefore, no critical receptors were identified. Identified sensitive receptors for this project, the construction phase of potential concern, and the distance from each sensitive receptor to the long-term and short-term ambient monitoring points are all listed in Table 3-19, and are shown in Plate 6.

Table 3-19. Noise Sensitive Receptor Sites within the Project Vicinity.

Receptor Type	**Receptor Name, Location, and/or Address**	**Project Phase and Operation of Potential Concern**	**Monitoring Location ID**
RESIDENTIAL	Lake View Apartments	Phase 1 and 5	LT-6
COMMERICAL	Commercial – Utilities north of Folsom Lake Crossing	Phase 1 and 5	LT-6
INDUSTRIAL	Power Plant	Reference only	NA
RESIDENTIAL	Folsom Prison – North and Northeastern Buildings	All Phases	LT-1
RESIDENTIAL	Mountain View Drive Residences	All Phases	LT-3
RESIDENTIAL	Christina Court Residence	Phase 1, 2, and 5	LT-2 and LT-3
RESIDENTIAL	Lorna Lane Residences	Phase 1, 2, and 5	LT-2 and LT-3
RESIDENTIAL	Amaya Drive Residence	Phase 1, 2, and 5	LT-2
RESIDENTIAL	East Natoma Drive Residences	MIAD only	LT-4
RESIDENTIAL	Singer Lane Residences	MIAD only	NA
RESIDENTIAL	Ballau Circle Residences	MIAD only	LT-4
RESIDENTIAL	Church Grounds north of E. Natoma	MIAD only	NA
RECREATION AREAS	Boat Launch	Phase 1,2 and 5	ST-8

Receptor Type	Receptor Name, Location, and/or Address	Project Phase and Operation of Potential Concern	Monitoring Location ID
COMMERCIAL/ RETAIL	East Natoma and Blue Ravine Road	MIAD only	NA
COMMERCIAL/ RETAIL	North of intersection of East Natoma and Green Valley Road	MIAD only	NA

Notes: NA = Reference only – no long-term monitoring conducted in these areas.

Regulatory Setting

There are numerous Federal, State, and local laws, ordinances, regulations, and standards pertaining to environmental noise and a sample of them can be found in Appendix E. For this analysis, the City of Folsom's ordinance and thresholds were used for the noise analysis and to determine the significance of potential affects.

The proposed project is located in the City of Folsom. Some traffic is expected through Sacramento County, Placer County, and El Dorado County. The noise impact evaluation with respect to traffic will use the City of Folsom requirements as they are the strictest. All construction noise from the project will occur in the City of Folsom and Sacramento County. The City of Folsom's noise ordinance standards are used as the threshold of significance to determine whether or not a noise impact exists for this study, as these are the strictest standards.

The City of Folsom uses L_{50} as the baseline criterion level. Construction noise is exempt from these regulations during the periods of 7:00 a.m. to 6:00 p.m on weekdays and 8:00 a.m. to 5:00 p.m. on weekends. Although construction outside of these times is not expected, if construction were to occur in the non-exempt periods, coordination with the City of Folsom would be needed. Activities would be required to comply with exterior and interior noise limits at residential receptors, as summarized in Table 3-20. For impulse noise (such as impact pile driving or blasting), the limits are reduced by 5 dBA.

For the purpose of this project, the City of Folsom's standards will be followed because it is the closest jurisdiction with the most restrictive noise ordinance. The baseline criterion level (L_{50}) is 50 dBA during daytime and 45 dBA during nighttime. If this criterion is met within the City of Folsom, noise standards for other nearby jurisdictions would also be achieved. If the ambient noise level is above 50 dBA, then this becomes the new standard at each individual noise-sensitive receptor. For the City of Folsom, construction noise exemptions allow for noise generated by construction would not be subject to the exterior noise standard limits. These exempt times last from 7:00 a.m. to 6:00 p.m. during weekdays and 8:00 a.m. to 5:00 p.m. on weekends. It is expected that all construction-related activities for the proposed project would occur during exempt (daytime) hours.

Table 3-20. Noise Ordinance Standards Established by the City of Folsom.

Maximum Time of Exposure*		Noise Levels Not To Be Exceeded In Residential Zone**	
EXTERIOR NOISE STANDARDS	Noise Metric	7 a.m. to 10 p.m. (day)	10 p.m. to 7 a.m. (night)
30 Minutes/Hour	L_{50}	50 dBA	45 dBA
15 Minutes/Hour	L_{25}	55 dBA	50 dBA
5 Minutes/Hour	$L_{8.3}$	60 dBA	55 dBA
1 Minute/Hour	$L_{1.7}$	65 dBA	60 dBA
Any period of time	L_{max}	70 dBA	65 dBA
INTERIOR NOISE STANDARDS			
5 Minutes/Hour	$L_{8.3}$	45 dBA	35 dBA
1 Minute/Hour	$L_{1.7}$	50 dBA	40 dBA
Any period of time	L_{max}	55 dBA	45 dBA

*Construction Noise Exemption Times: 7:00 a.m. - 6:00 p.m. Weekdays and 8:00 a.m. - 5:00 p.m. Weekends.
**5 dBA reduction for impact noise during non-exempt times.
Source: City of Folsom, CA Municipal Code. Chapter 8.42, Table 8.42.040.

Significance Criteria

For construction activities that will occur during non-exempt hours, the following City of Folsom thresholds are applicable:

- From 7:00 a.m. to 10:00 p.m.: L_{50} of 50 dBA or below L_{max} of 70 dBA.
- From 10:00 p.m. to 7:00 a.m.: L_{50} of 45 dBA or below L_{max} of 65 dBA.
- Below L_{max} of 70-85 dBA in areas outside of City of Folsom jurisdiction.
- For traffic noise within the City of Folsom: Ldn /CNEL of 65 dBA.

Environmental Effects

Environmental effects are presented in two sections; offsite traffic noise effects, and on site construction noise effects.

Methods

The following steps were taken in the preparation of the Technical Noise Report (Appendix E), in the analysis of potential environmental impacts related to noise, and in the development of appropriate mitigation measures:

- Obtained and modeled existing terrain and new topographic features based on past studies on the Control Structure, Spillway Chute, and Stilling Basin;

- Created a 3D model approximation of the Spillway Chute and Stilling Basin prior to lining;

- Created terrain models of the areas of work by project phase;

- Prepared haul route grading contours to approximately match current construction including the road cut beneath the boat launch;

- Conducted a site visit and area reconnaissance on February 17, 2010 to: evaluate previously identified sensitive receptors; identify sensitive receptors that may be potentially impacted by operations for this project; evaluate ground cover, current topography, and mitigable features such as landscaping, tree lines, and ridge lines; determine project site conditions and equipment types in use; evaluate human activity in areas adjacent to the project site and farther areas where potential noise impacts should be modeled;

- Prepared noise models using SoundPLAN 7, BNOISE2, TNM 2.5, and Road Construction Noise Model (RCNM); and,

- Compared modeled noise levels due to construction to existing ambient noise monitoring data.

The noise impacts analysis compared probable noise levels against the impact significance criteria. Significant effects are summarized for each project phase where one or more impacts were identified (see Table 3-21).

For the purposes of this noise evaluation, the overall project was divided into specific phases. Phases 1-3 are associated with the control structure work and phases 3-5 are associated with the chute and stilling basin work. The phases are specific to probable and significant variations in noise model input and output. This is primarily due to terrain elevation changes, variable equipment types proposed, and the modeled locations of each piece of equipment. These phases may differ slightly from the project description in Chapter 2. Figures for these phases are included in the Noise Technical Report (Appendix E).

Table 3-21. Construction Phase Activities and Figure Reference.

Construction Phase	Description	Comments
Control Structure and Chute and Stilling Basin		
Off-Site Haul Routes (1)	Traffic Noise on Folsom Lake Crossing and Folsom Auburn Road (2)	80 Heavy Truck ADT and 70 Auto ADT
Control Structure		
Phase 1	Control Structure Excavation	See sub phases below
Phase 1a	Blasting at Elevation 475’	Elevations vary between 470’ and 480’
Phase 1b	Blasting at Elevation 350’	Approximately 25-30 feet above assumed final cut elevation of 325’
Phase 1c	Excavation after Blasting	After Phase 1a - Noisiest due to higher elevations compared to Phase 1b and 1c. Includes Haul Road and rock disposal at Dike 7 and MIAD
Phase 2	Control Structure Foundation Work	Includes: Haul Road and coarse rock loading at Dike 7 and MIAD Stockpiling and Batch Plant operation at El. 480’ on existing Overlook
Phase 3	Control Structure Gate Installation	Limited noise sources – single point sound and RCNM screening used
Chute and Stilling Basin		
Phase 4	Stilling Basin and Spillway Chute Foundation Preparation and Backfill	Modeled noise sources in and around the Stilling Basin (Worst Case)
Phase 5	Stilling Basin and Spillway Chute Concrete Placement	Includes: Haul Road and coarse rock loading at Dike 7 and MIAD Stockpiling and Batch Plant operation in the Spillway Chute at El. 340-345’

Notes:
(1) Off-site Haul Routes for imported fill, aggregate, and rebar for foundation and other concrete work, and structural, mechanical, and electrical building components for the Control Structure. (Phase 2, 3, 4, and 5).
(2) North of Folsom Lake Crossing.

The noise analysis also made several other assumptions regarding the project:

- Elevations of the Spillway Chute and Stilling Basin are currently in final design modification, therefore the elevations assumed for modeled terrain and structures in this evaluation are conservative and provide “worst case” predicted noise levels at nearby receptors.

- Noise impact modeling for blasting was based on an initial configuration that was relatively shallow, and did not incorporate blast mats or blocking terrain between the blast area and sensitive receptors. The specifications were later refined to include blocking terrain, blast mats, and deeper borings.

- The total amount of explosive charge was increased due to closer spacing, but the initial modeling is considered a "worst case" scenario primarily due to the direct line-of-sight between the blast pattern and sensitive receptors along Mountain View Drive.

- The effects and the mitigation measures remain the same for both blasting configurations. The blasting configurations are as follows:

    - Modeled Configuration: Ammonium nitrate and fuel oil charges with a weight of 55- to 65-pounds per 5- to 10-foot deep hole on a 3-by-3-foot grid. A total of 9 charges with 30-foot spacing between each charge. No blast mats or blocking terrain between the blast grid and sensitive receptors. Two elevations were modeled; at approximate elevations 475-480 feet and 350 feet mean sea level.

    - Refined Configuration: Charge weight of 44 pounds packed in 20-foot deep borings on 5-foot centers on a 20-foot-wide bench with no larger than a 75-foot wall. The wall serves as shielding terrain from a noise perspective. No more than 75 charges will be used. Blast mats will be placed over the charges.

In addition, it is assumed that future operation and maintenance activities associated with the project would be conducted during exempt hours. Comparing modeled construction noise to noise criteria during exempt hours is irrelevant, so evening and nighttime laws, oridinances, and regulations were used should operations take place outside of exempt hours. Therefore, references to predicted noise impacts are limited to non-exempt hours.

Existing construction noise monitoring data were not available during the preparation of this report. Blasting and heavy construction work currently in progress at the Spillway Chute and Stilling Basin, and dumping at Dike 7 is being conducted during construction exempt hours between 7:00 a.m. and 6:00 p.m.

No Action

Under the no action alternative, construction of the control structure, and concrete lining of the spillway chute and stilling basin would not take place. Therefore, there would be no potential noise associated with construction activities from construction vehicles and equipment, concrete batch plant operation, concrete lining work, mass concrete placement, or the cofferdam borings effort. The types of noise sources and sensitive receptors would be the same as described for the existing conditions.

Proposed Action

Off Site Traffic Noise Effects

Projected traffic increases were evaluated for the proposed project (control structure, chute, and stilling basin work). Average Daily Trips (ADT) were calculated and rounded. The ADT used for traffic noise prediction are consistent with the traffic analysis. The ADT and percentage of daytime traffic by vehicle type were used to calculate hourly values. In the city of Folsom, no vehicles in excess of five tons would be allowed on city streets between 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. Five scenarios were modeled for comparison, the most likely scenarios for construction include the daytime exempt hours. The first three scenarios show the traffic occurring during day time hours and the last two scenarios show the traffic occurring in the evening or in non-exempt hours:

- Existing traffic noise during a daytime (i.e. "exempt") hour (as listed in Tables 3-22 and 3-23);
- Existing traffic, and half of the project auto and heavy truck traffic occurring within a daytime hour (Table 3-22);
- Existing traffic, and all project auto and heavy truck traffic occurring within a daytime hour (Table 3-23);
- Existing traffic, and half of the project auto and heavy truck traffic occurring within a nighttime (i.e. "non-exempt") hour (Table 3-24; and,
- Existing traffic, all project auto and heavy truck traffic occurring within a nighttime hour ("worst case") (Table 3-24).

Traffic data from the Early Approach Channel Excavation Supplemental EA/IS (Corps 2009) study for Folsom Auburn Road and Folsom Lake Crossing were updated using a 3-percent yearly increase in ADT. The input parameters and results are provided in Tables 3-22 to 3-24.

Table 3-22. Model Results, Existing ADT and Daytime Hourly Traffic + Half Project Traffic in a Daytime Hour.

Road Segment	Existing ADT and Hourly Daytime Traffic (1)	Existing A-Weighted Hourly Equiv. Sound Level at 50’	Project ADT + ½ Existing ADT by Daytime Hour	Projected Hourly Equiv. Sound Level at 50’ (dBA)	Incremental Increase in dBA
Folsom Lake Crossing	15,250 / 1000	66.5	15,325 / 1,075	68.0	1.5
Folsom Auburn Road	29,700 / 2,550	72.5	29,770 / 2,625	72.9	0.4

Notes: Breakdown of vehicle types at:
Folsom Lake Crossing = 937 Autos, 17 medium trucks, and 45 heavy trucks
Folsom Auburn Road = 1,931 Autos, 545 medium trucks, and 74 heavy trucks

Table 3-23. Screening Model Traffic Results, Existing Daytime CNEL and Existing ADT + All Project ADT in a Single Hour.

Road Segment	Existing ADT and Hourly Daytime Traffic (1)	Existing A-Weighted Hourly Equiv. Sound Level at 50'	Project ADT + ½ Existing ADT by Daytime Hour	Projected Hourly Equiv. Sound Level at 50' (dBA)	Incremental Increase in dBA
Folsom Lake Crossing	15,250 / 1000	66.5	15,400 / 1,150	69.0	2.5
Folsom Auburn Road	29,700 / 2,550	72.5	29,850 / 2,700	73.3	0.8

Table 3-24. Traffic Model Results, Existing Nighttime Hourly Traffic + Project Traffic in a Single Night Hour.

Road Segment	Existing Hourly Nighttime Traffic (1)	Existing A-Weighted Hourly Equiv. Sound Level at 50'	Project Hourly Traffic + Existing Hourly Traffic by Nighttime Hour (1/2 / Full) *	Projected Hourly Equiv. Sound Level at 50' (dBA) (1/2 / Full) *	Incremental Increase in dBA
Folsom Lake Crossing	176	57.0	261 / 326	63.3 / 65.6	6.3 / 8.6
Folsom Auburn Road	391	63.0	466 / 541	67.2	4.2

Notes:
(1) Breakdown of vehicle types during a nighttime hour at:
Folsom Lake Crossing = 172 Autos, 3 medium trucks, and 1 heavy truck.
Folsom Auburn Road = 327 Autos, 63 medium trucks, and 1 heavy truck.
* Current hourly traffic + half of project traffic and current hourly traffic + all project traffic.

Temporary incremental increases in traffic noise from the daytime (7 a.m. to 6 p.m.) transportation of material and equipment associated with project activities would range from less than one dBA to less than three dBA. Small increases less than three dBA are typically not perceived and therefore, these effects would not be considered significant. Additionally, traffic noise on both roads currently exceeds the City of Folsom's limitation of 65 dBA. As such, the project would result in less-than-significant daytime impacts.

However, if all heavy trucks were to arrive and depart in a single hour after 10:00 p.m. and before 7:00 a.m., when traffic and ambient noise levels are very low, impacts become significant as indicated in Table 3-25; However, all project-related traffic would not be expected to occur in a single hour or in the evening. The daytime increases in traffic noise would not exceed the significance criteria as stated above and would also be a short-term temporary effect, and no permanent noise increases would occur, therefore project-related effects would be less than significant.

On-site Construction Noise Effects

Construction noise sources are always temporary, and are typically mobile, but may be stationary or single event. Construction noise sources and corresponding noise levels in the project area would greatly fluctuate depending on the purpose of construction and the particular type, number, and duration of use of various types of construction equipment involved. The effect of construction noise on nearby receptors depends upon how much noise is generated by each individual piece of equipment, the distance between construction activities and the nearest noise-sensitive receptors, the frequency, type, and duration of noise produced, and the ambient noise levels at the receptors. Typical construction equipment noise levels at 50 feet are summarized in Table 3-25.

At a distance of 50 feet, noise levels would be between 68 to 96 L_{eq}. Noise levels would be correspondingly higher at receptor sites located closer to construction activities. Noise levels in this range would be substantially higher on a temporary basis than the ambient noise levels experienced by sensitive receptors in typical rural commercial, recreational, and residential environments. In many areas along the proposed project transportation routes, staging areas, and potential construction zones, intervening topography, trees, and foliage may provide some noise attenuation reduction.

Table 3-25. Construction Noise Sources.

Noise Source	**Sound Power Levels (dB) by Octave Band Center Frequency (Hertz)**								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**A-Weighted Total Sound Power (dBA)**
Large Dozer	110	122	113	114	110	108	104	94	116
Large Motor Grader	99	105	103	98	97	94	88	79	102
Large Excavator	107	114	107	106	103	101	94	88	109
80-Ton Crane	104	110	108	103	102	99	93	84	107
Super 20 Carrylift	104	110	108	103	102	99	93	84	112
Large Dozer-Ripper	110	122	113	114	110	108	104	94	116
40 TN Articulated Trucks	102	108	106	101	100	97	91	82	105
8 Mgal Water Pull	104	114	111	110	106	102	98	90	112
Dozer	110	122	113	114	110	108	104	94	116
Rock Drills	109	118	113	113	113	112	110	104	118
Powder Truck	102	108	106	101	100	97	91	82	116
Drill Rig	100	106	104	99	98	95	89	80	103
Diesel Generator Exhaust Discharge	109	114	109	104	94	84	81	71	105
Diesel Generator Gas Discharge	97	99	102	103	102	104	99	100	109
Large Front End Loader	112	124	114	110	108	106	102	90	115
Self-Propelled Vibratory Roller	102	108	110	106	102	100	98	90	109
On-Highway Transportation Trucks and Trailers	102	108	106	101	100	97	91	82	105

Source: DS/FDR Early Approach Channel Excavation Supplement EA/IS (Corps 2009).

Control Structure – Blasting. This section analyzes the blasting associated with the control structure work and references Phase 1 in Table N9. The blasting activities associated with the control structure excavation were modeled and evaluated including blasting at three different elevations and excavation after the highest blast elevation.

- Blasting at Elevation 340 feet (110 meters). A single event approximately 20 feet above the assumed final grade of the control structure. Terrain blocks line-of-sight to nearby sensitive receptors. This is the more realistic of the two modeled blasting scenarios.

- Blasting at Elevation 476 to 480 feet (146-148 meters). A single event within the footprint of the proposed control structure. Model is considered the "worst case" blasting scenario with direct line-of-site to sensitive receptors.

- Excavation, Hauling, and Disposal. Removal of material after previous blasting.

Blast models were developed using BNOISE2 and SoundPLAN 7, as described in the Noise Technical Report (Appendix E). The maximum off site noise level would be 72 dBA, using the worst case 476 to 480 feet blast model. Noise levels at the nearest residences would range from 50 to 61 dBA, below the significance criteria of L_{max} of 70 dBA.

Since single event noise very rarely exceeds an Ldn or CNEL, no adverse impacts to ambient noise levels would occur. Ambient noise levels would increase and then decay rapidly back to ambient levels over a short period of time. This period typically lasts several seconds and is the result of planned sequential firing of multiple charges. As such, the project would result in temporary increases in the ambient noise environment, which would be less than significant.

The blasting L_{max} would range from 50 to 72 dBA, according to the model. The highest values predicted would be at the closest buildings overlooking the reservoir and construction site at Folsom Prison, or immediately north of Folsom Prison property (LT-1). The highest noise level (L_{max}) predicted at specific residences on Mountain View Drive would range from 58 dBA to 61 dBA. Since these increases are predicted for the worse-case noise model, the temporary increases in noise are expected to be less than 58 dBA to 61 dBA. Since these increases would be less than the significance criteria of L_{max} of 70 dBA, and the work is expected to completed during the exempt work hours, the effects are not expected to be significant.

Vibration could cause minor annoyance to residents due to rattling windows or other structural building components. As such, control structure excavation could result in temporary significant noise and vibration effects to nearby sensitive receptors. Implementation of mitigation measures would reduce these temporary effects to less than significant.

The modeling as the elevations change after initial blasting have a direct line-of-sight to most sensitive receptors on all sides of the proposed area of work. Haul road travel by large dump trucks and rock disposal at Dike 7 and MIAD were also modeled. Ambient noise levels would temporarily increase during this part of construction. Modeled Ldn noise levels at LT-3 were 70 dBA for all floors.

Several residences adjacent to Dike 7 may be temporarily affected by rock disposal at Dike 7. The worst case model used a front-end loader and belly dump truck unloading rock in the southeast corner of this site. Additionally, haul road noise was modeled as a line source over an 8-hour day using typical ingress-egress routing into and out of Dike 7. The majority of work is expected to be completed during exempt work hours and would be less than significant. However, should any work occur during non-exempt hours, implementation of mitigation measures would reduce such temporary noise effects from the haul road and disposal activities to less than significant.

Control Structure - Foundation and Concrete Work. This section analyzes the foundation and concrete work associated with the control structure work and references Phase 2 in Table N9. Modeled noise sources include the concrete batch plant, haul road transport of coarse material to Dike 7 and MIAD by super dump trucks, wheeled front-end loaders and various cement mixing, curing, blowing, and pouring equipment/operations, as described in Appendix E. The batch plant was modeled both top-side on the peninsula and in the spillway chute for comparison.

The Ldn noise level at the property line of the residence on Mountain View Drive would be 74.8 dBA, the L_{max} would be 76.6 dBA, and at the actual residence the Ldn would be 70.1 dBA. Ambient noise levels would increase along the haul road, in Dike 7 and MIAD disposal areas and in the construction area by up to 10 dBA. The noise sources with the highest contribution would be the front-end loader loading coarse material into the large dump trucks. Several residences adjacent to Dike 7 could be significantly impacted by coarse material loading in Dike 7 and transport to the Batch Plant or aggregate stockpiles. The model assumptions were similar to those in the Phase 1d analysis except the front-end loader noise data was changed to rock and gravel loading instead of disposal.

It is expected that ambient noise levels would increase during Phase 2 in the construction area by up to 10 dBA. This would result in a significant effect to nearby sensitive receptors. However, implementation of mitigation measures would reduce this impact to less than significant.

Control Structure - Construction and Gate Installation. This section analyzes the construction and gate installation associated with the control structure work and references Phase 3 in Table N9. Screening level modeling was performed for the two tracked cranes that would be used to install the gates in the control structure using RCNM and single-point sound using SoundPLAN 7. Modeled noise levels at all receptors would be less than 40 dBA. As such, the project would result in a less-than-significant impact related to increased noise from the control structure construction and gate installation. No mitigation would be required.

Chute and Stilling Basin Work – Stilling Basin and Spillway Chute Foundation Preparation and Backfill. This section analyzes the foundation preparation and backfill associated with the chute and stilling basin work, and references Phase 4 in Table N9. Front-end loaders, grout drills, tracked driver cranes, and portable cement mixers were qualitatively and quantitatively evaluated at the screening level. This work is not expected to generate significant noise levels; therefore RCNM was used as an initial screening tool. Based on the RCNM results, more detailed modeling was performed for model correlation and to examine the effects of terrain, ground cover, and mitigable features such as dense vegetation and trees.

Based on this modeling, noise levels at the Lake Pointe Apartment residential receptors would range from 40 to 52 dBA, while ambient monitoring at LT-6 would range from 31.7 to 56.8 dBA. Although these results are above 50dBA, they are below the L_{max} of 70 dBA and therefore would not be considered a significant effect. Additionally, the work would be completed during exempt work hours. However, implementation of mitigation measures would reduce these effects.

Chute and Stilling Basin Work – Concrete Placement. This section analyzes the foundation preparation and backfill associated with the chute and stilling basin work and references Phase 5 in Table N9. Potential impacts to all identified sensitive receptors were evaluated using SoundPLAN 7. Jack hammers, portable cement mixers and blowers, and equipment/operations were modeled, with the loudest equipment at the stilling basin. The batch plant was modeled inside of the spillway chute for comparison.

Noise generated by rock and coarse aggregate loading at Dike 7 would be as described for the control structure work. Ldn noise levels at the residences with line of sight to Dike 7 would be above 65 dBA. In addition, L_{max} values would be within 1 to 2 dBA, indicating that the noise levels would be consistently high based on the usage factors calculated from the estimated equipment list. This is for the worst case scenario which placed the construction equipment within line of sight to sensitive receptors. Source contributions to the noise levels at each receptor are provided in Appendix E. However, implementation of the mitigation measures would reduce this impact to less than significant.

Mitigation

The following measures would be implemented during construction activities in order to ensure that any potential noise effects would be reduced to less than significant:

- Provide Advance Notices. Residents and businesses near the project area shall be provided with advance notices of project activities, schedule, anticipated traffic, and potential noise issues. The advance notice shall describe the potential noise disruption and the steps that would be taken to minimize the noise (e.g., by enclosing and muffling equipment, limiting idling and engine brake use).

- Monitor Noise Levels. The construction contractor shall monitor noise from construction activity. Noise shall be measured at the perimeter of the work area or adjacent to sensitive receptors. In the event that construction noise exceeds the City of Folsom’s thresholds, corrective actions would be taken to reduce the noise levels or stop the activity.

- Heavy Truck Operations and Delivery Hour Planning. Heavy truck deliveries would be scheduled during exempt working hours and whenever possible, avoid deliveries during a single hour, especially during non-exempt hours. Haul trucks operating near noise sensitive receptor sites would be spaced apart to avoid noise effects from simultaneous operation. All equipment, haul trucks, and worker vehicles would be turned off when not in use for more than 30 minutes.

- Prohibit Engine Brake (Jake Brake) Use Within City Limits. Many noise complaints arise from heavy truck use of engine brakes to slow the truck down. This type of brake is secondary to the main braking system of a large truck, the air brake. Use of this type of braking can be avoided by proper speed control.

- Properly Maintain Equipment. The application contractor shall properly maintain and tune engines of all application equipment and maintain properly functioning mufflers on all internal combustion engines to minimize noise levels. Perform noise reduction maintenance during routine maintenance for each vehicle serviced. Each piece of construction equipment and vehicle would be fitted with efficient, well-maintained mufflers that reduce equipment noise emission levels at the project site

- Advanced Notification. Notify the City of Folsom, and if necessary, nearby residents at least 72 hours in advance. Review previous noise monitoring results from blasting events during Early Approach Channel Excavation. Modify notification periods as necessary. Conduct blasting during exempt hours.

- Blast Location Planning. Where possible, plan blasting locations so existing terrain will shield blast noise. The current blasting specifications require this.

- Utilize Blast Mats or other best available control technologies (BACT). If the proposed charge size permits use of an available BACT to reduce noise and/or vibration, require the contractor to use them during blasting operations. The current blasting specifications require this.

- Restrict Use of Dike 7 and MAID. Do not use Dike 7 or MIAD for disposal during Non-exempt Hours. Do not use Dike 7 or MIAD for coarse material loading during non-exempt hours.

- Utilize Best Available Control Technologies. Minimize noise levels using BACT, including installation of temporary noise barriers, acoustical enclosures, and stack silencers.

- Utilize Terrain Features. Utilize terrain features to reduce noise to acceptable levels wherever possible. If possible, locate the concrete batch plant in the Spillway Chute instead of topside.

With the implementation of the above listed mitigation measures, any potential effects from noise and vibration would be reduced to less than significant.

3.3.4 Traffic

Transportation is defined for this analysis as the movement of vehicles from one place to another through a roadway network. The focus of this particular transportation and circulation analysis is the roadway network adjacent to the project site. The area within the parameters of this analysis is presented and described in: 1) the American River Watershed Project Folsom Bridge Final EIS/EIR (Corps 2006); 2) the Folsom Dam Safety and Flood Damage Reduction Final EIS/EIR (Reclamation 2007); and 3) the Final Supplemental EA/IS, Folsom Dam Safety and Flood Damage Reduction Early Approach Channel Excavation (Corps 2009). These documents comprise the background and basis of information for the data developed and presented in this transportation analysis.

Regulatory Setting

Regulatory conditions for traffic analysis are generally dictated by overall transportation industry standards as published by the Federal Highway Authority and the U.S. Department of Transportation. These organizations serve as oversight agencies ensuring the respective regional, state and local jurisdictions follow the appropriate guidelines and parameters. For traffic analysis parameters, delays are generally considered the leading indicators of traffic flow and operations; the shorter the delay, the better the roadway segment flows and the intersection operates. Federal regulations do not dictate specific levels of operation or minimum delays however it is primarily the local jurisdiction's judgment, supported by the analyst's qualitative calculations that establish the best options.

<u>Traffic Analyses Background</u>

For the purposes of this analysis, transportation facilities are divided into two categories of flow: uninterrupted and interrupted. Uninterrupted facilities include an interstate highway with no fixed elements such as traffic signals or stop signs. Interrupted facilities such as conventional city streets and county roads have access points, intersections and stop conditions. Roadway networks are composed of various types of classified and functionally characteristic facilities, including freeways and interstates, major and minor arterials and various sizes of collector and local roads. Each also is classified as urban or rural.

Capacity analysis is a set of procedures for estimating the traffic carrying ability of roadway facilities over a range of defined operational conditions. Capacity is used to express the maximum hourly rate at which vehicles can reasonably be expected to traverse a given point under prevailing roadway and traffic conditions.

Level of Service (LOS) is a measure of quality of operational conditions within a traffic stream based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. Six LOSs from A (best) to F (worst), define each type of transportation facility. Each LOS represents a range of operating conditions and the driver's perception of those conditions. Most analysis, design or planning efforts typically use service flow rates at LOS C or D or higher to ensure acceptable operating service for facility users. LOS E generally is considered unacceptable for planning purposes unless there are extenuating circumstances or attaining a higher LOS is not feasible or extremely costly. For LOS F, it is difficult to predict flow due to stop-and-start conditions.

Generally, traffic analyses are calculated during the peak hours, both a.m. and p.m. which tend to slightly vary but overall, represent the respective rush hours. This type of analysis is for the most severe traffic situations and will represent the longest delays. Often times, as is the case for this transportation analysis, much of the traffic generated is over the course of the entire day, and other than the commuting workers, not isolated to a specific duration. The resulting calculations therefore represent the most severe traffic restrictions. For signalized intersections, which represent the controlling evaluation for urban conditions similar to the study area, Table 3-26 represents the controlling criteria.

Table 3-26. Regulatory Criteria for Signalized Intersections.

Level Of Service (LOS)	Control Delay per Vehicle (seconds/vehicle)
A	<10
B	10 – 20
C	20 – 35
D	35 – 55
E	55 – 80
F	>80

Roadway transportation conditions are evaluated using capacity estimates that depend on several factors. These factors include the number of lanes, the width of the lanes, roadway gradients, the location of lateral obstructions, the percentage of truck and bus volumes, other physical characteristics and the condition of the roadway network. Queuing refers to the traffic backup that occurs as a result of vehicle delays.

Traffic volumes generally are reported as Annual Average Daily Traffic. This is the total number of vehicles per day averaged over the entire year. Table 3-27 shows the relationship of LOS thresholds for various roadway functional classifications.

Table 3-27. Roadway Functional Classification Thresholds.

Functional Class and Daily Roadway Segment LOS Thresholds						
Code	**Facility Type**	**LOS Capacity Threshold (Total vehicles per day in both directions except as noted)**				
		A	**B**	**C**	**D**	**E**
2C	2-Lane Collector	-	-	5,700	9,000	9,800
MI2	Minor 2-Lane Highway	900	2,000	6,800	14,100	17,400
MA2	Major 2-Lane Highway	1,200	2,900	7,900	16,000	20,500
MH4	4-Lane, Multilane Highway	10,700	17,600	25,300	32,800	36,500
2A	2-Lane Arterial	-	-	9,700	17,600	18,700
4AU	4-Lane Arterial, Undivided	-	-	17,500	27,400	28,900
4AD	4-Lane Arterial, Divided	-	-	19,200	35,400	37,400
6AD	6-Lane Arterial, Divided	-	-	27,100	53,200	56,000
8AD	8-Lane Arterial, Divided	-	-	37,200	71,100	74,700
4F	4-Lane Freeway	22,200	40,200	57,600	71,400	80,200
4FA	4-Lane Freeway with Auxiliary Lanes	28,200	51,000	72,800	89,800	100,700
2AMD	2-Lane Arterial, Moderate Access Control SAC COUNTY	10,800	12,600	14,400	16,200	18,000
4AMD	4-Lane Arterial, Moderate Access Control SAC COUNTY	21,600	25,200	28,800	32,400	36,000
6AMD	6-Lane Arterial, Moderate Access Control SAC COUNTY	32,400	37,800	43,200	48,600	54,000
4AHD	4-Lane Arterial, High Access Control SAC COUNTY	24,000	28,000	32,000	36,000	40,000
6AHD	6-Lane Arterial, High Access Control SAC COUNTY	36,000	42,000	48,000	54,000	60,000

These definitions and metrics are general transportation industry standards found in the Highway Capacity Manual American Association of State Highway and Transportation Officials and Institute of Transportation Engineers guidelines and nomenclature. They are used throughout the analysis and discussions of the transportation element of this report.

Methodology

While the construction activities associated with this project are varied and require differing construction elements, staffing, and equipment, from a transportation analysis viewpoint, the proposed activities have generally similar traffic projections and are therefore consolidated into one analysis. In some cases, where the projections slightly differ, this analysis always assumed the worst case scenario. Additionally, the analysis uses the traffic projections generated due to the action alternatives, analyzed against the peak hour flows of the surrounding network traffic patterns. This form of analysis presents the most aggressive and conservative analysis for all alternatives. The traffic breakdown and additional assumptions and conditions are further discussed in the respective sections of this transportation discussion.

Existing Conditions

The roadway network within the affected environment is considered an interrupted facility and a collector/local road network. The baseline conditions for this analysis were developed from the traffic data provided in the three documents listed previously under this section. The base conditions from the referenced documents presented Year 2004 and 2007 conditions. Growth factors were applied to that data to develop Year 2010 through 2016 conditions. In turn, the Year 2010 numbers were used as the basis for growth for the conditions established as part of this analysis. The annual growth rates listed were 3 percent up to Year 2010 and 2 percent from 2010 to 2016. These rates were published in earlier documents and used throughout this analysis. The resulting data and LOS for the 2010 – 2016 baseline conditions of the respective roadway segments and intersection locations are shown in Tables 3-28 and Plates 7 and 8. Baseline data show the study area to be generally heavily trafficked with LOSs at C or lower. The primary arterial roadways tend to have lower LOS. These conditions and results are typical for a developed area.

Table 3-28 reflects the roadway segment analysis for the no-action condition for the future years, 2011 and 2016. This assumes that there will be no additional proposed work at the Folsom Dam site and traffic growth continues as historically represented earlier, 2 to 3 % annually. The results show some deterioration of conditions but generally only isolated reductions in LOS.

Table 3-28. Roadway Segment Baseline Conditions and LOS – Year 2010—2016.

	Base Year 2010 Conditions			Year 2011 No-Action[1]		Year 2016 No-Action[1]	
Roadway Segment	**Functional Class**	**Traffic Volumes**	**LOS**	**Traffic Volumes**	**LOS**	**Traffic Volumes**	**LOS**
1. Douglas Boulevard – Barton Road to Folsom-Auburn Road	4AD	43,928	F	44,806	F	49,470	F
2. Barton Road – Douglas Boulevard to Eureka Road	2A	12,348	D	12,595	D	13,906	D
3. Eureka Road – Barton Road to Folsom-Auburn Road	2A	5,682	C	5,796	C	6,399	C
4. Auburn-Folsom Road – Douglas Boulevard to Eureka Road	4AU	37,481	F	38,230	F	42,209	F
5. Auburn-Folsom Road – Eureka Road to Oak Hill Drive	2A	33,328	F	33,995	F	37,533	F
6. Folsom-Auburn Road – Oak Hill Drive to Folsom Dam Road	4AD	44,037	F	44,918	F	49,593	F
7. Folsom-Auburn Road – Folsom Dam Road to Oak Avenue	4AU	23,384	D	23,852	D	26,335	D
8. Folsom Boulevard – Greenback Lane to Leidesdorff Street	4AD	35,623	E	36,335	E	40,117	F
9. Folsom Boulevard – Natoma Street to Blue Ravine Road	4AD	41,305	F	42,131	F	46,516	F
10. Folsom Boulevard – Blue Ravine Road to Iron Point Road	4AD	33,437	D	34,106	D	37,656	F
11. Oak Hill Drive – Barton Road to	2C	5,901	D	6,019	D	6,645	D

	Base Year 2010 Conditions			Year 2011 No-Action[1]		Year 2016 No-Action[1]	
Roadway Segment	Functional Class	Traffic Volumes	LOS	Traffic Volumes	LOS	Traffic Volumes	LOS
Folsom-Auburn Road							
12. Santa Juanita Avenue – Barton Road to Oak Avenue Parkway	2A	5,245	C	5,350	C	5,907	C
13. Sierra College Boulevard – Douglas Boulevard to Eureka Road	4AD	32,126	D	32,769	D	36,179	E
14. Hazel Avenue – Oak Avenue to Greenback Lane	4AMD	38,683	F	39,456	F	43,563	F
15. Hazel Avenue – Greenback Lane to Madison Avenue	4AMD	47,861	F	48,819	F	53,900	F
16. Hazel Avenue – Winding Way to Gold Country Boulevard	4AMD	61,958	F	63,197	F	69,774	F
17. Oak Avenue Parkway – Hazel Avenue to Santa Juanita Avenue	2AMD	13,550	C	13,821	C	15,259	D
18. Oak Avenue Parkway – American River Canyon Drive to Folsom-Auburn Road	4AD	17,702	C	18,056	C	19,936	D
19. Greenback Lane – Hazel Avenue to Madison Avenue	4AMD	26,335	C	26,861	C	29,657	D
20. Madison Avenue – Hazel Avenue to Greenback Lane	4AMD	35,841	E	36,558	F	40,363	F
21. Rainbow Bridge – Folsom Boulevard to Leidesdorff Street	2A	44,037	F	44,918	F	49,593	F
22. Folsom Dam Road – Folsom-Auburn Road to East Natoma Street [2]	2A	-		-		-	
23. East Natoma Street – Cimmaron Circle to Folsom Dam Road	4AU	18,139	D	18,502	D	20,428	D
24. East Natoma Street – Folsom Dam Road to Green Valley Road	4AU	29,613	F	30,205	F	33,349	F
25. Green Valley Road – East Natoma Street to Sophia Parkway	4AU	34,967	F	35,667	F	39,379	F
26. Sophia Parkway – Green Valley Road to Elmores Way	4AD	7,103	C	7,245	C	7,999	C
27. El Dorado Hills Boulevard – Green Valley Road to Francisco Drive	2A	8,414	C	8,582	C	9,476	C
28. Briggs Ranch Drive – East Natoma Street to Oak Avenue Parkway	2C	6,666	D	6,799	D	7,507	D
29. Oak Avenue Parkway – Willow Creek Drive to Blue Ravine Road	4AD	9,616	C	9,808	C	10,829	C
30. Oak Avenue Parkway – Blue Ravine Road to East Bidwell Street	6AD	24,259	C	24,744	C	27,319	D
31. Oak Avenue Parkway – East Bidwell Street to Riley Street	6AD	14,205	C	14,490	C	15,998	C
32. East Bidwell Street – Glenn Street to Blue Ravine Road	4AD	22,073	D	22,515	D	24,858	D
33. East Bidwell Street – Blue Ravine Road to Oak Avenue Parkway	6AD	27,427	D	27,976	D	30,888	D
34. East Bidwell Street – Clarksville Road to Iron Point Road	6AD	42,944	D	43,803	D	48,362	D
35. Sibley Street – Glenn Drive to Blue Ravine Road	2A	24,696	F	25,190	F	27,811	F
36. Prairie City Road – Blue Ravine Road to Iron Point Road	4AD	24,586	D	25,078	D	27,688	D
37. Blue Ravine Road – Folsom Boulevard to Sibley Street	6AD	19,778	C	20,174	C	22,274	C
38. Blue Ravine Road – Sibley Street to	4AU	31,798	F	32,434	F	35,810	F

	Base Year 2010 Conditions			Year 2011 No-Action[1]		Year 2016 No-Action[1]	
Roadway Segment	**Functional Class**	**Traffic Volumes**	**LOS**	**Traffic Volumes**	**LOS**	**Traffic Volumes**	**LOS**
Riley Street							
39. Blue Ravine Road – Riley Street to East Bidwell Street	4AU	25,570	D	26,081	D	28,796	E
40. Blue Ravine Road – East Bidwell Street to Oak Avenue Parkway	4AD	18,904	C	19,282	D	21,289	D
41. Blue Ravine Road – Oak Avenue Parkway to Green Valley Road	4AD	21,308	D	21,734	D	23,996	D
42. Iron Point Road – Black Diamond Drive to Prairie City Road	4AD	15,845	C	16,161	C	17,844	C
43. U.S. 50 – Hazel Avenue to Folsom Boulevard	4FA	127,631	F	130,183	F	143,733	F
44. U.S. 50 – Folsom Boulevard to Prairie City Road	4F	108,180	F	110,344	F	121,828	F
45. U.S. 50 – Prairie City Road to East Bidwell Street	4F	78,458	E	80,027	E	88,356	F
46. U.S. 50 – East Bidwell Street to County line	4F	89,494	F	91,284	F	100,785	F
47. Folsom Lake Crossing Bridge	4AHD	28,848	C	29,425	C	32,488	D
Folsom Bridge Summary (segments 8,21, and 47)	-	108,508	-	110,678	-	122,197	-

[1] Year 2011-2016 Traffic Volume calculated from Year 2010 ADTs with an annual 2% growth ratio.
[2] Folsom Dam Road has been converted to a restricted access road for construction after the Folsom Lake Crossing was built in 2007.

Table 3-29 shows the analysis for both the a.m. and p.m. peak hours for the intersections along with the respective delays in seconds. This table shows conditions for 2007 and 2010. This table also compares the no-action with the action alternative for the design year 2010.The results are typical for the general type of area and growth projections. The range of results varies with some of the larger intersections operating at LOS E and F although there are no significant LOS deteriorations for the respective intersections, with the proposed project. The additional traffic generated due to construction of the proposed project does not cause the LOS to deteriorate significantly. There are slight drops in the delays however, the LOS are the same between the no-action and the proposed project.

Table 3-29. Intersection Analysis – 2010 No-Action and Action Conditions.

	2007 Conditions				2010 No-Action Conditions[1]				2010 Alt 2 Conditions			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
Intersection	Delay[2] V/C[3]	LOS	Delay[2] V/C[3]	LOS	Delay[2] V/C[3]	LOS	Delay[2] V/C[3]	LOS	Delay[2] V/C[3]	LOS	Delay[2] V/C[3]	LOS
1. Auburn-Folsom Rd. / Douglas Blvd.	53.1	D	>80.0 1.03	F	68.7	E	>80.0 1.15	F	69.6	E	>80.0 1.16	F
2. Auburn-Folsom Rd. / Eureka Rd.	44.9	D	39.3	D	66.2	E	65.0	E	69.5	E	67.7	E
3. Auburn-Folsom Rd. / Oak Hill Dr.	22.6	C	26.4	C	30.4	C	32.0	C	31.1	C	32.0	C
4. Folsom-Auburn Rd. / Exist. Folsom Dam Rd.	4.7	A	5.5	A	5.3	A	6.1	A	5.3	A	6.2	A
5. Folsom-Auburn Rd. / Folsom Lake Crossing	30.7	C	60.3	E	35.5	D	69.6	E	36.0	D	71.5	E
6. Folsom-Auburn Rd. / Oak Ave. Pkwy.	79.4	E	>80.0 1.25	F	>80.0 1.19	F	>80.0 1.37	F	>80.0 1.19	F	>80.0 1.38	F
7. Folsom-Auburn Rd. / Greenback Ln.	>80.0 1.24	F	>80.0 1.51	F	>80.0 1.37	F	>80.0 1.56	F	>80.0 1.37	F	>80.0 1.56	F
8. Folsom-Auburn Rd. / Natoma St.	37.7	D	38.3	D	46.4	D	54.0	D	46.4	D	54.0	D
9. Riley St. / Scott St.	5.1	A	6.8	A	6.7	A	8.9	A	6.7	A	8.9	A
10. Riley St. / Leidesdorff St.	3.4	A	7.0	A	4.0	A	11.7	B	4.0	A	11.7	B
11. Riley St. / Sutter St.	4.5	A	11.0	B	5.3	A	20.6	C	5.3	A	20.6	C
12. Riley St. / Natoma St.	46.6	D	>80.0 1.37	F	61.6	E	>80.0 1.53	F	62.0	E	>80.0 1.53	F
13. Riley St. / E. Bidwell St.	14.5	B	12.2	B	16.0	B	13.2	B	16.0	B	13.3	B
14. Natoma St. / Coloma St.	26.7	C	40.1	D	33.1	C	50.9	D	33.1	C	51.0	D
15. Natoma St. / Wales Dr.	13.0	B	19.8	B	14.2	B	21.4	C	14.2	B	21.4	C
16. Natoma St. / Briggs Ranch Dr. [4]	54.7%	A	84.2%	E	59.2%	B	91.4%	F	59.2%	B	91.4%	F
17. E. Natoma St. / Folsom Lake Crossing	20.8	C	31.5	C	24.9	C	43.6	D	25.0	C	44.1	D
18. E. Natoma St. / Green Valley Rd.	27.7	C	34.5	C	29.5	C	39.3	D	29.7	C	39.3	D
19. Green Valley Rd. / Sophia Pkwy.	15.5	B	15.5	B	15.7	B	20.0	B	15.7	B	20.0	B

1. Base Year 2010 Traffic Turning Movement Volume calculated from Year 2007 TMV's with an annual 3% growth ratio.
2. Delay reported in seconds per vehicle
3. V/C – volume to capacity ratio. V/C ratio reported only under LOS F conditions
4. The only unsignalized intersection. Intersection Capacity Utilization and ICU LOS reported.

The Folsom Dam study area and roadway network are shown on Plates 7 and 8. Plate 7 designates the roadway segments and Plate 8 shows the intersections studied. These locations correlate to the information shown on the tables.

Environmental Effects

Significance Criteria

Adverse effects on traffic are considered significant if an alternative would result in any of the following:

- Substantially increase traffic in relation to existing traffic load and capacity of the roadway system.
- Substantially disrupt the flow and/or travel time of traffic.
- Expose people to significant public safety hazards resulting from construction activities on or near the public road system.
- Reduce supply of parking spaces sufficiently to increase demand above supply.

No Action

Under the no-action alternative, the Corps would not participate in construction of the control structure or concrete lining of the spillway chute and stilling basin. The existing roadway network, types of traffic, and circulation patterns would be expected to remain the same.

Proposed Action

Construction of the Proposed Action would have short-term effects on the traffic and circulation in the project area. Construction activities could potentially affect the types, volumes, and movement of traffic, and public safety in and near the project area.

Traffic generated by the proposed action would result in growth in two categories:

- Labor force accessing the site on a daily basis. This is estimated at 80 total trips per day based on an anticipated work force of 70 with two workers per vehicle and additional miscellaneous trips. This number is expected to be consistent throughout the duration of the construction activities;
- Truck trips due to earthwork hauling operations and large deliveries. This is estimated to be 70 round trips per day, based on the anticipated hauling operations and durations as shown in Table 3-30.

The additional traffic numbers developed are expected to be worst case/maximum amounts of additional traffic volumes based on anticipated work schedules and activities. Table

3-29 also shows that the traffic generated due to construction of the control structure and lining of the chute and stilling basin are similar, and therefore both action analyses are included under the one set of traffic impacts.

On-site haul routes were not analyzed since they are not considered part of the public roadway network system. All material excavated would be hauled and disposed of on-site near a disposal area at MIAD. Any other vehicles using the site due to earthwork operations and heavy materials and equipment deliveries are expected to access the site via one of two approved and pre-determined haul routes, one from I-80 and one from State Route 50. These hauling routes are further described in Section 2.3. The contractor would ultimately be responsible for his own deliveries and operations and all access through the City of Folsom's roadway network and would have to conform to the City's transportation restrictions and permit allowances.

The estimated additional trips generated due to the anticipated work efforts as part of the proposed actions were applied to the data to develop the Year 2011 through 2016 information, which was then subsequently used for the traffic circulation, roadway segment and intersection operation analysis. A summary of the additional traffic generated and the respective distribution patterns are shown in Tables 3-31 and 3-32. For the distribution of the labor force, the patterns follow the current traffic volumes based on weighted percentages and were then added to the current and projected volumes. Additional trips generated were designated to the respective roadway segment. This is shown in Table 3-31.

Table 3-30. Trip Generations and Distributions – Proposed Action

	Truck Trips						Employee Car Trips	
Construction Activities	**Begin**	**End**	**Duration (Days)**	**Working Days**	**Total Truck Trips One-Way**	**Truck Trips Per Day (ADT)[1]**	**Total # Employees On Site Per Day**	**Car Trips Per Day[2]**
1. Control Structure and Gate Installation	Qtr 3, 2010	Qtr 4, 2013	817				70	70
-1.1 Construction Mobilization	Qtr 4, 2010	Qtr 4, 2010	46	40	118	6		
-1.2 Excavation	Qtr 1, 2011	Qtr 3, 2011	174	150	230 per week	66		
-1.3 Aggregate Stockpiling and Concrete Placement	Qtr 3, 2011	Qtr 4, 2012	371	300	9,900	66		
-1.4 Gate Installation	Qtr 4, 2012	Qtr 2, 2013	151	130	1,309	20		
2. Spillway Chute and Stilling Basin Construction	Qtr 3, 2013	Qtr 4, 2016	849	700			70	70
-2.1 Construction Mobility	Qtr 4, 2013	Qtr 1, 2014	121	100	82	2		
-2.2 Concrete Placement	Qtr 1, 2014	Qtr 3, 2016	633	550	18,747	68		
3. Approach Channel Excavation	Qtr 4, 2010	Qtr 1, 2011	120	110	2	0	4	8 [3]
Estimated Total Daily Trips from 2010 to 2016 [4]	**70 Truck Trips Per Day**						**80 Car Trips Per Day**	

[1] Truck Trips Per Day (ADT) is calculated assuming total truck trips are distributed evenly over the construction period

[1] Truck trips per day (ADT) is calculated by multiplying daily one-way trips by 2

[2] Car trips per day (ADT) is calculated assuming 2 employees per car and 2 commute trips generated per car per day

[3] Assume 1 employee per car and 2 commute trips generated per car per day

[4] The estimated total daily trips is the conservative construction-generated off-site traffic used in traffic analysis models (roadway segments and intersections)

Table 3-31. Distribution of Labor Force.

Distribution of Labor Forces (80 Commute Trips Per Day)			
Region	**Construction Worker Distribution**	**Trips**	**Impacted Routes**
Rocklin area (Placer County to the north)	5%	4	4, 5, 6, 47
Roseville area (Placer County to the west)	5%	4	1, 3, 4, 5, 6, 47
Folsom	5%	4	23, 28, 29, 40, 32, 47
El Dorado area (Green Valley Road)	2.5%	2	25, 24 47
El Dorado area (US 50)	2.5%	2	46, 34, 30, 41, 24, 47
Sacramento area (I-80)	40%	32	1, 4, 5, 6, 47
Sacramento area (US 50)	40%	32	43, 10, 9, 8, 7, 47
Total	**100%**	**80**	

Similarly, following the identified haul routes for large deliveries and earthwork operations, the truck trips were developed and assigned to the respective segments as shown in Table 3-32.

Table 3-32. Distribution of Haul Trucks.

Distribution of Truck Trips (56 Truck Trips Per Day)			
Route	**Off-site Truck Trip Distribution**	**Trips**	**Impacted Routes**
West Route from US 50 @ Folsom Blvd	40%	22	43, 16, 20, 7, 47
South Route from US 50 @ E. Bidwell St	30%	17	43, 44, 45, 34, 30, 41, 24 25, 47
North Route from Folsom-Auburn Rd	30%	17	1, 4, 5, 6, 47

The additional traffic volumes from each category were combined and distributed to the appropriate roadway segment and are shown in Table 3-33. This table represents the additional truck trips generated for each respective roadway segment. The additional trip loads are relatively minor; all but one roadway segment less than 100 vehicles per day compared to the peak hour volumes.

The total traffic volumes were calculated and analyzed. The respective roadway segment analysis is shown in Table 3-34 for the proposed action alternative compared to the no-action alternative. The additional traffic volumes do not present any degradation of traffic service levels for any of the studied periods from Year 2010 to 2016. Any traffic effects to the local roadway network would be insignificant, as defined for this analysis. The current LOS would be maintained and any affects would be temporary, lasting only during construction. The additional trips due to the proposed action are all less than 125 vehicles per day and in most cases, significantly less than that. Comparing these numbers to the roadway system's current trips which generally range up to 45,000 vehicles per day shows that the additional traffic volumes due to the proposed action do not pose a significant effect to existing traffic conditions.

The intersection operational effects were developed and analyzed in similar fashion to the roadway segments. Comparing the future without project condition with the proposed action analysis shows that the respective a.m. and p.m. peak hour LOSs, conventionally the lowest of a typical weekday, are similar with no significant detrimental effects or degradation of service. The 2016 analysis year is considered the worst case scenario since that is when traffic has grown to its largest volumes.

Table 3-33. Additional Trips per Roadway Segment.

Roadway Segment	Additional Trips
1. Douglas Boulevard – Barton Road to Folsom-Auburn Road	44
2. Barton Road – Douglas Boulevard to Eureka Road	0
3. Eureka Road – Barton Road to Folsom-Auburn Road	3
4. Auburn-Folsom Road – Douglas Boulevard to Eureka Road	47
5. Auburn-Folsom Road – Eureka Road to Oak Hill Drive	47
6. Folsom-Auburn Road – Oak Hill Drive to Folsom Dam Road	47
7. Folsom-Auburn Road – Folsom Dam Road to Oak Avenue	46
8. Folsom Boulevard – Greenback Lane to Leidesdorff Street	24
9. Folsom Boulevard – Natoma Street to Blue Ravine Road	24
10. Folsom Boulevard – Blue Ravine Road to Iron Point Road	24
11. Oak Hill Drive – Barton Road to Folsom-Auburn Road	0
12. Santa Juanita Avenue – Barton Road to Oak Avenue Parkway	0
13. Sierra College Boulevard – Douglas Boulevard to Eureka Road	0
14. Hazel Avenue – Oak Avenue to Greenback Lane	0
15. Hazel Avenue – Greenback Lane to Madison Avenue	0
16. Hazel Avenue – Winding Way to Gold Country Boulevard	22
17. Oak Avenue Parkway – Hazel Avenue to Santa Juanita Avenue	0
18. Oak Avenue Parkway – American River Canyon Drive to Folsom-Auburn Road	0
19. Greenback Lane – Hazel Avenue to Madison Avenue	0
20. Madison Avenue – Hazel Avenue to Greenback Lane	22
21. Rainbow Bridge – Folsom Boulevard to Leidesdorff Street	0
22. Folsom Dam Road – Folsom-Auburn Road to East Natoma Street [2]	0
23. East Natoma Street – Cimmaron Circle to Folsom Dam Road	3
24. East Natoma Street – Folsom Dam Road to Green Valley Road	20
25. Green Valley Road – East Natoma Street to Sophia Parkway	18
26. Sophia Parkway – Green Valley Road to Elmores Way	0
27. El Dorado Hills Boulevard – Green Valley Road to Francisco Drive	0
28. Briggs Ranch Drive – East Natoma Street to Oak Avenue Parkway	3
29. Oak Avenue Parkway – Willow Creek Drive to Blue Ravine Road	3
30. Oak Avenue Parkway – Blue Ravine Road to East Bidwell Street	18

Roadway Segment	Additional Trips
31. Oak Avenue Parkway – East Bidwell Street to Riley Street	0
32. East Bidwell Street – Glenn Street to Blue Ravine Road	3
33. East Bidwell Street – Blue Ravine Road to Oak Avenue Parkway	0
34. East Bidwell Street – Clarksville Road to Iron Point Road	18
35. Sibley Street – Glenn Drive to Blue Ravine Road	0
36. Prairie City Road – Blue Ravine Road to Iron Point Road	0
37. Blue Ravine Road – Folsom Boulevard to Sibley Street	0
38. Blue Ravine Road – Sibley Street to Riley Street	0
39. Blue Ravine Road – Riley Street to East Bidwell Street	0
40. Blue Ravine Road – East Bidwell Street to Oak Avenue Parkway	3
41. Blue Ravine Road – Oak Avenue Parkway to Green Valley Road	18
42. Iron Point Road – Black Diamond Drive to Prairie City Road	0
43. U.S. 50 – Hazel Avenue to Folsom Boulevard	63
44. U.S. 50 – Folsom Boulevard to Prairie City Road	17
45. U.S. 50 – Prairie City Road to East Bidwell Street	17
46. U.S. 50 – East Bidwell Street to County line	2
47. Folsom Lake Crossing Bridge	116

Table 3-34. Proposed Action Conditions and LOS, Year 2010 – 2016

		Year 2010 Alt 2		Year 2011 Alt 2		Year 2016 Alt 2	
Roadway Segment	**Functional Class**	**Traffic Volumes**	**LOS**	**Traffic Volumes**	**LOS**	**Traffic Volumes**	**LOS**
1. Douglas Boulevard – Barton Road to Folsom-Auburn Road	4AD	43,985	F	44,863	F	49,527	F
2. Barton Road – Douglas Boulevard to Eureka Road	2A	12,348	D	12,595	D	13,906	D
3. Eureka Road – Barton Road to Folsom-Auburn Road	2A	5,686	C	5,800	C	6,403	C
4. Auburn-Folsom Road – Douglas Boulevard to Eureka Road	4AU	37,542	F	38,291	F	42,270	F
5. Auburn-Folsom Road – Eureka Road to Oak Hill Drive	2A	33,389	F	34,056	F	37,594	F
6. Folsom-Auburn Road – Oak Hill Drive to Folsom Dam Road	4AD	44,098	F	44,979	F	49,654	F
7. Folsom-Auburn Road – Folsom Dam Road to Oak Avenue	4AU	23,444	D	23,912	D	26,395	D
8. Folsom Boulevard – Greenback Lane to Leidesdorff Street	4AD	35,655	E	36,367	E	40,149	F
9. Folsom Boulevard – Natoma Street to Blue Ravine Road	4AD	41,337	F	42,163	F	46,548	F
10. Folsom Boulevard – Blue Ravine Road to Iron Point Road	4AD	33,469	D	34,138	D	37,688	F
11. Oak Hill Drive – Barton Road to Folsom-Auburn Road	2C	5,901	D	6,019	D	6,645	D
12. Santa Juanita Avenue – Barton Road to Oak Avenue Parkway	2A	5,245	C	5,350	C	5,907	C
13. Sierra College Boulevard – Douglas Boulevard to Eureka Road	4AD	32,126	D	32,769	D	36,179	E
14. Hazel Avenue – Oak Avenue to Greenback Lane	4AMD	38,683	F	39,456	F	43,563	F
15. Hazel Avenue – Greenback Lane to Madison Avenue	4AMD	47,861	F	48,819	F	53,900	F
16. Hazel Avenue – Winding Way to Gold Country Boulevard	4AMD	61,986	F	63,225	F	69,802	F
17. Oak Avenue Parkway – Hazel Avenue to Santa Juanita Avenue	2AMD	13,550	C	13,821	C	15,259	D
18. Oak Avenue Parkway – American River Canyon Drive to Folsom-Auburn Road	4AD	17,702	C	18,056	C	19,936	D
19. Greenback Lane – Hazel Avenue to Madison Avenue	4AMD	26,335	C	26,861	C	29,657	D
20. Madison Avenue – Hazel Avenue to Greenback Lane	4AMD	35,869	E	36,586	F	40,391	F

		Year 2010 Alt 2		Year 2011 Alt 2		Year 2016 Alt 2	
Roadway Segment	Functional Class	Traffic Volumes	LOS	Traffic Volume s	LOS	Traffic Volume s	LOS
21. Rainbow Bridge – Folsom Boulevard to Leidesdorff Street	2A	44,037	F	44,918	F	49,593	F
22. Folsom Dam Road – Folsom-Auburn Road to East Natoma Street [2]	2A	-		-		-	
23. East Natoma Street – Cimmaron Circle to Folsom Dam Road	4AU	18,143	D	18,506	D	20,432	D
24. East Natoma Street – Folsom Dam Road to Green Valley Road	4AU	29,638	F	30,230	F	33,374	F
25. Green Valley Road – East Natoma Street to Sophia Parkway	4AU	34,990	F	35,690	F	39,402	F
26. Sophia Parkway – Green Valley Road to Elmores Way	4AD	7,103	C	7,245	C	7,999	C
27. El Dorado Hills Boulevard – Green Valley Road to Francisco Drive	2A	8,414	C	8,582	C	9,476	C
28. Briggs Ranch Drive – East Natoma Street to Oak Avenue Parkway	2C	6,670	D	6,803	D	7,511	D
29. Oak Avenue Parkway – Willow Creek Drive to Blue Ravine Road	4AD	9,620	C	9,812	C	10,833	C
30. Oak Avenue Parkway – Blue Ravine Road to East Bidwell Street	6AD	24,282	C	24,767	C	27,342	D
31. Oak Avenue Parkway – East Bidwell Street to Riley Street	6AD	14,205	C	14,490	C	15,998	C
32. East Bidwell Street – Glenn Street to Blue Ravine Road	4AD	22,077	D	22,519	D	24,862	D
33. East Bidwell Street – Blue Ravine Road to Oak Avenue Parkway	6AD	27,427	D	27,976	D	30,888	D
34. East Bidwell Street – Clarksville Road to Iron Point Road	6AD	42,967	D	43,826	D	48,385	D
35. Sibley Street – Glenn Drive to Blue Ravine Road	2A	24,696	F	25,190	F	27,811	F
36. Prairie City Road – Blue Ravine Road to Iron Point Road	4AD	24,586	D	25,078	D	27,688	D
37. Blue Ravine Road – Folsom Boulevard to Sibley Street	6AD	19,778	C	20,174	C	22,274	C
38. Blue Ravine Road – Sibley Street to Riley Street	4AU	31,798	F	32,434	F	35,810	F
39. Blue Ravine Road – Riley Street to East Bidwell Street	4AU	25,570	D	26,081	D	28,796	E
40. Blue Ravine Road – East Bidwell Street to Oak Avenue Parkway	4AD	18,908	C	19,286	D	21,293	D

		Year 2010 Alt 2		Year 2011 Alt 2		Year 2016 Alt 2	
Roadway Segment	**Functional Class**	**Traffic Volumes**	**LOS**	**Traffic Volume s**	**LOS**	**Traffic Volume s**	**LOS**
41. Blue Ravine Road – Oak Avenue Parkway to Green Valley Road	4AD	21,331	D	21,757	D	24,019	D
42. Iron Point Road – Black Diamond Drive to Prairie City Road	4AD	15,845	C	16,161	C	17,844	C
43. U.S. 50 – Hazel Avenue to Folsom Boulevard	4FA	127,712	F	130,264	F	143,814	F
44. U.S. 50 – Folsom Boulevard to Prairie City Road	4F	108,201	F	110,365	F	121,849	F
45. U.S. 50 – Prairie City Road to East Bidwell Street	4F	78,479	E	80,048	E	88,377	F
46. U.S. 50 – East Bidwell Street to County line	4F	89,496	F	91,286	F	100,787	F
47. Folsom Lake Crossing Bridge	4AHD	28,998	C	29,575	C	32,638	D
Folsom Bridge Summary (segments 8,21, and 47)	-	108,690	-	110,860	-	122,379	-

[1] Year 2010-2016 Traffic Volume calculated from Year 2010 ADTs with an annual 2% growth ratio plus additional trips generated from worker commuting and off-site haul trucks

[2] Folsom Dam Road has been converted to a restricted access road for construction after the Folsom Lake Crossing was built in 2007.

Table 3-35. 2016 Intersection Analysis - No-Action / Proposed Action Comparison.

	2016 No-Action Conditions[1]				2016 Alt 2 Conditions[1]			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
Intersection	Delay[2] V/C[3]	LOS	Delay[2] V/C[3]	LOS	Delay[2] V/C[3]	LOS	Delay[2] V/C[3]	LOS
1. Auburn-Folsom Rd./Douglas Blvd.	>80.0 1.19	F	>80.0 1.31	F	>80.0 1.21	F	>80.0 1.32	F
2. Auburn-Folsom Rd./Eureka Rd.	>80.0 1.25	F	>80.0 1.20	F	>80.0 1.27	F	>80.0 1.20	F
3. Auburn-Folsom Rd./Oak Hill Dr.	52.0	D	43.5	D	53.5	D	43.5	D
4. Folsom-Auburn Rd./Exist. Folsom Dam Rd.	6.9	A	10.1	B	6.9	A	10.5	B
5. Folsom-Auburn Rd./Folsom Lake Crossing	43.8	D	>80.0 1.13	F	44.6	D	>80.0 1.14	F
6. Folsom-Auburn Rd./Oak Ave. Pkwy.	>80.0 1.35	F	>80.0 1.54	F	>80.0 1.35	F	>80.0 1.55	F
7. Folsom-Auburn Rd./Greenback Ln.	>80.0 1.56	F	>80.0 1.82	F	>80.0 1.56	F	>80.0 1.82	F
8. Folsom-Auburn Rd./Natoma St.	>80.0 1.11	F	>80.0 1.09	F	>80.0 1.11	F	>80.0 1.09	F
9. Riley St./Scott St.	9.7	A	13.7	B	9.7	A	13.7	B
10. Riley St./Leidesdorff St.	7.5	A	18.5	B	7.5	A	18.5	B
11. Riley St./Sutter St.	9.9	A	66.0	E	9.9	A	66.0	E
12. Riley St./Natoma St.	>80.0 1.12	F	>80.0 1.69	F	>80.0 1.12	F	>80.0 1.69	F
13. Riley St./E. Bidwell St.	18.9	B	15.2	B	18.9	B	15.2	B
14. Natoma St./Coloma St.	59.1	E	>80.0 1.06	F	59.1	E	>80.0 1.06	F
15. Natoma St./Wales Dr.	16.7	B	26.0	C	16.7	B	26.0	C
16. Natoma St./Briggs Ranch Dr.[4]	65.9%	C	102.1%	G	65.9%	C	102.1%	G
17. E. Natoma St./Folsom Lake Crossing	35.5	D	67.9	E	35.6	D	68.6	E
18. E. Natoma St./Green Valley Rd.	40.5	D	54.9	D	40.8	D	54.9	D
19. Green Valley Rd./Sophia Pkwy.	16.2	B	20.9	C	16.2	B	21.0	C

[1] Year 2016 Traffic Turning Movement Volume calculated from Year 2010 TMVs with an annual 2% growth ratio.
[2] Delay reported in seconds per vehicle
[3] V/C - volume to capacity ratio. V/C ratio reported only under LOS F conditions.
[4] The only unsignalized intersection. Intersection Capacity Utilization and ICU LOS reported.

An additional element of the environmental consequences is the traffic effects due to blasting operations. Due to the nature of the proposed excavation there would be the required use of explosives for blasting, causing the temporary closure of some roads. The blasting would not be permitted to interfere with peak traffic flow, would occur at consistent time(s) and would require an encroachment permit from the city of Folsom. It is likely that over five to seven months (estimated March 2011 to October 2011) blasting would occur once a day between 1:30 p.m. and 2:30 p.m. There would be additional provisions for a second blast in the morning between 10:00 a.m. and 11:00 a.m. This second blast would occur about one half of the time over the five to seven months. The contractor would coordinate with the city of Folsom and provide adequate notification to the public, include signage, prior to beginning blasting.

The traffic effects caused by any short-term roadway stoppage are not considered to be significant factors to the current and projected traffic conditions in the area. The blasting activities would be scheduled for off-peak traffic hours thereby minimizing the affects to the existing traffic patterns. General traffic volumes during off-peak hours are significantly lower and the short term stoppages due to blasting activities would have no significant degradation to service levels. Blasting activities would be conducted during a consistent time throughout the day so the local driving public can be better prepared and adjust their driving patterns accordingly. The contractor would also provide public information notices for the blasting operations and associated road closures. These items are generally part of the blasting permit issued by the local jurisdiction.

Mitigation

The following measures would be implemented to reduce any potential effects caused by the blasting events:

- Blasting events would be coordinated with the City of Folsom and would be scheduled for periods of time outside of peak traffic hours in order to offset any potential traffic effects due to road closures.

- There would be two scheduled road closures per day, Monday thru Friday, of one hour each, one in the morning and one in the afternoon. The primary blast period would be always in the afternoon, with the morning blasting time to be used as needed. Advance notification from the Contractor with the City would be required for any blasting events.

- Any unforeseen/exceptional-case reasons to close the road outside of the prescribed times will have to be coordinated with the City in advance.

- Roadway signage would be set up in advance of the blasting event to inform residents that the road (i.e. Folsom Lake Crossing) would be closed and that they would need to seek an alternate route. Six message board-type signs are required: two for the Lake Crossing Road and two at both East Natoma Street and Folsom-Auburn Road.

- On the day of road closures, detour signs would be set up identifying the alternate route.

- Folsom Lake Crossing would be physically blocked and/or guarded to ensure that no one inadvertently drives down the roadway.

These mitigation measures would reduce the potential effects on traffic due to blasting events to a less-than-significant level.

Outside of blasting events, the potential effects of the proposed action on the existing traffic patterns are less than significant, and no significant mitigation measures are anticipated or required. The Folsom Dam area construction site is a dynamic area with many concurrent and ongoing activities along with general day-to-day operations. The adjacent roadway network is currently operating at LOS of C or higher which is indicative of a developed, active area. Continued construction activities and the requisite additional traffic demands due to labor force access and materials deliveries are expected to be ongoing, however minor in nature and not affecting the existing traffic patterns or operation to a significant degree. The construction activities associated with the proposed action would be sequenced thereby not allowing concentrated traffic volumes for any isolated durations.

The local and state government's general roadway improvements and maintenance, such as resurfacing programs, signal timing improvements, and safety upgrades are anticipated to provide improvements to the network. To further minimize any traffic effect, workers should be encouraged to carpool and consolidate trips. Remote parking facilities with shuttle services generally provide an improvement however based on the relatively minor trips generated by the small work force and low trip generation, shuttle service is not practical, cost-effective or recommended as a significant traffic improvement. Carpooling however, is always recommended as a general good practice.

Although it is anticipated that no significant mitigation measures are required in order to reduce the potential effects of the proposed action on traffic patterns, the following standard mitigation measures will help insure that no potential significant effects occur:

- Construction zones along residential roadways would be posted to notify approaching motorists of trucks entering and exiting roadside construction sites and to reduce speeds through the construction zone.

- Before and during construction, signs would be placed at construction areas to notify users of ongoing construction and limits of use.

- Before and during construction, electronic signs would be posted for rerouted routes for motorists and bicyclist.

- Access would be provided for emergency vehicles at all times

- All speed limits, traffic laws, and transportation regulations would be obeyed during construction.

- If there are trucks or equipment needing time to maneuver in residential areas or into or out of construction sites, flaggers would be stationed to slow or stop approaching vehicles to avoid conflicts with construction vehicles or equipment.

- On-street parking for construction workers would be prohibited.

- Off-street parking would be identified and provided to the construction workers and their vehicles and trucks. If possible, parking would be close enough to walk to the site.

Although no mitigation measures are required, implementation of the above mitigation measures would further reduce potential effects on traffic to the traveling public.

3.3.5 Water Resources and Quality

This section describes the existing conditions of the water resources that may be significantly affected and evaluates the effects of the proposed project on water resources and water quality in the project area.

Existing Conditions

Regulatory Setting

Federal and State law mandates a series of programs for the management of surface water quality. The Clean Water Act (33 U.S.C. § 1251 et seq.) (CWA) is the Federal law that establishes the baseline that all state and local water quality laws must meet. The CWA also gives states the authority to adopt more stringent water quality programs to manage waters within the state. California's Porter-Cologne Water Quality Control Act (California Water Code, Division 7), which created the State Water Resources Control Board (SWRCB), regulates the California waterways and establishes pollution prevention plans and penalties.

The SWRCB is divided into nine Regional Water Quality Control Boards (RWQCB). Each RWQCB is responsible for enforcing State water quality laws and objectives, establishing beneficial uses for each State waterway, and developing and updating basin plans that protect water quality based on beneficial use. The project area falls within the jurisdiction of the Central Valley Regional Water Quality Control Board (CVRWQCB), which authorizes discharges into State waterways under the National Pollutant Discharge Elimination System (NPDES) permitting process. NPDES permits apply to storm water, groundwater, and other wastewater discharges in the project area. Construction activities that disturb more than one acre of land would require a NPDES permit for potential storm water discharges and construction dewatering.

Permit types are further divided into categories based on the project activity in question. Pertinent to this project, two storm water permits are required: a construction storm water permit for general construction activities, and an industrial storm water permit for the concrete batch plant operation. The industrial storm water permit is required because the batch plant gives rise to the potential for other pollutant types (associated with concrete mix materials). In addition, a limited threat discharge permit for dewatering of groundwater is required. All permits require a notice of intent to be submitted prior to commencing any soil disturbing activities, groundwater dewatering, or concrete batch plant operation. The construction and industrial storm water permits require that a SWPPP is developed and implemented along with a monitoring and reporting plan. The limited threat discharge permit for groundwater dewatering operations also requires that a monitoring and reporting plan is developed and implemented.

Section 401 of the CWA regulates the water quality of bodies of water associated with any in-water work, or discharge of dredged or fill material. Section 401 is administered by CVRWQCB. CVRWQCB either issues or denies water quality certifications based on whether or not the proposed in-water activity, discharge, or fill complies with all State and Federal laws, policies, and regulations governing the protection of the beneficial uses of the State's water resources.

Section 404 of the CWA regulates the discharge of dredged or fill material into wetlands and waters of the United States. Individual, general, and nationwide permits are issued by the Corps and EPA for activities that may affect wetlands and waters of the United States. Although the Corps does not issue itself permits for its own Civil Works projects, Corps regulations state that the Corps must apply the guidelines and substantive requirements of Section 404 to its activities. Such guidelines are known as the "Section 404(b)(1) Guidelines".

Surface Water

Folsom Dam and Reservoir is a multipurpose water project constructed by the Corps and operated by Reclamation. Folsom Reservoir has an average full-pool storage capacity of approximately 975,000 acre-feet.

The American River basin covers an area of approximately 2,100 square miles and has an average runoff of 2.7 million acre-feet per year. The American River is part of the Sacramento River watershed along with numerous other streams and rivers that drain the western slopes of the Sierra Nevada and Cascades. The North, Middle, and South Forks of the American River are the major tributaries draining into Folsom Reservoir. In general, these waters entering Folsom Reservoir from the upper American River watershed are of high quality. Monitoring of the region has found that the surface water quality rarely exceeds State of California water quality objectives for temperature, bacteria, dissolved oxygen, pH, oil and grease, total dissolved solids, and turbidity (Reclamation, 2004). The mainstem American River channel below Folsom Dam receives water from Folsom Lake after it passes through the dam.

Folsom Reservoir and Lake Natoma have numerous beneficial use designations as defined by the RWQCB. These beneficial uses include: municipal, domestic, and industrial water supply; irrigation; industrial power; water contact and non-contact recreation; warm and cold freshwater habitat, warm freshwater spawning habitat; and wildlife habitat (SAFCA 2003). Water quality in Folsom Reservoir and Lake Natoma is generally acceptable for the beneficial uses currently defined for these water bodies. However, taste and odor problems have occurred in municipal water supplies diverted from the lake in the past. These problems were attributed to blue-green algal blooms that occasionally occur in the reservoir as a result of elevated water temperatures.

Beneficial uses of Lake Natoma downstream of Folsom Dam are largely the same as those for Folsom Reservoir. Beneficial uses of the Lower American River downstream of Nimbus Dam include those listed for Folsom Reservoir as well as recreational canoeing and rafting, warm and cold water fish migration habitat, and coldwater spawning habitat.

Historically, water quality parameters for the Lower American River have typically been well within acceptable limits to achieve water quality objectives and beneficial uses (SAFCA 2003). Principal water quality parameters of concern for the river (pathogens, nutrients, total dissolved solids, total organic carbon, priority pollutants, and turbidity) are primarily affected by urban land use practices, runoff, and storm water discharges. The project area is likely less affected by these parameters due to the limited urban land use in the surrounding area. Generally, the total organic carbon and total dissolved solids levels in the Lower American River do not exceed existing regulatory standards.

Ground Water

Groundwater in the Sierra Nevada foothills are governed by a fractured rock aquifer, which may yield small quantities of water to wells (Corps 2006). The project area is dominated by such bedrock formations. There could be small areas of groundwater within the fractured formations. Alluvial materials in the river segment of the project area are minimal because of the hard rock formations that form and confine the American River streambed in the immediate area (Corps, 2006). Due to the potential for small areas of groundwater in fractured rock, as well as seepage inputs from Folsom Reservoir, construction of the control structure (i.e. excavation of the foundation) would include dewatering activities.

Jurisdictional Wetlands

Regulated or jurisdictional waters include all navigable waters, interstate waters, their tributaries, and adjacent wetlands. Any discharge of dredged or fill materials into these jurisdictional waters would be subject to compliance under CWA Sections 404 and 401 (33 U.S.C. §1251 et seq. [1972]).

A wetlands survey was conducted by USFWS for Reclamation and the Corps for the FEIS/EIR. All required and appropriate permits for previous phases of the JFP were obtained by Reclamation. No wetlands exist within the project footprint for construction of the control structure and concrete lining of the spillway chute and stilling basin, therefore no additional CWA permits are required for the proposed action analyzed in this EA/EIR.

Environmental Effects

This section evaluates the effects of the proposed project on water resources, as well as surface and ground water conditions in the project area. Qualitative effects on water quality were based on construction practices and materials, location, and duration of construction.

Standard pollution prevention measures including erosion and sediment control measures, proper control of non-storm water discharges, and hazardous spill prevention and response measures would be implemented as part of the project design.

Significance Criteria

Adverse effects on water quality were considered significant if the proposed action would result in any of the following:

- Substantially degrade surface water or groundwater quality such that it would violate criteria or objectives identified in the Central Valley RWQCB basin plan or otherwise substantially degrade water quality to the detriment of beneficial uses.
- Alter the quantity and quality of surface runoff.
- Violate any water quality standards or waste discharge requirements.
- Substantially alter the existing drainage pattern of the site or area, such that the flood risk and/or erosion and siltation potential would increase.
- Place structures that would impede or redirect flood flows within a 100-year flood plain.
- Expose people, structures, or facilities to significant risk from flooding, including flooding as a result of the failure of a levee or dam.
- Create or contribute to runoff that would exceed the capacity of an existing or planned storm water management system.
- Disturb existing channel banks, channel beds, or levees to the extent that erosion and sedimentation could be accelerated.
- Reduce groundwater quantity or quality.

No Action

Under the no action alternative, the construction of the control structure, concrete lining of the spillway chute and stilling basin, or exploratory cofferdam borings would not take place. As a result, the existing water quality in the project area would continue to be affected by local conditions such as storm water, urban runoff, and agricultural runoff. Water resources and quality may also be affected by any potentially significant floodwaters that could occur if the project were not completed.

Proposed Action

Construction activities associated with construction of the control structure and concrete lining of the spillway chute and stilling basin would use approximately 50 acres of land that has already been disturbed (see Plate 5) and evaluated in the FEIS/EIR. Exposed soil could potentially erode as a result of significant runoff events, causing increased turbidity in local waterways. In addition, debris and inadvertent spills of fuels, oils, or concrete mix materials from construction equipment, work areas, staging areas, or the concrete batch plant could be a source of contamination into adjacent waterways.

In order to assure the protection of water resources and water quality in the vicinity of the project area, the Corps met and coordinated with the CVRWQCB on March 15, 2010. The goal was to ensure that all relevant and appropriate permits for activities associated with this project would be applied for. Adjacent waterways that could potentially be affected include Folsom Reservoir, the outflow channel below Folsom Dam, Lake Natoma, and the American River. In order to protect water resources and maintain existing water quality conditions and beneficial uses of these waterways, the CVRWQCB has recommended obtaining and complying with three water quality permits for this project. Each permit is relevant to different aspects involved in construction of the control structure and concrete lining of the spillway chute and stilling basin, and the potential pollutants associated with each activity. The following NPDES permits will be acquired:

- Construction Storm Water Permit: NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ; NPDES No. CAS000002)

- Industrial Storm Water Permit: NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities (Order No. 97-03-DWQ; NPDES No. CAS000001)

- Limited Threat Discharge Permit: NPDES Permit for Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and other Limited Threat Wastewaters to Surface Water (Order No. R5-2008-0082; NPDES No. CAG995002)

The contractor would be required to obtain an NPDES Construction Storm Water Permit from the CVRWQCB, because the project would disturb more than one acre of land. Across the entire construction site, debris, soil, or oil and fuel spills could temporarily adversely affect the water quality of Folsom Lake and the Lower American River (including Lake Natoma) downstream. The construction storm water permit pertains to the prevention of increased turbidity of adjacent waterways as resulting from site erosion and sedimentation, as well as debris, soil, fuel, and oil spill prevention. The contractor would be required to design and implement a SWPPP prior to initiating construction activities, and to implement standard BMPs (see "Mitigation" below). There is also a potential for fugitive dust and construction runoff to enter waterways due to soil excavation, equipment use, slurry wall work, and movement of trucks in the project area and along the haul routes. However, frequent watering of haul routes, proper coverage and control of material stock piles (e.g. dirt, aggregate, etc), and the installation of K-rails to prevent any construction related materials or vehicles from entering the waterways, would help to prevent such pollution impacts. All these measures would be required of the contractor.

The NPDES Industrial Storm Water Permit requires that a SWPPP is designed and implemented, and is specific to the concrete batch plant operation. Pertaining to the concrete batch plant site, debris, oil and fuel, or concrete mix material spills could temporarily adversely affect the water quality of Folsom Lake and the Lower American River (including Lake Natoma) downstream. The industrial storm water permit addresses potential pollution inputs due to storm water runoff that are associated with all activities at the concrete batch plant. The contractor would be required to cover and control all material stock piles in order to prevent suspension of dust or concrete mix material due to wind. The contractor would also be required to coordinate the handling of all waste waters generated from concrete production with the CVRWQCB. Waste water generated from the batch plant is not allowed to be discharged to surface waters, groundwater, or land; rather, waste water must be sealed in an appropriate container and transported off-site to an approved disposal site.

In accordance with the NPDES Limited Threat Discharge Permit, groundwater must be tested for priority pollutants prior to dewatering activity in order to determine if any treatment would be required before discharging into Folsom Reservoir. Once cleared for dewatering, periodic, routine, and standardized sampling of the groundwater must be conducted before discharge into Folsom Reservoir occurs. This routine sampling ensures that the groundwater either meets or exceeds the water quality standards listed for beneficial uses of Folsom Reservoir and the Lower American River. Groundwater would be pumped into a holding tank where it is to be tested to meet water quality standards before being surface-discharged into Folsom Reservoir. All mandatory groundwater samples analyzed, both prior to commencement of dewatering activity and during ongoing dewatering operations, must be conducted by a State Certified Lab and meet the Reporting Minimum Levels.

The exploratory boring effort for the cofferdam is scheduled to occur from October 2010 to February 2012. As such, the existing water level of Folsom Reservoir is anticipated to be at a low stage, and in-water drilling would not be necessary. Water resources and quality impacts due to increased turbidity would be highly minimized if borings only occur in the dry. However, if in-water drilling takes place, a CWA Section 404, a 404(b)(1) Guidelines analysis would have to be completed and a State Water Quality Certification (CWA Section 401) would have to be obtained. The 401 Certification would be obtained from the Central Valley RWQCB.

Mitigation

The following standard BMPs would be implemented to avoid or minimize any effects of construction on surface waters. There may be additional BMPs identified as part of the three NPDES permits listed above. Implementation of all of these BMPs would ensure that the effects on water quality would remain at less-than-significant levels. Standard BMPs include:

- Appropriate erosion control measures would be incorporated into the SWPPP in order to prevent sediment from entering waterways. Examples include, but are not limited to: straw bales/wattles, erosion blankets, silt fencing, mulching, re-vegetation, and temporary covers. An appropriately designed and effective sediment capture and stilling basin must be implemented to capture and control sediments carried by site runoff. Sediment and erosion control measures must be maintained during construction at all times. Inspect control measures before, during, and after a rain event.

- Implement appropriate measures to prevent any debris, soil, rock, or other materials/products associated with construction activities from entering waterways. The contractor would use a water truck or other appropriate measures to control fugitive dust on haul roads, construction areas, and stockpiles. K-rails and construction fencing would be used to exclude vehicles and other construction equipment from in-water areas.

- A concrete and fuel spill management plan would be developed for the project.

- Provide secondary containment for storage of any fuel, oil or other liquid and properly dispose of such liquid wastes.

- Fuel and maintain vehicles in specified staging areas only, which are designed to capture potential spills. These areas cannot be near any ditch, stream, or other body of water or feature that may convey water to a nearby body of water.

- Fuels and hazardous materials would not be stored on site. Any spills of hazardous material would be cleaned up immediately. Spills would be reported in construction compliance reports.

- Inspect and maintain vehicles and equipment to prevent dripping of oil, lubricants, or any other fluids.

- Schedule construction to avoid as much of the wet season as possible. Ground disturbance activities are expected to begin in the summer of 2010. If rains are forecast during the construction period, erosion control measures would be implemented.

- Train construction personnel in storm water pollution prevention practices.

- Re-vegetate and restore areas cleared by construction in a timely manner to control erosion.

- Implementation of any additional requirements as mandated by either the construction storm water permit, industrial storm water permit, or the limited threat discharge permit would further reduce any potential adverse affects to adjacent waterways. In addition, the measures in the Spill Prevention and Response Plan and the Erosion and Sediment Control Plan would prevent any significant adverse effects to water quality in the project area. The inclusion of the above mitigation measures and complete compliance with all water quality permits obtained, would reduce any water resources and quality impacts to a less-than-significant level.

3.3.6 Fisheries

This section discusses non-listed fish resources in the vicinity of the project area. The water bodies discussed include Folsom Lake, the outflow below Folsom Dam (i.e. the American River channel), and Lake Natoma which is controlled by Nimbus Dam seven miles downstream of Folsom Dam. Information regarding regulated and/or special-status fish species can be found in Section 3.2.9, Special Status Species.

Existing Conditions

<u>Regulatory Setting</u>

The Magnuson-Stevens Fishery Conservation and Management Act established a management system for national marine and estuarine fishery resources. This legislation requires that all Federal agencies consult with the National Marine Fisheries Service regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect species within their jurisdiction, or essential fish habitat (EFH) of such species. EFH is defined as “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The legislation states that migratory routes to and from anadromous fish spawning grounds are considered EFH. The phrase “adversely affect” refers to the creation of any impact that reduces the quality or quantity of EFH.

A record of the current fish community known to be present within Folsom Lake, the outflow channel below Folsom Dam, and Lake Natoma was conducted by the Corps. This inventory was carried out using internet and literature searches, and phone/email correspondence with CDFG biologists, who survey the area frequently.

Folsom Lake, created by Folsom Dam, was built in 1955 and inundates approximately 12,000 acres of the North Fork, South Fork, and mainstem of the American River drainage. The reservoir has an estimated 85 miles of shoreline and a capacity of approximately 977,000 acre feet. Maximum depth is roughly 266 feet while the average is around 66 feet. The deep nature of Folsom Reservoir allows for thermal stratification annually from April through November, which results in a relatively warm epilimnion (i.e. surface water layer), a metalimnion (i.e. middle layer), or thermocline characterized by rapidly decreasing temperatures, and a cold hypolimnion (i.e. bottom layer). The warm epilimnion provides habitat for warmwater fishes, whereas the reservoir’s lower metalimnion and hypolimnion form a lower coldwater zone that provide habitat for coldwater fish species throughout summer and fall. Seasonal releases from Folsom Reservoir’s coldwater zone maintain cool thermal conditions in the lower American River, an important factor in sustaining fall-run Chinook salmon and steelhead populations below Nimbus Dam.

Lake Natoma, seven miles downstream from Folsom Dam, was formed by the construction of Nimbus Dam in 1955, and serves as a regulating afterbay for Folsom Reservoir. The upstream portion of Lake Natoma includes the highly bedrock-confined outflow channel below Folsom Dam. Lake Natoma has a surface area of approximately 500 acres. Because of its relatively small size and rapid flow-through rate, Lake Natoma has relatively little influence on the water quality of the water flowing through it, with the possible exception of water temperatures (i.e. slight increases). Lake Natoma supports many of the same fisheries found in Folsom Reservoir (e.g. centrarchids and ictalurids). There is also an active rainbow trout stocking program conducted by CDFG.

Not including Hardhead minnow (covered in Section 3.2.9) there are approximately 30 additional fish species that have the potential to occur in the project vicinity within either Folsom Reservoir, or downstream of Folsom Dam within either the outflow channel or Lake Natoma. Of these species, 24 are non-native while six are native. The number of fish species that are known to occur in any water body, include 20 of the 24 non-native species, and four of the six native species. The four native species known to occur in any water body adjacent to the project site include Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis*), rainbow trout (*Oncorhynchus mykiss*), and Chinook salmon (*Oncorhynchus tshawytsha*). The latter two species from the salmonid family are important cold-water game species that are managed and maintained by CDFG's active hatchery-based stocking program. As the Chinook salmon stocking program is relatively new, rainbow trout most likely comprise the highest numbers of all native species. The most abundant non-native species originate from the centrarchid family, and include various bass and sunfish (Table 3-36).

Boat electrofishing surveys conducted in Folsom Reservoir by CDFG in 2003, 2004, and 2009 indicate that spotted bass and bluegill exist in higher numbers compared to other bass or sunfish species (Thomas 2010). In addition, as with many foothill reservoirs, there are presumably relatively high numbers of fish from the non-native ictalurid family (i.e. catfishes; see Table 3-36). Of the non-game fish species, recent surveys indicate that wakasagi (*Hypomesus nipponensis*) are in high abundance (Kevin Thomas 2010).

Although the American River is a migratory pathway for listed, anadromous salmon and steelhead, and therefore considered EFH under the Magnuson-Stevens Act, Nimbus Dam located seven miles downstream of the project site impedes all upstream migrations (i.e. listed salmon and steelhead to not occur in the project vicinity). Therefore, no effects to Federally listed anadromous salmonid species, steelhead, or their associated EFH would occur within the project area.

Table 3-36. List of Fish Species and their Occurrence Potential in the Project Water Bodies (Folsom Reservoir, the Outflow Channel, or Lake Natoma).

Family / Common Name	*Scientific Name*	Federal / State Status	Introduced	Occurrence (in any water body) [1]
Clupeidae (Herring)				
Threadfin shad	*Dorosoma petenense*	–/–	X	Known
Cyprinidae (Minnows)				
Sacramento pikeminnow	*Ptychocheilus grandis*	–/–		Known
Hardhead minnow [2]	*Mylopharodon conocephalus*	–/SSC		Unlikely
California roach	*Hesperoleucus symmertricus*	–/–		Likely
Golden shiner	*Notemigonus crysoleucas*	–/–	X	Known
Fathead minnow	*Pimephales promelas*	–/–	X	Likely
Goldfish	*Carassius auratus*	–/–	X	Known
Common carp	*Cyprinus carpio*	–/–	X	Known
Speckled dace	*Rhinichthys osculus*	–/–		Likely
Catostomidae (Suckers)				
Sacramento sucker	*Catostomus occidentalis*	–/–		Known
Ictaluridae (catfishes)				
Black bullhead	*Ameiurus melas*	–/–	X	Known
Brown bullhead	*Ictalurus nebulosus*	–/–	X	Known
White catfish	*I. catus*	–/–	X	Known
Channel catfish	*I. punctatus*	–/–	X	Known
Osmeridae (Smelts)				
Wakasagi	*Hypomesus nipponensis*	–/–	X	Known
Salmonidae (Salmon & Trout)				
Chinook salmon [3]	*Oncorhynchus tshawytsha*	N/A		Known
Rainbow trout	*O. mykiss*	–/–		Known
Brown trout	*Salmo trutta*	–/–	X	Known
Poeciliidae (Live bearers)				
Western mosquitofish	*Gambusia affinis*	–/–	X	Known
Centrarchidae (Sunfish & Bass)				
Bluegill	*Lepomis macrochirus*	–/–	X	Known
Redear sunfish	*L. microchirus*	–/–	X	Known
Pumkinseed	*L. gibbosus*	–/–	X	Likely
Green sunfish	*L. cyanellus*	–/–	X	Known
Warmouth	*L. gulosus*	–/–	X	Likely
Redeye bass	*Micropterus coosae*	–/–	X	Known
Largemouth bass	*M. salmoides*	–/–	X	Known
Smallmouth bass	*M. dolomieui*	–/–	X	Known
Spotted bass	*M. punctulatus*	–/–	X	Known
White crappie	*Pomoxis annularis*	–/–	X	Likely
Black crappie	*P. nigromaculatus*	–/–	X	Known
Percidae (Perches)				
Bigscale logperch	*Percina macrolepida*	–/–	X	Known

1 Occurrence potential either (1) Known, (2) Likely, (3) Possible, or (4) Unlikely.
2 See Section 3.2.9 for Hardhead minnow discussion.
3 Chinook salmon in Folsom Reservoir are introduced via a hatchery-raised stocking program by CDFG for purpose of sport fishing. This population is not considered as a federal or state listed species.
SSC – California Species of Special Concern.

Environmental Effects

Significance Criteria

An alternative would be considered to have a significant effect on fisheries resources if it would:

- Substantially interfere with the movement of any resident or migratory fish.
- Permanently remove or diminish Essential Fish Habitat; or,
- Involve discharges of material into waterways that would pose a hazard to fish.

No Action

Under the no action alternative, construction of the control structure, concrete lining of the spillway chute and stilling basin, and the exploratory cofferdam borings would not occur. Therefore, there would be no direct or indirect impacts to fisheries resulting from control structure, spillway chute and stilling basin construction, concrete batch plant operation, or the cofferdam borings effort. The fisheries population in Folsom Reservoir and Lake Natoma (including the outflow channel) would persist as described in the Existing Conditions above.

Proposed Action

Construction of the control structure and lining of the spillway chute and stilling basin could potentially affect fish species inhabiting Folsom Reservoir, the outflow channel, or Lake Natoma, in an indirect manner. These impacts would be indirect as they would result from temporary water quality degradation due to a breach in either the general storm water pollution control measures, or the concrete batch plant pollution control measures present on-site (see Section 3.3.4 Water Resources and Water Quality for details). Water quality impacts could result from a failure to either of these pollution prevention systems, a large rain event (e.g. 5-10 year event), or a combination of the two. However, a failed pollution prevention system due to human error is not expected, as highly trained, experienced professionals will be responsible for maintaining the SWPPP and all associated BMPs. In addition, it is thought that the storm water pollution prevention systems in place would have the capacity to withstand large rain events. Furthermore, the majority of fish species present are "weedy", resilient, non-native species that have a high tolerance to elevated levels of fine sediment and/or poor water quality conditions in general. Finally, sedimentation or pollution resulting from a failed on-site pollution prevention system would be temporary. Therefore, such potential impacts would be highly unlikely or minimal if such an event were to actually occur, and are not considered significant.

Any controlled blasting activities associated with excavation of the foundation for the control structure will occur on land only. It is not expected that any debris from the blasting area would enter the water, as the blasting area would be controlled, of a limited size, and is located a safe distance away from the shoreline. A physical barrier such as k-rails (temporary concrete traffic barriers) or silt fences would be established between the construction area and the shoreline to prevent any construction-related activities from affecting fishery resources. The k-rails would also prevent construction vehicles form traversing into wet portions of the reservoir. As a result, no significant effects resulting from blasting of the control structure foundation would occur.

Any effect on fish due to the exploratory cofferdam borings would occur in Folsom Reservoir only. However, as the borings will take place during low reservoir levels between October and November of 2011, in all likelihood the drilling would occur in the dry and would therefore not impact fish within Folsom Reservoir.

In the unlikely event that any drilling has to be carried out in the wet, it is anticipated that such activity would take place within shallow depths. In this case effects to fish resulting from either noise or suspended sediment would be minimized significantly, as the area has very little habitat (i.e. vegetative cover) that the majority of the shoreline-inhabiting fish species are known to utilize (e.g. non-native bass and sunfish). Little habitat exists due to the large fluctuations in water levels that occur as a result of seasonal operation of the Folsom Dam facility. This has created an area that is homogeneous in character, consisting of mainly sand substrate and no vegetation. Other fish species such as hatchery-raised rainbow trout or Chinook salmon do not typically utilize shoreline areas and prefer the open water column. This would minimize any effects to these fish species resulting from drilling. Furthermore, any noise or suspended sediment impact would be short-term, localized, and relatively minor. This is because fish affected by noise or increased turbidity would most likely leave the area. Any suspended sediments generated by drilling, albeit minimal in quantity, would settle out quickly. Any drilling that would occur within shallow depths along the barren shoreline are not anticipated to have a significant effect on fish species.

Negative impacts to fish species due to the accidental release/spill of oil, gas, or drilling and processing waste, although highly unlikely, could occur. However, exposure to these pollutants would be both unlikely and temporary. This is due to the fact that drilling will most likely take place in the dry, fish presence in the immediate area is presumed to be low, and fish would vacate the area should a spill occur. Significant effects to fish caused by accidental spill or release of oil, gas, or drilling and processing waste is not expected during the exploratory cofferdam borings effort.

Mitigation

The potential negative effects on fisheries in the project area resulting from construction of the control structure and concrete lining of the spillway chute and stilling basin would be indirect, resulting from short-term water quality degradation. As such, all pertinent mitigation measures for fisheries are the same as those listed for water quality and resources in Section 3.3.4. In summary, compliance with the various water quality permits needed for this project, including implementation of the SWPPP and its associated BMPs, would reduce potential, indirect effects to less-than-significant.

The highest recommended mitigation measure for effects due to the exploratory borings for the cofferdam is complete avoidance of noise impacts by not conducting any drilling in the wet. As it is very unlikely that any borings would take place in the wet, effects on fisheries due to noise are less than significant. Further mitigation measures include controlling and proper disposal of all fuels, oils, lubricants, or other fluids used for boring. Implementation of these additional mitigation measures would further ensure that potential impacts to fisheries in the project area are at a less-than-significant level.

3.3.7 Cultural Resources

Existing Conditions

The discovery of gold in northern California in 1849 led to increased population growth in Sacramento and the surrounding cities. As some sources of gold were used up miners disappeared and settlers moved upstream and into the foothills around Sacramento. The juncture of the North and South Forks of the American River was settled by miners and after the railroad to Folsom was completed the city became a major destination for many groups of people, including a sizeable Chinese population. Mining activities took the form of dredging operations in 1900 and the population of Folsom slowly grew in the beginning decades of the new century.

Folsom Dam and Reservoir, and its surrounding area have had an important role in the history of water and growth in California.   During the 1920’s drought, water rights, and a lack of sufficient storage facilities endangered the State’s agricultural future. As a result, the CVP was designed and constructed. Before the construction of Folsom Dam, there was great concern in the Sacramento region about potential flooding if both the Sacramento and American Rivers should ever crest at the same time.

Construction began on Folsom Dam in 1948 under contracts supervised by the Corps. In 1956, the dam joined the overall CVP, and Reclamation took possession of the dam for operation and maintenance on May 15, 1956. The addition of the dam to the CVP operations added significant reservoir size to the dams on the Trinity, American, and Stanislaus Rivers. As a component of the CVP, Folsom Dam has been a significant contributor to the water and agricultural history of California. As an individual structure, Folsom Dam has had an important effect on flood control in the Sacramento region.

Records Search, Literature Review, Field Investigations

A records and literature search was conducted at the North Central Information Center located at California State University, Sacramento on March 13, 2009 for a previous phase of the overall JFP. The records search indicated that, other than those areas within the Folsom Lake reservoir, the entire project area has been previously surveyed for cultural resources. For the project area there are two known cultural resources within or directly adjacent to the area of potential effects (APE). Folsom Dam (which includes Folsom Dam, its associated Left and Right Wing Dams and Dikes) was found eligible for listing in the National Register of Historic Places (NRHP) in 2006. The second cultural resource, PLI-FDEIS-1, is a possible prospecting pit with associated spoil piles and drainage identified slightly east of Dike 8 near the MIAD borrow disposal and storage area. On April 7, 2009, Corps archeology staff conducted an archeological site visit of the project area. There were no additional cultural resources discovered during the site visit.

Native American Coordination

Letters dated June 3, 2010 were sent to the Shingle Springs Band of Miwok Indians and the United Auburn Indian Community of the Auburn Rancheria. For a previous phase of the JFP a representative of the Shingle Springs Band of Miwok Indians contacted us to inform us that they are unaware of any traditional cultural properties or sacred sites within or near the project area. The APE is located in areas of solid bedrock granite, areas disturbed by the original Folsom Dam construction and the more recent construction of the Folsom Bridge and the Bureau of Reclamation's excavation of the spillway. Additionally, the lakebed areas around Folsom Overlook that are within the APE and are inundated by the reservoir appear to be steep enough to preclude prehistoric occupation.

Environmental Effects

Significance Criteria

Any adverse effects on cultural resources that are listed or eligible for listing in the NRHP are considered to be significant. Effects are considered to be adverse if they alter, directly or indirectly, any of the characteristics of a cultural resource that qualify that resource of the NRHP so that the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association is diminished.

No Action

This alternative would have no effect on existing cultural resources or historic properties in or near the project areas.

Proposed Action

The proposed action would have no adverse effect on any cultural resources that are listed or eligible for listing in the NRHP. PLI-FDEIS-1, a possible prospecting pit, will be avoided by the proposed action. Folsom Dam and Dikes, resources eligible for listing in the NRHP, are located outside the APE or, in the case of Dikes 7 and 8 which will be used as a haul road and as staging areas, will not alter directly or indirectly any of the characteristics that make the resources eligible for listing in the NRHP. Additionally, the dikes in this area have been repeatedly used during various construction efforts undertaken by the Corps and the Bureau of Reclamation in the last few years. These efforts were previously determined during consultation with the State Historic Preservation Officer (SHPO) as resulting in no adverse effect to Folsom Dam or Dikes.

The proposed actions at the Folsom Overlook, in the Spillway, and in the APE have very little chance of disturbing buried resources. Much of the APE was built up from compacted loose rock and fill material from the dam construction. Within the reservoir, the steepened areas have also been stripped of all soil and sediment from wave and wash action. Due to these previous extensive disturbances in this area, including the recent excavation of the Spillway, there is little chance of encountering potential historic properties.

Mitigation

For the proposed action there would be no adverse effects to cultural resources and no mitigation would be required. Should any potentially significant cultural resources be discovered during construction, all ground-disturbing activities would cease in the area of the discovery, and take action as required by 36 CFR 800.13(b), "discoveries without prior planning". Data recovery or other mitigation measures might be necessary to mitigate adverse effects to significant properties. Implementation of mitigations measures, which may include avoidance and recordation or evaluation of a previously unidentified historic property by a qualified archeologist, would reduce this impact to a less-than-significant level.

4.0 CUMULATIVE AND GROWTH INDUCING EFFECTS

4.1 Introduction

NEPA and CEQA require the consideration of cumulative effects of the proposed project combined with the effects of other projects in and around the project vicinity. NEPA defines a cumulative effect as an effect on the environment that results from the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (CFR 40 Part 1508.7). The CEQA Guidelines define cumulative effects as "two or more individual effects which, when considered together, compound or increase other environmental impacts" (Section 15355).

Regulatory Background.

The NEPA regulations and CEQA Guidelines require that an EA/EIR discuss project effects that, when combined with the effects of other projects, result in significant cumulative effects. Cumulative effects are defined as "The effect on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor of collectively significant actions taken over a period of time" (CFR 40 Part 1508.7).

Cumulative effects under the CEQA Guidelines are defined as "two or more individual effects which, when considered together, compound or increase other environmental impacts" (Section 15355). The Guidelines require that an EIR discuss cumulative effects "when they are significant" (Section 15130). The CEQA Guidelines also state: "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to the other closely related past, present, and reasonable foreseeable probable future projects" (Section 15355).

Methodology

The geographic boundaries for this assessment are Douglas Boulevard/Folsom Dam Road/Green Valley Road on the north, Hazel Avenue on the west, El Dorado Hills Boulevard on the east, and Highway 50 on the south. The project area for the noise, air, and transportation and circulation analyses is within the boundaries of the cumulative effects study area. Construction of the project is anticipated to begin in the fall of 2011 and could continue through 2016. Specific site conditions will determine the amount of work that could take place during each construction season.

Cumulative effects are evaluated by identifying projects in and around the Folsom Dam vicinity that could have significant, adverse, or beneficial environmental effects. The potential significant effects are compared with the potential adverse and beneficial effects of the proposed alternative to determine the types and significance of potential cumulative effects. Additional detailed information on cumulative effects in the proposed project area is included in the FEIS/EIR (Reclamation 2007).

4.2 Geographic Scope

The geographic scope for cumulative impact analysis at Folsom Dam is generally larger than the boundaries for the resource impact analysis. The geographic scope for cumulative impact analysis varies depending on the type of environmental resources being considered. When considering the combined effects to identify cumulative impacts; the affected geographic area of other projects may also vary depending on the type of environmental effects being assessed. The following are the general regional geographic areas associated with the different resources addressed in the analysis:

- Noise: area under the jurisdiction of the City of Folsom and Sacramento County.
- Air Quality: area under the jurisdiction of the SMAQMD.
- Traffic and Circulation: roadways in the project region where traffic generated by multiple projects might interact on a cumulative basis.

4.3 Past, Present, and Reasonably Foreseeable Future Projects

Related Projects

The identified projects in the vicinity of the project area are briefly described below. Each of the identified projects is required to evaluate the effects of the proposed actions on environmental resources in their respective areas. Accordingly, mitigation or mitigation measures must be developed to avoid or reduce any adverse effects to less than significant based on Federal and local agency criteria. Effects that cannot be avoided or reduced to less than significant are likely to contribute to cumulative effects in the area. Timing and sequencing of construction activities for each of the projects are not yet determined and will affect the findings of the cumulative effects analysis.

Central California Area Office Building Replacement Project. (Reclamation) Phase I Fall 2009, Phase II Spring 2011. Removal of several existing buildings and the construction of a new maintenance center and administrative building for Reclamation.

El Dorado 50 – HOV lanes. (California Department of Transportation). Fall 2008 to Summer 2013. This project will construct bus-carpool (HOV) lanes in the eastbound and westbound directions by widening U.S. Highway 50 from approximately El Dorado Hills Boulevard to just west of Greenstone Road. The project will ultimately extend the current HOV lane system to provide approximately 23 continuous miles of eastbound and westbound HOV lanes between Sacramento and El Dorado counties. The project also includes bridge modifications, lighting improvements and new asphalt overlay. The project will be constructed in three phases: Phase 1 will extend the current HOV lanes from their existing terminus west of El Dorado Hills Boulevard to west of Bass Lake Road. Construction is scheduled to start in Fall 2008 with completion in Summer 2010. Phase 2 will extend the lanes from west of Bass Lake Road to approximately Ponderosa Road. Construction is currently targeted to start in Summer 2009 with completion in late Fall 2011. Phase 3 will extend the lanes from Ponderosa Road to just west of Greenstone Road. Construction is currently targeted to start in Summer 2011 with completion in late Winter 2013 (Caltrans 2007).

Folsom Joint Federal Project. Folsom Dam Phase II Safety Modification (Reclamation). Spring 2009 to Fall 2010. Major work includes partial excavation of the western portion of the auxiliary spillway, construction of the downstream cofferdams, relocation of Natoma Pipeline, and the creation of an access road to the stilling basin. This portion of the JFP was covered under the FEIS/EIR. This work will be completed prior to the start of the Control Structure construction effort.

Folsom Joint Federal Project. Dike 4 and 6 Repairs. (Reclamation). Summer 2009 to Fall 2010. To address seepage concerns due to static and hydrologic loading for Dikes 4 and 6, Reclamation will install full height filters, toe drains, and overlays on the downstream face of each earthen structure. This portion of the JFP was covered under the FEIS/EIR.

Folsom Joint Federal Project. Pier Tendon Installation, Spillway Pier Wraps, and Braces at Main Concrete Dam. (Reclamation) Winter 2010 through Winter 2012. This portion of the JFP was covered under the FEIS/EIR.

Folsom Joint Federal Project. Mormon Island Auxiliary Dam Modification. (Reclamation). Summer 2010 to Summer 2012. Reclamation released the Draft EIS/EIR for the MIAD Modification Project in December 2009. The preferred MIAD action alternative of jet grouting selected in the FEIS/EIR was determined to be neither technically nor economically feasible. Four action alternatives were analyzed in the MIAD Draft Supplemental EIS/EIR. All alternatives address methods to excavate and replace the MIAD foundation, place an overlay on the downstream side, and install drains and filters; the alternatives differ only in their method of excavation. In addition, all four action alternatives in the Draft Supplemental EIS/EIR include habitat mitigation proposed for up to 80 acres at Mississippi Bar on the shore of Lake Natoma to address impacts from the JFP.

Hazel Avenue Project. (Sacramento Department of Transportation). Summer 2009 to Summer 2010. The primary portion of this work involves (1) widening Hazel Avenue from four to six lanes over the American River Bridge from S.R. 50 to Curragh Downs Drive, (2) construction of new bicycle and pedestrian facilities, to include bike lanes and a barrier separating bicycle/pedestrian/equestrian modes from vehicle traffic on the bridge over the American River, (3) improved connections to American River bike trail, (4) architectural treatments on the bridge structure and decorative street lighting, and (5) traffic signal modifications at Curragh Downs Drive, Gold Country Boulevard and Tributary Point (SacDOT 2010).

Raw Water Bypass Pipeline Project. (Reclamation) Summer and Fall 2009. This project involves construction of a permanent raw water bypass pipeline to ensure delivery of Folsom Reservoir water to San Juan Water District and the City of Roseville during planned and unplanned outages of Reclamation's existing 84-inch diameter pipeline (San Juan Water District 2009).

4.4 Cumulative Effects

Analysis of Potential Cumulative Effects

Chapter 3 of this EA/EIR identifies the affected environment and includes impact analyses and mitigation measures of the proposed action with respect to noise, air quality, and transportation and circulation, water quality and resources, fisheries, and cultural resources. The results are assessed in the following cumulative effects analysis in terms of their potential to combine with similar environmental effects of the projects listed above. The analysis is focused on considering the potential for those impacts identified in Chapter 3 to make a considerable contribution to significant adverse cumulative effects. An initial qualitative assessment of potential cumulative effects indicated that air quality, noise, and transportation and circulation had the potential to contribute to cumulative impacts. Each of these resources will be addressed below.

The discussion of cumulative impacts shall focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact. For example, if another project contributes only to a cumulative impact upon natural resources, its impacts on public services need not be discussed as part of cumulative impact analysis.

4.4.1 Air Quality

The control structure and lining of the spillway chute and stilling basin at Folsom Dam could potentially overlap with ongoing Reclamation and DOT projects that are in and around the vicinity of the Folsom Facility. These concurrent construction activities could have significant adverse cumulative air quality effects. It is expected that impacts from these projects would be similar to the current project in that impacts would be due primarily to construction. Construction of these projects would increase emissions of criteria pollutants, including VOC, NO_X, CO, SO_2, and PM emissions, from onsite construction and transport of materials.

Individually these projects will mitigate emissions below significance thresholds levels. If these construction projects are implemented concurrently, the combined cumulative effects could be above CEQA thresholds for air quality emissions and the GCR de minimus thresholds. If this were the case, without consideration of scheduling and sequence of activities, concurrent construction projects within and adjacent to Folsom Reservoir could have adverse cumulative air quality impacts although these impacts would be temporary. To address these potential cumulative effects, the Corps would coordinate the scheduling and sequence of construction activities with Reclamation and SMAQMD. For example, should construction activities such as excavation significantly overlap such that SMAQMD thresholds would be exceeded, the agencies would stagger the work in order to comply with the thresholds, reducing the potential for cumulative effects. This coordination would reduce any potential air quality effects to less than significant.

4.4.2 Climate Change

It is unlikely that any single project by itself could have a significant impact on the environment with respect to GHGs. However, the cumulative effect of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which, in turn, have been shown to be the main cause of global climate change (IPCC 2007). Therefore, the analysis of the environmental effects of GHG emissions is inherently a cumulative impact issue. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative effect with respect to global climate change.

With respect to global warming, CO2 is tracked as a contributor to GHG emissions. The SMAQMD has emissions models for projects in the Sacramento Valley area. These models calculate air emissions based on construction phase, duration, type of equipment, project area, and other input criteria. The analysis for air quality impacts in Chapter 3 includes CO2 emission calculations.

It is expected that impacts from the local projects would be similar to the proposed project in that effects would be due primarily to construction. On an individual basis, these projects would mitigate emissions below significance threshold levels. If these projects are implemented concurrently, the combined cumulative effects could be above reporting requirements for GHG emissions. If this was the case, without consideration for scheduling and sequence of activities, concurrent construction projects within and adjacent to Folsom Dam could have temporary, adverse cumulative effects on climate change. To address these potential cumulative effects, the Corps would coordinate the scheduling and sequence of construction activities with Reclamation and SMAQMD. For example, should construction emissions that contribute to climate change (GHG) significantly overlap such that SMAQMD thresholds or the reporting requirements for CO_2 would be exceeded, the agencies would stagger the work in order to comply with the thresholds, reducing the potential for cumulative effects. This coordination would likely reduce any potential effects to less than significant.

4.4.3 Noise

The specific cumulative impacts for the control structure and lining of the spillway chute and stilling basin at Folsom Dam are evaluated for each construction phase by modeling the effects of each noise source in the equipment list. This worst-case scenario analysis includes modeling all stationary equipment, mobile construction equipment, and half of "transit" construction vehicles (including construction phases that use the haul road to and from Dike 7 and MIAD for disposal of excavated material or subsequent loading of coarse material for stockpiling and use at the batch plants).

The project could likely overlap with ongoing Reclamation and DOT projects that are in and around the vicinity of the Folsom Facility. It is expected that noise impacts from these projects would be similar to the current project in that impacts would result primarily from construction activities. Simultaneous construction of these projects would increase noise levels from onsite construction and transport of materials. The worst-case assumption indicates that simultaneous construction at the Folsom Facility could potentially increase source noise emissions. If these construction projects are implemented concurrently, the combined cumulative effects could be above significance thresholds, although these impacts would be temporary. Coordination of construction activities with Reclamation and DOT projects would occur throughout the project in an effort to keep potential noise impacts to below significance thresholds. This coordinated effort would be adjusted based on any feedback that is received from the City of Folsom. These coordination efforts would reduce any potential noise effects to less than significant.

4.4.4 Traffic

The control structure and lining of the spillway chute and stilling basin at Folsom Dam would likely overlap with ongoing Reclamation and DOT projects at, and surrounding, the Folsom Facility. It is expected that traffic impacts from projects at the Folsom Facility could be similar to the current project in that impacts would be primarily from the hauling of equipment and material to and from the proposed project sites and the daily commutes of the workers on-site.

The Folsom Dam area construction site is a dynamic area with many concurrent and ongoing activities along with general day-to-day operations. The adjacent roadway network is currently operating at LOS of C or higher which is indicative of a developed, active area. Continued construction activities and the requisite additional traffic demands due to labor force access and materials deliveries are expected to be ongoing, however minor in nature and not affecting the existing traffic patterns or operation to a significant degree. The construction activities associated with the proposed action will be sequenced thereby not allowing concentrated traffic volumes for any isolated durations. Additionally, the local and state government's general roadway improvements and maintenance such as resurfacing programs, signal timing improvements and safety upgrades are anticipated to provide improvements to the network. Each of the related projects listed above would perform a similar analysis, and would reduce any effects to less than significant. The Corps would coordinate the scheduling and sequence of construction activities with Reclamation and DOT to reduce any potential cumulative effects to less than significant. For example should the City of Folsom indicate to either the Corps or Reclamation that local traffic conditions were unacceptable due to the construction activities, the agencies would coordinate to stagger the construction-related traffic, reducing the potential for cumulative effects.

4.4.5 Water Resources and Quality and Fisheries

The geographic scope for the water resources, water quality, and fisheries cumulative effects analysis includes Folsom Reservoir in the immediate vicinity of the project area, the outflow channel below Folsom Dam (i.e. the Lower American River channel), and Lake Natoma. Potential cumulative effects on water resources, water quality, and fisheries in the project area are discussed in unison, because they are intertwined.

Construction of the control structure and concrete lining of the spillway chute and stilling basin would result in increased flood damage reduction. This impact would be beneficial to surrounding urban areas and communities downstream along the Lower American River corridor. The other remaining components of the JFP (e.g. MIAD Modification by Reclamation; see Reclamation 2010) have the potential to further increase dam safety and flood damage reduction of these communities through additional improvements. These projects would culminate in beneficial long-term cumulative impacts for flood damage reduction and dam safety.

Construction of control structure and concrete lining of the spillway chute and stilling basin, in combination with existing and probable future projects, could potentially affect water quality and fisheries in the area adjacent to Folsom Dam. The MIAD Modifications Project (Reclamation 2010), as well as the Raw Water Bypass Pipeline and CCAO Building Replacement Project all have the potential to create storm water runoff that could be discharged to the Lower American River upstream of Lake Natoma. These projects could adversely affect water quality and fisheries in these waters through clearing, grading, and foundation excavation work that could increase the potential for soil erosion and subsequent turbidity. During the rainy season, storm water runoff from areas that have been cleared for these projects may contain high levels of suspended sediments. However, these projects are not thought to potentially impact Folsom Reservoir (Reclamation 2010). The MIAD Modification Project would also discharge groundwater to Humbug Creek, a tributary of the Lower American River. Together, these projects along with construction of the control structure and concrete lining of the spillway chute and stilling basin, could potentially result in a cumulative effect on water quality, and indirect effects to fisheries.

Implementation of the appropriate mitigation measures for each these identified projects, along with the mitigation measures for construction of the control structure, and concrete lining of the spillway chute and stilling basin, which include implementation of a SWPPP, BMPs, pertinent permits, and appropriate monitoring and testing, would ensure that degradation of water quality is limited. This would also limit the potential for indirect significant effects to fisheries resources. The analysis results for potential impacts from construction of the control structure and concrete lining of the spillway chute and stilling basin were less than significant; thus, the contribution to cumulative effects on water quality and fisheries would be reduced considerably. Achieved compliance with NPDES water quality permits, including implementation of mitigation measures proposed in this supplemental EA/EIR, combined with mitigation and compliance for the MIAD Modifications Project, Raw Water Bypass Pipeline, and CCAO Building Replacement Project, would reduce the potential cumulative impacts on water quality and fisheries to a less than significant level.

4.5 Growth Inducing Effects

The proposed action would not directly remove obstacles to growth, result in population increases, or encourage and facilitate other activities that could significantly affect the environment. New development must be consistent with existing City and County general plan policies and zoning ordinances regarding land use, open space, conservation, flood protection, and public health and safety. Local population growth and development would be consistent with the most current Land Use Element of the County of Sacramento General Plan. The project area is zoned specifically for flood control activities, recreation, and Folsom State Prison activities. These land uses would not change due to the construction of the proposed project, or any of the related projects in the area. In addition, construction, operation, and maintenance of the improvements would not result in a substantial increase in the number of permanent workers or employees.

5.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

5.1 Federal Requirements

Clean Air Act of 1972, as amended, 42 U.S.C. 7401, et seq. *Full Compliance*. Section 3.3.1 discusses the effects of the proposed project on air quality. An analysis of air quality effects from the proposed action was completed and based on the modeling conducted, it is foreseeable that unmitigated construction generated emissions would exceed the applicable Federal air quality standards for PM_{10} and NO_X. However, with implementation of mitigation measures identified in Section 3.3.1 above, emissions would be reduced below the EPA's general conformity de minimis thresholds.

Clean Water Act of 1972, as amended, 33 U.S.C. 1251, et seq. *Full Compliance*. The potential effects of the proposed project on water quality have been evaluated and are discussed in section 3.3.5. As a result, the proposed project would have no adverse effects on water quality. Compliance with Clean Water Act Section 404(b)(1) was not required, as there will be no fill or discharge of material into the waters of the U.S. The contractor will be obtaining three water quality permits for this project. Each permit is pertinent to different aspects of construction activity and associate potential pollutants. The following National Pollutant Discharge Elimination System permits will be obtained:

1. Storm Water Permit: NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities.

2. Industrial Storm Water Permit: NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities.

3. Limited Threat Discharge Permit: NPDES Permit for Limited Threat Discharges of Treated/Untreated Groundwater to Surface Water.

As part of these permits, the contractor will be required to implement best management practices to avoid and minimize any adverse effects of construction on surface waters.

Endangered Species Act of 1973, as amended, 16 U.S.C. 1531, et seq. *Full Compliance*. A list of threatened and endangered species that may be affected by the project was obtained from USFWS (Appendix B) and from the USFWS as part of the USFWS draft Coordination Act Report (Appendix A). Due to the lack of suitable habitat for any of the species listed, the Corps has determined that the project would have "no effect" on Federal special status species, therefore no consultation was required.

Executive Order 11988, Floodplain Management. *Full Compliance*. The objective of this Executive Order is the avoidance, to the extent possible, of long-and short-term adverse effects associated with the occupancy and modification of the base flood plain (1 in 100 annual event) and the avoidance of direct and indirect support of development in the base flood plain wherever there is a practicable alternative. The proposed project is a portion of the JFP and it has been determined, by the project partners and Congress, that constructing the JFP is the only practicable way to reduce flood risk to the greater Sacramento area. The JFP in combination with other area flood risk projects, protects the existing urban population while providing residual risk information to the appropriate agencies making land use decisions in the area. Therefore the proposed project does not contribute to increased development in the floodplain and is in compliance with the executive order.

Executive Order 11990, Protection of Wetlands. *Full Compliance*. This executive order directs Federal agencies, in carrying out their responsibilities, to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. The project area is not located in or adjacent to wetlands and therefore would have no adverse effects on wetlands.

Executive Order 12989, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. *Full Compliance*. This Executive Order states that Federal agencies are responsible to conduct their programs, policies, and activities that substantially affect human health of the environment in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination under such programs, policies, and activities because of their race, color, or national origin. The benefits of the proposed action would extend to all areas of the greater Sacramento Area. The proposed project is on public land and is not located near any minority or low-income areas or communities.

Farmland Protection Policy Act, 7 U.S.C. 4201 et seq. *Full Compliance*. This act requires a Federal agency to consider the effects of its actions and programs on the Nations' farmland. There are no designated prime or unique farmlands within the project area and therefore there would no adverse effects to farmland.

Fish and Wildlife Coordination Act of 1958, as amended, 16 U.S.C. 661, et seq. *Full Compliance*. This act requires Federal agencies to consult with the FWS and State fish and game agencies before undertaking or approving water projects that control of modify surface water. Federal agencies undertaking water projects are required to fully consider recommendations made by the FWS in project reports. The USFWS and CDFG have participated in evaluating the proposed project. The USFWS has provided a Coordination Act Report (Appendix A).

Magnuson-Stevens Fishery Conservation and Management Act. *Full Compliance*. This legislation requires that all Federal agencies consult with National Marine Fisheries Service regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect essential fish habitat. Essential fish habitat is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Corps has determined the project would have "no effect" on Federal special status species and essential fish habitat.

Migratory Bird Treaty Act of 1936, as amended, 16 U.S.C. 703 et seq. Partial *Compliance*. This Act provides protection for migratory birds as defined in 16 USC 715j. The proposed action is located in an existing construction area and currently does not support suitable nesting habitat for migratory birds. Therefore, the proposed project would not result in the removal of any suitable nesting habitat. To ensure the project would not affect migratory birds, preconstruction surveys in areas adjacent to the project site, by a biologist would be conducted. If breeding birds are found in the area, a protective buffer would be delineated and USFWS and CDFG would be consulted for further actions.

National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, et seq. *Full Compliance*. This final document is in full compliance with this act. Comments received during the public review period have been considered and incorporated into the final document, and a comments and responses section has been prepared (Appendix F). The final EA is accompanied by a FONSI.

National Historic Preservation Act of 1966, as amended. *Full Compliance*. The project is in full compliance with Section 106 of the National Historic Preservation Act (36 CFR 800).

Letters to potentially interested Native Americans were sent on June 3, 2010. To date no responses have been received. A letter dated July 19, 2010 was sent to the State Historic Preservation Officer (SHPO) initiating consultation under 36 CFR Part 800.3. A response from SHPO dated July 26, 2010 concurred with the Corps' determination of the APE and identification efforts as well as the Corps' finding of no adverse effect to historic properties in accordance with 36 CFR 800.5(b). Correspondence to potentially interested Native Americans and letters to and from the SHPO are included in Appendix E.

Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq. *Full Compliance*. This act was enacted to preserve selected rivers or sections of rivers in their free-flowing condition in order to protect the quality of river waters and to fulfill other national conservation purposes. The Lower American River, below Nimbus Dam, has been included in the Federal Wild and Scenic Rivers system since 1981. The proposed project is located above this reach of the river and therefore, does not affect this portion of the Lower American River.

5.2 State of California Requirements

California Environmental Quality Act. *Full Compliance*. This joint NEPA/CEQA document would fully comply with CEQA requirements. The CVFPB will consider certifying the EIR and adopting findings. This action would provide full compliance for CEQA.

California Endangered Species Act. *Full Compliance*. This act requires the non-Federal agency to consider the potential adverse affects of State-listed species. As a joint NEPA/CEQA document, this EA/EIR has considered the potential effects and has determined that due to the lack of suitable habitat for any State-listed species, the project would have "no effect" on State special status species associated with the proposed action covered in this document.

State Water Resources Control Board, Division of Water Quality, and California Water Quality Control Board, Central Valley Region. *Full Compliance*. The State WRCB and the RWQCB for the Central Valley review activities that affect water quality. The Boards administer the requirements mandated by the State and Federal law (Clean Water Act). The RWQCB establishes water quality standards and reviews individual projects for compliance with the standards.

State Lands Commission. *Full Compliance*. The State Lands Commission has exclusive jurisdiction over all ungranted tidelands and submerged lands owned by the State and the beds of navigable rivers, sloughs, and lakes. A project cannot use these State lands unless a lease is first obtained from the State Lands Commission. The project would not use any submerged land under their jurisdiction and would not require a lease.

Central Valley Flood Protection Board (California Water Code, Title 23). *Fulll Compliance*. The CVFPB regulates encroachments within an adopted plan of flood control and set permissible work periods for regulated streams, including the excavation, borrow, and vegetation activities (including plantings and removal) within the channel. This project is not located within a flood prone area and therefore would not need an encroachment permit from the CVFPB.

5.3 Local Laws, Programs and Permit Requirements

Sacramento Metropolitan Air Quality Management District (SMAQMD). *Full Compliance*. An analysis of air quality effects from the proposed action was completed. Based on the modeling conducted, it is foreseeable that unmitigated construction generated emissions could result in exceeding the applicable SMAQMD's standards for NO_X. This area is also in a non-attainment area for PM_{10}. However, with implementation of mitigation measures identified in the EA/EIR, emissions would be reduced below the SMAQMD's thresholds.

6.0 COORDINATION AND REVIEW OF EA/EIR

The draft EA/EIR was circulated for 45 days to agencies, organizations, and individuals who have an interest in the proposed project. All comments received were considered and incorporated into the final EA/EIR, as appropriate. This project has been coordinated with all relevant government resource agencies including USFWS, SHPO, CDFG, and CVFPB.

7.0 FINDINGS

Based on the information in this EA/EIR the proposed project would have no significant adverse effects on the quality of the human environment, and the BMPs and other measures proposed in the EA/EIR are sufficient to reduce all potential effects to less than significant. The proposed project meets the definition of a FONSI (40 CFR §1508.13) and therefore an EIS is not necessary. The EIR will be certified by the CVFPB and findings will be adopted completing the CEQA process.

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PLATES

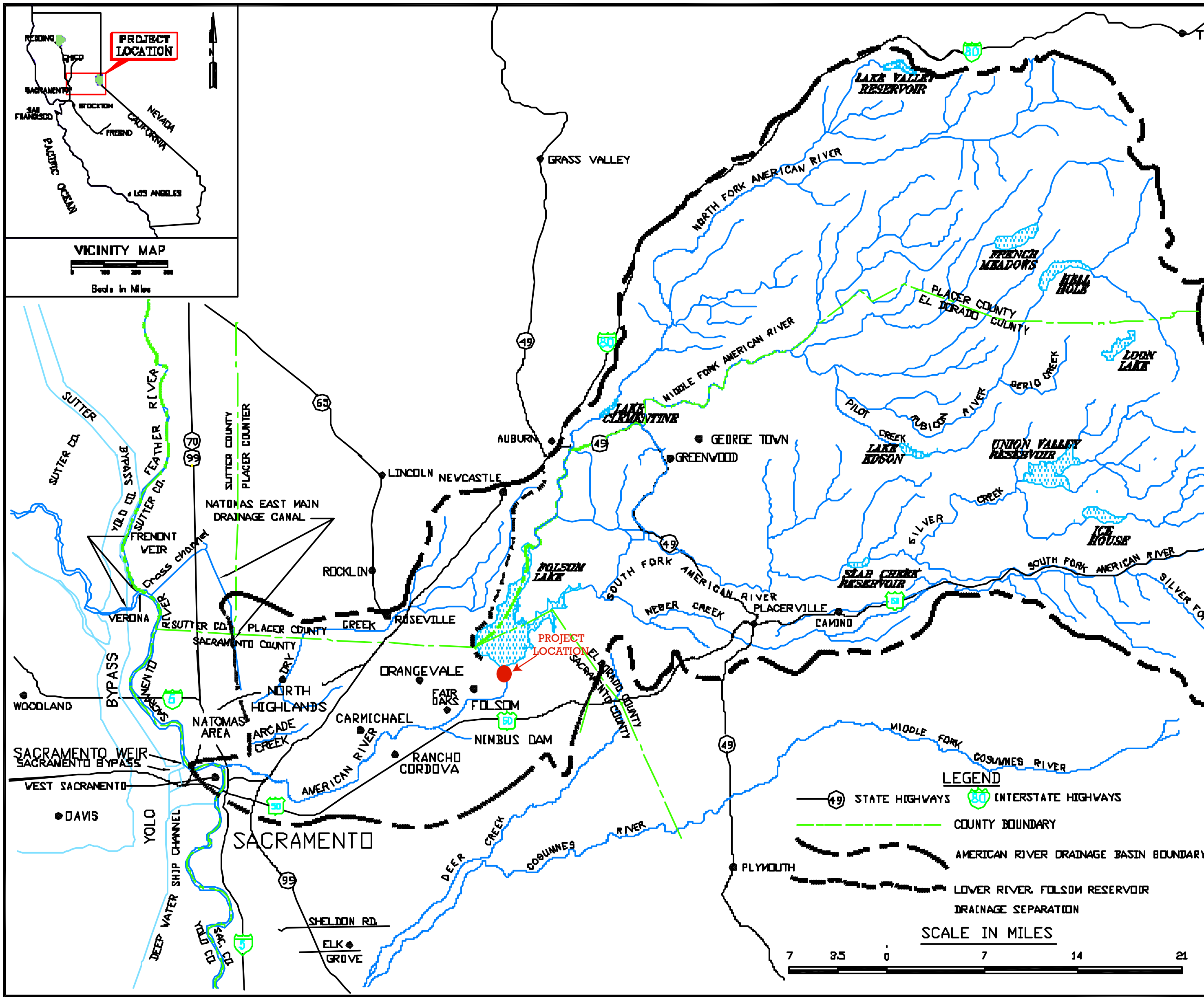


PLATE 1

PROJECT LOCATION AND VICINITY MAP

ORIGINAL SOURCE: AMERICAN RIVER WATERSHED PROJECT, CALIFORNIA, LONG TERM STUDY, FINAL SUPPLEMENTAL PLAN FORMULATION REPORT/EIS/EIR, 2002, US ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
This map is for illustrative purposes only. Some features may not be to scale.

Project

N

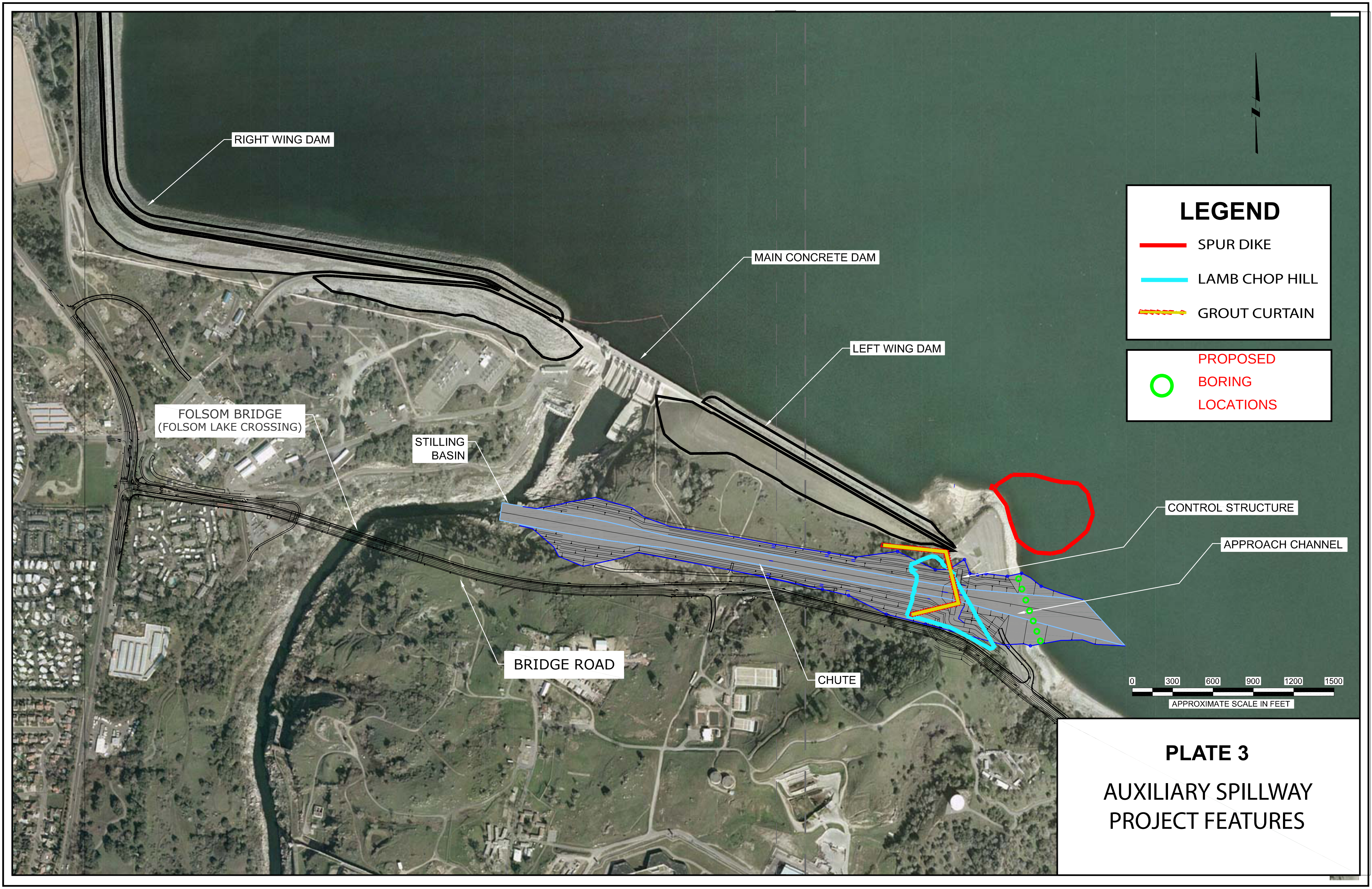
0 500 1,000

FEET

US Army Corps of Engineers

PLATE 2

PROJECT AREA AND FEATURES



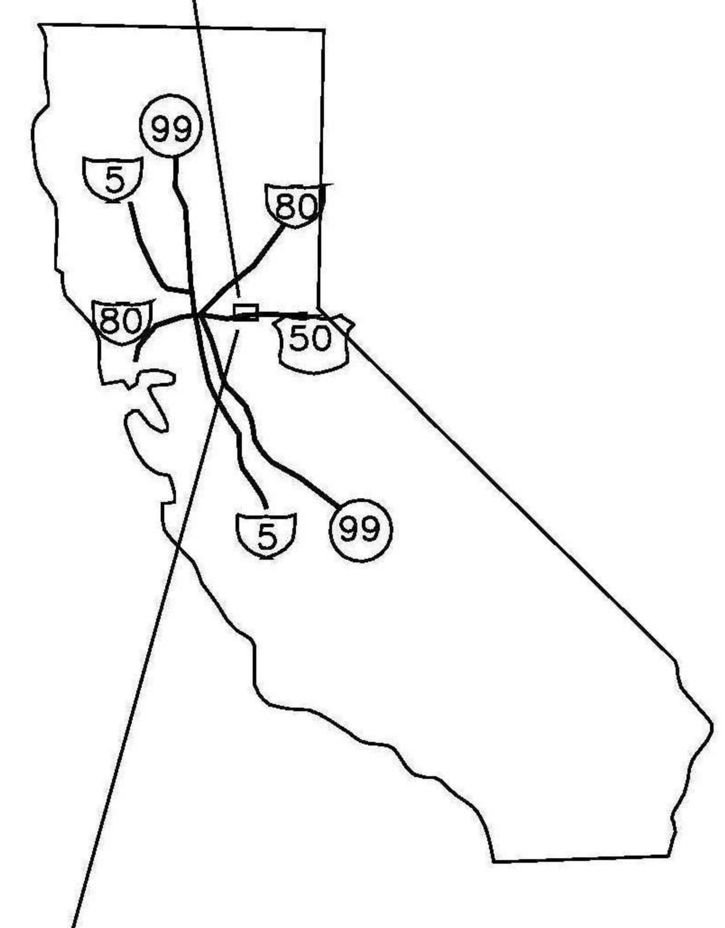
ORIGINAL SOURCE: FOLSOM DAM RAISE AND AUXILIARY SPILLWAY ALTERNATIVE, PROJECT ALTERNATIVE SOLUTIONS STUDY II (PASS II) FINAL REPORT, 200

Note: Some project features are graphically represented and are not to scale. The image is for the purpose of illustration only.

APPROVED COMMERCIAL TRUCK HAUL ROUTE DESIGNATION

H —— H

N



CALIFORNIA STATE MAP

NOT TO STANDARD SCALE

0 1 2

MILES

VICINITY MAP

PLATE 4a

AGGREGATE TRUCK HAUL ROUTES WITHIN & NEAR THE CITY OF FOLSOM BOUNDARIES

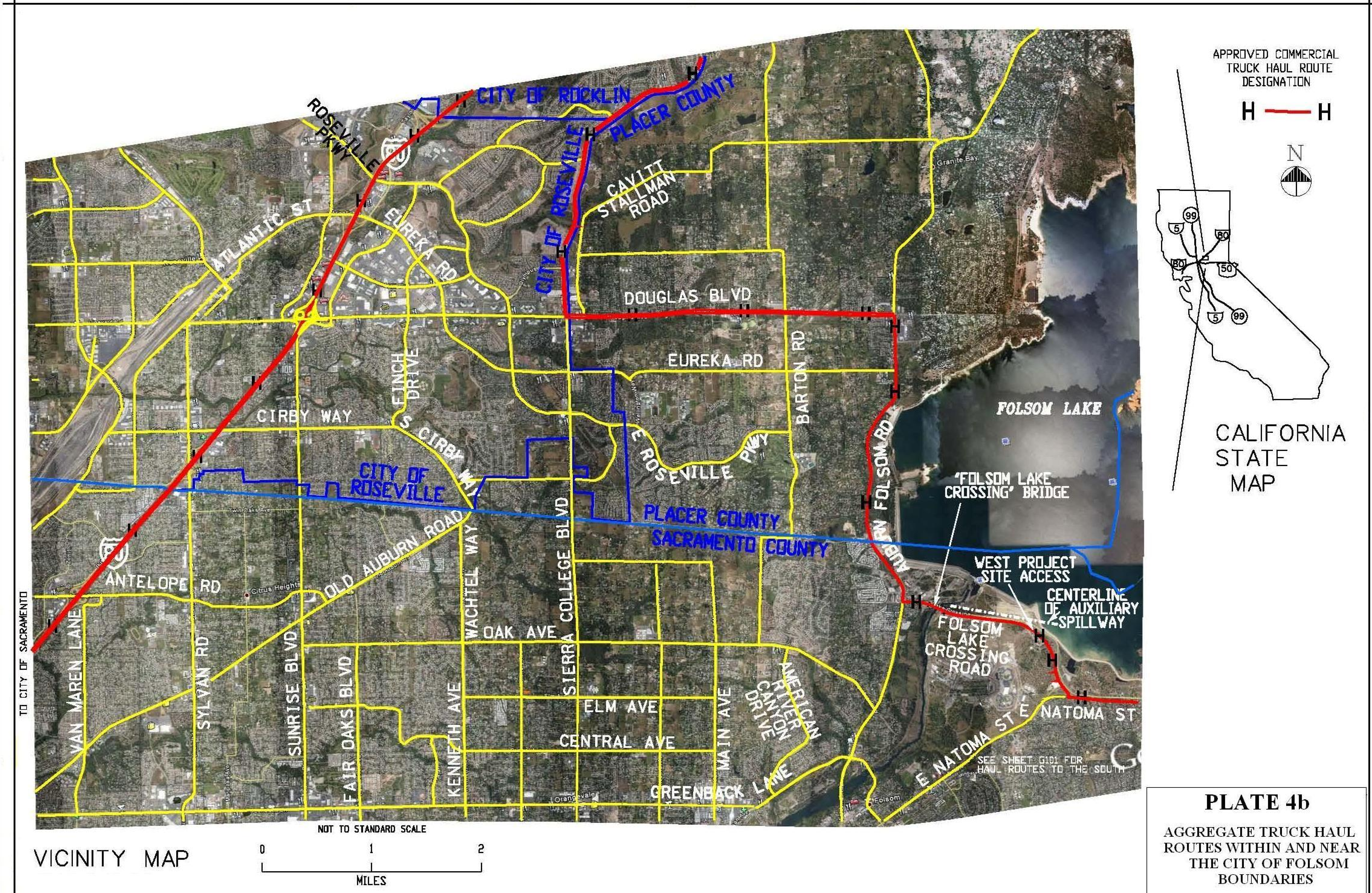


PLATE 4b

AGGREGATE TRUCK HAUL ROUTES WITHIN AND NEAR THE CITY OF FOLSOM BOUNDARIES

Plate 5 – Photographs of the Project Area and the existing, disturbed conditions prior to this Supplemental EA/EIR.

View of the project area looking northwest.

View of the Project area looking southeast.

Receptor Type	Map ID (Figure 2-3)	Receptor Name, Location, and/or Address	Project Phase and Operation of Potential Concern	Long-Term Ambient Noise Monitoring Location ID
RESIDENTIAL	R-1	Lake Pointe Apartments	Phase 1 and 5	LT-6
RESIDENTIAL	R-2	Folsom Prison – North Buildings	All Phases	LT-1
RESIDENTIAL	R-3	Mountain View Drive Residences	All Phases	LT-3
RESIDENTIAL	R-4	Christina Court Residence	Phase 1, 2, and 5	LT-2 and LT-3
RESIDENTIAL	R-5	Lorna Lane Residences	Phase 1, 2, and 5	LT-2 and LT-3
RESIDENTIAL	R-6	Amaya Drive Residence	Phase 1, 2, and 5	LT-2
RESIDENTIAL	R-7	East Natoma Drive Residences	MIAD only	LT-4
RESIDENTIAL	R-8	Singer Lane Residences	MIAD only	NA
RESIDENTIAL	R-9	Ballau Circle Residences	MIAD only	LT-4
RESIDENTIAL	R-10	Church Grounds north of East Natoma Drive	MIAD only	NA
COMMERCIAL / RETAIL	CR-1	East Natoma and Blue Ravine Road	MIAD only	NA
COMMERCIAL / RETAIL	CR-2	North of intersection of East Natoma Drive and Green Valley Road	MIAD only	NA
COMMERICAL / UTILITIES	CU-1	Commercial – Utilities north of Folsom Lake Crossing	Phase 1 and 5	LT-6
RECREATION AREAS	RA-1	Boat Launch	Phase 1, 2, and 5	LT-8
INDUSTRIAL	I-1	Power Plant	Reference only	NA

EXPLANATION:

APPROXIMATE AREAS OF WORK (REFER TO MAIN DOCUMENT)

HAUL ROAD

R-10 SENSITIVE (RESIDENTIAL) RECEPTOR

CR-1 COMMERCIAL, INDUSTRIAL, OR RECREATIONAL RECEPTOR

GRAPHIC SCALE
1:15,000

100 0 100 200 500 1,000m

0 500 1,000 3,000 FT

US Army Corps of Engineers
Sacramento District

JOINT FEDERAL PROJECT
CONSTRUCTION OF THE CONTROL STRUCTURE AND
LINING OF THE SPILLWAY CHUTE AND STILLING BASIN
SUPPLEMENTAL EA/IS

PLATE 6

SITE MAP - SENSITIVE RECEPTORS AND PROPOSED AREAS OF WORK

W92138-09-D-0032

MAY 2010

DOUGLAS GRANT, P.G. PLATE Ver12MAY10

PLATE 7

TRAFFIC STUDY ROADWAY SEGMENTS

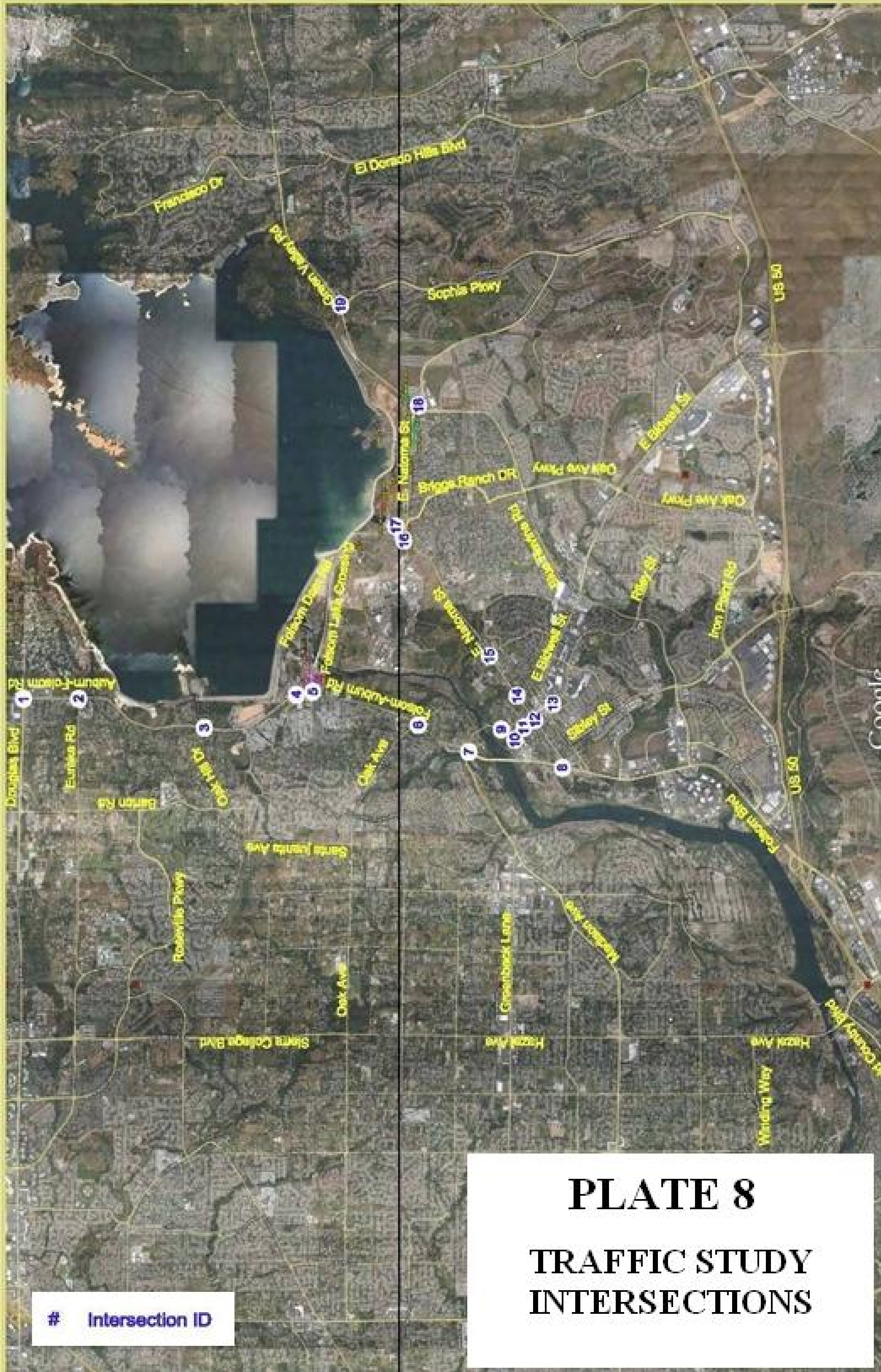


PLATE 8

TRAFFIC STUDY INTERSECTIONS