Chapter 10
Transportation and Circulation

This section describes how construction activities for the MIAD Modification Project would affect the area's transportation and circulation. This includes a description of the area of analysis for MIAD and the Mississippi Bar mitigation site. An accepted methodology has been utilized to analyze the traffic volumes on access routes that would be affected during construction for all alternatives. Appendix C includes multiple tables that support the transportation and circulation analysis.

It is important to note that no permanent or long-term traffic volume increases or changes in traffic patterns are expected as a result of the MIAD Modification Project. Any incremental transportation impacts associated with implementation of the project are limited to the proposed construction years; hence, the focus of analysis presented herein is on those impacts occurring from, and during, MIAD Modification Project construction activities.

10.1 Affected Environment/Environmental Setting

10.1.1 Area of Analysis

The MIAD Modification Project and Mississippi Bar study area includes roadways in the following jurisdictions:

- **Counties** – Yuba, Sacramento, Placer and El Dorado.
- **Communities** – Cities of Folsom, Roseville, Lincoln, Wheatland and Marysville and Community of Granite Bay.

The Sacramento Area Council of Governments (SACOG) serves as the area Metropolitan Planning Organization (MPO) for the region. Local municipalities determine their own criteria for streets and roads while the California Department of Transportation (Caltrans), oversees State highways.

The area is considered to be primarily suburban, low density development to the east of Sacramento. Transportation facilities and services include interstate and State highways, local roads and streets, local transit including local bus service and a light rail line from the City of Folsom to downtown Sacramento. Also, a number of bicycle paths/routes accompany major roads. Finally, a number of commuter bus services are provided within the counties and cities in the area.

10.1.1.1 Mormon Island Auxiliary Dam

Direct access to the proposed work site would be via Natoma Street and Green Valley Road. The new Folsom Bridge, now named Folsom Lake Crossing, has been opened to the public subsequent to filing of the EIS/EIR for the Folsom DS/FDR Project. It is anticipated that this road would be used by workers accessing MIAD from the Roseville and Rocklin areas. Figure 10-1 illustrates the routes that are proposed to be used for providing equipment, workers, and materials for the alternatives.

10.1.1.2 Mississippi Bar

The Mississippi Bar mitigation site includes 80 acres of land on the western shore of Lake Natoma, near the intersection of Sunset Avenue and Main Avenue and south of the community of Orangevale. All proposed mitigation would occur on land parcels currently owned by DPR and Reclamation and managed by DPR as part of the FLSRA. Direct access to Mississippi Bar would occur from US 50 to Hazel Avenue and then to Sunset Avenue and then to the intersection of Sunset Avenue and Main Avenue. Figure 10-1 shows the worker and materials access routes to Mississippi Bar.

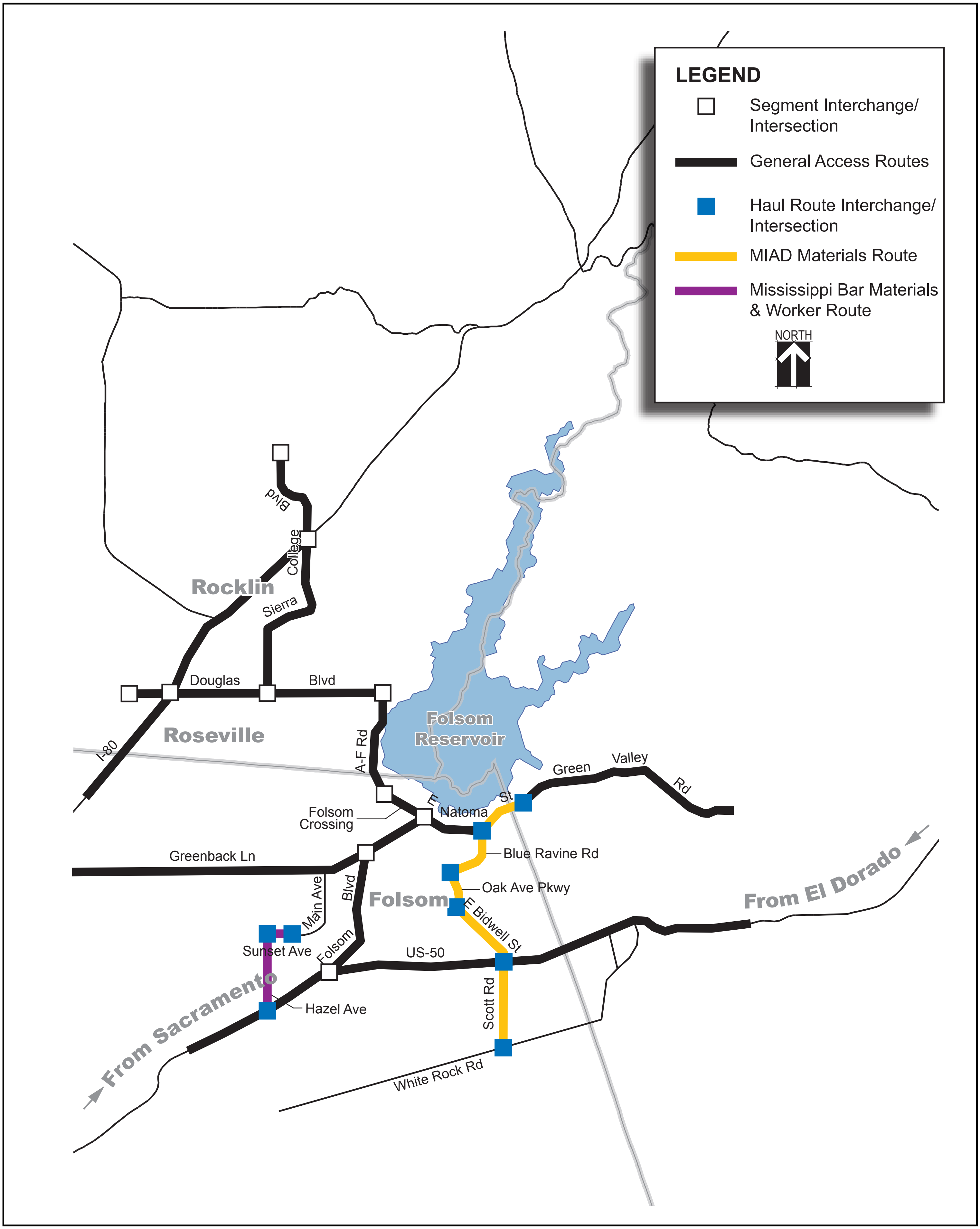

Figure 10-1. Project Transportation Routes

10.1.2 Regulatory Setting

Each of the jurisdictions within the area of analysis, with the exception of the City of Marysville, has adopted standards regarding the desired performance level for traffic conditions on the circulation system within its jurisdiction. Jurisdictions have also developed thresholds to minimize potential effects to traffic conditions from new proposed projects. The standards and thresholds are reflected through the County and City General Plans and typically use a measure called "Level of Service" to categorize traffic conditions. A more detailed explanation of LOS and how it is determined is provided in Section 10.2.1. In general, progressively worsening traffic conditions are given the letter grades 'A' through 'F'. While most motorists consider an 'A', 'B', or 'C' LOS as satisfactory, LOS 'D' is considered marginally acceptable. Congestion and delay are considered unacceptable to most motorists and given the LOS 'E' or 'F' ratings.

Table 10-1 summarizes the local regulatory setting related to traffic conditions, as defined by the LOS standards and thresholds. The standards generally apply to projects that would create a permanent increase in traffic.

Table 10-1. Local and Regional LOS Standards and Thresholds

Regulatory Agency	Level of Service Standards and Identified Thresholds
Sacramento County	**Standards:** Rural collectors: LOS 'D' Urban area roads: LOS 'E' **Thresholds:** *Roadways/Signalized Intersections*: A project is considered to have a significant effect if it would: • Result in a roadway or a signalized intersection operating at an acceptable LOS to deteriorate to an unacceptable LOS; or • Increase the volume to capacity (V/C) ratio by more than 0.05 at a roadway or at a signalized intersection that is operating at an unacceptable LOS without the project. *Unsignalized Intersections*: A project is considered to have a significant effect if it would: • Result in an unsignalized intersection movement/approach operating at an acceptable LOS to deteriorate to an unacceptable LOS, and also cause the intersection to meet a traffic signal warrant; or • For an unsignalized intersection that meets a signal warrant, increase the delay by more than 5 seconds at a movement/approach that is operating at an unacceptable LOS without the project. *Freeway Ramps*: A project is considered to have a significant effect if it would: • Result in a facility operating at an acceptable LOS to deteriorate to an unacceptable LOS, according to the LOS threshold defined by Caltrans. *Freeway Segments*: A project is considered to have a significant effect if it would: • Result in a facility operating at an acceptable LOS to deteriorate to an unacceptable LOS, according to the LOS threshold defined in the Caltrans Route Concept Report for that facility. *Residential Streets*: A project is considered to have a significant effect if it would: • Result in a residential street operating at an acceptable LOS to deteriorate to an unacceptable LOS; or

Table 10-1. Local and Regional LOS Standards and Thresholds

Regulatory Agency	Level of Service Standards and Identified Thresholds
	• Increase the V/C ratio by more than 0.05 at a residential street that is operating at an unacceptable LOS without the project. *Bicycle and Pedestrian Facilities:* A project is considered to have a significant effect if it would: • Eliminate or adversely affect an existing bikeway or pedestrian facility in a way that would discourage its use; • Interfere with the implementation of a planned bikeway as shown in the Bicycle Master Plan, or be in conflict with the Pedestrian Master Plan; or • Result in unsafe conditions for bicyclists or pedestrians, including unsafe bicycle/pedestrian, bicycle/motor vehicle, or pedestrian/motor vehicle conflict. *Safety:* A project is considered to have a significant effect if it would: • Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
City of Folsom	**Standards:** LOS 'C' **Thresholds:** If the "no project" level of service is LOS C or better and the project-generated traffic causes the intersection level of service to degrade to worse than LOS C (i.e. LOS D, E or F) then the proposed project must implement mitigation measures to return the intersection to LOS C or better. If the "no project" level of service is worse than LOS C (i.e. LOS D, E or F) and the project-generated traffic causes the overall average delay value at the intersection to increase by five seconds or more, then the proposed project must implement mitigation measures to improve the intersection to the "no project" condition or better. It is not necessary to improve the intersection to LOS C. If the "no project" level of service is worse than LOS C (i.e. LOS D, E, or F) and the project-generated traffic causes the overall delay value at the intersection to increase by less than five seconds, then the traffic impact is considered less than significant and no mitigation is required.
Placer County	**Standards:** LOS "C" on rural roadways, except within one-half mile of State highways where the standard shall be LOS "D". LOS "C" on urban/suburban roadways except within one-half mile of State highways where the standard shall be LOS "D". **Thresholds:** Require mitigation to LOS C unless an intersection is within 1/2 mile of a State Highway, in which case the LOS standard is "D". This applies where the existing LOS is at these levels, or better. If the LOS is worse than these standards, seek to mitigate impacts back to the existing level.
Granite Bay	**Standards:** The LOS on major roadways (i.e., arterial and collector routes) and intersection identified in the CIP shall be at Level "C" or better. **Thresholds:** Require mitigation to LOS C.
City of Lincoln	**Standards:** LOS 'C' for all streets and intersections (some variation by intersection) **Thresholds:** If the proposed project is shown to cause degradation of intersection LOS to worse than "C" (Or whichever LOS is identified in the General Plan for the particular intersection) after considering any improvements already planned by the City, then the traffic study shall recommend feasible mitigation measures to bring the intersection level of service within acceptable standards (in accordance with the General Plan)
City of Roseville	**Standards:** Varies by intersection

Table 10-1. Local and Regional LOS Standards and Thresholds

Regulatory Agency	Level of Service Standards and Identified Thresholds
	Thresholds: If the proposed project causes a signalized intersection previously identified in the Capital Improvement Program (CIP) as functioning at LOS C or better to function at LOS D or worse; If the proposed project causes a signalized intersection previously identified in the CIP as functioning at LOS D or E to degrade by one or more LOS category (i.e. from LOS D to LOS E); If the proposed project causes the overall percentage of intersections meeting LOS C at p.m. peak hour to fall below 70 percent.
Yuba County	**Standards:** On County roads in urban areas and within specific/ community plan areas, Level of Service "C" shall be maintained during the PM Peak Hour at signalized intersections. On County roads in rural areas, Level of Service "C" shall be maintained **Thresholds:** n/a
Wheatland	**Standards:** Maintain LOS "C" or better on all roadways, except within one-quarter mile of State highways. In these areas, the City shall strive to maintain LOS “D” or better. **Thresholds:** n/a
El Dorado County	**Standards:** Varies by intersection, LOS for County-maintained roads and State highways within the unincorporated areas of the county shall not be worse than LOS E in the Community Regions or LOS D in the Rural Centers and Rural Regions except as specified in the general plan **Thresholds:** Two (2) percent increase in traffic during the a.m. peak hour, p.m. peak hour, or daily, or The addition of 100 or more daily trips, or The addition of 10 or more trips during the a.m. peak hour or the p.m. peak hour.

Source: El Dorado County 2004; City of Marysville 1985; Sacramento County 1993; Placer County 1994; City of Folsom 1988; City of Roseville 2004; City of Lincoln 2005; City of Wheatland 2005; Yuba County 1994; Granite Bay 1989.

10.1.3 Existing Conditions

Figure 10-1 shows the local transportation network in the study area. This section describes existing roadway and intersections and associated traffic conditions.

10.1.3.1 Local Access Route Descriptions

The following describes the existing characteristics of the additional roadways and intersections located within the area of analysis. Existing traffic volume data for the subject roadways were collected from the City of Folsom, County of Sacramento, and the City of Roseville Traffic Engineering Departments.

Folsom Lake Crossing is a roadway that runs along the southern border of Folsom Lake. It begins at its intersection with Folsom-Auburn Road and continues until its intersection with East Natoma Street. Folsom Lake Crossing is a four lane undivided roadway. The road is posted at 55 mph.

Folsom Lake Crossing at Folsom-Auburn Road: This intersection consists of four approaches. Three of the approaches are roadway approaches (Folsom Lake Crossing westbound approach and Folsom-Auburn Road northbound and southbound approaches) while the fourth approach (eastbound approach) is an entrance- and exit-way for a retail center. The westbound approach has four lanes, an exclusive left turn lane, a shared left turn through lane, an exclusive right turn lane, and a right turn yield lane. The eastbound approach has two lanes, an exclusive left turn lane and a shared through right turn lane. The northbound has four lanes, a shared left turn and U-turn lane, two exclusive through lanes, and an exclusive right turn lane. The southbound approach has five lanes, one shared left turn U-turn lane, one exclusive left turn lane, two through lanes, and an exclusive right turn lane. Bicycle lanes are present on both sides of Folsom-Auburn Road in the vicinity of the intersection. Folsom-Auburn Road along the west side of the intersection has sidewalks on both sides; the northbound approach of Folsom-Auburn Road has a sidewalk to the south of Folsom Lake Crossing and a walking/bicycle path set back from the road to the north of Folsom Lake Crossing. There is no sidewalk on either side of Folsom Lake Crossing east of the intersection. However, the walking/bicycle path continues along the westbound approach past the Folsom Dam spillway and over the new Folsom Bridge. Crosswalks are provided across three of the intersection legs. There is no crosswalk across Folsom-Auburn Road on the south side of the intersection. The intersection is signalized and includes pedestrian signal heads and push button actuation. The intersection currently operates at LOS ‘B’.

Folsom Lake Crossing at East Natoma Street: This intersection consists of three approaches; from the southeast, west, and northeast. The north side of the intersection abuts onto Reclamation property. The Folsom Lake Crossing southeast approach has three lanes; one exclusive right turn lane and two shared through lanes. The east Natoma Street northeast approach has three lanes; two exclusive left turn lanes and one exclusive right turn lane. The East Natoma Street westbound approach has four lanes; two exclusive left turn lanes and two through lanes. There are no sidewalks on either side of the section of East Natoma Street south of the intersection. There is a walking/bicycle path along the northern side of Folsom Lake Crossing as well as along both sides of East Natoma Street east of the intersection. There is one north-south crosswalk at this intersection from the northeast approach of East Natoma Street to the walking/bicycle path adjacent to the Reclamation property on the north side of the intersection. There are in-street bicycle lanes along both the southeast Folsom Lake Crossing approach and the west approach on East Natoma Street. There is also a bicycle lane on the northeast approach of East Natoma Street. The intersection is signalized and includes pedestrian signal heads and push button actuation. The intersection currently operates at LOS ‘B’.

Sierra College Boulevard is a north-south roadway that begins at its intersection with Hazel Avenue and Old Auburn Road and continues north to Interstate 80 and ends at the Caperton Reservoir. From Old Auburn Road to

Seymour Place, Sierra College Boulevard is a four-lane divided roadway. At Seymour Place, the northbound side reduces to one lane. Sierra College Boulevard continues as a three-lane divided roadway to the Rocklin line north of Olympus Drive where it further reduces to a two-lane undivided roadway. It is classified as a divided arterial. Sierra College Boulevard is posted at 45 mph through the MIAD Modification Project area. Land use along much of the roadway varies from residential to commercial/retail.

Sierra College Boulevard at Eureka Road: This intersection consists of four approaches. The Sierra College Boulevard northbound and southbound approaches have eight lanes; two exclusive left turn lanes, four through lanes, and two channelized right turn lanes. There is a marked bicycle lane between the through and the right turn lane. The Eureka Road eastbound and westbound approaches have eight lanes; two exclusive left turn lanes, four through lanes, and two channelized right turn lanes. All four approaches have sidewalks present on both sides of the roadway. Crosswalks are provided across all four intersection legs. The intersection is signalized and includes pedestrian signal heads and push button actuation. The intersection currently operates at LOS 'B'.

Sierra College Boulevard at East Roseville Parkway: This intersection consists of four approaches. The Sierra College Boulevard northbound and southbound approaches have eight lanes; two exclusive left turn lanes, four through lanes, and two channelized right turn lanes. There is a marked bicycle lane between the through and right turn lanes. The East Roseville Parkway eastbound and westbound approaches also have eight lanes; two exclusive left turn lanes, four through lanes, and two channelized right turn lanes. There is a marked bicycle lane between the through and right turn lanes. All four approaches have sidewalks present on both sides of the roadway. Crosswalks are provided across all four intersection legs. The intersection is signalized and includes pedestrian signal heads and push button actuation. The intersection currently operates at LOS 'F'.

Sierra College Boulevard at Old Auburn Road: This intersection consists of four approaches. The Sierra College Boulevard northbound and southbound approaches have eight lanes; two exclusive left turn lanes, four through lanes, and two right turn lanes. There is a marked bicycle lane between the through and right turn lanes. The Old Auburn Road eastbound and westbound approaches have six lanes; two exclusive left turn lanes, two through lanes, and two right turn lanes. All four approaches have sidewalks present on both sides of the roadway. Crosswalks are provided across all four intersection legs. The intersection is signalized and includes pedestrian signal heads and push button actuation. The intersection currently operates at LOS 'D'.

Hazel Avenue is a north-south roadway that begins at its intersection with Sierra College Boulevard and Old Auburn Road and continues south to its intersection with Folsom Boulevard. From Old Auburn Road to Gold Country

Boulevard, Hazel Avenue is a four-lane divided roadway. From Gold Country Boulevard to Folsom Boulevard, Hazel Avenue is a six-lane divided roadway. It is classified as a divided arterial. Hazel Avenue is posted at 40 mph through the project area. Land use along much of the roadway varies from residential to commercial/retail.

Hazel Avenue at Cherry Avenue: This intersection consists of three approaches. The Hazel Avenue northbound and southbound approaches have six lanes; an exclusive left from the southbound approach, an exclusive U-turn from the northbound approach, and four through lanes. There is a marked bicycle lane adjacent to the through lanes. The Cherry Avenue westbound approach has an exclusive left turn lane and exclusive right turn lane. Sidewalks are present at both sides of the northbound approach, and on one side of the southbound and westbound approaches. Crosswalks are provided for the northbound and westbound approaches. The intersection is signalized and includes pedestrian signal heads and push button access. The intersection currently operates at LOS ‘A’.

Hazel Avenue at Golden Gate Avenue: This intersection consists of four approaches. The Hazel Avenue northbound and southbound approaches have six lanes; two exclusive left turn lanes and four through lanes. There is a marked bicycle lane adjacent to the through lanes. The Golden Gate Avenue eastbound and westbound approaches have three lanes; two through lanes and an exclusive right turn lane from the eastbound approach. Sidewalks are present at one side of the road for the northbound and southbound approaches, and on both sides for the eastbound approach. There are no sidewalks present on the westbound approach. Crosswalks are provided for the northbound, eastbound and westbound approaches. The intersection is signalized and includes pedestrian signal heads and push button access. The intersection currently operates at LOS ‘A’.

Hazel Avenue at Oak Avenue: This intersection consists of four approaches. The Hazel Avenue northbound and southbound approaches have six lanes; two exclusive left turn lanes and four through lanes. There is a marked bicycle lane adjacent to the through lanes. The Oak Avenue eastbound and westbound approaches have four lanes; two exclusive left turn lanes, and two through lanes. There are no sidewalks present on any of the approaches. Crosswalks are provided at all approaches. The intersection is signalized and includes pedestrian signal heads and push button access. Recent capacity analysis data for this intersection were not available.

Hazel Avenue at Elm Avenue: This intersection consists of four approaches. The Hazel Avenue northbound and southbound approaches have six lanes; two exclusive left turn lanes and four through lanes. The Elm Avenue eastbound and westbound approaches have four lanes; two through lanes and two exclusive right turn lanes. There are sidewalks present on one side of the road for all approaches. Crosswalks are provided at the northbound, eastbound and westbound approaches. The intersection is signalized and includes pedestrian signal heads and push button access. Recent capacity analysis data for this intersection were not available.

Hazel Avenue at Central Avenue: This intersection consists of four approaches. The Hazel Avenue northbound and southbound approaches have six lanes; two exclusive left turn lanes and four through lanes. There is a marked bicycle lane adjacent to the through lanes. The Central Avenue eastbound and westbound approaches have three lanes; two through lanes and an exclusive right turn lane from the westbound approach. There are no sidewalks present on any of the approaches. Crosswalks are provided at all approaches. The intersection is signalized and includes pedestrian signal heads and push button access. Recent capacity analysis data for this intersection were not available.

Hazel Avenue at Greenback Lane: This intersection consists of four approaches. The Hazel Avenue northbound and southbound approaches have ten lanes; four exclusive left turn lanes, four through lanes, and two exclusive right turn lanes. The Greenback Lane eastbound and westbound approaches have ten lanes; four exclusive left turn lanes, four through lanes, and two exclusive right turn lanes. There are sidewalks present on both sides of the road for all approaches. Crosswalks are provided at all approaches. The intersection is signalized and includes pedestrian signal heads and push button access. Recent capacity analysis data for this intersection were not available.

Hazel Avenue at Pershing Avenue: This intersection consists of four approaches. The Hazel Avenue northbound and southbound approaches have six lanes; two exclusive left turn lanes and four through lanes. There is a marked bicycle lane adjacent to the through lanes. The Pershing Avenue eastbound and westbound approaches have four lanes; two through lanes and two exclusive right turn lanes. There are sidewalks present on both sides of the road for the southbound and eastbound approaches and on one side of the road for the northbound and westbound approaches. Crosswalks are provided at the southbound, eastbound and westbound approaches. The intersection is signalized and includes pedestrian signal heads and push button access. Recent capacity analysis data for this intersection were not available.

Hazel Avenue at Madison Avenue: This intersection consists of four approaches. The Hazel Avenue northbound and southbound approaches have ten lanes; four exclusive left turn lanes, and six through lanes. There is a marked bicycle lane adjacent to the through lanes. The Madison Avenue eastbound and westbound approaches have eleven lanes; four exclusive left turn lanes, three through lanes from the eastbound approach, two through lanes from the westbound approach, and two exclusive right turn lanes. There is a marked bicycle lane adjacent to the right turn lanes. There are sidewalks present on both sides of the road for all approaches. Crosswalks are provided at all approaches. The intersection is signalized and includes pedestrian signal heads and push button access. Recent capacity analysis data for this intersection were not available.

Hazel Avenue at Sunset Avenue: This intersection consists of four approaches. The Hazel Avenue northbound and southbound approaches have eight lanes; two exclusive left turn lanes, four through lanes, and two exclusive right turn lanes. The Sunset Avenue eastbound and westbound approaches have six lanes; one exclusive left turn lane from the eastbound approach, two exclusive left turn lanes from the westbound approach, two through lanes, and one exclusive right turn lane from the westbound approach. There is a marked bicycle lane between the through lane and right turn lane for the westbound approach. There are sidewalks present on both sides of the roadway for all approaches. Crosswalks are provided for the northbound, eastbound and westbound approaches. The intersection is signalized and includes pedestrian signal heads and push button access. Recent capacity analysis data for this intersection were not available.

10.2 Environmental Consequences/Environmental Impacts

10.2.1 Assessment Methods

Transportation impacts associated with the MIAD Modification Project are evaluated by assessing average daily traffic increases during specific time periods during the day (i.e., hourly basis, as needed).

The traffic analysis is based on the following assumptions:

- **Work Shifts** – Two work shifts will operate, from 6 a.m. to 4 p.m. and from 4 p.m. to 2 a.m.

- **Material Hauling** – Will occur during hours of work shifts, from 6 a.m. to 2 a.m.

The traffic impact analysis evaluates the increase in traffic volumes on a daily basis as a result of the project alternatives and compares impacts to standards and thresholds to determine the level of significance. Any impacts determined significant would then be evaluated for hourly impacts. This section describes how traffic increases are determined.

This analysis evaluates the traffic impacts under the following conditions:

Existing Conditions – Current year traffic volumes and peak hour LOS analysis of affected State highway facilities

No Action/No Project Alternative - Trip generation, distribution and assignment assuming growth rates, but no construction of the project

Project Alternatives – Trip generation, distribution and assignment during construction of the MIAD Modification Project from 2010 through 2013.

10.2.1.1 Future Conditions and Growth Rates

The transportation impacts associated with the MIAD Modification Project are only related to the construction elements of the project. No long-term or permanent traffic volume increases or long-term changes in traffic patterns are expected as a result of the project. Therefore, any incremental transportation impacts associated with the MIAD Modification Project are limited to the proposed construction years. The analysis years include all construction years from the project startup in 2010 to completion in 2013, as well as the 2009 baseline conditions required by CEQA.

Two components of traffic growth are typically considered when evaluating future year conditions. First, an annual background growth rate is determined based on historical data. Second, any increase in traffic volumes expected from approved development projects are added into the network.

The same growth rates have been used as the original Folsom DS/FDR project for local access routes. A 3% growth rate will be used through 2010 and a 2% per year growth rate will be used for any years beyond that.

10.2.2.2 Trip Generation Assumptions

Trip generation includes new trips to and from the construction site as a result of the project. New trips have been determined by calculating the amount worker trips from traveling to and from the jobsite and number of truck trips from hauling aggregate offsite materials to and from the site. The volumes are based on the schedule provided by Reclamation.

Worker Trips The shifts and crew numbers for each step of each alternative were doubled to represent round trips. The morning shift workers are assumed to enter the site during the AM peak hour and leave during the PM peak hour. The evening shift workers are assumed to enter the site during the PM peak hour and exit the site at off peak hours. Therefore, both morning and evening shift workers are traveling to or from the site during the PM peak period. The number of worker trip volumes is shown in Tables 10-2 through 10-5.

Table 10-2. Alternative #1 – Large Open Cut Worker Trip Volumes

Step	Daily Totals	AM Peak Hours		PM Peak Hours	
		Enter[1]	Exit	Enter[2]	Exit[3]
1 – Clearing and Grubbing	20	10	0	0	10
2 – Dewatering Well Installation	48	12	0	12	12
3 – Excavation	120	30	0	30	30
4 – Excavation Backfill	100	25	0	25	25
5a – Filter Material Supply	0	0	0	0	0
5b – Filter Placement and Overlay	100	25	0	25	25

[1] Morning shift workers traveling to the site
[2] Evening shift workers traveling to the site
[3] Morning shift workers leaving the site

Table 10-3. Alternative #2 – Single Wall Excavation Worker Trip Volumes

Step	Daily Totals	AM Peak Hours		PM Peak Hours	
		Enter	Exit	Enter	Exit
1 – Clearing and Grubbing	20	10	0	0	10
2 – Dewatering Well Installation	48	12	0	12	12
3 – Wall Construction	48	12	0	12	12
4 – Excavation	120	30	0	30	30
5 – Excavation Backfill	100	25	0	25	25
6a – Filter Material Supply	0	0	0	0	0
6b – Filter Placement and Overlay	100	25	0	25	25

Table 10-4. Alternative #3 – Dual Wall Excavation Worker Trip Volumes

Step	Daily Totals	AM Peak Hours		PM Peak Hours	
		Enter	Exit	Enter	Exit
1 – Clearing and Grubbing	20	10	0	0	10
2 – Dewatering Well Installation	48	12	0	12	12
3 – Wall Construction	48	12	0	12	12
4 – Excavation	100	25	0	25	25
5 – Excavation Backfill	100	25	0	25	25
6a – Filter Material Supply	0	0	0	0	0
6b – Filter Placement and Overlay	100	25	0	25	25

Table 10-5. Alternative #4 – Cellular Wall Excavation Worker Trip Volumes

Step	Daily Totals	AM Peak Hours		PM Peak Hours	
		Enter	Exit	Enter	Exit
1 – Clearing and Grubbing	20	10	0	0	10
2 – Dewatering Well Installation	48	12	0	12	12
3 – Wall Construction	48	12	0	12	12
4 – Excavation	100	25	0	25	25
5 – Excavation Backfill	100	25	0	25	25
6a – Filter Material Supply	0	0	0	0	0
6b – Filter Placement and Overlay	100	25	0	25	25

Truck Trips The number of daily truck trips for each step of each alternative was doubled to represent round trips, and then multiplied by a truck factor of 1.5 to represent the slower acceleration rates for heavy vehicles. Trucks would travel to and from the site all day long. The number of hourly trucks is the daily total divided by the number of hours in the workday (20 hours to account for the two shifts). Only offsite hauling was considered, so none of the truck traffic for the onsite excavation was considered. The number of truck trips can be seen in Tables 10-6 through 10-9.

Table 10-6. Alternative #1 – Large Open Cut Truck Trip Volumes

Step	Daily Totals	AM Peak Hours		PM Peak Hours	
		Enter	Exit	Enter	Exit
1 – Clearing and Grubbing	0	0	0	0	0
2 – Dewatering Well Installation	0	0	0	0	0
3 – Excavation	0	0	0	0	0
4 – Excavation Backfill	0	0	0	0	0
5a – Filter Material Supply	180	9	9	9	9
5b – Filter Placement and Overlay	0	0	0	0	0

*Note – Volumes were doubled to represent round trips and multiplied by truck factor of 1.5

Table 10-7. Alternative #2 – Single Wall Excavation Truck Trip Volumes

Step	Daily Totals	AM Peak Hours		PM Peak Hours	
		Enter	Exit	Enter	Exit
1 – Clearing and Grubbing	0	0	0	0	0
2 – Dewatering Well Installation	0	0	0	0	0
3 – Wall Construction	12	1	1	1	1
4 – Excavation	0	0	0	0	0
5 – Excavation Backfill	0	0	0	0	0
6a – Filter Material Supply	180	9	9	9	9
6b – Filter Placement and Overlay	0	0	0	0	0

*Note – Volumes were doubled to represent round trips and multiplied by truck factor of 1.5

Table 10-8. Alternative #3 – Dual Wall Excavation Truck Trip Volumes

Step	Daily Totals	AM Peak Hours		PM Peak Hours	
		Enter	Exit	Enter	Exit
1 – Clearing and Grubbing	0	0	0	0	0
2 – Dewatering Well Installation	0	0	0	0	0
3 – Wall Construction	12	1	1	1	1
4 – Excavation	0	0	0	0	0
5 – Excavation Backfill	0	0	0	0	0
6a – Filter Material Supply	180	9	9	9	9
6b – Filter Placement and Overlay	90	5	5	5	5

*Note – Volumes were doubled to represent round trips and multiplied by truck factor of 1.5

Table 10-9. Alternative #4 – Cellular Wall Excavation Truck Trip Volumes

Step	Daily Totals	AM Peak Hours		PM Peak Hours	
		Enter	Exit	Enter	Exit
1 – Clearing and Grubbing	0	0	0	0	0
2 – Dewatering Well Installation	0	0	0	0	0
3 – Wall Construction	12	1	1	1	1
4 – Excavation	0	0	0	0	0
5 – Excavation Backfill	0	0	0	0	0
6a – Filter Material Supply	180	9	9	9	9
6b – Filter Placement and Overlay	90	5	5	5	5

*Note – Volumes were doubled to represent round trips and multiplied by truck factor of 1.5

10.2.1.4 Trip Distribution Assumptions

Trip distribution considers the routes taken by construction workers and haul trucks to and from the site.

Worker Trips The distribution of worker trips for the MIAD Modification Project is the same as for the MIAD project feature from the Folsom DS/FDR. Tables 10-10 through 10-14 illustrate the assumptions of where workers originate from, the route they travel to and from work each day, and the number of trips expected along each route.

Truck Trips The distribution of offsite haul truck trips for the MIAD Modification Project is the same as for the MIAD project feature from the Folsom DS/FDR. The Tiechert Prairie City Borrow Source located on Scott Road south of White Rock Road in Sacramento County is assumed to be the source for aggregate and batch plant materials. Cement and concrete aggregates for the MIAD Modification Project are assumed to be coming from Prairie City to the Batch Plant (BP-3) located at MIAD. Table 10-15 illustrates the assumed haul routes for the trucks.

Many of the proposed construction activities under each alternative have overlap. The worst case scenario for each construction year of each alternative was determined and used for analysis.

Table 10-10. Worker Access Route Designations

Worker Access Route Designation	Street															Facility
W-1E	Roseville area	Douglas Boulevard	to	A-F Road	to	F-A Road	to	Folsom Lake Crossing	to	E. Natoma Street	to	Green Valley Road	to			MIAD
W-2E	Rocklin area	Sierra College Boulevard	to	Douglas Boulevard	to	A-F Road	to	F-A Road	to	Folsom Lake Crossing	to	E. Natoma Street	to	Green Valley Road	to	MIAD
W-3E	Folsom	E. Natoma Street	to	Green Valley Road	to											MIAD
W-4E	Sacramento I-80	Greenback Lane	to	Folsom Boulevard	to	E. Natoma Street	to	Green Valley Road	to							MIAD
W-5E	Sacramento US50	Folsom Boulevard	to	E. Natoma Street	to	Green Valley Road	to									MIAD
W-6E	El Dorado (US50)	US50	to	E. Bidwell St	to	Oak Ave. Parkway	to	Blue Ravine	to	Green Valley Road	to					MIAD
W-7E	El Dorado (GVR)	Green Valley Road	to													MIAD

Assumptions:
5% of worker population comes from Rocklin area
5% of worker population comes from Roseville area
5% of worker population comes from Folsom area
40% of worker population comes from Sacramento I-80
40% of worker population comes from Sacramento US50
2.5% of worker population comes from El Dorado (US50)
2.5% of worker population comes from El Dorado (GVR = Green Valley Road)*

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Table 10-11. Worker Volumes Per Route - 2010

Worker Access Route Designation	Percentage of Workers from Area	Area	*Alternative #1*					*Alternative #2*					*Alternative #3*					*Alternative #4*				
			AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total
			Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit	
		Total	42	0	42	42	168	30	0	30	30	120	12	0	12	12	48	62	0	62	62	248
W-1E	5%	Roseville	2	0	2	2	8	2	0	2	2	6	1	0	1	1	2	3	0	3	3	12
W-2E	5%	Rocklin	2	0	2	2	8	2	0	2	2	6	1	0	1	1	2	3	0	3	3	12
W-3E	5%	Folsom	2	0	2	2	8	2	0	2	2	6	1	0	1	1	2	3	0	3	3	12
W-4E	40%	Sacramento I-80	17	0	17	17	67	12	0	12	12	48	5	0	5	5	19	25	0	25	25	99
W-5E	40%	Sacramento US50	17	0	17	17	67	12	0	12	12	48	5	0	5	5	19	25	0	25	25	99
W-6E	2.5%	El Dorado (US50)	1	0	1	1	4	1	0	1	1	3	0	0	0	0	1	2	0	2	2	6
W-7E	2.5%	El Dorado (GVR)	1	0	1	1	4	1	0	1	1	3	0	0	0	0	1	2	0	2	2	6

Table 10-12. Worker Volumes Per Route - 2011

Worker Access Route Designation	Percentage of Workers from Area	Area	*Alternative #1*					*Alternative #2*					*Alternative #3*					*Alternative #4*				
			AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total
			Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit	
		Total	80	0	80	80	320	80	0	80	80	320	50	0	50	50	200	87	0	87	87	348
W-1E	5%	Roseville	4	0	4	4	16	4	0	4	4	16	3	0	3	3	10	4	0	4	4	17
W-2E	5%	Rocklin	4	0	4	4	16	4	0	4	4	16	3	0	3	3	10	4	0	4	4	17
W-3E	5%	Folsom	4	0	4	4	16	4	0	4	4	16	3	0	3	3	10	4	0	4	4	17
W-4E	40%	Sacramento I-80	32	0	32	32	128	32	0	32	32	128	20	0	20	20	80	35	0	35	35	139
W-5E	40%	Sacramento US50	32	0	32	32	128	32	0	32	32	128	20	0	20	20	80	35	0	35	35	139
W-6E	2.5%	El Dorado (US50)	2	0	2	2	8	2	0	2	2	8	1	0	1	1	5	2	0	2	2	9
W-7E	2.5%	El Dorado (GVR)	2	0	2	2	8	2	0	2	2	8	1	0	1	1	5	2	0	2	2	9

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Table 10-13. Worker Volumes Per Route - 2012

Worker Access Route Designation	Percentage of Workers from Area	Area	*Alternative #1*					*Alternative #2*					*Alternative #3*					*Alternative #4*				
			AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total
			Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit	
		Total	50	0	50	50	200	50	0	50	50	200	75	0	75	75	300	25	0	25	25	100
W-1E	5%	Roseville	3	0	3	3	10	3	0	3	3	10	4	0	4	4	15	1	0	1	1	5
W-2E	5%	Rocklin	3	0	3	3	10	3	0	3	3	10	4	0	4	4	15	1	0	1	1	5
W-3E	5%	Folsom	3	0	3	3	10	3	0	3	3	10	4	0	4	4	15	1	0	1	1	5
W-4E	40%	Sacramento I-80	20	0	20	20	80	20	0	20	20	80	30	0	30	30	120	10	0	10	10	40
W-5E	40%	Sacramento US50	20	0	20	20	80	20	0	20	20	80	30	0	30	30	120	10	0	10	10	40
W-6E	2.5%	El Dorado (US50)	1	0	1	1	5	1	0	1	1	5	2	0	2	2	8	1	0	1	1	3
W-7E	2.5%	El Dorado (GVR)	1	0	1	1	5	1	0	1	1	5	2	0	2	2	8	1	0	1	1	3

Table 10-14. Worker Volumes Per Route - 2013

Worker Access Route Designation	Percentage of Workers from Area	Area	*Alternative #1*					*Alternative #2*					*Alternative #3*					*Alternative #4*				
			AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total	AM Peak		PM Peak		Daily Total
			Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit		Enter	Exit	Enter	Exit	
		Total	25	0	25	25	100	25	0	25	25	100	25	0	25	25	100	25	0	25	25	100
W-1E	5%	Roseville	1	0	1	1	5	1	0	1	1	5	1	0	1	1	5	1	0	1	1	5
W-2E	5%	Rocklin	1	0	1	1	5	1	0	1	1	5	1	0	1	1	5	1	0	1	1	5
W-3E	5%	Folsom	1	0	1	1	5	1	0	1	1	5	1	0	1	1	5	1	0	1	1	5
W-4E	40%	Sacramento I-80	10	0	10	10	40	10	0	10	10	40	10	0	10	10	40	10	0	10	10	40
W-5E	40%	Sacramento US50	10	0	10	10	40	10	0	10	10	40	10	0	10	10	40	10	0	10	10	40
W-6E	2.5%	El Dorado (US50)	1	0	1	1	3	1	0	1	1	3	1	0	1	1	3	1	0	1	1	3
W-7E	2.5%	El Dorado (GVR)	1	0	1	1	3	1	0	1	1	3	1	0	1	1	3	1	0	1	1	3

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Table 10-15. Material Route Designations

Materials (from Prairie City)													
Route Designation	**Route**												**Facility**
A-6	From	Prairie City Borrow (White Rock/Scott Road)	to	Scott Road	to	East Bidwell St	to	Oak Ave. Parkway	to	Blue Ravine	to	Green Valley Road	to	MIAD
BP-3	From	Prairie City Borrow (White Rock/Scott Road)	to	Scott Road	to	East Bidwell St	to	Oak Ave. Parkway	to	Blue Ravine	to	Green Valley Road	to	Batch Plant #3

Assumptions:

Cement and concrete aggregates for MIAD would come from Prairie City to Plant #3

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10.2.1.5 Level of Service Description

The evaluation of transportation impacts associated with the MIAD Modification Project focuses on capacity analysis. A primary result of capacity analysis is the assignment of levels of service to traffic facilities under various traffic flow conditions. The capacity analysis methodology is based on the concepts and procedures in the *Highway Capacity Manual* (HCM) (Transportation Research Board 2000). The concept of LOS is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A LOS definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are assigned letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

A description of the operating condition under each level of service is provided below:

LOS A describes conditions with little to no delay to motorists.

LOS B represents a desirable level with relatively low delay to motorists.

LOS C describes conditions with average delay to motorists.

LOS D describes operations where the influence of congestion becomes more noticeable. This level is considered by many agencies to be the limit of acceptable delay.

LOS E represents operating conditions with high delay values. This level is considered by many agencies to be the limit of acceptable delay.

LOS F is considered to be unacceptable to most drivers with high delay values that often occur when arrival flow rates exceed the capacity of the intersection.

10.2.1.6 Unsignalized and Signalized Intersections

Levels of service for unsignalized and signalized intersections are calculated using the operational analysis methodology of the HCM. *Synchro 7* software was used for analysis for this project and is based on the concepts and procedures of the HCM. The procedure accounts for lane configuration on both the minor and major street approaches, conflicting traffic stream volumes, and the type of intersection control (STOP, YIELD, or all-way STOP control). The definition of LOS for unsignalized intersections is a function of average *control* delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

The methodology for signalized intersections assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on average *control* delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The LOS criteria for unsignalized and signalized intersections are shown in Table 10-16.

Table 10-16. Local Access Route Existing Traffic Volumes and Arterial LOS

Level of Service	Unsignalized Intersection Criteria Average Control Delay (Seconds per Vehicle)	Signalized Intersection Criteria Average Control Delay (Seconds per Vehicle)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

10.2.2 Significance Criteria

As illustrated earlier in Table 10-1, there are a variety of thresholds established by the communities and counties through which the project transportation components are expected to pass. Most of the thresholds focus on whether the existing LOS along a roadway is degraded by one or more letter grades due to project related traffic (i.e., LOS C to LOS D or worse). However, when a facility is already experiencing LOS F, the Sacramento County guidelines illustrate that an increase in the Volume to Capacity (V/C) ratio by more than 0.05 is also of concern. And finally, El Dorado County presents the most stringent thresholds that include determining whether project-related traffic exceeds a 2% increase in traffic during the A.M. peak hour, P.M. peak hour, or daily.

Based on existing thresholds, this analysis uses the following criteria to determine level of significance of traffic impacts.

- Roadways that experience LOS deterioration from an existing LOS C to an LOS D or worse as a result of the project; or
- Roadways that currently operate at LOS F and experience an increase in the V/C ratio of more than the 0.05 as a result of the project; or
- Roadways that experience an increase in daily traffic volumes of 2% or more.

10.2.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

There would be no impacts associated with implementation of the No Action/No Project Alternative. The impact of not implementing the MIAD Modification Project and not conducting the associated construction activities would have no impact on existing and future 'no build' traffic volumes. The CEQA baseline year of 2009 and the 2010 through 2013 'no build' conditions would not experience an increase in traffic aside from that of normal background growth due to other unrelated development projects as well as, general population, job and household growth in the area.

The No Action/No Project Alternative would result in increases in traffic related to future growth and development.

10.2.4 Environmental Consequences/Environmental Impacts of Alternative 1

Tables 10-17 through 10-20 show expected changes in the Average Daily Trips (ADT), LOS, volume to capacity (V/C) ratios for all roadways experiencing LOS F, and the percent increase for each alternative for each construction year. Whenever a roadway segment would be expected to have a significant impact, the value was highlighted with red text in the table. Appendix C provides additional results of the traffic analysis.

MIAD construction under this alternative would result in traffic impacts.

This impact considers new trip generation and distribution as a result of worker and haul routes under Alternative 1. Tables 10-17 through 10-20 summarize results for each construction year.

LOS Deterioration. No LOS deterioration would be expected to occur for any of the roadway segments for all construction years.

ADT Increase > 2%. There would be some roadway segments in certain years that would be expected to experience an increase in ADT of greater than 2%, listed below.

- Scott Road, south of White Rock Road (2010 & 2011)
- Scott Road, north of White Rock Road (2010)

Scott Road, in Sacramento County, operates at LOS C and carries a minimal amount of traffic on a daily basis relative to other roads in the study area. It is south of Highway 50 in a largely undeveloped part of the County. Any increase in number of trips on Scott Road would be a relatively large percent of the total; therefore, the ADT percentage increase is skewed. Scott Road is expected to continue to operate at an LOS C under Alternative 1, which is an acceptable LOS in Sacramento County. This impact would not be significant.

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Table 10-17. 2010 Daily Project Impacts Alternatives 1 though 4

Roadway	Location	Materials/ Equip. Routes	Worker Routes	No Action/No Project ADT	No Action/No Project V/C	No Action/No Project code	No Action/No Project LOS
Folsom Boulevard	Natoma Street to Blue Ravine Road		W-3E, 5E	40,906	1.09	4AD	F
Folsom-Auburn Road	Oak Hill Drive to Folsom Dam Road		W-1E, 2E	43,611	1.51	4AU	F
Folsom-Auburn Road	Folsom Dam Road to Oak Avenue		W-1E, 2E	23,159		4AU	D
Auburn-Folsom (A-F) Road	Douglas Boulevard to Eureka Road		W-1E, 2E	37,117	1.28	4AU	F
Auburn-Folsom (A-F) Road	Eureka Road to Oak Hill Drive		W-1E, 2E	33,006	1.77	2A	F
Sierra College Boulevard	north of Douglas Boulevard		W-2E	27,364		4AD	D
Douglas Boulevard	Barton Road to A-F Road		W-1E, 2E	43,502	1.16	4AD	F
Blue Ravine Road	Oak Avenue Parkway to Green Valley Road/East Natoma	A-6, BP3	W-6E	21,102		4AD	D
East Natoma St	Cimmaron Circle to Folsom Dam Road		W-1E, 2E, 3E, 4E, 5E	17,964		4AU	D
East Natoma St	Folsom Dam Road to Green Valley Road	A-6, BP3	W-1E, 2E, 3E, 4E, 5E,	29,327	1.01	4AU	F
Green Valley Road	East Natoma Street to Sophia Parkway	A-6	W-1E, 2E, 3E, 4E, 5E,	34,628	1.20	4AU	F
Greenback Lane	Hazel Avenue to Madison Avenue		W-4E	26,080		4AMD	C
East Bidwell Street	Clarksville Road to Iron Point Road	A-6, BP-3	W-6E	42,528	1.14	4AD	F
Oak Avenue Parkway	Blue Ravine Road to East Bidwell Street		W-6E	24,024		6AD	C
Scott Road (south)	south of White Rock Road	A-6, BP-3		1,790		2C	C
White Rock Road	between Scott Road (south) and Scott Road (north)	A-6, BP-3		9,834	1.00	2C	F
Scott Road (north)	north of White Rock Road	A-6, BP-3		6,845		2C	D
US50	Hazel Avenue to Folsom Boulevard		W-5E	126,393	1.26	4FA	F
US50	East Bidwell St to County Line		W-6E	88,626	1.11	4F	F

Roadway	Location	Alt. 1 - Large Open Cut Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Alt. 2 - Single Wall Excavation Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS
Folsom Boulevard	Natoma Street to Blue Ravine Road	75		40,981	1.10	0.18%	4AD	F	54		40,960	1.10	0.13%	4AD	F
Folsom-Auburn Road	Oak Hill Drive to Folsom Dam Road	16		43,627	1.51	0.04%	4AU	F	12		43,623	1.51	0.03%	4AU	F
Folsom-Auburn Road	Folsom Dam Road to Oak Avenue	16		23,175		0.07%	4AU	D	12		23,171		0.05%	4AU	D
Auburn-Folsom (A-F) Road	Douglas Boulevard to Eureka Road	16		37,133	1.28	0.04%	4AU	F	12		37,129	1.28	0.03%	4AU	F
Auburn-Folsom (A-F) Road	Eureka Road to Oak Hill Drive	16		33,022	1.77	0.05%	2A	F	12		33,018	1.77	0.04%	2A	F
Sierra College Boulevard	north of Douglas Boulevard	8		27,372		0.03%	4AD	D	6		27,370		0.02%	4AD	D
Douglas Boulevard	Barton Road to A-F Road	16		43,518	1.16	0.04%	4AD	F	12		43,514	1.16	0.03%	4AD	F
Blue Ravine Road	Oak Avenue Parkway to Green Valley Road/East Natoma	4	180	21,286		0.87%	4AD	D	3	180	21,285		0.87%	4AD	D
East Natoma St	Cimmaron Circle to Folsom Dam Road	158		18,122		0.88%	4AU	D	114		18,078		0.63%	4AU	D
East Natoma St	Folsom Dam Road to Green Valley Road	162	180	29,669	1.03	1.17%	4AU	F	117	180	29,624	1.03	1.01%	4AU	F
Green Valley Road	East Natoma Street to Sophia Parkway	162	180	34,970	1.21	0.99%	4AU	F	117	180	34,925	1.21	0.86%	4AU	F
Greenback Lane	Hazel Avenue to Madison Avenue	67		26,147		0.26%	4AMD	C	48		26,128		0.18%	4AMD	C
East Bidwell Street	Clarksville Road to Iron Point Road	4	180	42,712	1.14	0.43%	4AD	F	3	180	42,711	1.14	0.43%	4AD	F
Oak Avenue Parkway	Blue Ravine Road to East Bidwell Street	4		24,028		0.02%	6AD	C	3		24,027		0.01%	6AD	C
Scott Road (south)	south of White Rock Road		180	1,970		**10.06%**	2C	C		180	1,970		**10.06%**	2C	C
White Rock Road	between Scott Road (south) and Scott Road (north)		180	10,014	1.02	1.83%	2C	F		180	10,014	1.02	1.83%	2C	F
Scott Road (north)	north of White Rock Road		180	7,025		**2.63%**	2C	D		180	7,025		**2.63%**	2C	D
US50	Hazel Avenue to Folsom Boulevard	67	180	126,640	1.26	0.20%	4FA	F	48	180	126,621	1.26	0.18%	4FA	F
US50	East Bidwell St to County Line	4		88,630	1.11	0.00%	4F	F	3		88,629	1.11	0.00%	4F	F

Roadway	Location	Alt. 3 - Dual Wall Excavation Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Alt. 4 - Cellular Wall Excavation Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS
Folsom Boulevard	Natoma Street to Blue Ravine Road	21		40,927	1.09	0.05%	4AD	F	111		41,017	1.10	0.27%	4AD	F
Folsom-Auburn Road	Oak Hill Drive to Folsom Dam Road	4		43,615	1.51	0.01%	4AU	F	24		43,635	1.51	0.06%	4AU	F
Folsom-Auburn Road	Folsom Dam Road to Oak Avenue	4		23,163		0.02%	4AU	D	24		23,183		0.10%	4AU	D
Auburn-Folsom (A-F) Road	Douglas Boulevard to Eureka Road	4		37,121	1.28	0.01%	4AU	F	24		37,141	1.29	0.06%	4AU	F
Auburn-Folsom (A-F) Road	Eureka Road to Oak Hill Drive	4		33,010	1.77	0.01%	2A	F	24		33,030	1.77	0.07%	2A	F
Sierra College Boulevard	north of Douglas Boulevard	2		27,366		0.01%	4AD	D	12		27,376		0.04%	4AD	D
Douglas Boulevard	Barton Road to A-F Road	4		43,506	1.16	0.01%	4AD	F	24		43,526	1.16	0.06%	4AD	F
Blue Ravine Road	Oak Avenue Parkway to Green Valley Road/East Natoma	1	192	21,295		0.91%	4AD	D	6	192	21,300		0.94%	4AD	D
East Natoma St	Cimmaron Circle to Folsom Dam Road	44		18,008		0.24%	4AU	D	234		18,198		1.30%	4AU	D
East Natoma St	Folsom Dam Road to Green Valley Road	45	192	29,564	1.02	0.81%	4AU	F	240	192	29,759	1.03	1.47%	4AU	F
Green Valley Road	East Natoma Street to Sophia Parkway	45	192	34,865	1.21	0.68%	4AU	F	240	192	35,060	1.21	1.25%	4AU	F
Greenback Lane	Hazel Avenue to Madison Avenue	19		26,099		0.07%	4AMD	C	99		26,179		0.38%	4AMD	C
East Bidwell Street	Clarksville Road to Iron Point Road	1	192	42,721	1.14	0.45%	4AD	F	6	192	42,726	1.14	0.47%	4AD	F
Oak Avenue Parkway	Blue Ravine Road to East Bidwell Street	1		24,025		0.00%	6AD	C	6		24,030		0.02%	6AD	C
Scott Road (south)	south of White Rock Road		192	1,982		**10.73%**	2C	C		192	1,982		**10.73%**	2C	C
White Rock Road	between Scott Road (south) and Scott Road (north)		192	10,026	1.02	1.95%	2C	F		192	10,026	1.02	1.95%	2C	F
Scott Road (north)	north of White Rock Road		192	7,037		**2.80%**	2C	D		192	7,037		**2.80%**	2C	D
US50	Hazel Avenue to Folsom Boulevard	19	192	126,604	1.26	0.17%	4FA	F	99	192	126,684	1.26	0.23%	4FA	F
US50	East Bidwell St to County Line	1		88,627	1.11	0.00%	4F	F	6		88,632	1.11	0.01%	4F	F

New Aggregate trips are those trips hauling aggregate materials (fine & coarse filters, road base and asphalt)

New Offsite trips are those trips hauling offsite materials (slope u/s, toe drain, hdpe pipe, pipe filter, u/s filter, seeding, rebar)

New BP trips are those trips hauling aggregate materials (cement, fine & coarse aggregates) directly to the batch plants. This does not include trips from the batch plants to the project features

New Equipment trips are those trips hauling in equipment to each project feature staging area (staging area assumed adjacent to project feature for hauling evaluation).

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Table 10-18. 2011 Daily Project Impacts Alternatives 1 though 4

				No Action/No Project				Alternative 1 - Large Open Cut							Alternative 2 - Single Wall Excavation							Alternative 3 - Dual Wall Excavation							Alternative 4 - Cellular Wall Excavation						
Roadway	Location	Materials/ Equip. Routes	Worker Routes	ADT	V/C	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS
Folsom Boulevard	Natoma Street to Blue Ravine Road		W-3E, 5E	41,725	1.12	4AD	F	144		41,869	1.12	0.35%	4AD	F	144		41,869	1.12	0.35%	4AD	F	90		41,815	1.12	0.22%	4AD	F	156		41,881	1.12	0.37%	4AD	F
Folsom-Auburn Road	Oak Hill Drive to Folsom Dam Road		W-1E, 2E	44,484	1.54	4AU	F	32		44,516	1.54	0.07%	4AU	F	32		44,516	1.54	0.07%	4AU	F	20		44,504	1.54	0.04%	4AU	F	34		44,518	1.54	0.08%	4AU	F
Folsom-Auburn Road	Folsom Dam Road to Oak Avenue		W-1E, 2E	23,623		4AU	D	32		23,655		0.14%	4AU	D	32		23,655		0.14%	4AU	D	20		23,643		0.08%	4AU	D	34		23,657		0.14%	4AU	D
Auburn-Folsom (A-F)	Douglas Boulevard to Eureka Road		W-1E, 2E	37,860	1.31	4AU	F	32		37,892	1.31	0.08%	4AU	F	32		37,892	1.31	0.08%	4AU	F	20		37,880	1.31	0.05%	4AU	F	34		37,894	1.31	0.09%	4AU	F
Auburn-Folsom (A-F)	Eureka Road to Oak Hill Drive		W-1E, 2E	33,667	1.80	2A	F	32		33,699	1.80	0.10%	2A	F	32		33,699	1.80	0.10%	2A	F	20		33,687	1.80	0.06%	2A	F	34		33,701	1.80	0.10%	2A	F
Sierra College Boulevard	north of Douglas Boulevard		W-2E	27,912		4AD	D	16		27,928		0.06%	4AD	D	16		27,928		0.06%	4AD	D	10		27,922		0.04%	4AD	D	17		27,929		0.06%	4AD	D
Douglas Boulevard	Barton Road to A-F Road		W-1E, 2E	44,373	1.19	4AD	F	32		44,405	1.19	0.07%	4AD	F	32		44,405	1.19	0.07%	4AD	F	20		44,393	1.19	0.05%	4AD	F	34		44,407	1.19	0.08%	4AD	F
Blue Ravine Road	Oak Avenue Parkway to Green Valley Road/East Natoma	A-6, BP3	W-6E	21,525		4AD	D	8	180	21,713		0.87%	4AD	D	8	180	21,713		0.87%	4AD	D	5	270	21,800		1.28%	4AD	D	9	282	21,816		1.35%	4AD	D
East Natoma St	Cimmaron Circle to Folsom Dam Road		W-1E, 2E, 3E, 4E, 5E	18,324		4AU	D	304		18,628		1.66%	4AU	D	304		18,628		1.66%	4AU	D	190		18,514		1.04%	4AU	D	329		18,653		1.80%	4AU	D
East Natoma St	Folsom Dam Road to Green Valley Road	A-6, BP3	W-1E, 2E, 3E, 4E, 5E,	29,914	1.04	4AU	F	312	180	30,406	1.05	1.64%	4AU	F	312	180	30,406	1.05	1.64%	4AU	F	195	270	30,379	1.05	1.55%	4AU	F	338	282	30,534	1.06	**2.07%**	4AU	F
Green Valley Road	East Natoma Street to Sophia Parkway	A-6	W-1E, 2E, 3E, 4E, 5E,	35,321	1.22	4AU	F	312	180	35,813	1.24	1.39%	4AU	F	312	180	35,813	1.24	1.39%	4AU	F	195	270	35,786	1.24	1.32%	4AU	F	338	282	35,941	1.24	1.76%	4AU	F
Greenback Lane	Hazel Avenue to Madison Avenue		W-4E	26,602		4AMD	C	128		26,730		0.48%	4AMD	C	128		26,730		0.48%	4AMD	C	80		26,682		0.30%	4AMD	C	139		26,741		0.52%	4AMD	C
East Bidwell Street	Clarksville Road to Iron Point Road	A-6, BP-3	W-6E	43,379	1.16	4AD	F	8	180	43,567	1.16	0.43%	4AD	F	8	180	43,567	1.16	0.43%	4AD	F	5	270	43,654	1.17	0.63%	4AD	F	9	282	43,670	1.17	0.67%	4AD	F
Oak Avenue Parkway	Blue Ravine Road to East Bidwell Street		W-6E	24,505		6AD	C	8		24,513		0.03%	6AD	C	8		24,513		0.03%	6AD	C	5		24,510		0.02%	6AD	C	9		24,514		0.04%	6AD	C
Scott Road (south)	south of White Rock Road	A-6, BP-3		1,826		2C	C		180	2,006		**9.86%**	2C	C		180	2,006		**9.86%**	2C	C		270	2,096		**14.79%**	2C	C		282	2,108		**15.44%**	2C	C
White Rock Road	between Scott Road (south) and Scott Road (north)	A-6, BP-3		10,031	1.02	2C	F		180	10,211	1.04	1.79%	2C	F		180	10,211	1.04	1.79%	2C	F		270	10,301	1.05	**2.69%**	2C	F		282	10,313	1.05	**2.81%**	2C	F
Scott Road (north)	north of White Rock Road	A-6, BP-3		6,982		2C	D		180	7,162		2.58%	2C	D		180	7,162		2.58%	2C	D		270	7,252		**3.87%**	2C	D		282	7,264		**4.04%**	2C	D
US50	Hazel Avenue to Folsom Boulevard		W-5E	128,921	1.28	4FA	F	128	180	129,229	1.28	0.24%	4FA	F	128	180	129,229	1.28	0.24%	4FA	F	80	270	129,271	1.28	0.27%	4FA	F	139	282	129,342	1.28	0.33%	4FA	F
US50	East Bidwell St to County Line		W-6E	90,399	1.13	4F	F	8		90,407	1.13	0.01%	4F	F	8		90,407	1.13	0.01%	4F	F	5		90,404	1.13	0.01%	4F	F	9		90,408	1.13	0.01%	4F	F

New Aggregate trips are those trips hauling aggregate materials (fine & coarse filters, road base and asphalt)

New Offsite trips are those trips hauling offsite materials (slope u/s, toe drain, hdpe pipe, pipe filter, u/s filter, seeding, rebar)

New BP trips are those trips hauling aggregate materials (cement, fine & coarse aggregates) directly to the batch plants. This does not include trips from the batch plants to the project features

New Equipment trips are those trips hauling in equipment to each project feature staging area (staging area assumed adjacent to project feature for hauling evaluation).

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Table 10-19. 2012 Daily Project Impacts Alternatives 1 though 4

				No Action/No Project				Alternative 1 - Large Open Cut							Alternative 2 - Single Wall Excavation							Alternative 3 - Dual Wall Excavation							Alternative 4 - Cellular Wall Excavation						
Roadway	Location	Materials/ Equip. Routes	Worker Routes	ADT	V/C	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS
Folsom Boulevard	Natoma Street to Blue Ravine Road		W-3E, 5E	42,543	1.14	4AD	F	90		42,633	1.14	0.21%	4AD	F	90		42,633	1.14	0.21%	4AD	F	135		42,678	1.14	0.32%	4AD	F	45		42,588	1.14	0.11%	4AD	F
Folsom-Auburn Road	Oak Hill Drive to Folsom Dam Road		W-1E, 2E	45,356	1.57	4AU	F	20		45,376	1.57	0.04%	4AU	F	20		45,376	1.57	0.04%	4AU	F	30		45,386	1.57	0.07%	4AU	F	10		45,366	1.57	0.02%	4AU	F
Folsom-Auburn Road	Folsom Dam Road to Oak Avenue		W-1E, 2E	24,086		4AU	D	20		24,106		0.08%	4AU	D	20		24,106		0.08%	4AU	D	30		24,116		0.12%	4AU	D	10		24,096		0.04%	4AU	D
Auburn-Folsom (A-F) Road	Douglas Boulevard to Eureka Road		W-1E, 2E	38,602	1.34	4AU	F	20		38,622	1.34	0.05%	4AU	F	20		38,622	1.34	0.05%	4AU	F	30		38,632	1.34	0.08%	4AU	F	10		38,612	1.34	0.03%	4AU	F
Auburn-Folsom (A-F) Road	Eureka Road to Oak Hill Drive		W-1E, 2E	34,327	1.84	2A	F	20		34,347	1.84	0.06%	2A	F	20		34,347	1.84	0.06%	2A	F	30		34,357	1.84	0.09%	2A	F	10		34,337	1.84	0.03%	2A	F
Sierra College Boulevard	north of Douglas Boulevard		W-2E	28,459		4AD	D	10		28,469		0.04%	4AD	D	10		28,469		0.04%	4AD	D	15		28,474		0.05%	4AD	D	5		28,464		0.02%	4AD	D
Douglas Boulevard	Barton Road to A-F Road		W-1E, 2E	45,243	1.21	4AD	F	20		45,263	1.21	0.04%	4AD	F	20		45,263	1.21	0.04%	4AD	F	30		45,273	1.21	0.07%	4AD	F	10		45,253	1.21	0.02%	4AD	F
Blue Ravine Road	Oak Avenue Parkway to Green Valley Road/East Natoma	A-6, BP3	W-6E	21,947		4AD	D	5		21,952		0.02%	4AD	D	5		21,952		0.02%	4AD	D	8	90	22,045		0.45%	4AD	D	3	90	22,040		0.42%	4AD	D
East Natoma St	Cimmaron Circle to Folsom Dam Road		W-1E, 2E, 3E, 4E, 5E	18,683		4AU	D	190		18,873		1.02%	4AU	D	190		18,873		1.02%	4AU	D	285		18,968		1.53%	4AU	D	95		18,778		0.51%	4AU	D
East Natoma St	Folsom Dam Road to Green Valley Road	A-6, BP3	W-1E, 2E, 3E, 4E, 5E,	30,501		4AU	F	195		30,696		0.64%	4AU	F	195		30,696		0.64%	4AU	F	293	90	30,884		1.26%	4AU	F	98	90	30,689		0.62%	4AU	F
Green Valley Road	East Natoma Street to Sophia Parkway	A-6	W-1E, 2E, 3E, 4E, 5E,	36,014	1.25	4AU	F	195		36,209	1.25	0.54%	4AU	F	195		36,209	1.25	0.54%	4AU	F	293	90	36,397	1.26	1.06%	4AU	F	98	90	36,202	1.25	0.52%	4AU	F
Greenback Lane	Hazel Avenue to Madison Avenue		W-4E	27,124		4AMD	C	80		27,204		0.29%	4AMD	C	80		27,204		0.29%	4AMD	C	120		27,244		0.44%	4AMD	C	40		27,164		0.15%	4AMD	C
East Bidwell Street	Clarksville Road to Iron Point Road	A-6, BP-3	W-6E	44,230	1.18	4AD	F	5		44,235	1.18	0.01%	4AD	F	5		44,235	1.18	0.01%	4AD	F	8	90	44,328	1.19	0.22%	4AD	F	3	90	44,323	1.19	0.21%	4AD	F
Oak Avenue Parkway	Blue Ravine Road to East Bidwell Street		W-6E	24,985		6AD	C	5		24,990		0.02%	6AD	C	5		24,990		0.02%	6AD	C	8		24,993		0.03%	6AD	C	3		24,988		0.01%	6AD	C
Scott Road (south)	south of White Rock Road	A-6, BP-3		1,862		2C	C			1,862			2C	C			1,862			2C	C		90	1,952		**4.83%**	2C	C		90	1,952		**4.83%**	2C	C
White Rock Road	between Scott Road (south) and Scott Road (north)	A-6, BP-3		10,228		2C	F			10,228			2C	F			10,228			2C	F		90	10,318		0.88%	2C	F		90	10,318		0.88%	2C	F
Scott Road (north)	north of White Rock Road	A-6, BP-3		7,119		2C	D			7,119			2C	D			7,119			2C	D		90	7,209		1.26%	2C	D		90	7,209		1.26%	2C	D
US50	Hazel Avenue to Folsom Boulevard		W-5E	131,449	1.31	4FA	F	80		131,529	1.31	0.06%	4FA	F	80		131,529	1.31	0.06%	4FA	F	120	90	131,659	1.31	0.16%	4FA	F	40	90	131,579	1.31	0.10%	4FA	F
US50	East Bidwell St to County Line		W-6E	92,172	1.15	4F	F	5		92,177	1.15	0.01%	4F	F	5		92,177	1.15	0.01%	4F	F	8		92,180	1.15	0.01%	4F	F	3		92,175	1.15	0.00%	4F	F

New Aggregate trips are those trips hauling aggregate materials (fine & coarse filters, road base and asphalt)

New Offsite trips are those trips hauling offsite materials (slope u/s, toe drain, hdpe pipe, pipe filter, u/s filter, seeding, rebar)

New BP trips are those trips hauling aggregate materials (cement, fine & coarse aggregates) directly to the batch plants. This does not include trips from the batch plants to the project features

New Equipment trips are those trips hauling in equipment to each project feature staging area (staging area assumed adjacent to project feature for hauling evaluation).

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Table 10-20. 2013 Daily Project Impacts Alternatives 1 though 4

				No Action/No Project				Alternative 1 - Large Open Cut							Alternative 2 - Single Wall Excavation							Alternative 3 - Dual Wall Excavation							Alternative 4 - Cellular Wall Excavation						
Roadway	Location	Materials/ Equip. Routes	Worker Routes	ADT	V/C	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS	Worker Trips	Truck Trips	New ADT	V/C	% increase	code	LOS
Folsom Boulevard	Natoma Street to Blue Ravine Road		W-3E, 5E	43,361	1.16	4AD	F	45		43,406	1.16	0.10%	4AD	F	45		43,406	1.16	0.10%	4AD	F	45		43,406	1.16	0.10%	4AD	F	45		43,406	1.16	0.10%	4AD	F
Folsom-Auburn Road	Oak Hill Drive to Folsom Dam Road		W-1E, 2E	46,228	1.60	4AU	F	10		46,238	1.60	0.02%	4AU	F	10		46,238	1.60	0.02%	4AU	F	10		46,238	1.60	0.02%	4AU	F	10		46,238	1.60	0.02%	4AU	F
Folsom-Auburn Road	Folsom Dam Road to Oak Avenue		W-1E, 2E	24,549		4AU	D	10		24,559		0.04%	4AU	D	10		24,559		0.04%	4AU	D	10		24,559		0.04%	4AU	D	10		24,559		0.04%	4AU	D
Auburn-Folsom (A-F) Road	Douglas Boulevard to Eureka Road		W-1E, 2E	39,345	1.36	4AU	F	10		39,355	1.36	0.03%	4AU	F	10		39,355	1.36	0.03%	4AU	F	10		39,355	1.36	0.03%	4AU	F	10		39,355	1.36	0.03%	4AU	F
Auburn-Folsom (A-F) Road	Eureka Road to Oak Hill Drive		W-1E, 2E	34,987	1.87	2A	F	10		34,997	1.87	0.03%	2A	F	10		34,997	1.87	0.03%	2A	F	10		34,997	1.87	0.03%	2A	F	10		34,997	1.87	0.03%	2A	F
Sierra College Boulevard	north of Douglas Boulevard		W-2E	29,006		4AD	D	5		29,011		0.02%	4AD	D	5		29,011		0.02%	4AD	D	5		29,011		0.02%	4AD	D	5		29,011		0.02%	4AD	D
Douglas Boulevard	Barton Road to A-F Road		W-1E, 2E	46,113	1.23	4AD	F	10		46,123	1.23	0.02%	4AD	F	10		46,123	1.23	0.02%	4AD	F	10		46,123	1.23	0.02%	4AD	F	10		46,123	1.23	0.02%	4AD	F
Blue Ravine Road	Oak Avenue Parkway to Green Valley Road/East Natoma Street	A-6, BP3	W-6E	22,369		4AD	D	3		22,372		0.01%	4AD	D	3		22,372		0.01%	4AD	D	3	90	22,462		0.42%	4AD	D	3	90	22,462		0.42%	4AD	D
East Natoma St	Cimmaron Circle to Folsom Dam Road		W-1E, 2E, 3E, 4E, 5E	19,042		4AU	D	95		19,137		0.50%	4AU	D	95		19,137		0.50%	4AU	D	95		19,137		0.50%	4AU	D	95		19,137		0.50%	4AU	D
East Natoma St	Folsom Dam Road to Green Valley Road	A-6, BP3	W-1E, 2E, 3E, 4E, 5E,	31,087		4AU	F	98		31,185		0.32%	4AU	F	98		31,185		0.32%	4AU	F	98	90	31,275		0.60%	4AU	F	98	90	31,275		0.60%	4AU	F
Green Valley Road	East Natoma Street to Sophia Parkway	A-6	W-1E, 2E, 3E, 4E, 5E,	36,706	1.27	4AU	F	98		36,804	1.27	0.27%	4AU	F	98		36,804	1.27	0.27%	4AU	F	98	90	36,894	1.28	0.51%	4AU	F	98	90	36,894	1.28	0.51%	4AU	F
Greenback Lane	Hazel Avenue to Madison Avenue		W-4E	27,645		4AMD	C	40		27,685		0.14%	4AMD	C	40		27,685		0.14%	4AMD	C	40		27,685		0.14%	4AMD	C	40		27,685		0.14%	4AMD	C
East Bidwell Street	Clarksville Road to Iron Point Road	A-6, BP-3	W-6E	45,080	1.21	4AD	F	3		45,083	1.21	0.01%	4AD	F	3		45,083	1.21	0.01%	4AD	F	3	90	45,173	1.21	0.21%	4AD	F	3	90	45,173	1.21	0.21%	4AD	F
Oak Avenue Parkway	Blue Ravine Road to East Bidwell Street		W-6E	25,466		6AD	C	3		25,469		0.01%	6AD	C	3		25,469		0.01%	6AD	C	3		25,469		0.01%	6AD	C	3		25,469		0.01%	6AD	C
Scott Road (south)	south of White Rock Road	A-6, BP-3		1,898		2C	C			1,898			2C	C			1,898			2C	C		90	1,988		**4.74%**	2C	C		90	1,988		**4.74%**	2C	C
White Rock Road	between Scott Road (south) and Scott Road (north)	A-6, BP-3		10,425		2C	F			10,425			2C	F			10,425			2C	F		90	10,515		0.86%	2C	F		90	10,515		0.86%	2C	F
Scott Road (north)	north of White Rock Road	A-6, BP-3		7,256		2C	D			7,256			2C	D			7,256			2C	D		90	7,346		1.24%	2C	D		90	7,346		1.24%	2C	D
US50	Hazel Avenue to Folsom Boulevard		W-5E	133,977	1.33	4FA	F	40		134,017	1.33	0.03%	4FA	F	40		134,017	1.33	0.03%	4FA	F	40	90	134,107	1.33	0.10%	4FA	F	40	90	134,107	1.33	0.10%	4FA	F
US50	East Bidwell St to County Line		W-6E	93,944	1.17	4F	F	3		93,947	1.17	0.00%	4F	F	3		93,947	1.17	0.00%	4F	F	3		93,947	1.17	0.00%	4F	F	3		93,947	1.17	0.00%	4F	F

New Aggregate trips are those trips hauling aggregate materials (fine & coarse filters, road base and asphalt)

New Offsite trips are those trips hauling offsite materials (slope u/s, toe drain, hdpe pipe, pipe filter, u/s filter, seeding, rebar)

New BP trips are those trips hauling aggregate materials (cement, fine & coarse aggregates) directly to the batch plants. This does not include trips from the batch plants to the project features

New Equipment trips are those trips hauling in equipment to each project feature staging area (staging area assumed adjacent to project feature for hauling evaluation).

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LOS F – V/C Increase > 0.05. There are no instances where this is expected to occur under this alternative.

Traffic impacts from construction would be less than significant.

Increased traffic on roadways within the study area, including increased truck travel, could incrementally increase the risk of collisions or affect alternative transportation.

Increased traffic resulting from the project, especially truck traffic, could ostensibly affect alternative transportation, to the extent that bike lanes and routes are temporarily constrained, if and at all. Mitigation Measures T-1 through T-3 would address this impact.

Implementation of the proposed project will draw a large construction workforce, which, in turn, will create the need for worker vehicle parking areas.

It is anticipated that much of the needed parking area will be provided within open areas near MIAD, in areas not currently used for parking. There may, however, be the need or opportunity for centralized off-site parking, with a shuttle to transport workers to and from the site. The designation and use of areas for parking would be coordinated with other existing demands, if any for use of the same area. It is possible that existing parking along certain segments of designated truck haul routes may be temporarily restricted from time to time in order to enhance capacity and flow along the route during construction hours. Similar to above, any temporary restrictions on street parking would be designed, timed, and implemented in coordination with the existing needs for that parking, and would include provisions for temporary replacement parking nearby, if appropriate.

Based on the above, implementation of this alternative poses the potential to result in significant traffic impacts. Mitigation Measures T-1 through T-3 would address this impact.

Habitat mitigation activities at Mississippi Bar would result in minimal traffic impacts.

A total of 29 truck trips (58 round trips) would be needed to deliver soil material to the site. Up to 10 trucks (20 round trips) would be required to deliver plants and other required materials. A minimal number of worker trips would be required each day of construction. This traffic would be temporary and would be spread over 24 months as the three phases are implemented. No permanent increases in traffic would occur beyond occasional site visits for O&M.

Traffic impacts associated with Mississippi Bar habitat mitigation would be temporary and less than significant.

Temporary relocation of Green Valley Road could disrupt traffic.

The temporary relocation of Green Valley Road would have minimal traffic impacts. A road detour would be constructed approximately 250 feet south of the existing Green Valley Road. Once paved, all traffic would be re-routed through the detour. Signs would be posted to alert drivers to the detour and additional traffic controls (such as flag men) would be implemented, as needed. The detour would be coordinated with the City of Folsom. Once construction is complete, the detour would be removed and Green Valley Road would be restored to its original location.

Traffic impacts from the temporary relocation of Green Valley Road would be less than significant.

10.2.5 Environmental Consequences/Environmental Impacts of Alternative 2

MIAD construction under this alternative would result in traffic impacts.

This impact considers new trip generation and distribution as a result of worker and haul routes under Alternative 2. Tables 10-17 through 10-20 summarize results for each construction year.

LOS Deterioration. No LOS deterioration would be expected to occur for any of the roadway segments for all construction years.

ADT Increase > 2%. There would be some roadway segments in certain years that would be expected to experience an increase in ADT of greater than 2%, listed below.

- Scott Road, south of White Rock Road (2010 & 2011)
- Scott Road, north of White Rock Road (2010)

As described under Alternative 1, the percentage increase in ADT on Scott Road is skewed because of the low total number of trip on the road. It is not expected increased trips on Scott Road would significantly affect traffic conditions. This impact would be less than significant.

LOS F – V/C Increase > 0.05. There are no instances where this is expected to occur under this alternative.

Traffic impacts from construction would be less than significant.

Other traffic related impacts under Alternative 2 would be similar to Alternative 1.

10.2.6 Environmental Consequences/Environmental Impacts of Alternative 3

MIAD construction under this alternative would result in traffic impacts.

This impact considers new trip generation and distribution as a result of worker and haul routes under Alternative 3. Tables 10-17 through 10-20 summarize results for each construction year.

LOS Deterioration. No LOS deterioration would be expected to occur for any of the roadway segments for all construction years.

ADT Increase > 2%. There would be some roadway segments in certain years that would be expected to experience an increase in ADT of greater than 2%, listed below.

- Scott Road, south of White Rock Road (2010 – 2013)
- White Rock Road, between Scott Road north and south (2011)
- Scott Road, north of White Rock Road (2010, 2011)

As described under Alternative 1, the percentage increase in ADT on Scott Road is skewed because of the low total number of trip on the road. It is not expected increased trips on Scott Road would significantly affect traffic conditions. The same conditions occur on White Rock Road. This impact would be less than significant.

LOS F – V/C Increase > 0.05. There are no instances where this is expected to occur under this alternative.

Traffic impacts from construction would be less than significant.

Other traffic related impacts under Alternative 3 would be similar to Alternative 1.

10.2.7 Environmental Consequences/Environmental Impacts of Alternative 4

MIAD construction under this alternative would result in traffic impacts.

This impact considers new trip generation and distribution as a result of worker and haul routes under Alternative 4. Tables 10-17 through 10-20 summarize results for each construction year.

LOS Deterioration. No LOS deterioration would be expected to occur for any of the roadway segments for all construction years.

ADT Increase > 2%. There would be some roadway segments in certain years that would be expected to experience an increase in ADT of greater than 2%, listed below.

- East Natoma Street, between Folsom Lake Crossing and Green Valley Road (2011)
- Scott Road, south of White Rock Road (2010 – 2013)
- White Rock Road, between Scott Road north and south (2011)
- Scott Road, north of White Rock Road (2010, 2011)

As described under Alternative 1, the percentage increase in ADT on Scott Road is skewed because of the low total number of trip on the road. It is not expected increased trips on Scott Road would significantly affect traffic conditions. The same conditions occur on White Rock Road.

LOS F – V/C Increase > 0.05. There are no instances where this is expected to occur under this alternative.

Impacts to East Natoma Street would be potentially significant. Mitigation measures T-1 through T-3 would reduce these impacts to a less-than-significant level.

Other traffic related impacts under Alternative 4 would be similar to Alternative 1.

Major intersections along roadway segments that would be expected to have a significant impact were then evaluated for peak hour impacts, if turning movement count information was available. The same distribution and volumes of traffic were used to apply the traffic to the existing network.

The following roadway segment would be expected to have a significant impact under Alternative 4:

- East Natoma Street (Folsom Lake Crossing to Green Valley Road)

East Natoma Street is the only roadway segment that has turning movement count information available. Under Alternative 4, project-related construction traffic would cross the 2% threshold in 2011. The major intersections along this segment were at Folsom Lake Crossing and Green Valley Road. The results of the peak hour analysis are shown in Tables 10-21 and 10-22.

Table 10-21: A.M. Peak Hour Analysis

Intersection	2009 Baseline		2011 No Action		2011 Alt. 4	
	LOS	Delay	LOS	Delay	LOS	Delay
E. Natoma & Folsom Lake Crossing	C	30.3	C	31.8	C	31.8
E. Natoma & Green Valley Road	D	42.0	D	44.7	D	53.1

Table 10-22: P.M. Peak Hour Analysis

Intersection	2009 Baseline		2011 No Action		2011 Alt. 4	
	LOS	Delay	LOS	Delay	LOS	Delay
E. Natoma & Folsom Lake Crossing	D	40.0	D	43.2	D	46.3
E. Natoma & Green Valley Road	D	40.4	D	42.7	D	49.8

10.3 Comparative Analysis of Alternatives

Table 10-23 present the comparative analysis of alternatives is presented in below. Under all alternatives, Scott Road would experience the highest percentage increase in ADT; however, because of the low-traveled and more rural nature of the road, it is not expected to be a significant impact.

Under Alternative 4, during 2011, East Natoma Street from Folsom Lake Crossing to Green Valley Road would be expected to have an increase of 2.07%, which would be a potentially significant impact. Mitigation measures would reduce the impact to less than significant.

Table 10-23. Comparative Analysis of Alternatives

Environmental Consequence/ Environmental Impact	Significance					Environmental Commitment/ Mitigation Measure
	No Action/ No Project Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Disruption of traffic from relocation of Green Valley Road	NI	LTS	NI	NI	NI	None required
Change in LOS	NI	NI	NI	NI	NI	None required
ADT Increase above 2%	NI	LTS	LTS	LTS	LTSWM	**T-1:** Peak Hour Capacity Analysis, Roadway Improvements, Traffic Modifications **T-2:** Transportation Management Plan **T-3:** Signage
V/C Increase greater than 0.05. for any roads currently experiencing LOS F	NI	NI	NI	NI	NI	None required
Increase risk of collisions	NI	LTSWM	LTSWM	LTSWM	LTSWM	**T-1:** Peak Hour Capacity Analysis, Roadway Improvements, Traffic Modifications

Environmental Consequence/ Environmental Impact	Significance					Environmental Commitment/ Mitigation Measure
	No Action/ No Project Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
						T-2: Transportation Management Plan **T-3:** Signage
Temporary traffic from Mississippi Bar habitat mitigation.	NI	LTS	LTS	LTS	LTS	None required

Key:
LTS = Less Than Significant
LTSWM = Less than Significant with Mitigation
SU = Significant and Unavoidable
NI = No Impact
B = Beneficial
N/A = Not Applicable
ADT = average daily traffic
V/C = volume to capacity

10.4 Environmental Commitments/Mitigation Measures

Mitigation measures will be required of the MIAD Modification Project whenever the impacts exceed the thresholds indentified in Section 10.2.2.

The following mitigation measures will be implemented:

T-1: Peak Hour Capacity Analysis, Roadway Improvements, and Traffic Modifications
In conjunction with the development and review of more detailed project design and construction specifications, a peak hour capacity analysis will be performed on specific intersections to evaluate the need for changes to traffic signal timing, phasing modification, provision of additional turn lanes through restriping or physical improvements, as necessary and appropriate to reduce project-related impacts to an acceptable level. In conjunction with that assessment, the potential need for roadway improvements or operation modifications (i.e., temporary restrictions on turning movements, on-street parking, etc.) to enhance roadway capacity in light of additional traffic from the project will be evaluated. The completion of these evaluations and the identification of specific traffic improvement measures, as deemed necessary and appropriate in light of the temporary nature of impacts, will be coordinated with the transportation departments of the affected jurisdictions.

T-2: Transportation Management Plan
Construction contractor will prepare a transportation management plan, outlining proposed routes to be approved by the appropriate local entity, and will implement it. High collision intersections will be identified and avoided if possible. Drivers will be informed and trained on the various types of haul routes, and areas that are more sensitive (e.g., high level of residential or education centers, or narrow roadways).

T-3: Signage
Construction contractor will develop and utilize appropriate signage to inform the general public of the haul routes and route changes, if applicable.

10.5 Potentially Significant and Unavoidable Impacts

There are no potentially significant and unavoidable impacts.

10.6 Cumulative Effects

Table 22-1 in Chapter 22 lists projects considered in the cumulative analysis. Several of the projects include construction within the project area that will require transport of materials to and from the site. In addition, population is increasing in the region, which will further increase traffic congestion in the study area. Under the cumulative condition, activities under the larger Folsom DS/FDR Project will have the potential for significant cumulative transportation and circulation effects should construction activities at MIAD and other Folsom DS/FDR actions occur concurrently. Alternatives of the MIAD Modification Project have the potential to contribute to significant cumulative impacts on transportation and circulation at select roads, including, but not limited to, East Natoma Street, White Rock Road, and Scott Road, from increased trip generation.

This would be considered a cumulative considerable effect. Any roadways experiencing cumulative effects from construction traffic would be controlled through coordination with other ongoing projects and the scheduling and sequencing of haul truck traffic to reduce congestion. With this mitigation, cumulative traffic impacts would be less than significant.

10.7 References

California Department of Transportation (Caltrans). 2002. *Guidelines for the Preparation of Traffic Impact Studies, December 2002*. Accessed on: 05 27 2009. Available at: http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

City of Folsom. 1988. *City of Folsom General Plan.*

City of Lincoln. 2005. *October 2005 General Plan Public Draft Goals and Policies Report, City of Lincoln.*

City of Marysville. 1985. *City of Marysville General Plan - Circulation and Scenic Highways Element, August 1985.Accessed on: 05 22 2009. Available at: http://co.el-dorado.ca.us/planning/GeneralPlanAdopted.html*

City of Roseville. 2004. *City of Roseville General Plan.*

City of Wheatland. 2005. *Wheatland General Plan Policy Document Part II December 2005.*

El Dorado County. 2004. *2004 El Dorado County General Plan. A Plan for Managed Growth and Open Roads; A Plan for Quality Neighborhoods and Traffic Relief, July 19 2004.* Accessed on: 05 24 2009. Available at: http://co.el-dorado.ca.us/planning/GeneralPlanAdopted.html

Granite Bay. 1989. *Granite Bay Community Plan, May 8, 1989.*

Placer County. 1994. *Placer County General Plan, August 1994 – Transportation and Circulation.*

Sacramento County. 1993. *Circulation Element of the County of Sacramento General Plan, December 15, 1993.*

Transportation Research Board. 2000. *Highway Capacity Manual, 2000*. Washington D.C., 2001.

Yuba County. 1994. *Yuba County General Plan – Transportation and Circulation.*

Chapter 11
Noise

This section addresses potential noise impacts associated with construction of the features proposed under each of the four MIAD Modification Project action alternatives, including the No Action/No Project Alternative and Alternatives 1 through 4. The discussion herein includes an explanation of noise descriptors, to provide the reader with an understanding of the basic noise concepts and terminology reflected in the analysis, a delineation of the geographic analysis area, and a description the affected environment and existing conditions within the MIAD and Mississippi Bar construction areas and along the potential truck hauling routes. This discussion is followed by the noise impacts discussion, which includes the delineation of criteria used to define and determine significant noise impacts, an explanation of the assessment methodology, a discussion of the noise impacts associated with each alternative and comparison of alternatives, recommendations for noise mitigation measures, and an analysis of cumulative effects. The focus of the analysis is on potential noise impacts to local noise receptors resulting from construction activities.

11.1 Affected Environment/Environmental Setting

Noise is measured in decibels (dB) and is a measurement of sound pressure level. The human ear perceives sound, which is mechanical energy, as pressure on the ear. The sound pressure level is the logarithmic ratio of that sound pressure to a reference pressure, and is expressed in decibels. Environmental sounds are measured with the A-weighted scale of the sound level meter. The A scale simulates the frequency response of the human ear, by giving more weight to the middle frequency sounds, and less to the low and high frequency sounds. A-weighted sound levels are designated as dBA. Figure 11-1 shows the range of sound levels for common indoor and outdoor activities, in dBA.

Because sounds in the environment usually vary with time they cannot simply be described with a single number. Two methods are used to describe variable sounds. These are exceedance levels and equivalent levels, both of which are derived from a large number of moment-to-moment A-weighted noise level measurements. Exceedance levels are values from the cumulative amplitude distribution of all the noise levels observed during a measurement period. Exceedance levels are designated L_n, where n represents a value from 0 to 100 percent. For example, L_{50} is the median noise level, or the noise level in dBA exceeded 50 percent of the time during the measurement period. Sacramento, El Dorado, and Placer Counties have established L_{50} noise limits for non-transportation noise sources in residential areas.

Decibel Levels of Common Noise Sources

Sound Pressure Level (dBA)	Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

Ref: A Guide to Noise Control in Minnesota, Acoustical Properties, Measurement, Analysis, Regulation, Minnesota Pollution Control Agency, 3/99

Figure 11-1. Range of Sound Levels for Common Indoor and Outdoor Activities and Areas

The equivalent noise level (L_{eq}) is the constant sound level that in a given period has the same sound energy level as the actual time-varying sound pressure level. L_{eq} provides a methodology for combining noise from individual events and steady state sources into a measure of cumulative noise exposure. It is used by local jurisdictions and the Federal Highway Administration (FHWA) to evaluate noise impacts.

The day-night noise level (L_{dn}) is the energy average sound level for a 24-hour day determined after the addition of a 10-dBA penalty to all noise events occurring at night between 10:00 p.m. and 7:00 a.m. The L_{dn} is a useful metric of community noise impact because people in their homes are much more sensitive to noise at night, when they are relaxing or sleeping, than they are to noise in the daytime. The L_{dn} is used by local jurisdictions to rate community noise impacts from transportation noise sources.

In the State of California, the community noise equivalent level (CNEL) is widely used. It is similar to the L_{dn} noise level, except it weights events occurring between the evening hours of 7:00 p.m. and 10:00 p.m. by increasing noise levels by 5 dBA.

In addition to evaluating noise impacts based on complying with noise standards, project noise impacts can also be assessed by annoyance criteria, or the incremental increases in existing noise levels. The impact of increasing or decreasing noise levels is presented in Table 11-1. For example, it shows that a change of 3 dBA is barely perceptible and that a 10-dBA increase or decrease would be perceived by someone to be a doubling or halving of the noise level (loudness).

Table 11-1. Decibel Changes, Loudness, and Energy Loss

Sound Level Change (dBA)	Relative Loudness	Acoustical Energy Loss (%)
0	Reference	0
-3	Barely Perceptible Change	50
-5	Readily Perceptible Change	67
-10	Half as Loud	90
-20	1/4 as Loud	99
-30	1/8 as Loud	99.9

11.1.1 Area of Analysis

11.1.1.1 Mormon Island Auxiliary Dam

Potential sources of noise impacts from the MIAD actions include both construction- and transportation-related noise sources. The construction noise impact analysis focuses on the areas adjacent to the MIAD construction area. Anticipated sources of construction noise include onsite concrete soil batch plant operations proposed for each alternative. Table 11-2 summarizes the construction equipment proposed for each of the four alternatives.

The transportation noise impacts associated with trucks hauling construction materials focuses on sensitive land uses along both local and regional roadways. Regional haul routes refer to potential routes for trucking construction materials into the MIAD site. Materials are not expected to be delivered from sources or suppliers north of MIAD and therefore Interstate Route 80 is not expected to be a regional haul or supply route. Borrow and aggregate materials will most likely be supplied locally with delivery trucks traffic using only local roads. US Highway 50 will likely serve as the primary regional route by which construction equipment, supplies and other materials are transported to the construction site.

Table 11-2. Construction Equipment Proposed for Each Alternative

Alternative	Description	Equipment
1	Open Cut Excavate and Replace	Scrapers, Dozers, Compactors, Vibratory Rollers, Water Pumps, or Excavators, Shovels, and Dump Trucks. Soil Cement Batch Plant required.
2	Walled Excavate and Replace	Scrapers, Dozers, Compactors, Vibratory Rollers, Water Pumps, or Excavators, Shovels, and Dump Trucks. Soil Cement Batch Plant and Rotary Drills are required.
3	Open Excavation with a Dual Wall System	Excavators, Shovels, and Dump Trucks or alternatively Scrapers, Dozers, Compactors, Vibratory Rollers, Water Pumps. Soil Cement Batch Plant, Pile Drivers and Rotary Drills are required.
4	Cellular Open Excavation	Excavators, Shovels, Water Pumps. Soil Cement Batch Plant, Pile Drivers and Rotary Drills are required.

Local haul routes refer to roadways in the vicinity of MIAD that may be used for trucks hauling materials to and from borrow sites, as well as to the dam from regional routes. Potential local haul routes include Scott Road, East Bidwell, Oak Avenue Parkway, Blue Ravine Road, East Bidwell Street, East Natoma Street and Green Valley Road. Section 10, Transportation and Circulation, provides a detailed description of the regional and local access routes assumed for construction activities. Communities potentially impacted by the project related traffic include the City of Folsom, El Dorado Hills in Eldorado County, Granite Bay in Placer County and communities in unincorporated Sacramento, El Dorado and Placer Counties.

11.1.1.2 Mississippi Bar

The Mississippi Bar mitigation site includes 80 acres of land on the western shore of Lake Natoma, near the intersection of Sunset Avenue and Main Avenue and south of the community of Orangevale. All proposed mitigation would occur on land parcels currently owned by DPR and Reclamation and managed by DPR as part of the FLSRA. Potential sources of noise impacts from the Mississippi Bar actions include both construction- and transportation-related noise sources. The construction noise impact analysis focuses on the areas adjacent to the Mississippi Bar restoration area. Anticipated sources of construction noise include a dozer, an excavator, a front end loader, dump trucks and haul trucks. Compactors, vibrating rollers and other impaction equipment are not anticipated for this work. Local and regional roads that could provide access to the restoration site include State Route 50, Hazel Avenue, and Sunset Avenue.

The communities that would primarily be affected by the Mississippi Bar habitat mitigation actions would be Orangevale, Fair Oaks, Folsom, and Alder Creek.

11.1.2 Regulatory Setting

The area of analysis includes noise-sensitive land uses primarily in Sacramento County, El Dorado County, Placer County, the City of Folsom and the communities of Fair Oaks, Nimbus, Alder Creek and Granite Bay. Most jurisdictions have adopted noise standards for both transportation and non-transportation noise sources in the Noise Element of their General Plan. In addition to the local Noise Elements, because this is a NEPA/CEQA action, it is also appropriate to apply Federal and state traffic noise impact assessment criteria to evaluate haul truck noise impacts. Presented below is a summary of the applicable noise standards for actions under the MIAD and Mississippi Bar projects.

11.1.2.1 Federal and State

The federal regulations that apply to noise include the applicable FHWA noise abatement criteria (NAC) (23 CFR Part 772), which have been interpreted and implemented for projects in California by California Department of Transportation (Caltrans). These criteria are included in the Caltrans Traffic Noise Analysis Protocol, October 1998 (herein referred to as the Protocol).

The FHWA noise abatement criteria (NAC), presented in Table 11-3, are based on specific land use categories. These NAC are based on one-hour average Leq noise levels (FHWA, Federal-Aid Highway Program Manual, Volume 7, Chapter 7, *Section 3, August 9, 1980*).

Land uses along the local and regional haul routes are predominantly Activity Categories B and C, and, to a lesser degree, Activity Category E (i.e., residential). The FHWA noise standards indicate that noise mitigation must be considered when the Horizon Year project levels approach or exceed the stated NAC. In addition, the FHWA noise standards also indicate that noise mitigation must be considered when the Future-Year or Horizon-Year project levels "substantially" exceed existing noise levels.

Table 11-3. FHWA Noise Abatement Criteria (NAC)

Activity Category	Leq(1hr) [1] (dBA)	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

(1) No single hourly average Leq in a 24-hour day can exceed this value.

Source: 23 CFR Part 772.

The Protocol defines "approach the noise abatement criteria" (23 CFR 772.5(g)) as 1 dB(A) below the NAC and defines "substantially" as a predicted incremental impact equal to or greater than 12 dB(A) over existing noise levels.

11.1.2.2 Local

A project would have a potentially significant effect on the environment if it conflicts with the adopted noise standards, substantially increases the ambient noise levels for adjacent areas, or causes severe noise impacts for exposed people. All jurisdictions where construction or truck hauling would occur have adopted local ordinances regulating noise levels in order to minimize impacts on sensitive land uses. These local standards have been established for both non-transportation and transportation noise sources. Table 11-4 lists the non-transportation noise standards in the relevant jurisdictions, and Table 11-5 lists the transportation noise standards in those jurisdictions where actions may involve trucks hauling materials.

Table 11-4. Local Government Non-Transportation Noise Standards (dBA)

Noise Element Jurisdiction/Land Use Category	Maximum Allowable Exterior Noise Levels					
	Daytime 7a.m. - 7p.m.		Evening 7 p.m. - 10 p.m.		Nighttime 10p.m. - 7 a.m.	
Sacramento County Residential Areas	Hourly		Hourly		Hourly	
	L50	Lmax	L50	Lmax	L50	Lmax
	50	70	50	70	45	65
El Dorado County[(1)]	Leq	Lmax	Leq	Lmax	Leq	Lmax
Residential areas (Community Areas)	55	75	50	65	45	60
Residential Areas (Rural Regions)	50	60	45	55	40	50
Commercial areas (Community Areas)	70	90	65	75	65	75
Commercial areas (Rural Regions)	65	75	60	70	60	70
Open Space, Natural Resource (Rural Regions)	65	75	60	70	60	70
City of Folsom [(2),(3)]	Hourly Leq				Hourly Leq	
	50				45	

(1) Non-transportation construction noise standards.
(2) Construction noise is exempt from the City of Folsom Noise Element provided that construction does not take place before 7 a.m. or after 6 p.m. during weekdays and before 8 a.m. or after 5 p.m. on weekends.
(3) Based on cumulative 30 minutes in any one-hour time period.

Sources:
County of Sacramento General Plan Noise Element (December 1993, amended 1998)
City of Folsom Municipal Code, Chapter 8.42 Noise Control

Table 11-5. Transportation Noise Standards

Noise Element Jurisdiction/Land Use Category	Maximum Allowable Noise Levels	
	Exterior Ldn/ CNEL[(1)]	Interior Ldn/ CNEL
Sacramento County Residential areas	60	45
El Dorado County, Placer County and Granite Bay Community[(2)]		
Residential Areas	60	45
Other Sensitive Areas (Parks)	70	
Other sensitive areas: hospitals, nursing homes, churches, transient lodging	60	45
City of Folsom Residential areas including single- or multiple-family residence, school, church, hospital or public library)	60	45

(1) The jurisdictions along the haul routes with standards for transportation noise impacts have adopted a maximum Ldn/CNEL noise limit of 60 dBA for residential land uses, with a potential allowable Ldn/CNEL exceedance level 65 dBA, if 60 dBA is not practicable in a situation given the application of the best-available noise reduction measures.
(2) Interior spaces worst-case one hour Leq noise standards of 35-45 dBA have been adopted for theaters, auditoriums, music halls, churches, meeting halls, office buildings, schools, libraries and museums.
Sources:
County of Sacramento General Plan Noise Element (December 1993, amended 1998)
City of Folsom Municipal Code, Chapter 8.42 Noise Control

Construction noise may potentially impact three primary jurisdictions, El Dorado Hills located in El Dorado County, the City of Folsom which has its own noise ordinance and Sacramento County which has its own noise ordinance. These jurisdictions either have non-transportation noise standards based on time of day and land use sensitivity or provide exemptions for construction as long as those activities occur during the daytime. Residential areas are considered the most noise sensitive land use and have the strictest noise standards. All of the jurisdictions have established maximum allowable exterior one-hour noise limits for both daytime and nighttime hours. The City of Folsom Noise Element exempts construction activities provided that construction does not take place before 7 a.m. or after 6 p.m. during weekdays and before 8 a.m. or after 5 p.m. on weekends.

11.1.3 Existing Conditions

11.1.3.1 Mormon Island Auxiliary Dam

The MIAD area, bordered by Folsom Reservoir to the north and Green Valley Road to the South, has a rural-suburban character heading to the north and east and a suburban character heading to the west. Residential areas lie approximately one half mile to the south of, and are approximately 80 feet below the top of the dam. Green Valley Road generally separates the dam from residential areas. Noise levels are affected by seasonal variations with the reservoir being an active site for recreational boating and jet and water ski activities during the summer, which tends to increase background noise levels. During the winter months, human and recreational activity is less; therefore, background noise levels tend to be lower.

Noise data available from several noise studies in the Folsom Reservoir area were used to help define the existing noise conditions at MIAD and along proposed truck hauling routes. These recent noise studies include:

- Reclamation, Folsom Dam Road Access Restriction, Final Environmental Impact Statement: Section 3.3 (April 2005);
- Wallace, Roberts, and Todd et al., Folsom Lake State Recreation Area, Draft Resource Inventory, Environmental Conditions: Noise (April 2003);
- USACE, Folsom Dam Bridge SEIR/SEIS (Draft 2006);
- Reclamation, Folsom DS/FDR Pre-Construction Noise Monitoring Survey Report, (January 2008).

These existing studies, along with USEPA Levels document and the results of the roadway noise modeling analysis performed this project were used to describe ambient noise conditions.

Noise monitoring data presented in the Folsom DS/FDR Pre-construction Noise Monitoring Survey Report, January 2008 were used to provide guidance for defining existing ambient noise conditions. The two locations nearest to MIAD where noise monitoring data was recorded were the western corner of Elvie Perazzo and Briggs Park in Folsom and a location north of Maul Oak Court and west of Lakeridge Oaks Drive in El Dorado County. Ambient noise measurements are summarized in Table 11-6.

Table 11-6. Summary of Ambient Noise Monitoring Data

Monitoring Locations		Date	Sample Period	Noise Level Measurements (dBA)										
							Daytime (7 a.m. - 10 p.m.)				Nighttime (10 p.m. - 7 a.m.)			
ID	**Description**			**Ldn**	**CNEL**	**Min./ Max.**	**Lmax**	**Leq**	**L10**	**L90**	**Lmax**	**Leq**	**L10**	**L90**
2	Briggs Park, Folsom	12/11/2007	Weekday	58.6	57.5	Min.	--	48.3	50.7	44.5	--	38.6	57.9	33.5
						Max.	74.4	58.4	60.9	54.7	73.4	55.3	41.1	51.8
		12/15/2007	Weekend	58.7	59.2	Min.	--	50.8	53.3	45.2	--	43.3	46.4	38.1
						Max.	78.8	57.6	59.7	53.8	72.4	55.4	57.4	52.5
3	North of Maul Oak Court/ Lakeridge Oaks Drive, El Dorado County	12/11/2007	Weekday	51.4	51.8	Min.	--	38.7	40.8	35.7	--	35.6	36.9	31.9
						Max.	78.8	56.7	53.7	48.0	76.9	50.0	52.5	46.4
		1/12/2008	Weekend	46.0	46.3	Min.	--	38.3	40.2	35.0	--	31.1	32.7	26.6
						Max.	77.1	59.6	57.2	43.6	57.8	41.7	45	35.5

At the monitoring locations with the lowest noise levels there was minimal human activity influencing ambient noise conditions. Background noise levels at these monitoring locations are based upon 24-hour measurements.

11.1.3.2 Mississippi Bar

The Mississippi Bar study area is bordered by suburban residential areas to the north and west and the American River to the south and east. Noise levels are affected by the close proximity of State Route 50 which at its closest point is approximately one third of a mile from Mississippi Bar. Recreational activities along the American River that are potential sources of background noise are influenced by seasonal changes in its use with the river providing for non-motorized recreational activities during the summer, including paddling, swimming, and fishing.

Because noise monitoring was not conducted for this area during the Folsom Dam Preconstruction Noise Monitoring Survey, the data provided in the USEPA Levels Document[1] were used to define average ambient daytime and nighttime L_{eq} and L_{dn} noise conditions around the Mississippi Bar site. The L_{dn}

[1] U.S. EPA, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March 1974.

noise levels are based on the various land use descriptors. The daytime and nighttime L_{eq} noise levels were estimated based on the L_{dn} noise levels. According to the USEPA, typically, there is a 10-dBA change in noise levels between the daytime and nighttime. Table 11-7 presents summary of the ambient noise levels for various land uses.

Table 11-7. Average Ambient Noise Levels for Various Land Uses

Land Use Description	Average Ldn (dBA)	Daytime Leq (dBA)	Nighttime Leq (dBA)
Wilderness	35	35	25
Rural Residential	40	40	30
Quiet Suburban Residential	50	50	40
Normal Suburban Residential	55	55	45
Urban Residential	60	60	50
Noisy Urban Residential	65	65	55
Very Noisy Urban Residential	70	70	60

Source: [1]U.S. EPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974.

11.1.3.3 Receptors

A review of existing topographic and aerial photographs was used to select two noise sensitive receptor locations for each of the MIAD and Mississippi Bar construction locations that represent residential areas closest to the proposed construction sites. The most appropriate land use descriptors and noise levels to describe the MIAD and Mississippi Bar areas range from “rural residential/quiet suburban residential” to “urban residential.” Each noise-sensitive receptor represents the closest point to the proposed construction activities. Figure 11-2 shows two noise sensitive receptors that could be impacted by construction activities from MIAD and Figure 11-3 shows two noise sensitive receptors that could be impacted by construction activities from Mississippi Bar. Table 11-8 presents the ambient noise levels representative of the MIAD and Mississippi Bar sites at each noise-sensitive receptors.

Table 11-8 Construction Noise-Sensitive Receptors for MIAD and Mississippi Bar Sites

Noise- Sensitive Receptors		Daytime Leq	Nighttime Leq	Ldn
Receptor Id. (See Figure 3.10-2)	Description	(dBA)	(dBA)	(dBA)
1 (MIAD)(1)	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	56.7	50	51.4
2 (MIAD)(1)	Immediately north of the homes on Mountain View Drive, Folsom	58.4	55.3	58.6
3 (Mississippi Bar)(2)	Caltrop Ct, Fair Oaks	60	50	60
4 (Mississippi Bar)(2)	River Look Lane, Fair Oaks	55	50	55

(1)Weekdays
(2)Estimated Average Ambient Noise Conditions Based on Land use

Figure 11-2. Construction Noise-Sensitive Receptors Near Mormon Island Auxiliary Dam

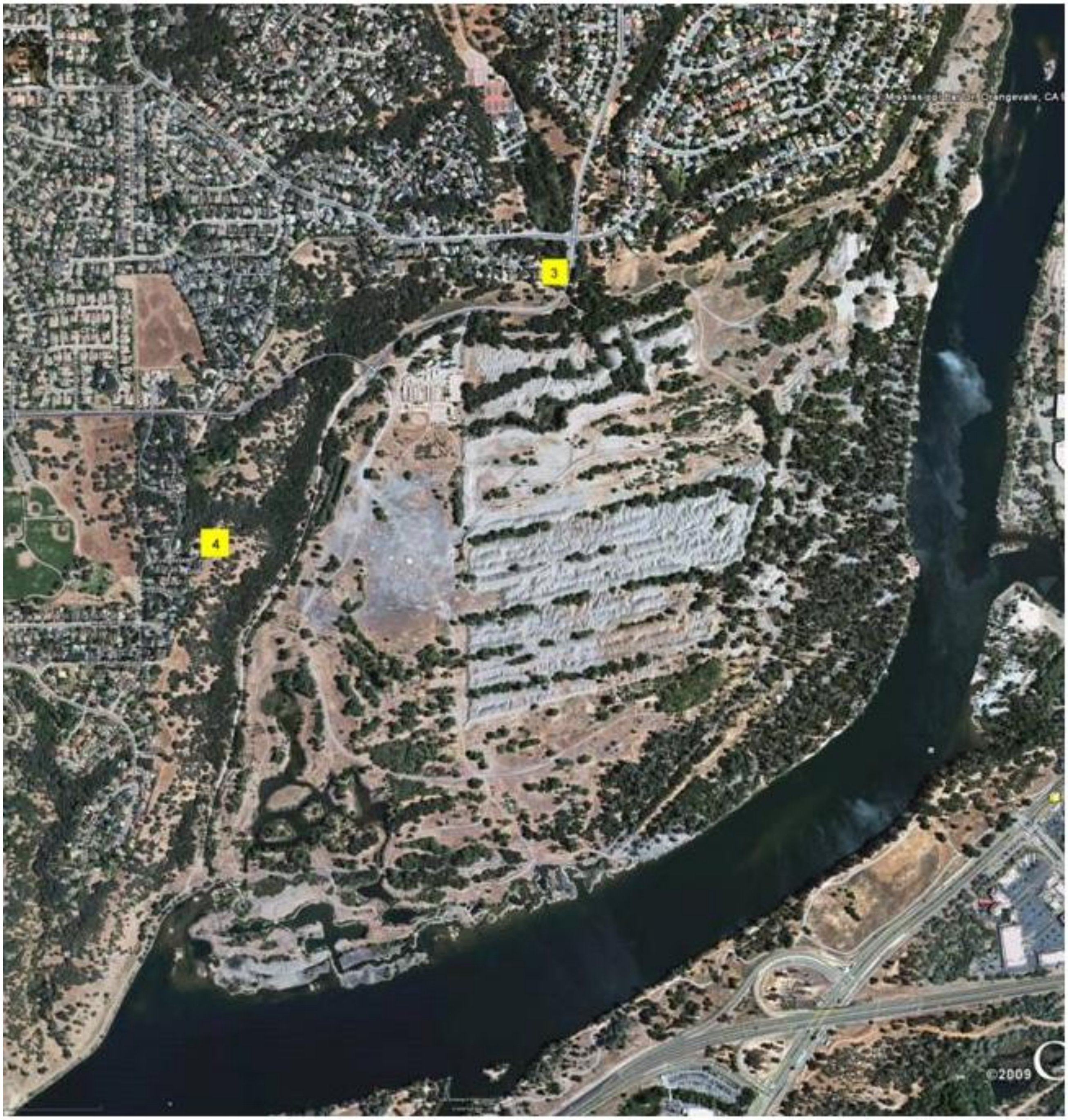

Figure 11-3. Construction Noise-Sensitive Receptors Near Mississippi Bar

Noise monitoring and traffic data presented in the *Folsom Dam Road Access Restriction, Final Environmental Impact Statement* (USBR, April 2005) were used to provide guidance for defining existing ambient conditions along the proposed local truck hauling routes. A traffic noise modeling analysis, based on 2006 traffic data, was conducted for the Folsom DS/FDR to estimate existing peak hour and 24-hour noise levels noise-sensitive receptors adjacent to the proposed local truck hauling routes. These modeling results and additional noise modeling conducted in 2009 were used to determine the existing noise at eleven roadway noise-sensitive receptor locations that represent residential areas adjacent to the proposed local truck hauling routes and are shown in Figure 11-4.

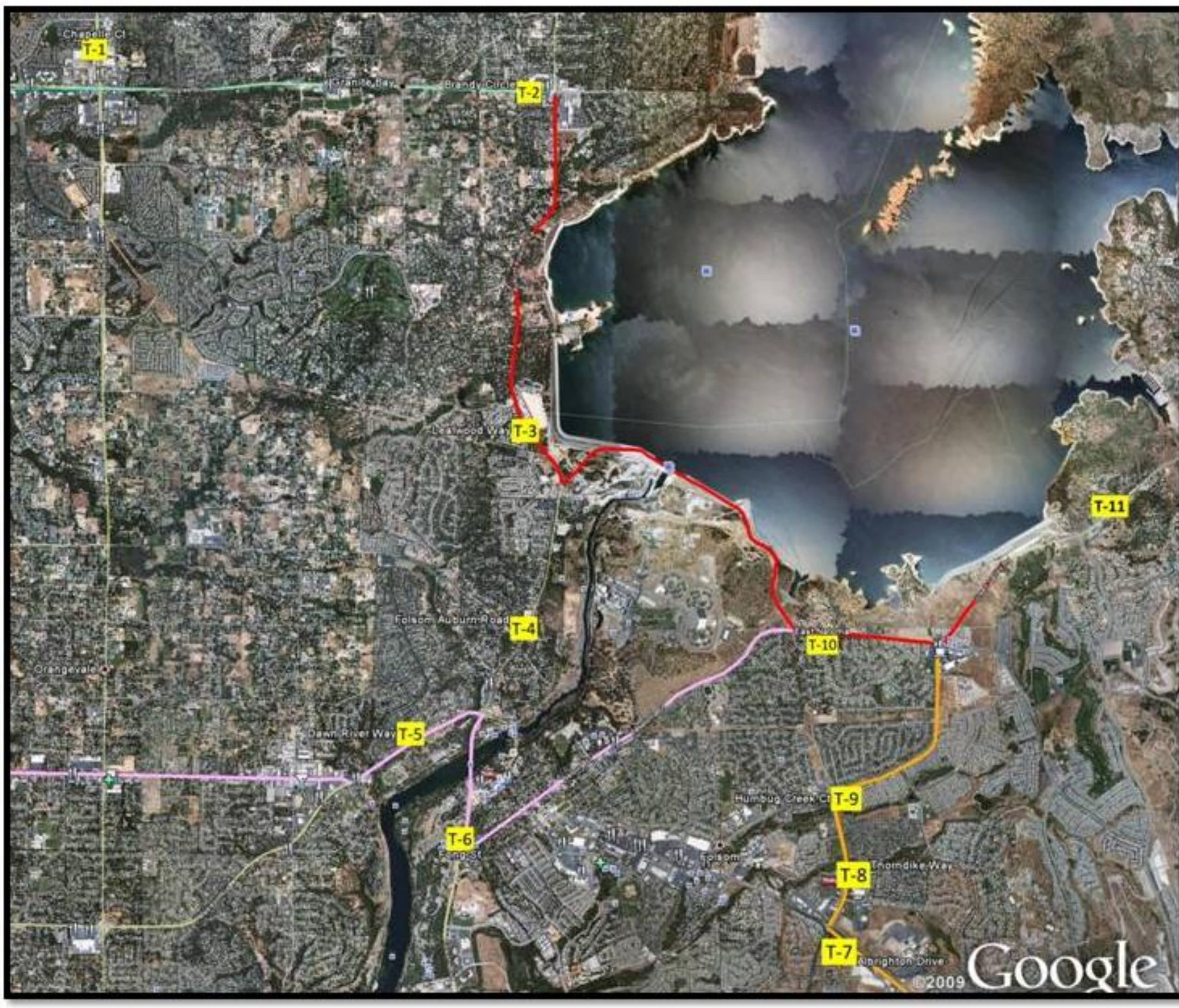

Figure 11-4. Roadway Noise Sensitive Receptors in Sacramento and El Dorado Counties

Peak hour daytime and nighttime L_{eq} and L_{dn} noise levels were estimated for each noise sensitive receptor. Daytime L_{eq} noise levels range from 69.7 to 73.1 dBA and nighttime L_{eq} noise levels range from 59.1 to 66.5 dBA. The L_{dn} noise levels range from 69 to74.7 dBA. The lowest noise levels were estimated along Sierra College Blvd. and the highest noise levels were estimated for East Bidwell Street. These noise levels are typical for noise-sensitive receptors located near busy secondary and arterial roadways. Table 11-9 also summarizes the existing ambient noise levels.

Table 11-9. Potential Local Hauling Routes-- Existing Ambient Noise Conditions (2009) Noise Levels at 50 Feet from Local Roadway[(2)]

Sensitive Noise Receptor	Local Roadway	Description	Daytime Leq (dBA)	Nighttime Leq (dBA)	Ldn (dBA)
T-1	Sierra College Blvd.	Chapelle Court	71.0	59.1	69.0
T-2	Douglas Blvd.	Brandy Circle	71.8	61.8	71.2
T-3	Auburn Folsom Rd.	Leafwood Way	72.0	62.1	71.5
T-4	Folsom Auburn Rd	Pine View Drive Cul-de-sac	71.7	61.7	71.1
T-5	Greenback Lane	Dawn River Way	72.1	62.1	71.5
T-6	Folsom Blvd	Fong St.	71.3	61.4	70.8
T-7[(1)]	East Bidwell Street	Albrighton Road	73.1	66.5	74.7
T-8	Oak Avenue Parkway	Thorndike Way	72.1	62.1	71.5
T-9[(1)]	Blue Ravine Road	Cobblefields Court	69.7	63	71.2
T-10	East Natoma Street	Sanborn Court	72.2	62.2	71.6
T-11[(1)]	Green Valley Road	Green Valley Road	72.7	66.1	74.3

[(1)] 2009 Ldn from Folsom DS/FDR Draft EIS/EIR - December 2006
[(2)] Predicted in July/August 2009 using FHWA TNM2.5 unless otherwise noted.

11.2 Environmental Consequences/Environmental Impacts of Construction

This section presents the environmental consequences/environmental impacts associated with construction noise.

11.2.1 Construction Noise Assessment Methods

11.2.1.1 Construction Noise Analysis

Construction activities are expected to begin in 2010 and last approximately three years. The construction schedule includes ten construction activities, which would be staggered in the construction timeline. Not all action alternatives would involve all the construction activities. For example, Alternative 1 would not involve wall construction. Table 11-10 presents the proposed construction activities and schedule for the main features of the MIAD Modification Project. Each of these construction activities were analyzed for their potential noise impacts on two noise-sensitive receptors, which are shown in Figure 11-2. The noise impacts associated with each alternative were then identified in terms of the specific features included in each alternative and the associated construction-related noise impacts were characterized accordingly.

Table 11-10. Proposed Construction Activities and Schedule

Construction Activity	Schedule
Clear & Grub	2010
Well Installation	2010
Wall Construction (Alternatives 2-4 only)	2010-2011
Detention Pond Operations	2010-2012
Overlay Materials Supply	2010-2011
Excavation	2010-2011
Placement	2011-2012
Dam Stripping	2011
Filter Placement	2011-2013
Shell Placement	2011-2013

Source: CDM 2009.

The construction operations, such as drilling, concrete batch plant operation, and various grading activities, and the types of construction equipment that are expected to be used for all of the alternatives are presented in Table 11-11. Table 11-11 was based on information provided the Federal Highway Administration's Roadway Construction Noise Model (RCNM). It also presents the L_{max} sound level and percent of time the equipment would be operated at full power (usage factor) for each piece of construction equipment used. The L_{max} sound levels represent typical maximum noise that normally occurs during full power operation of the equipment. These levels typically only occur for a short duration, since the equipment is not operated at full power for an entire workday.

Table 11-11. Construction Operations, Equipment Types, and Their Noise Levels

Equipment Types	Usage Factor	Lmax @ 50'
Articulated Trucks	40%	84
Cement Plant	15%	83
Dozers	40%	85
Drill Rigs	20%	85
Scrapers	40%	85
Secant Pile Drill	20%	85
Sheet Pile Driver	20%	95
Water Pump	50%	77
Water Truck	40%	84
Wheel Loaders	40%	80

Source: U.S. DOT, FHWA, Roadway Construction Noise Model, January 2006.

The methodology used to compare each action alternative's long-term construction noise impacts was based on the projected L_{dn} noise level at each sensitive receptor and the duration of the construction. For major construction phases that would be adjacent to noise-sensitive receptors, the construction duration, in total number of days, and the projected L_{dn} noise level at each noise-sensitive receptor were used to calculate a construction period average L_{dn} noise level for each action alternative.

11.2.1.2 Vibration Assessment Methods

Construction has the potential to produce noise and vibration levels that may be annoying or disturbing to humans and may cause damage to structures. Vibration from construction projects is caused by general equipment operations, and is usually highest during pile driving, soil compacting, jack hammering and construction related to demolition and blasting activities. Measurements of vibration are expressed in terms of the peak particle velocity (PPV) in the unit of inches per second (ips). The PPV, a quantity commonly used for vibration measurements, is the maximum velocity experienced by any point in a structure during a vibration event. It is an indication of the magnitude of energy transmitted through vibration. PPV is an indicator often used in determining potential damage to buildings from stress associated with blasting and other construction activities.

Table 11-12 summarizes the levels of vibration and the usual effect on people and buildings based on the U.S. Department of Transportation (USDOT) guidelines for vibration levels from construction-related activities. Table 11-13 presents the vibration levels for typical construction equipment used to assess potential vibration impacts from the MIAD Modification Project.

11.2.1.3 Construction Noise Control Considerations

As part of the construction noise impact analysis, a Best Available Control Technology (BACT) analysis was prepared to evaluate the extent and likelihood that unmitigated noise levels associated with certain types of construction equipment could be feasibly reduced. In particular, noise associated with quasi-stationary and stationary sources, such as drill rigs, cement plants, and water pumps, was evaluated in terms of whether provision of a portable or stationary barrier as part of the operation of such equipment would be necessary and appropriate to reduce construction-related noise at the nearest noise-sensitive receptor to an acceptable level. The application of BACT for the subject types of equipment was directed at those situations where the overall unmitigated increase in ambient noise level, resulting from construction activities, was estimated to exceed 5 dB (i.e., the threshold of significance for construction-related noise - see paragraph below).

Table 11-12. Summary of Vibration Levels and Effects on Humans and Buildings

Peak Particle Velocity (in/sec)	Effects on Humans	Effects on Buildings
<0.005	Imperceptible	No effect on buildings
0.005 to 0.015	Barely perceptible	No effect on buildings
0.02 to 0.05	Level at which continuous vibrations begin to annoy people in buildings	No effect on buildings
0.1 to 0.5	Vibrations considered unacceptable for people exposed to continuous or long-term vibration	Minimal potential for damage to weak or sensitive structures.
0.5 to 1.0	Vibrations considered bothersome by most people, however tolerable if short-term in length	Threshold at which there is a risk of architectural damage to buildings with plastered ceilings and walls. Some risk to ancient monuments and ruins.
1.0 to 2.0	Vibrations considered unpleasant by most people	U.S. Bureau of Mines data indicates that blasting vibration in this range will not harm most buildings. Most construction vibration limits are in this range.
>3.0	Vibration is unpleasant	Potential for architectural damage and possible minor structural damage.

Source: Michael Minor & Associates, Vibration Primer http://www.drnoise.com/PDF_files/Vibration%20Primer.pdf, downloaded May 2006.

Table 11-13. Vibration Levels for Typical Construction Equipment

Equipment		PPV at 25 (in/sec)
Pile Driver (impact)	Upper range	1.518
	Typical	0.644
Pile Driver (sonic)	Upper range	0.734
	Typical	0.170
Large bulldozer		0.089
Loaded trucks		0.076
Small bulldozer		0.003

Source: FTA, Transit Noise and Vibration Impact Assessment, April 1995.

11.2.1.4 Construction Noise Impacts Analysis

The results of the construction noise impact analysis were compared to the significance criteria and local regulations in the two jurisdictions with non-transportation noise standards. It should be noted that the results of the construction noise impact analysis represent average noise impact conditions. There would be times during construction activities when construction noise levels at each of the noise-sensitive receptors could be higher and lower than those presented below. This would be true when construction activities occur either closer to or further way from noise-sensitive receptors than at the center of the proposed construction activities, as assumed for this noise impact analysis. Furthermore, noise impacts would be higher during the fall and winter months when background noise levels are lower due to less recreational activities at the reservoir. It is also possible during certain atmospheric conditions that construction noise could be heard at locations further away than the two noise-sensitive receptors during the nighttime. This could occur under clear skies and very light winds when there would be a temperature inversion above the ground surface, which acts as a "ceiling." This causes the sound waves to be redirected back to the ground level and travel further distances.

11.2.2 Significance Criteria

There are two principal criteria for evaluating noise impacts of a project: 1) evaluating the increase in noise levels above the existing ambient levels as a result of the project, and 2) compliance with relevant standards and regulations. CEQA requires comparing project-related noise impacts with existing noise levels and NEPA requires comparing project-related noise levels with the noise levels of the No Action/No Project Alternative. For the purposes of complying with CEQA and NEPA requirements, it was conservatively assumed that the existing and the future no-action noise levels would be same, not including future background noise increases associated with potential growth in the area of analysis. The applicable CEQA significance criteria for noise include: a substantial increase in ambient noise levels in the project vicinity above existing levels, or a substantial temporary or periodic increase in ambient noise levels in the project vicinity. Because there are no specific construction noise limits defined under CEQA, the following general guidelines were used to assess short-term (hourly and daily) construction noise impacts, as compared to existing ambient levels:

- A less than 3 dBA increase in sound level is considered no impact;
- A 3 to 5 dBA increase in sound level is considered a slight impact;
- A 6 to 10 dBA increase in sound level is considered a moderate impact; and
- A greater than 10 dBA increase in sound level is considered a severe impact.

This analysis assumes that an increase greater than 5 dBA would be potentially significant and would require evaluating construction noise mitigation measures.

Several county and local jurisdictions have established noise standards that are applicable to construction activities related to the MIAD Modification Project. Projected construction noise levels were compared with exterior noise standards for the City of Folsom and El Dorado County to assess potential noise impacts, and to identify and evaluate noise control measures to reduce potential noise impacts.

11.2.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative would not generate construction activity noise impacts relative to the existing conditions.

Under the No Action/No Project Alternative, the MIAD Modification Project would not be constructed. This analysis assumes that noise under the No Action/No Project Alternative would be the same as existing conditions. In some instances, noise levels under the existing conditions exceed existing noise standards. This is not attributable to the MIAD Modification Project.

While there may be significant noise impacts (noise that exceeds local standards) under the No Action/No Project Alternative, they are not attributable to the MIAD Modification Project.

11.2.4 Environmental Consequences/Environmental Impacts of Alternative 1

Construction activities would generate incremental noise increases over the No Action/No Project Alternative and existing conditions.

Table 11-14 presents a summary of the projected daytime and nighttime unmitigated noise levels for each alternative at each noise-sensitive receptor and compares them to the significance criteria.

For Noise-Sensitive Receptor R-1, the unmitigated daytime and nighttime L_{eq} noise levels ranged from 60 dBA to 63 dBA under Alternative 1. These noise levels would represent no significant change (relative to the criteria) compared to the No Action/No Project Alternative and existing conditions.

At a barely perceptible 3 dBA increase, these impacts to noise levels at R-1 would be less than significant.

Under Alternative 1, the daytime and nighttime unmitigated noise levels at Noise-Sensitive Receptor R-2 peaked at 67 dBa. This is a 22 dBA increase relative to the No Action/No Project Alternative and existing conditions and would be significant.

This impact at R-2 would be significant. In addition to the BACT measures, the inclusion of multiple noise barriers with the operation of stationary/quasi-stationary equipment and activities should contribute to a reduction in some unmitigated noise. These measures or other types of noise control measures, as reflected in mitigation measure N-1, would reduce the construction noise associated with Alternative 1 to a less than significant level.

Table 11-14. Summary of Construction Noise Impacts Results

Comparison of Daytime Unmitigated Noise Impacts Results

Receptor ID.	No-Action/ Existing Daytime L_{eq}	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Noise Impact Description
		Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	
R-1	60	63	3	63	3	63	3	63	3	No Impact
R-2	45	67	22	67	22	67	22	67	22	Severe

Comparison of Daytime BACT Noise Levels (dBA)

Receptor ID.	No-Action/ Existing Daytime L_{eq}	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Noise Impact Description
		Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	
R-1	60	63	3	62	3	62	3	63	3	No Impact
R-2	45	66	22	66	22	66	22	66	22	Severe

Comparison of Nighttime Unmitigated Noise Levels (dBA)

Receptor ID.	No-Action/ Existing Daytime L_{eq}	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 1
		Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	
R-1	60	60	3	60	3	60	3	60	3	No Impact
R-2	45	67	22	67	22	67	22	67	22	Severe

Comparison of Nighttime BACT Noise Levels (dBA)

Receptor ID.	No-Action/ Existing Daytime L_{eq}	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Noise Impact Description
		Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	Unmitigated Daytime L_{eq}	Increase Above Existing	
R-1	60	60	3	59	3	59	3	60	3	No Impact
R-2	45	66	22	66	22	66	22	66	22	Severe

Note: R-1 is located North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County and R-2 is located at the Western corner of Elvie Perazzo and Briggs Park, Folsom

Construction activities would generate increases in noise that may exceed local noise standards.

In addition to evaluating the potential incremental increase in noise levels over existing/No Action/No Project Alternative noise levels, the projected construction noise levels for each noise-sensitive receptor were compared to their respective non-transportation noise standards. These noise standards include daytime and nighttime L_{max}, L_{eq} and L_{50} noise limits. While Sacramento County has 24-hour exterior noise limits covering the time periods 7:00 A.M to 7:00 P.M, 7:00 P.M. to 10:00 P.M and 10:00 P.M. to 7:00 A.M, the City of Folsom which is in Sacramento County has no noise ordinance for construction as long as the work is conducted between the hours of 7:00 A.M. and 6:00 P.M. Since work is expected to occur 24 hours per day for this project, the City of Folsom's noise limits will apply. For the purposes of this analysis, it was conservatively assumed that L_{50} noise levels would be the same as the L_{eq} noise levels. Table 11-15 presents the maximum noise levels for Alternative 1 and compares them with the respective noise standards to identify any exceedances of the noise standards.

The daytime construction L_{max} noise level at R-1 and R-2 are projected to be below the standard. The daytime $L_{eq/}$ L_{50} noise level for R-1 which is located in El Dorado County exceed the standard by 7 dBA. R-2 is located in the City of Folsom which exempts construction activities from noise standards during daytime operations.

The nighttime construction L_{max} noise level at R-1 is projected to exceed the standard by 2 dBA. A difference of 3 dBA is considered to be barely perceptible by most humans. The construction nighttime L_{max} predicted for R-2 exceeds the standard by 4 dBA. A 5 dBA change in noise level is considered to be perceptible by most humans. The nighttime $L_{eq/}$ L_{50} construction noise levels for R-1 and R-2 exceeded the standard by 13 and 20 dBA, respectively. The City of Folsom does not exempt nighttime construction activities from their noise standard.

For Alternative 1, this impact at Noise-Sensitive Receptors 1 and 2 would be significant, even with the application of BACT to stationary/quasi-stationary construction equipment. Mitigation measure N-1 would reduce the impact to less than significant.

Habitat mitigation activities at Mississippi Bar would result in minimal noise impacts.

Construction activities at Mississippi Bar would result in the removal of 285 cubic yards of topsoil and various activities to restore plants in the area. Construction equipment associated with the mitigation will include a heavy duty loader, dump trucks D-8 Caterpillar with ripper attachment, and a road grader. The associated earthmoving activities will occur over 24 months and will provide minimal noise impacts.

Noise impacts associated with Mississippi Bar habitat mitigation would be temporary and less than significant.

Table 11-15. Alt 1 - Comparison of Construction Noise Levels to Community Noise Standards

Receptor Locations		L_{max} Level (dBA)		Exceedance	L_{50}/L_{eq} Level (dBA)		Exceedance
Station Id.	Description	Daytime	Standard	Yes/No	Daytime	Standard	Yes/No
R-1	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	64	75	No	62	55	Yes
R-2	Western corner of Elvie Perazzo and Briggs Park, Folsom	69	70	No	65	--	--
Receptor Locations		L_{max} Level (dBA)		Exceedance	L_{50}/L_{eq} Level (dBA)		Exceedance
Station Id.	Description	Nighttime	Standard	Yes/No	Nighttime	Standard	Yes/No
R-1	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	62	60	Yes	58	45	Yes
R-2	Western corner of Elvie Perazzo and Briggs Park, Folsom	69	65	Yes	65	45	Yes

[1]Noise at R2 is predicted to exceed the Sacramento County standard by 1 dBA which is considered unnoticeable by humans (Ref: A Guide to Noise Control in Minnesota, Minnesota Pollution Control Agency, March 1999) Acoustical Properties, Measurement, Analysis, Regulation

<u>*Construction activities would result in minor vibration to nearby receptors.*</u>

Vibration impacts associated with construction equipment were calculated for five types of construction equipment that would be similar to the equipment anticipated to be used during construction. This equipment includes large bulldozers, loaded trucks, jackhammers, sheetpile drivers and drill rigs. Vibration levels from each piece of equipment measured at a reference distance of 25 feet away are summarized in Table 11-16. Residences are located at a nominal distance of 1,000 feet or more. At that distance, the effects of vibration will be imperceptible to barely perceptible by humans and are, therefore, considered to be less than significant.

Impacts from vibration would be less than significant.

Table 11-16. Construction Equipment Vibration Impacts

Equipment	PPV at 25 ft (in/sec)	PPV at 1,000 ft (in/sec)	Effects on Humans
Large Bulldozer	0.089	0.000352	imperceptible
Loaded Trucks	0.076	0.000300	imperceptible
Sheet Pile Driver	1.1	0.004348	imperceptible
Caisson Drilling	0.089	0.000352	imperceptible
Jack Hammer	0.035	0.000138	imperceptible

11.2.5 Environmental Consequences/Environmental Impacts of Alternative 2

Table 11-14 presents a summary of the projected daytime and nighttime unmitigated noise levels for each alternative at each noise-sensitive receptor and compares them to the significance criteria.

<u>*Construction activities would generate incremental noise increases over the No Action/No Project Alternative and existing conditions.*</u>

For Receptor R-1, the unmitigated daytime and nighttime L_{eq} noise levels ranged from 60 dBA to 63 dBA under Alternative 2. The noise levels at R-1 would represent no significant change (relative to the criteria) compared to the No Action/No Project Alternative and existing conditions.

At a barely perceptible 3 dBA increase, these impacts to noise levels at R-1 would be less than significant.

Under Alternative 2, the unmitigated daytime and nighttime L_{eq} noise levels peak at 67 dBA at Noise-Sensitive Receptor R-2. This is a 22 dBA increase relative to the No Action/No Project Alternative and existing conditions and would be significant.

This impact at R-2 would be significant. In addition to the BACT measures, the inclusion of multiple noise barriers with the operation of stationary/quasi-stationary equipment and activities should contribute to a reduction in some unmitigated noise.

These measures or other types of noise control measures, as reflected in mitigation measure N-1, would reduce the construction noise associated with Alternative 2 to a less than significant level.

Construction activities would generate increases in noise that may exceed local noise standards.

In addition to evaluating the potential incremental increase in noise levels over existing/No Action/No Project Alternative noise levels, the projected construction noise levels for each noise-sensitive receptor were compared to their respective non-transportation noise standards. Table 11-17 presents the maximum noise levels for Alternative 2.

Table 11-17. Alt 2 - Comparison of Construction Noise Levels to Community Noise Standards

Receptor Locations		L_{max} Level (dBA)		Exceedance	L_{50}/L_{eq} Level (dBA)		Exceedance
Station Id.	**Description**	**Daytime**	**Standard**	**Yes/No**	**Daytime**	**Standard**	**Yes/No**
R-1	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	64	75	No	62	55	Yes
R-2	Western corner of Elvie Perazzo and Briggs Park, Folsom	70	70	No	66	--	--
Receptor Locations		**L_{max} Level (dBA)**		**Exceedance**	**L_{50}/L_{eq} Level (dBA)**		**Exceedance**
Station Id.	**Description**	**Nighttime**	**Standard**	**Yes/No**	**Nighttime**	**Standard**	**Yes/No**
R-1	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	63	60	Yes	59	45	Yes
R-2	Western corner of Elvie Perazzo and Briggs Park, Folsom	69	65	Yes	66	45	Yes

The daytime construction L_{max} noise level at R-1 is projected to be below the standard. The construction daytime L_{max} predicted for R-2 will be at the standard. The daytime $L_{eq/}$ L_{50} noise level for R-1 which is located in El Dorado County exceed the standard by 7 dBA. R-2 is located in the City of Folsom which exempts construction activities from noise standards during daytime operations.

The nighttime construction L_{max} noise level at R-1 is projected to exceed the standard by 3 dBA. A difference of 3 dBA is considered to be barely perceptible by most humans. The construction nighttime L_{max} predicted for R-2 exceeds the standard by 4 dBA. This difference in noise levels is considered to be nearly perceptible by most humans and therefore is not considered a significant impact. The nighttime $L_{eq/}$ L_{50} construction noise levels for R-1 and R-2 exceeded the standard by 14 and 21 dBA, respectively. The City of Folsom does not exempt nighttime construction activities from their noise standard.

For Alternative 2, this impact at Noise-Sensitive Receptors 1 and 2 would be significant, even with the application of BACT to stationary/quasi-stationary *construction equipment. Mitigation measure N-1 would reduce the impact to less than significant.*

Habitat mitigation activities at Mississippi Bar would result in minimal noise impacts.

This impact would be the same as Alternative 1 and would therefore be less than significant.

Construction activities would result in minor vibration to nearby receptors.

This impact would be the same as Alternative 1 and would therefore be less than significant.

11.2.6 Environmental Consequences/Environmental Impacts of Alternative 3

Table 11-14 presents a summary of the projected daytime and nighttime unmitigated noise levels for each alternative at each noise-sensitive receptor and compares them to the significance criteria.

Construction activities would generate incremental noise increases over the No Action/No Project Alternative and existing conditions.

For Receptor R-1, the unmitigated daytime and nighttime L_{eq} noise levels ranged from 60 dBA to 63 dBA under Alternative 3. The noise levels at R-1 would represent no significant change (relative to the criteria) compared to the No Action/No Project Alternative and existing conditions.

The 3 dBA is considered a barely perceptible increase, therefore a 3 dBA noise increase would be a less than significant impact to noise levels at R-1.

Under Alternative 3, the unmitigated daytime and nighttime L_{eq} noise levels peak at 67 dBA at Noise-Sensitive Receptor R-2. This is a 22 dBA increase relative to the No Action/No Project Alternative and existing conditions and would be significant.

This impact at R-2 would be significant. In addition to the BACT measures, the inclusion of multiple noise barriers with the operation of stationary/quasi-stationary equipment and activities should contribute to a reduction in some unmitigated noise. These measures or other types of noise control measures, as reflected in mitigation measure N-1, would reduce the construction noise associated with Alternative 3 to a less than significant level.

Construction activities would generate increases in noise that may exceed local noise standards.

In addition to evaluating the potential incremental increase in noise levels, the projected construction noise levels for each noise-sensitive receptor were compared to their respective non-transportation noise standards. Table 11-18 presents the maximum noise levels for Alternative 3.

The daytime construction L_{max} noise level at R-1 is projected to be below the standard. The construction daytime L_{max} predicted for R-2 will be at the standard. The daytime $L_{eq/}$ L_{50} noise level for R-1 which is located in El Dorado County exceeds the standard by 7 dBA. R-2 is located in the city of Folsom which exempts construction activities from noise standards during daytime operations.

Table 11-18. Alt 3 - Comparison of Construction Noise Levels to Community Noise Standards

Receptor Locations		L_{max} Level (dBA)		Exceedance	L_{50}/L_{eq} Level (dBA)		Exceedance
Station Id.	**Description**	**Daytime**	**Standard**	**Yes/No**	**Daytime**	**Standard**	**Yes/No**
R-1	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	65	75	No	62	55	Yes
R-2	Western corner of Elvie Perazzo and Briggs Park, Folsom	70	70	No	66	--	--
Receptor Locations		**L_{max} Level (dBA)**		**Exceedance**	**L_{50}/L_{eq} Level (dBA)**		**Exceedance**
Station Id.	**Description**	**Nighttime**	**Standard**	**Yes/No**	**Nighttime**	**Standard**	**Yes/No**
R-1	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	63	60	Yes	59	45	Yes
R-2	Western corner of Elvie Perazzo and Briggs Park, Folsom	70	65	Yes	66	45	Yes

The nighttime construction L_{max} noise level at R-1 is projected to exceed the standard by 3 dBA. A difference of 3 dBA is considered to be barely perceptible by most humans. The construction nighttime L_{max} predicted for R-2 exceeds the standard by 5 dBA. This difference in noise levels is considered to be perceptible by most humans and may or may not be a nuisance, therefore it is considered a significant impact. The nighttime $L_{eq/}$ L_{50} construction noise levels for R-1 and R-2 exceeded the standard by 14 and 21 dBA, respectively. The City of Folsom does not exempt nighttime construction activities from their noise standard.

For Alternative 3, this impact at Noise-Sensitive Receptors 1 and 2 would be significant, even with the application of BACT to stationary/quasi-stationary construction equipment. Mitigation measure N-1 would reduce the impact to less than significant.

Habitat mitigation activities at Mississippi Bar would result in minimal noise impacts.

This impact would be the same as Alternative 1 and would therefore be less than significant.

Construction activities would result in minor vibration to nearby receptors.

This impact would be the same as Alternative 1 and would therefore be less than significant.

11.2.7 Environmental Consequences/Environmental Impacts of Alternative 4

Table 11-14 presents a summary of the projected daytime and nighttime unmitigated noise levels for each alternative at each noise-sensitive receptor and compares them to the significance criteria.

Construction activities would generate incremental noise increases over the No Action/No Project Alternative and existing conditions.

For Noise-Sensitive Receptor R-1, the unmitigated daytime and nighttime L_{eq} noise levels ranged from 60 dBA to 63 dBA under Alternative 4. The noise levels at R-1 would represent no significant change (relative to the criteria) compared to the No Action/No Project Alternative (i.e., existing noise level).

The 3 dBA is considered a barely perceptible increase; therefore a 3 dBA noise increase would be a less than significant impact at R-1.

Under Alternative 4, the unmitigated daytime and nighttime L_{eq} noise levels peak at 66 to 67 dBA at Noise-Sensitive Receptor R-2. This is a 22 dBA increase relative to the No Action/No Project Alternative and existing conditions.

This impact at R-2 would be significant. In addition to the BACT measures, the inclusion of multiple noise barriers with the operation of stationary/quasi-stationary equipment and activities should contribute to a reduction in some unmitigated noise. These measures or other types of noise control measures, as reflected in mitigation measure N-1, would reduce the construction noise associated with Alternative 4 to a less than significant level.

Construction activities would generate increases in noise that may exceed local noise standards.

In addition to evaluating the potential incremental increase in noise levels, the projected construction noise levels for each noise-sensitive receptor were compared to their respective non-transportation noise standards. Table 11-19 presents the maximum noise levels for Alternative 4.

Table 11-19. Alt 4 - Comparison of Construction Noise Levels to Community Noise Standards

Receptor Locations		L_{max} Level (dBA)		Exceedance	L_{50}/L_{eq} Level (dBA)		Exceedance
Station Id.	**Description**	**Daytime**	**Standard**	**Yes/No**	**Daytime**	**Standard**	**Yes/No**
R-1	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	66	75	No	63	55	Yes
R-2	Western corner of Elvie Perazzo and Briggs Park, Folsom	71	70	Yes	66	--	--
Receptor Locations		**L_{max} Level (dBA)**		**Exceedance**	**L_{50}/L_{eq} Level (dBA)**		**Exceedance**
Station Id.	**Description**	**Nighttime**	**Standard**	**Yes/No**	**Nighttime**	**Standard**	**Yes/No**
R-1	North of Maul Oak Court and west of Lakeridge Oaks Drive, El Dorado County	64	60	Yes	60	45	Yes
R-2	Western corner of Elvie Perazzo and Briggs Park, Folsom	71	65	Yes	66	45	--

The daytime construction L_{max} noise level at R-1 is projected to be below the standard. The construction daytime L_{max} predicted for R-2 will exceed the standard by 1 dBA. The daytime L_{eq}/ L_{50} noise level for R-1 which is located in El Dorado County exceeds the standard by 8 dBA. R-2 is located in the City of Folsom which exempts construction activities from noise standards during daytime operations.

The nighttime construction L_{max} noise level at R-1 is projected to exceed the standard by 4 dBA. A difference of 3 dBA is considered to be barely perceptible by most humans. The construction nighttime L_{max} predicted for R-2 exceeds the standard by 6 dBA. A 5 dBA difference in noise levels is considered to be perceptible by most humans and therefore a 6 dBA noise increase is considered a significant impact. The nighttime L_{eq}/ L_{50} construction noise levels for R-1 and R-2 exceeded the standard by 15 and 21 dBA, respectively. The City of Folsom does not exempt nighttime construction activities from their noise standard.

For Alternative 4, this impact at Noise-Sensitive Receptors 1 and 2 would be significant, even with the application of BACT to stationary/quasi-stationary construction equipment. Mitigation measure N-1 would reduce the impact to less than significant.

Habitat mitigation activities at Mississippi Bar would result in minimal noise impacts.

This impact would be the same as Alternative 1 and would therefore be less than significant.

Construction activities would result in minor vibration to nearby receptors.

This impact would be the same as Alternative 1 and would therefore be less than significant.

11.3 Environmental Consequences/Environmental Impacts of Construction Transportation

11.3.1 Transportation Noise Assessment Methods

The following sections describe assessment methods, significance criteria, and potential impacts associated with transportation noise.

Traffic noise levels generated from construction worker vehicles and trucks hauling materials on local roads were evaluated for nine noise-sensitive receptors and compared with existing ambient and No Action/No Project Alternative noise levels to determine the need to evaluate noise mitigation measures. Section 10 provides traffic data used to estimate traffic noise levels for each model scenario. Presented below is the methodology used to evaluate transportation noise impacts.

Traffic Noise on Local Roads Traffic noise levels were estimated for construction workers' commuting vehicles, delivery trucks and trucks hauling aggregate materials using the FHWA Traffic Noise Model, Version 2.5 (TNM2.5). As of January 15, 2005, Caltrans requires all new projects to use TNM2.5 to model potential noise impacts for highway projects. TNM2.5 was used to estimate noise levels for the existing, No Action/No Project Alternative and Alternatives 1 through 4 along the proposed truck haul routes. TNM2.5 is capable of modeling noise impacts from automobiles, medium trucks (2 axles), heavy trucks (3 or more axles), buses, and motorcycles factoring in vehicle volume, vehicle speed, roadway configuration, distance to the noise-sensitive receptors, atmospheric absorption, and ground attenuation characteristics. When predicting noise levels, TNM2.5 accounts for the effects of different pavement types, changes in roadway grades and attenuation due to rows of buildings and dense vegetation. TNM2.5 is used to predict hourly Leq and Ldn noise levels for both free-flowing and interrupted-flow conditions (i.e., intersections, and traffic control devices). The model is generally considered to be accurate within +/- 3 dB.

Existing, No Action/No Project Alternative, and Alternatives 1 through 4 ADT volumes were obtained from Section 10. Vehicle classification data by vehicle type was based on 2007 national data from the Research and Innovative Technology Administration. These vehicle distributions were applied to all local roadway ADT volumes. The alternative with the maximum employee and truck ADT was used to predict the noise impact. This is based upon the premise that if modeling shows no impact for the maximum construction ADT, then alternatives with lesser ADT will also show no impact. For 2011, Alternative 4 is projected to have the most truck and worker ADT. To model worst case noise, the 2011 ADT for Alternative 4 was combined with 2013 projected local ADT as this year had the highest predicted local traffic. Table 11-20 summarizes the maximum annual truck and worker ADT for each alternative.

Table 11-20. Projected Employee and Truck ADT Volumes [1]

Year	Action Alternatives			
	Alt 1	Alt 2	Alt 3	Alt 4
2010	348	300	240	440
2011	500	500	470	630
2012	200	200	390	190
2013	100	100	190	190

For this traffic noise analysis, a single reference point based on a 50-foot distance from the roadway centerline to each noise-sensitive receptor was used. This distance will represent a uniform evaluation of noise impacts for all nine noise-sensitive receptor locations. In addition, since this analysis primarily compares traffic noise levels with and without action, those differences between receptors would remain constant. The most notable variable between alternatives is the projected traffic volume.

Regional Haul Routes Noise The proposed regional haul routes in the Cities of Fair Oaks, El Dorado Hills, Granite Bay, Rocklin and Roseville include Interstate 80 and US Highway 50. The existing and future No Action/No Project Alternative ADT volumes along these highways would not be substantially affected by any vehicle additions as a result of the MIAD Modification Project. The combined construction workers and haul truck ADT volumes represent less than one percent of the total ADT volume along these proposed regional haul routes. In order to project an appreciable noise level increase of 3 dBA or greater would require the traffic volumes to double the existing or No Action/No Project Alternative traffic volumes. The projected increase in ADT volumes due to the actions would generate less than 0.3 dBA increase in existing noise levels. Therefore, a detailed traffic noise modeling analysis was not conducted for the regional haul routes.

11.3.2 Transportation Noise Impacts Significance Criteria

The existing peak hour noise levels (daytime Leq) summarized in Table 11-21 exceed the FHWA NAC of 66 dBA at all eleven noise-sensitive receptors. In addition, existing Ldn noise levels also exceed each of the county and community exterior Ldn/CNEL maximum allowable noise levels of 60 dBA at all eleven noise-sensitive receptors. Therefore, noise effects on noise-sensitive receptors were considered significant and would require evaluating noise mitigation measures if either of the following were predicted by the noise modeling results:

- The increase in existing (2009) noise levels, as a result of construction-related traffic associated with any of the action alternatives, would be 12 dBA or more per Caltrans noise policy; or
- The incremental change in traffic noise levels due to construction-related traffic from actions related to the MIAD Modification Project would, at any noise-sensitive receptor, increase the peak hour Leq and Ldn noise levels by 5

dBA or more above those of the No-Action/No Project Alternative. A 5-dBA threshold was selected since this change in noise levels is considered readily perceptible by humans.

11.3.3 Environmental Impacts/Environmental Consequences of the No Action/No Project Alternative

The No Action/No Project Alternative would not generate construction traffic relative to the existing conditions.

This analysis uses 2013 average daily traffic to predict transportation noise levels under the Future No Action/No Project Alternative. Under the No Action/No Project Alternative, the MIAD Modification Project would not be constructed. Noise levels related to traffic would slightly increase over existing conditions, but this increase would likely be imperceptible. This noise would not be attributable to the project; it would be a result of annual growth.

There would be less than significant impacts under the No Action/No Project Alternative.

11.3.4 Environmental Consequences/Environmental Impacts of Alternative 1

Tables 11-21 through 11-26 present a summary of the projected daytime and nighttime peak hour Leq and Ldn noise levels for each noise-sensitive receptor and the worst-case action Alternative (Alternative 4 in 2011), and compare them to the existing and No Action/No Project Alternative noise levels. The details behind results of the traffic noise modeling analysis are presented in Appendix D.

Alternative 1 would cause increases in noise from construction traffic.

There is less transport of construction workers, materials, and equipment to the construction and borrow sites under Alternative 1 than Alternative 4 and therefore Alternative 1 would generate daytime and nighttime peak hour Leq and Ldn noise levels increases below the Leq and Ldn predicted for Alternative 4. Since construction transportation activities under Alternative 4 will not result in noise levels that exceed the 5 and 12 dBA significance criteria, neither will construction transportation activities under Alternative 1.

Alternative 1 noise from construction traffic would be less than significant.

Habitat mitigation activities at Mississippi Bar would result in minimal noise impacts.

A total of 29 truck trips (58 round trips) would be needed to deliver soil material to the site. Up to 10 trucks (20 round trips) would be required to deliver plants and other required materials. A minimal number of worker trips would be required each day of construction. This traffic would be temporary and would be spread over 24 months as the three phases are implemented. Any noise impacts associated with the mitigation at Mississippi Bar will be temporary and less than significant.

Noise impacts associated with Mississippi Bar habitat mitigation would be temporary and less than significant.

11.3.5 Environmental Consequences/Environmental Impacts of Alternative 2

Tables 11-21 through 11-26 present a summary of the projected daytime and nighttime peak hour Leq and Ldn noise levels for each noise-sensitive receptor and the worst-case action Alternative (Alternative 4 in 2011), and compare them to the existing and No Action/No Project Alternative noise levels. The details behind results of the traffic noise modeling analysis are presented in Appendix D.

Alternative 2 would cause increases in noise from construction traffic.

There is less transport of construction workers, materials, and equipment to the construction and borrow sites under Alternative 2 than Alternative 4 and therefore Alternative 2 would generate daytime and nighttime peak hour Leq and Ldn noise levels increases below the Leq and Ldn predicted for Alternative 4. Since construction transportation activities under Alternative 4 will not result in noise levels that exceed the 5 and 12 dBA significance criteria, neither will construction transportation activities under Alternative 2.

Alternative 2 noise from construction traffic would be less than significant.

Habitat mitigation activities at Mississippi Bar would result in minimal noise impacts.

This impact would be the same as Alternative 1 and would therefore be less than significant.

11.3.6 Environmental Consequences/Environmental Impacts of Alternative 3

Tables 11-21 through 11-26 present a summary of the projected daytime and nighttime peak hour Leq and Ldn noise levels for each noise-sensitive receptor and the worst-case action Alternative (Alternative 4 in 2011), and compare them to the existing and No Action/No Project Alternative noise levels. The details behind results of the traffic noise modeling analysis are presented in Appendix D.

Alternative 3 would cause increases in noise from construction traffic.

There is less transport of construction workers, materials, and equipment to the construction and borrow sites under Alternative 3 than Alternative 4 and therefore Alternative 3 would generate daytime and nighttime peak hour Leq and Ldn noise levels increases below the Leq and Ldn predicted for Alternative 4. Since construction transportation activities under Alternative 4 will not result in noise levels that exceed the 5 and 12 dBA significance criteria, neither will construction transportation activities under Alternative 3.

Alternative 3 noise from construction traffic would be less than significant.

Habitat mitigation activities at Mississippi Bar would result in minimal noise impacts.

This impact would be the same as Alternative 1 and would therefore be less than significant.

Table 11-21. Summary of Daytime Peak Hour Results L_{eq} Noise Levels at 50 Feet from Local Roadway

Sensitive Noise Receptor	Local Roadway	Description	Existing: 2009 Leq (dBA)[2]	No Action Leq (dBA)	Alternative 4 2011 Leq (dBA)
T-1[1]	Sierra College Blvd.	Chapelle Court	71	73.4	73.6
T-2	Douglas Blvd.	Brandy Circle	71.8	75.2	75.4
T-3	Auburn Folsom Rd.	Leafwood Way	72	74.9	75.0
T-4	Folsom Auburn Rd	Pine View Drive Cul-de-sac	71.7	75.6	75.8
T-5	Greenback Lane	Dawn River Way	72.1	73.4	74.0
T-6	Folsom Blvd	Fong St.	71.3	75.1	75.3
T-7[1]	East Bidwell Street	Albrighton Road	73.1	76.8	76.9
T-8[3]	Oak Avenue Parkway	Thorndike Way	72.1	74.3	74.5
T-9[1]	Blue Ravine Road	Cobblefields Court	69.7	73.9	73.9
T-10[1]	East Natoma Street	Sanborn Court	72.2	75.8	75.9
T-11[1]	Green Valley Road	Green Valley Road	72.7	76.3	76.6

(1) 2009 Leq from Folsom DS/FDR Draft EIS/EIR - December 2006
(2) Predicted using TNM2.5 unless otherwise noted.
(3) In 2006, existing daytime noise was estimated to be 70 dBA, noise level was remodeled in 2009 using 2008 ADT data and assuming an annual growth of 2%.

Table 11-22. Comparison to 2009 Existing Noise Level and No Action For Daytime L_{eq} Noise Levels at 50 Feet from Local Roadway

Sensitive Noise Receptor	Local Roadway	Description	Existing: 2009	Diff Between Alternative-4 2011 and Existing	Diff Between Alternative-4 2011 and No Action	Difference from Existing Level >12 dBA?	Difference From No Action > 5 dBA?
			Leq (dBA)	Leq (dBA)	Leq (dBA)	Yes/No	Yes/No
T-1	Sierra College Blvd.	Chapelle Court	--	2.6	0.2	No	No
T-2	Douglas Blvd.	Brandy Circle	--	3.6	0.2	No	No
T-3	Auburn Folsom Rd.	Leafwood Way	--	3.4	0.5	No	No
T-4	Folsom Auburn Rd	Pine View Drive Cul-de-sac	--	4.1	0.2	No	No
T-5	Greenback Lane	Dawn River Way	--	1.9	0.6	No	No
T-6	Folsom Blvd	Fong St.	--	4	0.2	No	No
T-7	East Bidwell Street	Albrighton Road	--	3.8	0.1	No	No
T-8	Oak Avenue Parkway	Thorndike Way	--	2.4	0.2	No	No
T-9	Blue Ravine Road	Cobblefields Court	--	4.2	0	No	No
T-10	East Natoma Street	Sanborn Court	--	7.0	0.1	No	No
T-11	Green Valley Road	Green Valley Road	--	3.9	0.3	No	No

Table 11-23. Summary of Nighttime Peak Hour Results L_{eq} Noise Levels at 50 Feet from Local Roadway

Sensitive Noise Receptor	Local Roadway	Description	Existing: 2009	No Action	Alternative 4 2011
			Leq (dBA)[2]	Leq (dBA)	Leq (dBA)
T-1	Sierra College Blvd.	Chapelle Court	59.1	63.5	65.1
T-2	Douglas Blvd.	Brandy Circle	61.8	65.2	66.3
T-3	Auburn Folsom Rd.	Leafwood Way	62.1	64.9	66.3
T-4	Folsom Auburn Rd	Pine View Drive Cul-de-sac	61.7	65.7	67.3
T-5	Greenback Lane	Dawn River Way	62.1	63.7	65.3
T-6	Folsom Blvd	Fong St.	61.4	65.2	66.3
T-7[1]	East Bidwell Street	Albrighton Road	66.5	66.8	67.8
T-8[3]	Oak Avenue Parkway	Thorndike Way	62.1	64.3	66.8
T-9[1]	Blue Ravine Road	Cobblefields Court	63.0	63.8	64.5
T-10[1]	East Natoma Street	Sanborn Court	62.2	65.5	67.2
T-11[1]	Green Valley Road	Green Valley Road	66.1	66.3	67.5

(1) 2009 Leq from Folsom DS/FDR Draft EIS/EIR - December 2006
(2) Predicted using TNM2.5 unless otherwise noted.
(3) In 2006, the existing daytime noise for 2009 was estimated to be 63.3 dBA, noise level was remodeled in 2009 using 2008 ADT data and assuming an annual growth of 3%.

Table 11-24. Comparison to 2009 Existing Noise Level and No Action For Nighttime L_{eq} Noise Levels at 50 Feet from Local Roadway

Sensitive Noise Receptor	Local Roadway	Description	Existing: 2009	Diff Between Alternative-4 2011 and Existing	Diff Between Alternative-4 2011 and No Action	Difference from Existing Level >12 dBA?	Difference From No Action > 5 dBA?
			Leq (dBA)	Leq (dBA)	Leq (dBA)	Yes/No	Yes/No
T-1	Sierra College Blvd.	Chapelle Court	--	6	1.6	No	No
T-2	Douglas Blvd.	Brandy Circle	--	4.5	1.1	No	No
T-3	Auburn Folsom Rd.	Leafwood Way	--	4.2	1.4	No	No
T-4	Folsom Auburn Rd	Pine View Drive Cul-de-sac	--	5.6	1.6	No	No
T-5	Greenback Lane	Dawn River Way	--	3.2	1.6	No	No
T-6	Folsom Blvd	Fong St.	--	4.9	1.1	No	No
T-7	East Bidwell Street	Albrighton Road	--	1.3	1	No	No
T-8	Oak Avenue Parkway	Thorndike Way	--	4.7	2.5	No	No
T-9	Blue Ravine Road	Cobblefields Court	--	1.5	0.7	No	No
T-10	East Natoma Street	Sanborn Court	--	4.9	1.7	No	No
T-11	Green Valley Road	Green Valley Road	--	1.4	1.2	No	No

Table 11-25. Summary of 24 Hour Ldn Noise Levels at 50 Feet from Local Roadway

Sensitive Noise Receptor	Local Roadway	Description	Existing: 2009 Ldn (dBA)[2]	No Action Ldn (dBA)	Alternative-4 2011 Ldn (dBA)
T-1[1]	Sierra College Blvd.	Chapelle Court	69.0	72.9	73.7
T-2[3]	Douglas Blvd.	Brandy Circle	71.2	74.6	75.2
T-3	Auburn Folsom Rd.	Leafwood Way	71.5	74.3	75.3
T-4	Folsom Auburn Rd	Pine View Drive Cul-de-sac	71.1	75.1	75.9
T-5	Greenback Lane	Dawn River Way	71.5	73	74.0
T-6	Folsom Blvd	Fong St.	70.8	74.6	75.2
T-7[1]	East Bidwell Street	Albrighton Road	74.7	76.2	76.7
T-8[1]	Oak Avenue Parkway	Thorndike Way	71.5	73.7	75.1
T-9[1]	Blue Ravine Road	Cobblefields Court	71.2	73.3	73.6
T-10[1]	East Natoma Street	Sanborn Court	71.6	75.1	75.9
T-11[1]	Green Valley Road	Green Valley Road	74.3	75.7	76.4
Generic/50 feet from Roadway[4]	White Rock Road	50 feet North of White Rock Road	67	67	69.4
Generic/50 feet from Roadway[4]	Scott Road	50 feet North of Scott Road	65.5	65.5	68.5

(1) 2009 Leq from Folsom DS/FDR Draft EIS/EIR - December 2006
(2) Predicted using TNM2.5 unless otherwise noted.

(3) In 2006, the 2009 Ldn for Douglas Blvd receptor @ 50 feet was estimated to be 74.6 dBA; the Douglas Blvd. Ldn noise levels @ 50 feet was remodeled in 2009 using 2008 ADT data and assuming an annual growth of 3%.

(4) These Haul Truck routes located in Sacramento County are remote, with the nearest potential receptor being more than 1000 feet away. At 1000 feet, the Ldn drops to 48 dBA and 48.7 dBA for Scott and White Rock Roads, respectively, below Sacramento County's Ldn outdoor standard of 50 dBA for residential areas. Due to the remoteness of these roads, little difference is expected between the existing Ldn for 2009 and the no-action year of 2010.

Table 11-26. Comparison to 2009 Existing Noise Level and No Action For 24 Hour Ldn Noise Levels at 50 Feet from Local Roadway

Sensitive Noise Receptor	Local Roadway	Description	Existing: 2009	Diff Between Alternative-4 2011 and Existing	Diff Between Alternative-4 2011 and No Action	Difference from Existing Level >12 dBA?	Difference From No Action > 5 dBA?
			Leq (dBA)	Leq (dBA)	Leq (dBA)	Yes/No	Yes/No
T-1	Sierra College Blvd.	Chapelle Court	--	4.7	0.8	No	No
T-2	Douglas Blvd.	Brandy Circle	--	4.0	0.6	No	No
T-3	Auburn Folsom Rd.	Leafwood Way	--	3.8	1.0	No	No
T-4	Folsom Auburn Rd	Pine View Drive Cul-de-sac	--	4.8	0.8	No	No
T-5	Greenback Lane	Dawn River Way	--	2.5	1.0	No	No
T-6	Folsom Blvd	Fong St.	--	4.4	0.6	No	No
T-7	East Bidwell Street	Albrighton Road	--	2.0	0.5	No	No
T-8	Oak Avenue Parkway	Thorndike Way	--	3.6	1.4	No	No
T-9	Blue Ravine Road	Cobblefields Court	--	2.4	0.3	No	No
T-10	East Natoma Street	Sanborn Court	--	5.4	0.8	No	No
T-11	Green Valley Road	Green Valley Road	--	2.1	0.7	No	No
Generic/50 feet from Roadway	White Rock Road	50 feet North of White Rock Road	--	2.4	2.4	No	No
Generic/50 feet from Roadway	Scott Road	50 feet North of Scott Road	--	3.0	3.0	No	No

11.3.7 Environmental Consequences/Environmental Impacts of Alternative 4

Tables 11-21 through 11-26 present a summary of the projected daytime and nighttime peak hour Leq and Ldn noise levels for each noise-sensitive receptor and the worst-case action Alternative (Alternative 4 in 2011), and compare them to the existing and No Action/No Project Alternative noise levels. The details behind results of the traffic noise modeling analysis are presented in Appendix D.

Alternative 4 would cause increases in noise from construction traffic relative to existing conditions.

Difference between Predicted Alternative-4 and Existing Noise Levels

Alternative 4 will have the greatest transportation activities for construction workers, materials, and equipment to the construction and borrow sites of any other alternative. The largest difference between the Alternative 4 daytime Leq and the existing daytime Leq noise levels is 7.0 dBA that is predicted at Receptor T-10 along Sanborn Court south of East Natoma Street. The largest difference between the Alternative 4 nighttime Leq and the existing nighttime Leq noise levels is 6.0 dBA that is predicted to occur for Receptor T-1 located at Chapelle Court near Sierra College Boulevard. The greatest difference between the Alternative 4 24-hour Ldn and the existing Ldn noise levels is 5.4 dBA that is predicted to occur for Receptor T-10 located at Sanborn Court south of East Natoma Street. All these differences in noise levels are all well below the Caltrans 12 dBA significance threshold.

Construction traffic noise under Alternative 4 would be less than significant.

Alternative 4 would cause increases in noise from construction traffic relative to the Future No Action/No Project Alternative.

Difference between Predicted Alternative-4 and No Action Noise Levels

The largest difference between the Alternative 4 day time Leq and the No Action daytime Leq noise levels is 0.6 dBA that is predicted at Receptor T-5 on Dawn River Way adjacent to Greenback Lane. The largest difference between the Alternative 4 nighttime Leq and the No Action nighttime Leq noise levels is 2.5 dBA for Receptor T-8 located on Thorndike Way adjacent to the Oak Avenue Parkway. The greatest difference between the Alternative 4 24-hour Ldn and the No Action Ldn noise levels is 3.0 dBA predicted for a generic receptor location 50 feet north of Scott Road in Sacramento County. All these differences in noise levels are all well below the 5 dBA significance threshold.

This impact would be less than significant.

Habitat mitigation activities at Mississippi Bar would result in minimal noise impacts.

This impact would be the same as Alternative 1 and would therefore be less than significant.

11.4 Comparative Analysis of Alternatives

Table 11-27 presents the comparative analysis of alternatives for construction and transportation noise.

Table 11-27. Comparative Analysis of Alternatives

Environmental Consequence/ Environmental Impact	Significance					Environmental Commitment/ Mitigation Measure
	No Action/ No Project Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Construction						
Incremental daytime noise increases that exceed 5dBA	SU	LTSWM	LTSWM	LTSWM	LTSWM	**N-1:** Noise Control Plan
Incremental nighttime noise increases that exceed 5dBA	SU	LTSWM	LTSWM	LTSWM	LTSWM	**N-1:** Noise Control Plan
Exceed local daytime noise standards	SU	LTSWM	LTSWM	LTSWM	LTSWM	**N-1:** Noise Control Plan
Exceed local nighttime noise standards	SU	LTSWM	LTSWM	LTSWM	LTSWM	**N-1:** Noise Control Plan
Result in substantial vibration to nearby sensitive receptors	NI	LTS	LTS	LTS	LTS	None Required
Temporary construction noise from Mississippi Bar mitigation actions	NI	LTS	LTS	LTS	LTS	None Required
Transportation Noise						
Increase noise levels from construction traffic by 12dBA or increase peak hour noise levels by 5 dBA	LTS	LTS	LTS	LTS	LTS	None Required
Temporary transportation noise from Mississippi Bar mitigation actions	NI	LTS	LTS	LTS	LTS	None Required

Key:
LTS = Less Than Significant
LTSWM = Less than Significant with Mitigation
SU = Significant and Unavoidable
NI = No Impact
B = Beneficial
N/A = Not Applicable

11.4.1 Construction Noise

The results of the construction noise impact analysis showed that the daytime and nighttime incremental noise increases above the No Action/No Project Alternative and existing conditions would not be perceptible at Noise-Receptor R-1 for any of the alternatives, but would be perceptible at Noise-Receptor R-1 for all alternatives and would be significant.

The nighttime L_{max} was predicted to be exceeded at both receptors for all alternatives as shown in Table 11-28. The maximum predicted L_{max} was for Alternative 4 for both Receptors.

Table 11-28. Summary of Nighttime L_{max} For All Alternatives

Alternative	Receptor 1 (dBA)	Std (dBA)	Receptor 2 (dBA)	Std (dBA)
1	62	60	69	65
2	63		69	
3	63		70	
4	64		71	

The daytime L_{eq}/L_{max} was predicted to exceed the L_{eq}/L_{max} standard by as much as 8 dBA at Receptor 1 for all alternatives. Receptor 2 is located in Folsom County which does not have a daytime noise ordinance. The nighttime L_{eq}/L_{max} was predicted to exceed the standard at Receptor 1 by approximately 15 dBA and exceed the standard at Receptor 2 by approximately 21 dBA.

11.4.2 Transportation Noise

For project related transportation, Alternative 4 was determined to have the most project traffic in 2011 and the year with the most local traffic was estimated to be 2013. TNM modeling runs predicted no exceedances of 5 dBA above the No Action/No Project Alternative noise level and no exceedances above the 12 dBA criteria for any daytime Leq , nighttime Leq or 24-hr Ldn. The maximum daytime and nighttime Leqs and the 24-Hour Ldn were predicted to occur at Receptor T-7 on Albrighton Road adjacent to East Bidwell Street.

11.5 Environmental Commitments/Mitigation Measures

The following measures will be implemented to reduce noise impacts to less than significant levels

N-1: Noise Control Plan A Noise Control Plan (NCP) will be developed to address increased noise levels as a result of the MIAD modifications. The NCP will identify the procedures for predicting construction noise levels at sensitive receptors and will describe the reduction measures required to minimize construction noise. The NCP will be prepared by, and will require the signature of, the Acoustical Engineer. The noise mitigation measures in the NCP will include, but are not limited to:

- Appropriate level of sound attenuation will be utilized or constructed to minimize noise. Potential sound attenuation measures could include, but are not limited to stationary equipment, or otherwise placed between the source(s) of construction noise and noise-sensitive receptors, as appropriate.
- Equipment will be maintained to comply with noise standards (e.g., exhaust mufflers, acoustically attenuating shields, shrouds, or enclosures).
- If necessary, above-ground conveyor systems will be enclosed in acoustically-treated enclosures.
- If necessary, hoppers, conveyor transfer points, storage bins and chutes will be lined or covered with sound-deadening material.
- For nighttime or after-hour construction, Reclamation will coordinate with the local jurisdictions to minimize noise.
- Truck loading, unloading, and hauling operations will be scheduled so as to reduce nighttime noise impacts to less than noticeable levels.
- In the event that blasting is required, the blasting schedule will be coordinated with local jurisdictions to minimize noise.
- The examination of any properties, structures and conditions where complaints and damages have been filed will be performed within three weeks of any work causing excessive vibration.

11.6 Potentially Significant and Unavoidable Impacts

No potentially significant or unavoidable impacts have been identified for noise impacts. The mitigation measures identified above in Section 11.5 would reduce all impacts to a less-than-significant level

11.7 Cumulative Effects

Table 22-1 in Chapter 22 presents the projects that were considered in the analysis of cumulative effects. Construction of these projects could increase construction noise; however, all projects would be responsible for mitigating noise to less than significant levels. Furthermore, the MIAD Modification Project is not expected to result in significant impacts of noise. Since all projects will mitigate noise impacts, the cumulative effects would not be significant.

11.8 References

Title 23, Code of Federal Regulations, Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise.* Federal Register: April 1, 2005 (Volume 70, Number 62).

Bureau of Reclamation (Reclamation). 2005. *Folsom Dam Road Access Restriction, Final Environmental Impact Statement, April 2005.*

Bureau of Reclamation (Reclamation). 2008. *Folsom Dam Safety and Flood Damage Reduction Project Pre-Construction Noise Monitoring Survey Report, January 2008.*

City of Folsom. Undated. *Municipal Code, Chapter 8.42 Noise Control.*

County of Sacramento. 1993. *General Plan Noise Element, December 1993, amended 1998.*

Federal Highway Administration (FHWA). 2006. *Roadway Construction Noise Model, January 2006.*

Federal Transportation Administration (FTA). 1995. *Transit Noise and Vibration Impact Assessment, April 1995, updated May 2006.*

Michael Minor & Associates. 2006. *Vibration Primer.* Accessed on 05 01 2006. Available at: http://www.drnoise.com/PDF_files/Vibration%20Primer.pdf

Minnesota Pollution Control Agency. 1999. A Guide to Noise Control in Minnesota. Accessed on: 05 05 2005. Available at: http://www.nonoise.org/library/sndbasic/Sound.pdf

U.S. Army Corps of Engineers (Corps). 2006. *Folsom Dam Bridge Draft Supplemental Environmental Impact Statement/Environmental Impact Report.*

U.S. Environmental Protection Agency (USEPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974.*

Wallace, Roberts, and Todd et al. 2003. *Folsom Lake State Recreation Area, Draft Resource Inventory, Environmental Conditions: Noise (April 2003).*

Chapter 12
Cultural Resources

This chapter discusses the affected environment/environmental setting and environmental consequences/environmental impacts for cultural resources.

12.1 Affected Environment/Environmental Setting

This section describes the area of analysis for cultural resources, applicable laws and regulations, and the affected environment/environmental setting for cultural resources.

12.1.1 Area of Analysis

12.1.1.1 Mormon Island Auxiliary Dam

The cultural resources area of analysis for the MIAD modifications includes MIAD, approximately 13 acres surrounding Green Valley Road for wetlands restoration, and approximately 3,300 feet of roadway for the Green Valley Road Relocation.

12.1.1.2 Mississippi Bar

The Mississippi Bar mitigation site is located on the western shore of Lake Natoma, near the intersection of Sunset Avenue and Main Avenue and south of the community of Orangevale. The cultural resources area of analysis for Mississippi Bar includes approximately 141 acres of land owned by DPR and Reclamation. While not all of the 141 acres would be developed for habitat mitigation, the cultural resources area of analysis was expanded to include a larger area because of nature of the site and the extent of the historical mine tailings.

12.1.2 Regulatory Setting

This section discusses the applicable cultural resources regulatory requirements the project would be required to comply with.

12.1.2.1 Federal

The NHPA of 1966, as amended through 1992, establishes a program for the preservation of historic properties throughout the nation. The regulations for following the Section 106 process are found in 36 CFR Part 800. The SHPO administers the national historic preservation program at the State level, reviews National Register of Historic Places (NRHP) nominations, maintains data on historic properties that have been identified but not yet nominated, and provides consultation for Federal agencies during NHPA Section 106 review.

Reclamation, as lead Federal agency, is responsible for project compliance with Section 106 of the NRHP and its implementing regulations found at 36 CFR Part 800. According to Section 106, Reclamation must take into account the effects of its undertaking on historic properties, as defined in 36 CFR Part 800.16 (l) (1). Guidelines for efforts to identify historic properties are found at 36 CFR Part 800.4.

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (Public Law 101-601; 25 USC. 3001 et seq.) outlines the process for Federal agencies to return Native American cultural items such as human remains, funerary objects, sacred objects, or objects of cultural patrimony, to descendants, Indian tribe, and other related organizations. NAGPRA includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items on Federal and tribal lands, and penalties for noncompliance and illegal trafficking.

Under NEPA (42 USC Sections 4321-4327), Reclamation is required to consider potential environmental impacts and appropriate mitigation measures for projects with Federal involvement. A complete list pertinent Federal laws, regulations and guidance that direct Reclamation cultural resources policies and responsibilities is found in Reclamation's Directives and Standards Manual LND 02-01 for Cultural Resource Management.

Project undertakings by Reclamation must follow directives and guidelines found in Reclamation Manuals LND P01, LND 02-01, LND 10-01, and LND 07-01. LND P01 establishes policy and authority for cultural resource identification, evaluation and management of cultural resources. LND 02-01 provides directives and standards and clarifies the role of Reclamation regarding implementation of its cultural resources management responsibilities. LND 10-01 provides procedures for inadvertent discoveries of human remains on Reclamation lands. LND 07-01 provides procedures for inadvertent discoveries of cultural items that are under the authority of the NAGPRA.

12.1.2.2 State

Impact assessment focuses on properties listed or eligible for listing on the NRHP, properties known as historic properties, or sites designated as either historical resources or "unique archeological resources" as per the CEQA Guidelines.[1] Under CEQA, the evaluation of impacts on historical resources parallels Federal law. Properties protected under CEQA include those eligible for listing or listed on the California Register of Historical Resources (CRHR)

[1] As defined either in 36 Code of Federal Regulations (CFR) 800.16(l) for Federal actions or in the State CEQA Public Resources Code (PRC) (21084.1 and 21083.2) and the CEQA Guidelines (15064.5[a])

or those properties determined "unique archaeological resources." It should be noted that a property found not eligible for listing on the NRHP may be found to have historical significance for listing on the CRHR.

The CEQA Guidelines state that if a project follows the Secretary of Interior's Standards for the Treatment of Historic Properties, the impacts are considered "mitigated to a level of less than a significant impact" (CEQA Guidelines 15064.5[b][3]). Section 106 of the NHPA and its implementing regulations (36 CFR Part 800) require that the Advisory Council on Historic Preservation (ACHP), SHPO, and the interested public, including Native Americans, be provided an opportunity to comment on the effects that the proposed action may have on historic properties.

12.1.2.3 Local

There are no local cultural resource regulations applicable to the project.

12.1.3 Existing Conditions

This section is based on the results of a record search of documents at the North Central Information Center (California State University, Sacramento), documents supplied by Reclamation, and archaeological surveys conducted by Pacific Legacy (2009) and URS (2009). The results of the records review and archaeological surveys document the numbers and types of archaeological and historical resources recorded within the project area.

12.1.3.1 Ethnographic Background

The project area is located within the territorial boundaries of the ethnographic Nisenan. The Nisenan, often referred to as the Southern Maidu in anthropological literature, are classified as the southern linguistic group of the Maidu tribe, and together with Maidu and Konkow, form a subgroup of the California Penutian linguistic family (Wilson and Towne 1978). The Nisenan linguistic group is further subdivided based on dialect into Northern Hill Nisenan, inhabiting the Yuba River drainage; Southern Hill Nisenan, living along the American River; and Valley Nisenan, occupying Sacramento River Valley (Beals 1933; Kroeber 1925, 1929).

Habitation Patterns Prior to Euro-American contact, Nisenan territory extended west into the Sacramento Valley to encompass the lower Feather River drainage, north to include the Yuba River watershed, south comprising the whole of the Bear and American River drainages and the upper reaches of the Cosumnes River and east to the crest of the Sierra Nevada (Wilson and Towne 1978).

Politically, the Nisenan were organized by tribelet, each tribelet was composed of several large, semi-autonomous villages that accepted the leadership of the headman of a specific village. Wilson and Towne (1978) identify three Valley Nisenan tribelet centers in the Sacramento Valley located at the mouth of the

American River (present-day Sacramento); at the mouth of the Bear River; and at the confluence of the Yuba and Feather rivers near present-day Marysville. Nisenan villages varied greatly in size, ranging from three to seven houses up to 40 to 50 houses, with the largest valley tribelets inhabited by more than 500 people (Littlejohn 1928). Villages in the lower valleys tended to be located along low rises and mounds adjacent to streams and rivers.

Nisenan built structures, including semi-permanent houses, temporary wikiup-like shelters, semi-subterranean dance houses, acorn granaries, and sweathouses (Curtis 1924; Kroeber 1925; Wilson and Towne 1978). The semi-permanent houses were generally conical, measuring 10-15 feet in diameter and smaller. The temporary shelters were used in the warm seasons while hunting and gathering.

Subsistence The basic subsistence strategy of the Nisenan was seasonally mobile hunting and gathering. Acorns from the California Black Oak, the primary staple, were gathered in the fall and stored in granaries for use during the rest of the year. Other plant resources included seeds, buckeye, wild onion, wild sweet potato, Indian potato, wild garlic, wild carrot, many varieties of berries and fruit, grasses, herbs, and rushes.

Communal hunting drives were undertaken to obtain deer, quail, rabbits, and grasshoppers. Mountain lions and bobcats were hunted for their skins, as well as their meat, and bears were hunted ceremonially in the winter when their hides were at their best condition (Wilson and Towne 1978). Runs of salmon in the spring and fall provided a regular supply of fish, while other fish such as suckers, pike, whitefish, and trout were caught with hooks, harpoons, nets, weirs, snares, fish traps, or with various fish poisons such as soaproot. Birds were trapped with nooses or large nets, and shot with bow and arrow (Wilson and Towne 1978).

Technology Stone technology included flaked stone knives, projectile points, and other tools made from obsidian, basalt, and silicates. Ground stone tools included club heads, pipes, charms, and mortars and pestles made from local coarser-grained rocks (Beals 1933; Wilson and Towne 1978). Shells and beads manufactured from bone, shell, and minerals such as magnesite were used for ornamentation. Wood and bone were used for a variety of tools and weapons, bows, arrow shafts and points, fishhooks, looped stirring sticks, flat-bladed mush paddles, pipes, and hide preparation tools. Cordage was made from plant material, and was used to construct fishing nets and braided and twined tumplines.

Baskets were used for a variety of tasks, including storage, cooking, serving and processing foods, burden baskets, traps, cradles, hats, cages, seed beaters, and winnowing trays. Other woven artifacts include tule matting and netting made of milkweed, sage fibers, or wild hemp (Hill 1972). In the Sacramento Valley the Nisenan used tule balsa rafts and log canoes (Kroeber 1929) for fishing and used the boats extensively for travel among the major river villages.

Ethnohistory Initial contact with Euro-Americans in the eighteenth century may have had little effect on the Nisenan, but as the nineteenth century progressed the encounters became more disruptive. The earliest known contacts were with Spanish exploratory expeditions in the Central Valley led by José Canizares and Gabriel Moraga, followed in the 1820s by American and Hudson's Bay Company trappers (Wilson and Towne 1978:396). Introduced diseases, against which the Native Californians had no natural immunities, were the single greatest cause of death among them after Euro-American contact. The great epidemic of 1833 (probably malaria) devastated the Valley Nisenan population by as much as 75 percent, in some instances wiping out entire villages (Cook 1955a cited in Wilson and Towne 1978).

Captain John Sutter settled in Nisenan territory in 1839. Word of James Marshall's 1848 discovery of gold near the Nisenan settlement of Culloma soon triggered an influx of thousands of fortune seekers in Hill Nisenan territory (Wilson and Towne 1978). The Nisenan experienced a cultural and religious resurgence with the Ghost Dance revival of 1870 (Wilson and Towne 1978). Originating with the Paiute, the basic tenets included the end of the world and/or return of the dead, return of the world to Native Americans, and the destruction of White people (Bean and Vane 1978). Indian "rancherias" were established by the Federal government in the Maidu area between 1906 and 1937. Today, the majority of the estimated 2,500 Maiduan peoples (including persons descended from Nisenan, Konkow, and Maidu groups) live within the traditional territory inhabited at historic contact by their ancestors.

12.1.3.2 Historical Overview

Exploration into the interior of present-day California began in 1808 with an expedition, led by the Spanish explorer Gabriel Moraga, looking for potential sites for new missions (Thompson and West 1880). The British, working for the Hudson's Bay Company based out of Fort Vancouver on the Columbia River, entered the region from the north via the Siskiyou Trail at the end of the first decade of the nineteenth century (Dillon 1975). The Americans, led by Jedidiah Strong Smith in 1826, followed an overland route (Hurtado 1988). Smith led a small band of men across the Sacramento Valley in 1827, searching for a pass across the Sierra Nevada, and camping at a site that is now part of the City of Folsom.

Fur trappers were followed by military expeditions in the 1840s charged with exploring the region in advance of American westward expansion. A detachment of the Wilkes expedition, led by Lt. George Foster Emmons, traveled from the Columbia River to Sacramento in 1841. John Charles Frémont led the Army Corps of Topographical Engineers into present-day California twice in the 1840s in two separate expeditions.

The first large-scale Euro-American settlements in the area around Folsom Reservoir sprang up following the discovery of gold at Coloma in 1848. This discovery led to an influx of miners who sought rich placer deposits along the American River and its tributaries. As new deposits were discovered, towns and camps were established near the discoveries and these quickly developed into communities to provide for the needs of the expanding population. These communities included Mormon Island, Goose Flat, Alabama Bar, Sailor's Bar, Negro Bar, Salmon Falls, McDowell Hill, Beal's Bar, Condemned Bar, Doton's Bar, Long Bar, Horseshoe Bar, and Rattlesnake Bar (Hoover *et al.* 1966; Peak and Associates 1990c:5; Waechter and Mikesell 1994).

Mining Mormon Island, the site of California's second important gold discovery, was one of the most prominent of the early communities in the area. The camp was originally established on a gravel bar at the confluence of the North and South Forks of the American River. The settlement was located on a branch of the Coloma Road, the first route into the region which connected Sutter's Fort in Sacramento to his sawmill in Coloma. "By 1853, the camp had some 2,500 inhabitants and had three dry goods stores, five general merchandise stores, two blacksmith's shops, a bakery, saloons, hotels, schools, a post office, and express offices for both Wells Fargo & Company and Adams & Company" (Waechter and Mikesell 1994). As with the majority of the communities formed by miners, Mormon Island went into decline as nearby gold deposits were exhausted. By the 1880s, the population had dwindled to 20, and by the time the town site was inundated by Folsom Reservoir, it was no longer inhabited (Waechter and Mikesell 1994).

The lands adjacent to the Lower American River were rich in placer deposits, and the area came to be known as the American River Mining District (also the Folsom Mining District) (EDAW 2009). Placer mining involves separating minerals such as gold from the surrounding matrix, usually sand or gravel. Most placer mining systems require just two components: water to wash away the relatively light matrix and a method for capturing heavy minerals like gold (Caltrans 2008; EDAW 2009). The famous gold pan used during the California Gold Rush was among the simplest and least costly extraction methods. California miners, however, quickly turned to more intensive forms of hand mining extraction such as long toms, sluice boxes and ground sluicing. Many of these methods were employed in the Folsom District (Caltrans 2008; EDAW 2009).

As ground sluicing and hydraulic mining became more common from the 1850s onward, the need for large amounts of water led to the construction of numerous dams, ditches, and flumes throughout the region. The largest and most prominent of these endeavors were undertaken by two joint stock companies: the Natoma Water and Mining Company, and the American River Water and Mining Company. Although several smaller companies, such as the Salmon Falls Water and Mining Company which constructed the Clark-Eastman Ditch, were involved in the creation of water conveyance systems in the region, these operations were overshadowed by the large scale projects of the Natoma Water and Mining Company and the later American River Water and Mining Company (Waechter and Mikesell 1994).

The Natoma Water and Mining Company was first founded in 1851 and later acquired by H.G. Livermore in 1862. The company completed its first water conveyance from near Salmon Falls on the South Fork of the American River to Granite City (Folsom) in 1854. Following the company's acquisition by Livermore in 1862, the company became increasingly interested in water development for industry as well as for logging. The Natoma Water and Mining Company spawned two additional entities under Livermore, the Folsom Water and Power Company, which promoted water-powered industry, and the American River Land and Lumber Company, which controlled the timber-related activities (Waechter and Mikesell 1994:10). As part of this move to water power and logging, the original Folsom Dam was completed in 1893.

In the last years of the nineteenth century, gold mining companies also turned their attention back to the gravel bars along the American River where they accelerated the development of dredge mining, what has been called the "final refinement of placer mining" (Caltrans 2008). Miners had employed various forms of dredges in the state as early as the 1850s, but it wasn't until the turn of the twentieth century that dredge mining operations became successful in California (Doolittle 1905). Beginning at Folsom and extending downstream for ten miles, the Folsom Mining District along the Lower American River was one of California's most important dredge fields. In 1899, the Colorado-Pacific Gold Dredging Company initiated the first successful dredging operation in the Folsom District, with the use of its steam-powered bucket-line dredge at the northwestern part Mississippi Bar (EDAW 2009b).

In 1906, many of the smaller dredge mining companies, such as the Colorado-Pacific Gold Dredging Company and the Syndicate Dredging Company, were combined to form the Natoma Development Company eventually becoming the Natomas Company in 1928 (Rhea and Rhea 2003). The company's dredging operations at Mississippi Bar began in 1908 (EDAW 2009a). A small settlement to the north of the dredge workings included houses for workers and associated outbuildings (EDAW 2009b). Until 1962, the Natomas Company controlled nearly all of the major gold dredging operations in the Folsom district, mining continuously for several decades except for a brief hiatus during World War II (EDAW 2009b).

Gold production peaked in California not long after the initial Gold Rush of the mid-nineteenth century. Many of the surface placer deposits mined in the early American period were rich in gold, but were quickly depleted (Romanowitz 1970). The advent of hydraulic mining allowed for the exploitation of deeper placer deposits, but at a great environmental cost. After many of the rivers of the Central Valley became clogged with sediment unleashed by upstream hydraulic mining operations, the process was effectively shut down by a court decision in 1884. The highly successful dredging operations on rivers such as the American, Feather, and Yuba were a relatively late development in the history of gold mining in California. Indeed, gold production from dredging in California didn't peak until the 1930s, after which it entered a period of slow decline. Most gold dredging enterprises in the State were shuttered by the end of the 1960s, although some scattered activities have continued into recent years (Kirshenbaum 2000).

Almost as soon as the large-scale dredging operations on the Lower American River began, questions of land reclamation arose. The Natomas Company experimented with various ways to level their dredge tailings for potential use as agricultural land, although such methods were not widely employed (EDAW 2003). There was also public outcry over the tailings, which were considered to be an eyesore. As early as 1907, the Natomas Company began crushing the cobbles produced as a byproduct of dredging and selling the material for road construction and other uses. Many of the early paved roads and streets in the region were constructed with reclaimed dredge tailings (Rhea and Rhea 2003).

Mississippi Bar was home to significant rock-crushing operations, probably beginning in the 1930s. Pacific Coast Aggregates (PCA) apparently operated in the area until their land was condemned by the Army Corp of Engineers so that rock from the site could be used in the construction of Folsom Dam. PCA resumed rock crushing activities at Mississippi Bar in the 1960s (EDAW 2009b). At some point before 1950, the Teichert Company also established a rock crushing operation at Mississippi Bar, and in the late 1950s, Teichert was engaged in reclamation activities the area, creating ponds and other recreational spaces where dredge tailings had previously been located (EDAW 2003; Teichert 2009). The land was later donated to the State of California.

In the later years of the nineteenth century, before the advent of dredging enabled more intensive mining of placer deposits near Folsom, many local businesspeople turned their attention from mining to agriculture, which like mining required large amounts of water to be successful. Initially developed for mining, the series of ditches and flumes throughout the project area provided the necessary water to provide for the agricultural productivity of the region. In response to the switch from mining to agriculture, the Natoma Water and Mining Company as well as the American River Water and Mining Company organized several new companies, including the Natoma Vineyards Company and the North Fork Ditch Company. In the twentieth century, through a series of reorganizations and sales, the Natoma Water and Mining Company became simply the Natomas Company while the American River Water and Mining Company eventually became the San Juan Suburban Water District (Waechter and Mikesell 1994).

Agriculture As the twentieth century progressed, agriculture replaced mining as the dominant industry in the region. The ample supply of water and the rich soils of the area provided for the cultivation of grain, hay, wine grapes, oranges, and other fruits (Peak and Associates 1990c). Although a small community existed at Salmon Falls (Peak and Associates 1990c), most of the formerly numerous mining communities ceased to exist in the area. By the early 1950s when the Federal government acquired the land to create the present Folsom Reservoir, few people inhabited the region.

Transportation According to Byrd (in Waechter and Mikesell 1994) the Folsom area has a long history of transportation development. Many of the early non-Native trails and roads in the region were associated with mining operations, although one of the first roads—the Coloma Road laid out by John Sutter and his employees in 1847-1848—was designed as a route to Sutter's sawmill on the American River. After the onset of the California Gold Rush, this road was extended to the early mining community of Mormon Island. In the 1850s, numerous stagecoaches provided service between Sacramento and Coloma, although by the 1860s trains had replaced stagecoaches as the dominant form of ground transportation in the region (EDAW 2003). During the early years of the Gold Rush, several ferries operated in the region and required their operators to construct roads leading to the ferry crossings. A few early suspension bridges were also constructed in the area. As the gold deposits were depleted, many of the minor roads and bridges were gradually abandoned, and several of the surviving roads were re-routed in the 1950s to allow for the creation of Folsom Reservoir.

Development of the Central Valley Project and Folsom Dam The Central Valley Project (CVP) was initially originally authorized by the US congress in 1935 and again in 1937 with the initial construction starting on the Contra Costa Canal – near the Sacramento/San Joaquin River Delta, Shasta Dam – to the north near Redding, CA., and Friant Dam – near Fresno, CA. With its roots in early ambitious water project proposed by the State of California, the CVP represented an ambitious Federal undertaking to bring water from Sacramento River Valley to the San Joaquin River Valley as far south as Bakersfield, CA.

Construction on the American River Unit of the CVP began in 1949. Folsom Dam was completed in 1956 and consists of a concrete dam flanked by earth wing dams and dikes with a total length of approximately nine miles. The reservoir extends approximately 15 miles up the North Fork and 11 miles up the South Fork of the American River. Key to the successful storage and operation of Folsom Dam are its Dikes, Wing Dams and the Mormon Island Auxiliary Dam. MIAD, is by far the most significant of all these retention features. MIAD is a rolled earth fill structures 4,820 feet long and 110 feet high with a volume of approximately 3,820,000 cubic yards. Without MIAD, Folsom Lake would not be able to store its current nearly-full pool capacity of 1,000,000 acre feet.

12.1.3.3 Archaeological Overview

The project area is within the eastern Sacramento Valley and western Sierra Nevada slope regions. Archaeologists have developed distinct culture histories for each of these regions.

Sacramento Valley Fredrickson (1973) developed the Central California Taxonomic System (CCTS) and proposed the use of *patterns*, modified by distinctive *aspects* and *phases*, which are not confined by temporal positions and serve to outline a general way of life. Such patterns are characterized by particular technological skills, economic forms, exchange networks, and ceremonial practices. Fredrickson identifies six such patterns in central California, and places them in a chronological framework. Three of these patterns are relevant to the prehistory of the Central Valley.

- The Windmiller Pattern (4,500-3,000 B.P.) encompasses components ascribed to the Early Horizon of the CCTS, and is characterized by a mixed economy that includes both game and plant exploitation. The Windmiller Pattern suggests a seasonal adaptation of winter habitation sites in the valley and summer camps in the foothills (Fredrickson 1973).
- The Berkeley Pattern (3,500-1,500 B.P.) corresponds with the Middle Horizon, and suggests a shift in milling equipment to a mortar and pestle technology with an increased dependence on acorns. Projectile points and atlatls suggest that hunting game remained an important part of subsistence (Fredrickson 1973).
- The Augustine Pattern (1,500 B.P-Contact) is widespread in central California, and represents a mixture of traits retained from the Berkeley Pattern as well as a number of introduced traits including bow and arrow technology as reflected in Gunther-Barbed and other small projectile points (Fredrickson 1973).

Sierra Nevada Sierra Nevada region prehistoric archaeological deposits were first found during the Gold Rush era. Deposits consisting of mortars, charmstones, pestles, and human remains were among the cultural resources discovered in the 1850s and 1860s (Moratto 1984). In the mid-nineteenth century, mining led to the discovery of prehistoric sites. In the later nineteenth and twentieth centuries, dam construction within the Sierras also precipitated the discovery of numerous archaeological sites.

In 1952, a total of 26 northern Sierra sites were recorded by University of California at Berkeley archaeologists T. Bolt, A. B. Elsasser, and R. F. Heizer. Two archaeological cultures were identified from this survey, the Martis Complex (centered in the Martis Valley) and the Kings Beach Complex (Lake Tahoe area). The Martis Valley Complex was unusual for its use of basalt rather than obsidian for tool making. Dates from the tools suggest the complex is dated from 4000-2000 years B.C. to A.D. 500 (Moratto 1984).

The Kings Beach Complex (A.D. 500-1800) was distinguished by flaked obsidian and silicate implements, small projectiles points, the bow and arrow, and occasional scrapers and bedrock mortars (Moratto 1984). W. A. Davis and R. Elston continued to piece together the connection between these two complexes and expanded archaeological testing in the area. Jacks Lake and Spooner Lake Summit were two of the primary sites they used to develop a chronology that spanned about 7,000 years (Moratto 1984).

In 1970, Ritter compared various Lake Oroville area sites to the Martis Valley and Kings Beach sites to help develop a chronology for the Lake Oroville area (Ritter 1970). The Lake Oroville chronology consists of the Mesilla, Bidwell, Sweetwater, and Oroville complexes, as well as the ethnographic Maidu era, and spans a period of about 3,000 years (Moratto 1984).

The Mesilla Complex was identified as a sporadic occupation of the foothills. People who created this complex hunted with atlatls and processed their food in mortar bowls and on millingstones. Shell beads, charmstones and bone pins show a close relationship between the Mesilla Complex and the Sacramento Valley cultures between 1000 B.C. and A.D. 1 (Moratto 1984).

After the Mesilla Complex occupation, the cultural sequence continued with the Bidwell Complex from A.D. 1 to A.D. 800. The Bidwell Complex people lived in permanent villages, hunted deer and smaller game with slate and basalt projectile points, fished, ground acorns on millingstones, and collected fresh water mussels. A new cultural element for this complex was the manufacture of steatite cooking vessels (Moratto 1984).

The Sweetwater Complex (A.D. 800-1500) was defined by new cultural items and forms, which included: particular shell ornament types; wide use of steatite for cups, bowls and smoking pipes; and small, light projectile points that indicate the use of bows and arrows for hunting (Moratto 1984).

The Oroville Complex is significant because it represents the protohistoric Nisenan (A.D. 1500-1833) (Moratto 1984). The Nisenan culture was characterized by bedrock mortars for acorn processing, dance halls, and burials that were placed in tightly flexed positions on their sides with the graves marked by stone cairns. The Lake Oroville Chronology sequence ended with the Historic era and the abandonment of traditional settlements in the nineteenth century (Moratto 1984).

12.1.3.4 Records Search and Previous Surveys

A records search of the current project area was conducted at the North Central Information Center (NCIC) by Monique Pomerleau of Pacific Legacy during March and April of 2006. An update to this search was conducted by Marc Greenberg in May 2009. Prior to conducting this records search, studies provided to Pacific Legacy by Reclamation were consulted. To date, the most thorough assessment of previous research within the project area was completed by Waechter and Mikesell (1994). In addition to Pacific Legacy's records search at the NCIC, John Holson of Pacific Legacy conducted a records search with DPR at Folsom Dam. DPR manages recreational activities and facilities at Folsom Reservoir.

A total of 19 cultural resource studies have been carried out within a quarter mile of the project area. Of these 19 studies, six have been conducted within the project area. The studies conducted within the project area led to the partial survey coverage of the Green Valley Road relocation area south of the Mormon Island Auxiliary Dam, the portions of Mississippi Bar to be affected by wetlands mitigation in that area, and MIAD. All of the studies conducted within a quarter mile of the project area are listed in Table 12-1.

Table 12-1. Previous Cultural Resource Studies within a Quarter Mile of the Project Area

NCIC Study No.	Author	Date	Within Project Area?
571	Motz and Johnson	1980	Yes
1949	Derr	2000	No
3843	Peak and Associates	1990b	Yes
4471	Peak and Associates	2000	No
4472	Brown	1993	Yes
4475	Peak and Associates	1990a	No
4476	Archeo-Tec	1986	No
4477	Jackson	1994	No
4488	Peak and Associates	1993a	No
4516	Jones and Stokes	1993	No
4517	Peak and Peak	1994	No
4524	Peak and Associates	1993b	No
6077	PAR Environmental Services	2005	No
6098	Welch *et al.*	2004	No
N/A	EDAW	2003	Yes
N/A	Corps	2006	Yes
N/A	URS	2006	No
N/A	Bartoy et al.	2007	Yes
N/A	EDAW	2009	Yes

The studies have resulted in the discovery of four cultural resources within or immediately adjacent to the project area. One historic site, CA-SAC-434H, is located near MIAD but is not in the current project area. This segment of the Natomas ditch has not been evaluated for listing on the NRHP. CA-SAC-973H is the Folsom Dam which includes MIAD. The two remaining resources are located within the project area at Mississippi Bar and are part of the discontinuous district CA-SAC-308H, the American River Mining District. These sites were originally given the sub-designations LN-10 and LN-12 (Deis 2002a and 2002b). LN-10 or its constituent features have not been evaluated for listing on the NRHP. A recent study in the area of LN-12 has dropped the sub-designation, instead referring to the area simply as Mississippi Bar (Deis and Tordoff 2009; EDAW 2009a, 2009b). Features within the area previously referred to as LN-12 have been determined eligible as contributing elements of the American River Mining District (CA-SAC-308H). All of the sites discovered within a quarter mile of the project area are listed in Table 12-2.

Table 12-2. Previously Recorded Cultural Resources within a Quarter Mile of the Project Area

Trinomial / Temporary No.	Author and Date	CRHR/NRHP Eligible?	Within Project Area?
CA-SAC-308H / LN-10	Deis (2002a); Lindstrom (1988); EDAW (2003)	Eligible	Yes
CA-SAC-308H / LN-12	Deis (2002b); Deis and Tordoff (2009); EDAW (2003, 2009a)	Eligible	Yes
CA-SAC-434H	Peak *et al.* (1992); Gerry *et al.* (1990)	Not Evaluated near project area	No
CA-SAC-937H	Corps 2006	Determined eligible for the NRHP under Criterion A	Yes, MIAD is a contributing element of the Folsom Dam Complex and CVP

CA-SAC-434H CA-SAC-434H is located south of MIAD and consists of the remains of the Natomas Ditch, which was constructed in the 1850s to transport water for mining operations in the area. The ditch provided water to several mining areas near present-day Folsom and also allowed for irrigated farming. Much of the ditch today lies beneath the waters of Folsom Reservoir; the section of the Natomas ditch near the project area mostly consists of unimproved channels (Peak and Associates 1990a:22-23). Segments of the Natomas Ditch have been determined eligible for inclusion on the National Register of Historic Places (NRHP), however the segment near the project area remains unevaluated.

CA-SAC-308H / LN-10 LN-10 is located near the present day shore of Lake Natoma at Mississippi Bar. This area contains the remains of ground sluicing operations attributed to the early iterations of the Natomas Company that date to the second half of the nineteenth century (ca. 1860-1898). The site consists of rock-walled sluices as well as associated drainage systems and tailings (Deis 2002a).

CA-SAC-308H / LN-12 LN-12 is located at Mississippi Bar and is characterized by dredge tailings, slickens, and ponds which mostly date to between 1899 and 1918. These remains are primarily associated with gold mining operations by the Natomas Company, although some tailings from the Colorado-Pacific Gold Dredging Company operations are also present (Deis 2002b; EDAW 2009a). Earlier mining activities such as ground sluicing may have also taken place in this area of Mississippi Bar beginning in the late 1840s, but subsequent dredging would have erased any traces of the earliest mining activities in the area.

Note: In keeping with recent work at Mississippi Bar (Deis and Tordoff 2009; EDAW 2009a), the sub-designations LN-10 and LN-12 will not continue to be used in this document. Instead, the inventory and evaluation of resources at Mississippi Bar will focus on intact features that may constitute contributing elements to the American River Mining District which has been given the designation, CA-SAC-308H.

CA-SAC-937H CA-SAC-937H is Folsom Dam, constructed in 1956 as a multi-purpose dam. MAID is one of several impoundment elements recorded with the dam complex. The dam played a prominent role in the development of CVP and flood control in California. The dam was recorded in 2006 by Corps and recommended as eligible for NRHP under Criterion A with a period of significance of 1948 to 1956 (Corps 2006). Folsom Dam is considered significant under the theme of Development, Construction, and Operation of the CVP. The dam and its operation have resulted in significant flood control for downstream municipalities. The listing is for the features associated with the dam's historic function. The dam was found not to be eligible for the NRHP under Criterion B, C, or D. Contributing elements of the resource include the main concrete and earthen Right and Left Wing Dams, penstocks, gantry cranes, pump house, eight dikes, MIAD and powerhouse. Reclamation is in the process of listing Folsom and Nimbus Dams as contributing elements of the Central Valley Project (CVP) Multiple Property Listing. The determination will not be formal until accepted by the Keeper of the NRHP.

12.1.3.5 Archaeological Survey Methods and Results

Pacific Legacy conducted archaeological survey of previously unsurveyed portions of the project area on May 26 and 27 and June 2, 2009 and November 17, 2009. A pedestrian survey was carried out by a crew of two archaeologists and was focused on the Mississippi Bar and the area south of MIAD for the wetlands restoration and road relocation. The survey results of these two portions of the project area are discussed separately. Pacific Legacy archaeologists relocated portions of one previously recorded historical site at Mississippi Bar and identified one newly discovered historical resource in the MIAD area. Mississippi Bar is located within a previously identified and recorded cultural resource, the American River Mining District (CA-SAC-308H). The historical site at MIAD was designed PL-MD-S01. MIAD itself had been the subject of a recent study, Bartok et al. (2007), so was not resurveyed.

Mississippi Bar The survey area included a small portion of Mississippi Bar that borders Lake Natoma as well as areas in the vicinity of former dredge tailings piles that were presumably crushed to make gravel and aggregate. The entire survey area exhibited disturbance from the Teichert rock crushing plant and associated reclamation activities, as well as from access roads and trails.

On the whole, surface visibility was moderate, approximately 50%, but was much lower (5-10%) in some areas due to dense ground cover. The entire area was walked in transects of no greater than fifteen meters apart, although areas that posed a safety risk—such as steep piles of loose rock and densely vegetated areas that may have contained ponds—were not surveyed. Approximately 120 acres were surveyed. Mississippi Bar is part of the larger American River Mining District, CA-SAC-308H determined to be eligible for the NRHP.

The area along Lake Natoma—generally as far inland as the modern bike path—contains the remains of ground sluicing operations attributed to the Natomas Company (formerly LN-10). These features date to the second half of the nineteenth century (ca. 1860-1898). The site contains rock-walled sluices as well as associated drainage systems and tailings (Deis 2002a). Dredging and reclamation activities have likely disturbed many such features, particularly in the southwestern portion of Mississippi Bar. The present survey only covered the far western extent of the area thought to contain remnants of the ground sluicing operations, and no intact features were noted in that area.

Much of the inland portion of Mississippi Bar is characterized by dredge tailings, slickens, and ponds, most of which date from 1899 to 1918 (formerly LN-12). These remains are primarily associated with gold mining operations by the Natomas Company, although some tailings piles formed by the operations of the Colorado-Pacific Gold Dredging Company also exist in the area (Deis 2002b; EDAW 2009a, 2009b). Earlier mining activities such as ground sluicing may have taken place in this area of Mississippi Bar beginning in the late 1840s, but subsequent dredging would have erased any traces of the earlier mining activities in the area. Within the area of Mississippi Bar surveyed by Pacific Legacy, rock-crushing operations by the Teichert Company and others have greatly disturbed most of the dredge tailings associated with the late nineteenth century and twentieth century dredging operations by Natomas and others.

Mormon Island Auxiliary Dam The wetlands and road relocation area is located south of MIAD and Green Valley Road. The area exhibited disturbance from access roads and landscape modifications. Surface visibility was low, approximately 5-10 percent, due to dense grasses and ground cover. The entire area was walked in transects of no greater than fifteen meters apart. The entire surface was inspected. Approximately 13 acres were surveyed for the wetlands area. One previously undocumented cultural resource was noted during survey, PL-MD-S01. No cultural resources were noted in the road relocation area.

PL-MD-S01 consists of six concrete pylons that appear to be the foundation for a bridge or water conveyance device that crossed a small drainage or low swale. Four of the pylons are easily visible above ground and two are partially obscured in the western embankment of the embankment. The pylons are associated with accumulations of fist-sized cobbles, as well as one welded iron object that may be the remains of a sluice gate. Landscape modifications near the feature suggest that the pylons may be related to a bridge or ramp, but the exact nature of the earthworks could not be determined due to ground cover and erosion. Construction techniques recorded at PL-MD-S01 suggest that it was built in the early to mid-twentieth century.

MIAD, a feature of Folsom Dam which is a contributing element of the Folsom Dam and Central Valley Project (CVP) Multiple Property Listing, was not resurveyed as it had recently been surveyed by Bartoy et. al (2007). Folsom Dam was determined to be eligible for the NRHP as part of the CVP and MIAD was determined to be a contributing element of the CVP (Reclamation et al. 2006). Modifications to MIAD were considered as part of the Folsom Dam Safety of Dams Project and the Folsom Dam Joint Federal Project. Reclamation had determined that the modifications to MIAD would not have an adverse effect to the CVP or Folsom Dam. State Historic Preservation Officer concurrence for this for a no adverse effect determination was received in 2007 (Stratton 2007).

Within the project area, two resources determined eligible for the NRHP are present. This includes MIAD and Mississippi Bar. These resources are considered historic properties.

12.2 Environmental Consequences/Environmental Impacts

This section presents the environmental consequences/environmental impacts of the proposed alternative on cultural resources.

12.2.1 Assessment Methods

The criteria for determining the historical significance of cultural resources are the NRHP eligibility criteria as defined at 36 CFR Part 60.4, and the CRHR eligibility criteria as defined at Section 5024.1 of the California Public Resources Code. Two historic properties, CA-SAC-308H and CA-SAC-937H have been determined eligible for the NRHP. A formal determination of NRHP or CRHR eligibility occurs when SHPO formally concurs in an evaluation made by the responsible government agency. Alternatively, an evaluation of a historic property may be submitted to the Keeper of the NRHP for a formal determination of NRHP eligibility. These two sites are considered historic properties.

The analysis of potential impacts to historic properties employs the Criteria of Adverse Effect as developed by the ACHP in its regulations for the “Protection of Historic Properties” (36 CFR Part 800). Adverse effects and/or significant impacts can occur when NRHP eligible or listed sites, structures, buildings, objects, or districts are subjected to the following effects:

- Physical destruction or alteration of all or part of the property;

- Isolation of the property from or alteration of the property's setting when that character contributes to the property's qualification for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and,
- Transfer, lease, or sale of the property (36 CFR Part 800.9).

Section 106 of the NHPA and its implementing regulations (36 CFR Part 800) require that the ACHP, SHPO, and the interested public, including Native Americans, be provided an opportunity to comment on the effects that the proposed action may have on historic properties.

Because the proposed project must also comply with CEQA, an impact is considered significant if a project would have an effect that may change the historical significance of the resource (Public Resources Code Section 21084.1). Demolition, replacement, substantial alteration, and relocation of historic properties are actions that would change the historical significance of a property eligible for listing or listed on the CRHR.

12.2.2 Significance Criteria

To be considered as a historic property and/or a historical resource, a cultural resource must retain the quality of integrity. The concept of integrity is usually interpreted to mean "intactness" of physical characteristics, but in terms of the NRHP and the CRHR, integrity is a measure of the degree to which a property retains or is able to convey the essential characteristics defined under one of the four eligibility criteria. These characteristics may be expressed through integrity of location, design, setting, materials, workmanship, feeling, and association of a property. An archaeological property may retain sufficient integrity to qualify it for the NRHP or CRHR if the property retains the ability to yield information important to an understanding of history or prehistory. It must be demonstrated to have the potential, or to have previously yielded, data that can be used to address important research questions.

The standard for integrity for NRHP eligible properties is more stringent than that for CRHR eligible resources. It should be noted that a property found to not retain sufficient integrity to be NRHP eligible may be found to possess sufficient integrity to be CRHR eligible.

Because the proposed project constitutes a Federal undertaking that requires compliance with Section 106 of the NHPA, Federal significance criteria apply. Cultural resource significance is evaluated in terms of eligibility for listing on the NRHP. NRHP criteria for eligibility are defined as follows:

The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and that:

a) Are associated with events that have made a contribution to the broad pattern of our history;

b) Are associated with the lives of people significant in our past;

c) Embody the distinct characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or,

d) Have yielded, or are likely to yield, information important in prehistory or history (36 CFR Part 60.4).

CEQA defines a significant historical resource as "a resource listed or eligible for listing on the California Register of Historical Resources" (Pub. Res. Code Section 5024.1). For a historical resource to be eligible for listing on the CRHR, it must be significant at the local, State, or National level under one or more of the following four criteria:

1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

2) It is associated with the lives of persons important to local, California, or national history;

3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or,

4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Historical resources automatically listed on the CRHR include those historic properties listed on, or formally determined eligible for listing on the NRHP.

12.2.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

Under the No Action/No Project Alternative, no construction-related activities or changes to MIAD or Mississippi Bar would take place. Therefore, no construction-related effects would occur to historic properties.

The No Action/No Project Alternative would have no effect on cultural resources.

12.2.4 Environmental Consequences/Environmental Impacts of Alternative 1

PL-MD-S01, located at the MIAD site has been recommended as not eligible for the NRHP and consequently may not be considered a historic property. MIAD is a component of Folsom Dam and is a contributing element of the CVP Multiple Property listing, which has been determined eligible for the NRHP under Criterion A. MIAD is considered a historic property. However, alterations to MIAD were considered for the Folsom Day Safety of Dams Project and the Folsom Dam Joint Federal Project. Reclamation determined that modifications to MIAD would not have an adverse effect on the property and SHPO concurred. The mitigation site at Mississippi Bar contains one historic property. Mississippi Bar is a contributing element of CA-SAC-308H, the American River Mining District, determined eligible for listing on the NRHP under Criterion A and D. Alterations to contributing features (tailings, sluice pits) of this historic property would be considered an adverse effect. Alterations could include destruction of contributing elements during staging and construction or introducing elements which would impair the visual setting of the property.

Construction would lead to adverse effects to historic properties and/or historical resources.

All of the project areas associated with Alternative 1 have been subject to cultural resources survey and inventory. Under this alternative, two historic properties, MIAD (CA-SAC-937H) and Mississippi Bar (CA-SAC-308H) would be impacted. Modifications to MIAD would not be considered an adverse effect to the CVP or Folsom Dam. Adverse effects to CA-SAC-308H could be avoided if contributing elements of the NRHP district are not disturbed. . Adverse effects would be resolved, under the NHPA, through development of an agreement document. Under NEPA and CEQA, construction-related impacts to historic properties and/or historical resources would be significant.

This impact would be potentially significant if Alternative 1 is chosen. Implementation of mitigation measure CR-1 would reduce this impact to a less than significant level.

Project construction could lead to the inadvertent discovery of cultural resources.

There always exists the possibility that ground disturbing activities will result in the inadvertent discovery of potential historic properties and/or historical resources.

This impact would be potentially significant if undiscovered or buried historic properties or historical resources are identified. Implementation of mitigation measure CR-2 would reduce this impact to a less-than-significant level

12.2.5 Environmental Consequences/Environmental Impacts of Alternative 2

Alternative 2 would have the same affect on cultural resources as Alternative 1. Mitigation measures CR-1 and CR-2 would reduce any potentially significant impacts to a less-than-significant level.

12.2.6 Environmental Consequences/Environmental Impacts of Alternative 3

Alternative 3 would have the same affect on cultural resources as Alternative 1. Mitigation measures CR-1 and CR-2 would reduce any potentially significant impacts to a less-than-significant level.

12.2.7 Environmental Consequences/Environmental Impacts of Alternative 4

Alternative 4 would have the same affect on cultural resources as Alternative 1. Mitigation measures CR-1 and CR2 would reduce any potentially significant impacts to a less-than-significant level

12.3 Comparative Analysis of Alternatives

Table 12-3 presents the comparison of impacts under each of the alternatives, including the No Action/No Project Alternative. All the alternatives would have the same cultural resources impacts, with the exception of the No Action/No Project Alternative, which would have no impacts. Under all alternatives, one historic property could be impacted. There always exists the possibility that ground disturbing activities will result in the inadvertent discovery of potential historic properties and/or historical resources. Mitigation measures would reduce this potentially significant impact to a less-than-significant level for each of the alternatives.

Table 12-3. Comparative Analysis of Alternatives

Environmental Consequence/ Environmental Impact	Significance					Environmental Commitment/ Mitigation Measure
	No Action/ No Project Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Project construction could lead to adverse effects to known historic properties and/or historical resources	NI	LTSWM	LTSWM	LTSWM	LTSWM	**CR-**1: Development of Agreement Document
Project construction could lead to the inadvertent discovery of cultural resources	NI	LTSWM	LTSWM	LTSWM	LTSWM	**CR-2:** Inadvertent Discovery Plan

Key:
LTS = Less Than Significant
LTSWM = Less than Significant with Mitigation
SU = Significant and Unavoidable
NI = No Impact
B = Beneficial
N/A = Not Applicable

12.4 Environmental Commitments/Mitigation Measures

The project has the potential to adversely impact one identified historic property, CA-SAC-308H, which could result in potentially significant impacts to cultural resources.

Implementation of Mitigation Measure CR-1 would reduce all potential impacts to a less than significant level. Adverse effects to historic properties, under Section 106, are resolved through development of an agreement document.

CR-1*: Mitigation (Treatment) of Impacts to Historic Properties and/or Historical Resources.* A memorandum of agreement will be developed, in consultation with SHPO and consulting parties, to mitigate impacts to any identified historic properties or historic resources. The implementation of the agreement document will reduce impacts to historic properties or historic resources to less than significant levels, per NEPA and CEQA. To mitigate adverse impacts, important information contained in affected resources would be recovered by treatment and mitigation required by Section 106 of the NRHP and Reclamations Directives and Standards LND P01, LND-02, and LND 10-01.

The project has the potential to discover buried or otherwise obscured cultural resources, which could result in potentially significant impacts to cultural resources. Implementation of mitigation measure CR-2 would reduce this impact to a less-than-significant level.

CR-2: Inadvertent Discovery Plan In order to minimize the potential for significant impacts on as of yet undiscovered historic properties and/or historical resources, the following measures would be required:

a) Prior to construction, if deemed appropriate by Reclamation, sensitivity training to all contractors involved in subsurface work in the project area would be conducted. Workers involved in ground disturbing activities should be trained in: the recognition of archaeological resources (e.g., historic and prehistoric artifacts typical of the general area), procedures to report such discoveries, and other appropriate protocols to ensure that construction activities avoid or minimize impacts to potentially significant cultural resources. Reclamation would have the authority to halt or redirect construction if potentially significant archaeological features or materials are uncovered;

b) In the event that as of yet undiscovered archaeological artifacts or cultural deposits are encountered during ground disturbing activities, stop all work in the immediate vicinity of the find, notify Reclamation. As appropriate, conduct additional cultural resources survey and inventory within areas disturbed during construction, or conduct subsurface exploration if there is the assessed potential for buried artifacts or cultural deposits consistent with guidelines found in 36 CFR Part 800.13; and,

c) In the event that human skeletal remains are discovered anywhere in the project area, discontinue work in the vicinity of the discovery and contact the Reclamation Area Manager or Regional Archaeologist who will contact the county coroner, for El Dorado, Placer, or Sacramento County, as appropriate. If skeletal remains are found to be prehistoric Native American (not modern), the coroner should call the Native American Heritage Commission (NAHC) in Sacramento within 24 hours, as provided in California Health and Safety Code Section 7050.5. Since the project is located on Federal lands, provisions set out in the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations at 43 CFR Part 10 and Reclamations Directives and Standards LND 10-01would apply. Reclamation would follow, as deemed appropriate by the agency, Federal regulations (43 CFR Part 10) and Reclamation’s LND 10-01 for the inadvertent discovery of NAGPRA related cultural items.

Reclamation has not completed the Section 106 process. Prior to project implementation, Reclamation commits to completing the Section 106 process as outlined in the regulations at 36 CFR Part 800.3(a)(1) including mitigation of adverse effects if necessary.

12.5 Potentially Significant and Unavoidable Impacts

There would be no potentially significant and unavoidable impacts on cultural resources. Mitigation measures CR-1 and CR-2 would reduce all potentially significant impacts to less-than-significant levels.

12.6 Cumulative Effects

Table 22-1 in Chapter 22 presents the projects that were considered in the analysis of cumulative effects. In addition to these projects, continued county, municipal, and private development in the region surrounding Folsom Reservoir is also be considered in this analysis. Non-Federal development in the surrounding region has resulted in impacts to historic and prehistoric resources.

For some Federal cumulative projects, the impacts on historic properties would not be known until further site-specific historic resource studies have been undertaken, project designs have been more fully developed, and projects implemented. For Federal projects, the lead Federal agency would carry out any necessary inventories and evaluations of NRHP significance; consultation with the SHPO and Native American groups and interested parties; and treatment/mitigation required by Section 106 of the NRHP.

Cultural resources have been affected by past actions since Folsom Dam was constructed in 1956. Identified resources could be subject to damage from ongoing maintenance, new construction, demolition, rehabilitation of existing facilities, and natural processes (e.g. wave erosion). Alternatives 1 through 4 have the potential to contribute to the loss of regional cultural resources as a consequence of disturbance or degradation of previously undiscovered archaeological sites. To mitigate adverse impacts, important information contained in affected resources would be recovered by treatment and mitigation required by Section 106 of the NRHP and Reclamations Directives and Standards LND P01, LND-02, and LND 10-01.

Future development in El Dorado and Sacramento Counties may lead to incremental adverse impacts to cultural resources. However, provided that proper mitigation consistent with Section 106 of the NHPA for Federal actions and CEQA for State, county and municipal actions, is implemented in conjunction with development of related projects, no significant cumulative impacts are anticipated.

12.7 References

Anonymous. Undated. View of Mississippi Bar, California. Drawing on Paper. PIC 1963.002.1302—F. Bancroft Library, University of California, Berkeley.

Archeo-Tec.1986. An Archaeological Surface Reconnaissance of the Proposed Russell Ranch Development Project, Folsom, California. Report S-4476 on file at the North Central Information Center, Sacramento State University, and Sacramento, California.

Bartoy, K., K. Jones, J. Holson, and E. Reese. 2007. Cultural Resources Literature Search, Inventory, and National Register Evaluations for the Folsom Dam Safety and Flood Damage Reduction EIS/EIR, El Dorado, Placer, and Sacramento Counties, California. Final Report. On file at the North Central Information Center, Sacramento State University, Sacramento, California.

Beals, R. B.1933. Ethnology of the Nisenan. *University of California Publications in American Archaeology and Ethnology* 31(6): 335-414.

Bean, L. J., and S. B. Vane. 1978. Cults and Their Transformations. In *Handbook of North American Indians: California*, edited by R. F. Heizer, pp.662-672. Smithsonian Institution, Washington D. C

Brown, J. L.1993. Negative Historic Property Survey Report for the Proposed Green Valley Road Bike Path Widening Project, Sacramento County, California. Report S-4472 on file at the North Central Information Center, Sacramento State University, and Sacramento, California.

Bureau of Reclamation, U.S. Army Corps of Engineers, Central Valley Flood Protection Board, Sacramento Area Flood Control Agency. 2006. *Folsom Dam Safety and Flood Damage Reduction Project Draft Environmental Impact Statement/Environmental Impact Report, December 2006, Vol. I & II*. State Clearinghouse # 2006022091.

California Department of Transportation. 2008. Historical Context and Archaeological Research Design for Mining Properties in California. Division of Environmental Analysis, California Department of transportation, Sacramento.

Curtis, E. S. 1924. The Maidu. In *The North American Indian* Vol. 14. Johnson Reprint Corporation, New York.

Deis, R. 2002a. Site Record for LN-10. On file at North Central Information Center, Sacramento State University, Sacramento, California.

Deis, R. 2002b. Site Record for LN-12. On file at the North Central Information Center Sacramento State University, Sacramento, California.

Deis, R. and J. Tordoff . 2009. Site Record for Mississippi Bar. On file at the North Central Information Center, Sacramento State University, Sacramento, California.

Derr, E. H. 2000. Pacific Bell Mobile Services: Dyke 8 Recreation Area, Folsom Lake, Sacramento County: Site # SA-165-06. Report S-1823 on file at the North Central Information Center, Sacramento State University, Sacramento, California.

Dillon, R.1975. *Siskiyou Trail: The Hudson's Bay Company Route to California*. McGraw-Hill Book Company, New York.

Doolittle, J.E.1905. Gold Dredging in California. *California Mining Bureau Bulletin* 36. San Francisco.

EDAW. 2003. Cultural Resources Inventory and Site Assessment for the Lake Natoma State Recreation Area, Sacramento County, California. Report on file at the North Central Information Center, Sacramento State University, Sacramento, California.

EDAW. 2009a Cultural Resources Inventory and Site Assessment for the American River Spawning Gravel Augmentation Project, Sacramento County, California. Report on file at EDAW, Sacramento, California.

EDAW. 2009b Historic Context for Mining along the Lower American River—Mississippi and Sailor Bars. Prepared for the Bureau of Reclamation and the Sacramento City-County office of Metropolitan Water Planning. Report on file at EDAW, Sacramento, California.

Folsom Historical Society. 1942. *Folsom: The Hub of the Mother Lode.* Folsom Historical Society, Folsom, California.

Fredrickson, D. A. 1973. Early Cultures of the North Coast Ranges. Report S-7888 on file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Gerry, R., M. Peak, and N. Neuenschwander. 1990. Site Record for CA-SAC-434-H. On file at the North Central Information Center, Sacramento State University, Sacramento, California.

Hill, D. 1972. Maidu Use of Native Flora and Fauna. Unpublished manuscript.

Hoover, M. E., H. E. Rensch, and E. G. Rensch. 1966. *Historic Spots in California*. 3rd edition, edited by W. Abeloe. Stanford University Press, Stanford.

Hurtado, A. L.1988. *Indian Survival on the California Frontier*. Yale University Press, New Haven.

Jackson, Robert J. 1994. Determination of Adverse Effect for the Russell Ranch Project. Report S-4477 on file at the North Central Information Center, Sacramento State University, and Sacramento, California.

Jones & Stokes Associates, Inc.1993. Addendum Determination of Eligibility Report for a Segment of the Natomas Ditch System and Determination of Effect for the Parkway at Blue Ravine Project, Folsom, California. Report S-4516 on file at the North Central Information Center, Sacramento State University, Sacramento, California.

Kirshenbaum, N. W. 2000. The Giant Gold Diggers: California's Land-Going Fleet of Dredges. *Mining History Journal* 11-23.

Kroeber, A. L.1925. *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Washington D.C. [Reprinted, Dover Publications, New York, 1976.]

Kroeber, A. L.1925-1929.The Valley Nisenan. *University of California Publications in American Archaeology and Ethnology*. 24(4): 263-290.

Lindstrom, S. G.1988. A Comparative Evaluation of the Natoma Ground Sluice Diggings, Folsom, California. Prepared for Environmental Impact Professionals, Sacramento. On file at the North Central Information Center, Sacramento State University, Sacramento, California.

Littlejohn, H. W. 1928.*Nisenan Geography*. Manuscript on file at the Bancroft Library, University of California, Berkeley.

Moratto, M.1984. *California Archaeology*. Academic Press, New York.

Motz, Lee and J. Johnson. 1980. A Cultural Resource Assessment of the Current and Proposed Right-of-Way of the Nimbus/Folsom Transmission Line. Report S-571 on file at the North Central Information Center, Sacramento State University, Sacramento, California.

PAR Environmental Services, Inc.2005. Cultural Resources Assessment of the Sunset Avenue/Main Avenue Bikeway Project. Report S-6077 on file at the Northern California Information Center, Sacramento State University, Sacramento, California.

Peak & Associates, Inc. 1990a. Cultural Resources Assessment of the Russell Ranch Project, Sacramento County, California. Report S-4475 on file at the North Central Information Center, Sacramento State University, Sacramento, California.

Peak & Associates, Inc 1990b. Cultural Resources Overview for the Preliminary Plan for the Humbug Creek-Willow Creek Parkway, City of Folsom, California. Report S-3843 on file at the North Central Information Center, Sacramento State University, Sacramento, California

Peak & Associates, Inc.1990c. Folsom Lake Reoperation: Historical Resources Overview. On file at the North Central Information Center, Sacramento State University, Sacramento, California.

Peak & Associates, Inc.1993a. The Natomas Ditch: A Determination of Eligibility and Effect on the Remaining Sections within the Boundaries of the Parkway at Blue Ravine Project Area. Report S-4488 on file at the North Central Information Center, Sacramento State University, Sacramento, California.

Peak & Associates, Inc.1993b. Cultural Resource Inventory and Preliminary Evaluation for the Parkway Development at Blue Ravine, City of Folsom, California. Report S-4524 on file at the North Central Information Center, Sacramento State University, Sacramento, California.

Peak & Associates, Inc.2000. Archaeological Monitoring at the Parkway, City of Folsom, CA. Report S-4471 on file at the North Central Information Center, Sacramento State University, Sacramento, California.

Peak, M. and A. S. Peak. 1994. Test Excavations for Evaluation of Two Historic Period Sites within the Parkway at Blue Ravine, City of Folsom, California. Report S-4517 on file at the Northern California Information Center, Sacramento State University, Sacramento, California.

Peak, M., J. Oglesby, M. Marine and M. Waters.1992. Site Record for CA-SAC-434-H. On file at the North Central Information Center, Sacramento State University, Sacramento, California.

Rhea, A., and R. Rhea. 2003. *The Legacy of Natomas: A Company Story*. Folsom History Museum, Folsom.

Ritter, E. W. 1970. Northern Sierra Foothill Archaeology: Culture History and Process. University of California, Center for Archaeological Research at Davis, Publications 2:171-184. Davis, California.

Romanowitz, C. M. 1970.California's Gold Dredges. *Mineral Information Service: A Publication of the California Division of Mines and Geology* 23(8): 155-168.

Stratton, S. 2007. Section 106 Compliance Letter for Folsom Dam Safety of Dams Project and the Folsom Dam Joint Federal Project, Placer and Sacramento Counties. Letter submitted to U.S. Bureau of Reclamation, Mid-Pacific Regional Office.

Teichert. 2009.Teichert Aggregate Resource Development Website. Accessed on: 06 2009. Available at: http://www.teichert.com/aggregate-resource.cfm

Thompson, T., and A. A. West. 1880.*History of Nevada County, California*. [Reprinted Howell-North Books, Berkeley, 1970].

URS. 2006. Draft Report: Cultural Resources Inventory of In-Reservoir Borrow Pit Locations, Folsom Dam and Appurtenant Structures Project, Placer and El Dorado Counties, California. On file at the North Central Information Center, Sacramento State University, Sacramento, California.

U.S Army Corps of Engineers (Corps). 2006. Cultural Resources Archaeological Survey and National Register Evaluation of Folsom Dam and Properties for the Folsom Bridge Project, Folsom California. (Draft in possession of author).

Waechter, S., and S. D. Mikesell. 1994. Research Design for Prehistoric, Ethnographic, and Historic Cultural Resources at Folsom Reservoir, California. Submitted to the U.S. Department of the Interior, Bureau of Reclamation, Sacramento, California.

Welch, P., A. Leigh and J. West. 2004. Archaeological Inventory of Geologic Testing for the Folsom Dam, Safety of Dams Project, El Dorado, Placer, and Sacramento Counties, California. Report S-6098 on file at the North Central Information Center, Sacramento State University, Sacramento, California.

Wilson, N. L., and A. H. Towne. 1978. Nisenan. In *Handbook of North American Indians: California*, edited by Robert F. Heizer, pp. 387-397. Smithsonian Institution, Washington, D.C.

Chapter 13
Land Use, Planning, and Zoning

This chapter describes existing land use designations, plans, and zoning in the area of analysis, and discusses the potential impacts associated with land use, planning, and zoning that could occur as a result of implementation of the MIAD Modification Project.

13.1 Affected Environment/Environmental Setting

This section describe existing land use designations and zoning in the area around MIAD and Mississippi Bar. The proposed construction haul routes and staging areas are defined in Chapter 2. These haul routes and staging areas were analyzed for potential land use impacts in the previous Folsom DS/FDR EIS/EIR therefore, land use impacts from the staging areas and haul routes are not further analyzed in this document.

The affected environment includes many public recreation uses within the area of analysis. This chapter describes the various public recreation uses in general terms. A full analysis of the MIAD Modification Project impacts on recreation uses is included in Chapter 14, Recreation Resources.

13.1.1 Area of Analysis

The area of analysis is broken down into various Federal, State, county and city jurisdictions.

13.1.1.1 Mormon Island Auxiliary Dam

MIAD is located on the western shore of Folsom Reservoir in Sacramento and El Dorado Counties. The improvements proposed for MIAD would occur within Sacramento and El Dorado Counties and in a portion of the FLSRA. No work is proposed within Placer County. All work at MIAD would occur on Federal property owned by Reclamation and managed by DPR under a current lease agreement.

13.1.1.2 Mississippi Bar

The Mississippi Bar mitigation site includes 80 acres of land on the western shore of Lake Natoma, near the intersection of Sunset Avenue and Main Avenue and south of the community of Orangevale. All proposed mitigation would occur on land parcels currently owned by DPR and Reclamation and managed by DPR as part of the FLSRA.

13.1.2 Regulatory Setting

This section describes the regulatory setting for land use, planning, and zoning in the area of analysis and surrounding jurisdictions.

13.1.2.1 Federal and State

Since 1976, DPR has managed the land in the FLSRA by lease or contract with Reclamation for the purpose of providing recreation opportunities to the public. The FLSRA is managed by DPR in accordance with the FLSRA General Plan prepared in 1979 (DPR 1979) and later General Plan Amendments prepared in 1986, two in 1988, and 1996. An update to the FLSRA General Plan was completed by DPR in partnership with Reclamation, in 2007. DPR Commission approved the FLSRA/Folsom Powerhouse State Historic Park General Plan/Resource Management Plan (GP/RMP) and certified the associated EIR on October 8, 2009. Reclamation approval of the GP/RMP and EIS is pending. The *Folsom Lake State Recreation Area and Folsom Powerhouse State Historic Park General Plan/Resource Management Plan (GP/RMP)* (Reclamation and DPR 2007) guides the protection of natural and cultural resources, provides for and manages recreational opportunities, and outlines the future development of public facilities at FLSRA.

The Mormon Island Wetland Preserve management goal is to maintain and enhance its role as an important wetland preserve within the FLSRA and expand opportunities for interpretation and education. Applicable land use management guidelines for Mormon Island Wetland Preserve include:

MORMONPRES-4: As appropriate, upgrade the existing boardwalk trail in the Preserve to enhance interpretation and education opportunities of this resource. If further analysis determines the boardwalk is inappropriate for the Preserve, remove the existing remnants of the boardwalk and restore any impacted areas as needed.

MORMONPRES-8: Protect and manage grassland areas of the management zone that are known or potential habitat for the following special status species: California horned lizard, burrowing owl, and loggerhead shrike.

MORMONPRES-10: Protect and restore riparian areas of the management zone that are known or potential habitat for special status aquatic amphibian and reptile species, such as the Western pond turtle, California red-legged frog, and Foothill yellow-legged frog.

MORMONPRES-13: Protect and manage freshwater marsh areas of the management zone that are known or potential habitat for special status bird species, such as the Tri-colored blackbird.

The Mississippi Bar management goal is to maintain and enhance the natural, cultural, and recreation resources of the area, and expand opportunities for interpretation and education. Applicable land use management guidelines for Mississippi Bar include:

MISSISSIPPI-2: Develop a plan to restore riparian and floodplain habitat in the portions of Mississippi Bar which remain un-rehabilitated from past aggregate mining activity. Restoration should focus on those areas which have not recovered from past mining activities. The federal portion of the area has remained largely undisturbed since historic gold mining operations ended in the early 1900s and includes significant cultural and natural resources. However, the State portion of the are remains impacted by more recent aggregate mining operations and was not restored when those operations ceased. Restoration would focus on re-contouring the land to re-establish more natural drainage patterns, seasonal wetlands and backwater channels, as appropriate. Habitat restoration will need to be planned in concert with other goals for the areas, including: developing new recreation facilities; and the preservation and interpretation examples of historic dredge mining as described elsewhere in this section. The plan should provide for the following:

- Designs related to the structural and vegetative patterns of similar natural floodplain systems in the region;
- Re-establishing natural drainage patterns to the extent feasible;
- Analysis and predictive modeling of fluvial geomorphology and hydrology of Mississippi Bar and Lake Natoma;
- Excavation of additional backwater channels and oxbow ponds;
- Re-establishment of a range of elevations keyed to the range of water stages in Lake Natoma; and
- Re-establishment of a mosaic of riparian and wetland habitat types similar to those that naturally develop in riverine floodplain systems of bars and terraces, backwater channels, and oxbows (Reclamation and DPR 2007).

13.1.2.2 Local

A portion of the MIAD Modification Project area of analysis is in El Dorado County. Relevant land use goals and objectives in the El Dorado County General Plan include:

Flood Hazards

- *Goal 6.4:* Protect the residents of El Dorado County from flood hazards.
- *Objective 6.4.1*: Development Regulations

Minimize loss of life and property by regulating development in areas subject to flooding in accordance with FEMA guidelines, California law, and the El Dorado County Flood Damage Prevention Ordinance.

A portion of the MIAD Modification Project area of analysis is also adjacent to the City of Folsom. City of Folsom General Plan goals and policies that are relevant to this project include:

Safety Element Goals and Policies

- *Goal 29:* To protect the lives and property from unacceptable risks resulting from natural and manmade hazards.
- *Policy 29.4* – The City shall work with the U.S. Army Corp of Engineers in developing standards for development within the inundation boundary resulting from a failure of Folsom Dam or the dikes retaining Folsom Reservoir.

Mississippi Bar is contains a portion of the American River Bike Trail and is considered part of the American River Parkway. The Sacramento County Department of Environmental Review and Assessment is currently updating the American River Parkway Plan (ARPP), which includes Mississippi Bar. The County will be reviewing the MIAD Modification Project for potential conflicts with the ARPP (County of Sacramento 2008).

13.1.3 Existing Conditions

This section describes the existing land uses at the two project sites as well as surrounding land uses.

13.1.3.1 Folsom Reservoir and Folsom Lake State Recreation Area

The primary land uses within the FLSRA are; flood management, water supply, and power generation, and recreation. Recreation land uses are managed by DPR and include: water-related activities such as swimming, boating, fishing, waterskiing, and windsurfing; and non-water-related activities such as camping, hiking, mountain biking, the American River Bikeway, horseback riding, and picnicking. The park includes many facilities throughout all areas providing for boat launching and marina storage, day-use parking, camping areas, public restrooms and chemical toilets, equestrian staging areas, riding and hiking trails, bicycle trails, picnic areas with barbecues, and the Park Headquarters near the main dam. A paved road provides access throughout the park and to Folsom Reservoir (Wallace, Roberts, and Todd et al. 2003).

MIAD is a part of the Folsom Facility and is an earthen dam constructed across the Blue Ravine, a historic river channel. The land uses in the vicinity of the MIAD include recreation and flood management. Folsom Point is the main visitor area just west of MIAD and includes a picnic area, boat launch facilities and restrooms. MIAD received its name from the original gold mining settlement name during the California gold rush (DPR and Reclamation 2007). Green Valley Road is located south of the MIAD and is a major travel-way for the local area.

Future plans for the MIAD area include: conservation, preservation, and medium intensity recreation, according to the FLSRA General Plan update in progress (DPR and Reclamation 2007).

The FLSRA General Plan is the key planning document for the Mississippi Bar area. As noted above, DPR is currently in the process of updating the FLSRA General Plan and Resource Management Plan.

Mississippi Bar is approximately 750 acres of primarily undeveloped land and is the largest upland area along Lake Natoma. The area is highly disturbed as it was used for mining activities and still contains dredged tailings that have been left behind. As a secondary visitor area and day-use facility, it currently provides picnic sites, water and trail access, parking, equestrian staging area and trailhead, and an equestrian center (DPR 1988). The paved American River Bike Trail and other user-made equestrian and pedestrian trails traverse through the area.

13.1.3.2 El Dorado County

The eastern portion of MIAD falls within El Dorado County. According to the El Dorado County General Plan, existing land uses adjacent to the MIAD area of analysis include: Medium Density Residential, Open Space and Commercial. Figure 13-1 shows the land use in El Dorado County.

Zoning El Dorado County zoning districts near the MIAD area of analysis include the following:

- Recreational Facilities within FLSRA and developed areas of El Dorado County. The intent of this zoning district is to allow for the development and maintenance of land suitable for public recreation and to protect lands from uses having an adverse effect on natural resources.
- Single Family Two Acres along Green Valley Road. The purpose of this zoning district is to allow for low-density suburban development with sufficient space for residents to pursue limited horticulture and agriculture endeavors.

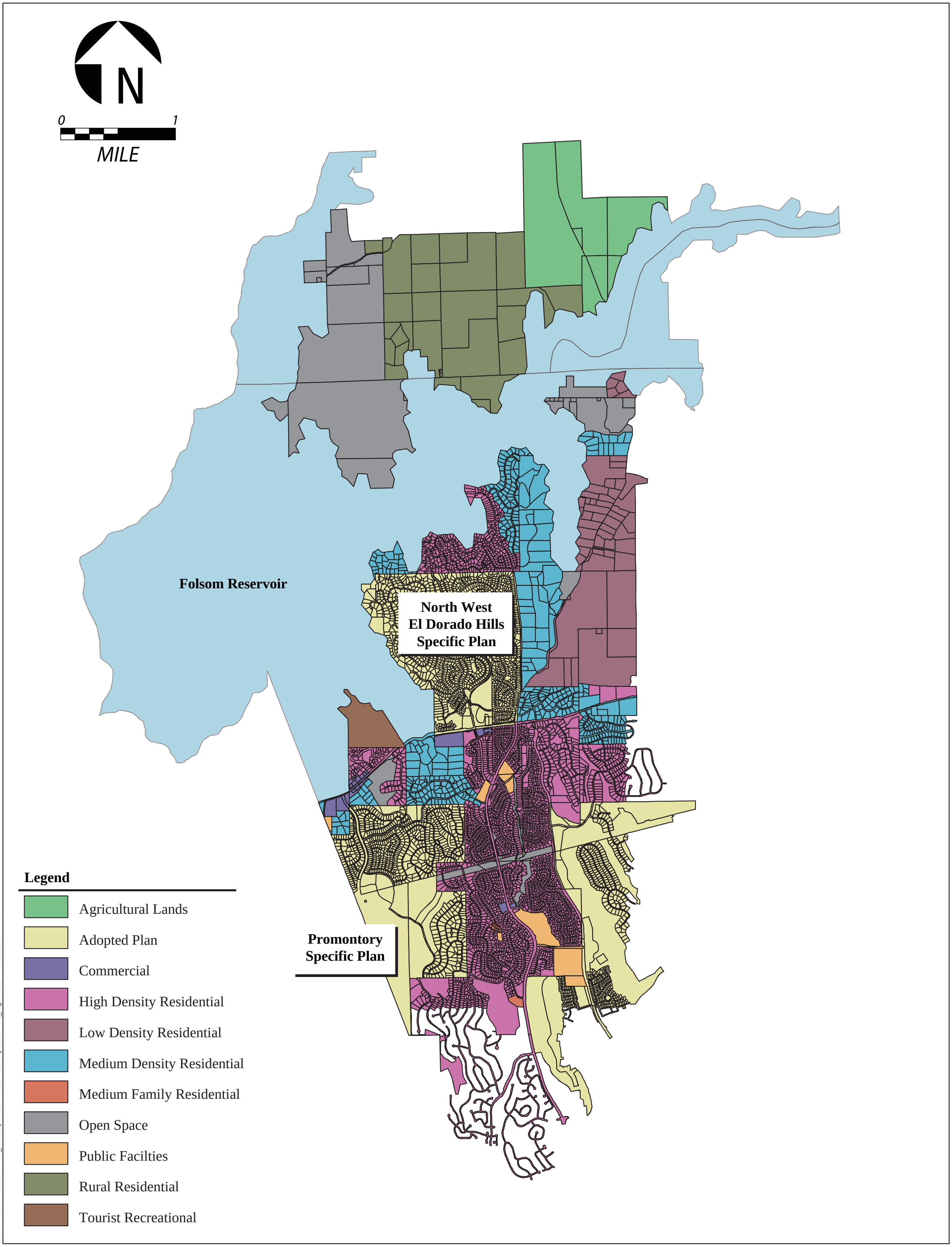

Figure 13-1. El Dorado County Land Use

13.1.3.3 Sacramento County

Mississippi Bar is located within an unincorporated area of Sacramento County, but is entirely on Federal and State-owned land. As stated above, Mississippi Bar is considered part of the ARPP that is currently being updated by the Sacramento County Department of Environmental Review and Assessment and they would review the MIAD Modification Project for potential conflicts with the ARPP.

13.1.3.4 City of Folsom

The City of Folsom is located the southern end of Folsom Reservoir and FLSRA and extends to State Route 50. The City borders El Dorado County to the east and Placer County to the north. The Lower American River flows from Folsom Reservoir through the City of Folsom to Lake Natoma. Figure 13-2 shows the zoning for the City of Folsom near the area of analysis.

Land uses in the area of analysis under the jurisdiction of the City of Folsom include: the Green Valley Road right-of-way located south of MIAD, land south of the Mormon Island Wetland Preserve, and the proposed Humbug Creek/Willow Creek Parkway south of Green Valley Road.

Zoning According to the City of Folsom Zoning Ordinance, zoning districts adjacent to MIAD include the following:

- A-1-A – Agricultural Reserve District is adjacent to the MIAD and provides a buffer between Folsom Reservoir and developed area 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. Minimum allowed lot area is 50 acres.

13.1.3.5 Existing Easements

The City of Folsom has an easement for Green Valley Road south of MIAD. Pacific Gas and Electric (PG&E) own a utility easement for a gas pipeline located within the Green Valley Road easement.

The WAPA owns an easement for a service road in the Mississippi Bar area of analysis. This is used to service their overhead utility lines.

N

Not to Scale

Legend

Residential Zoning

- Single Family Dwelling, Large Lot District
- Single Family Dwelling, Medium Lot District
- Single Family Dwelling, Small Lot District
- Two Family Residence District
- Neighborhood Apartment District
- Residential, Multi Family Dwelling District
- General Apartment District
- Trailers and Trailer parks

Commercial Zoning

- Business and Professional District
- Neighborhood Business District
- Central Business District
- General Commercial District

Industrial Zoning

- Light Industrial District
- General Industrial District
- Limited Manufacturing District
- Industrial Frontage District

Misc. Zoning / Combining Designations

- Agricultrual - Reserve District
- Open Space Conservation District
- Historical District

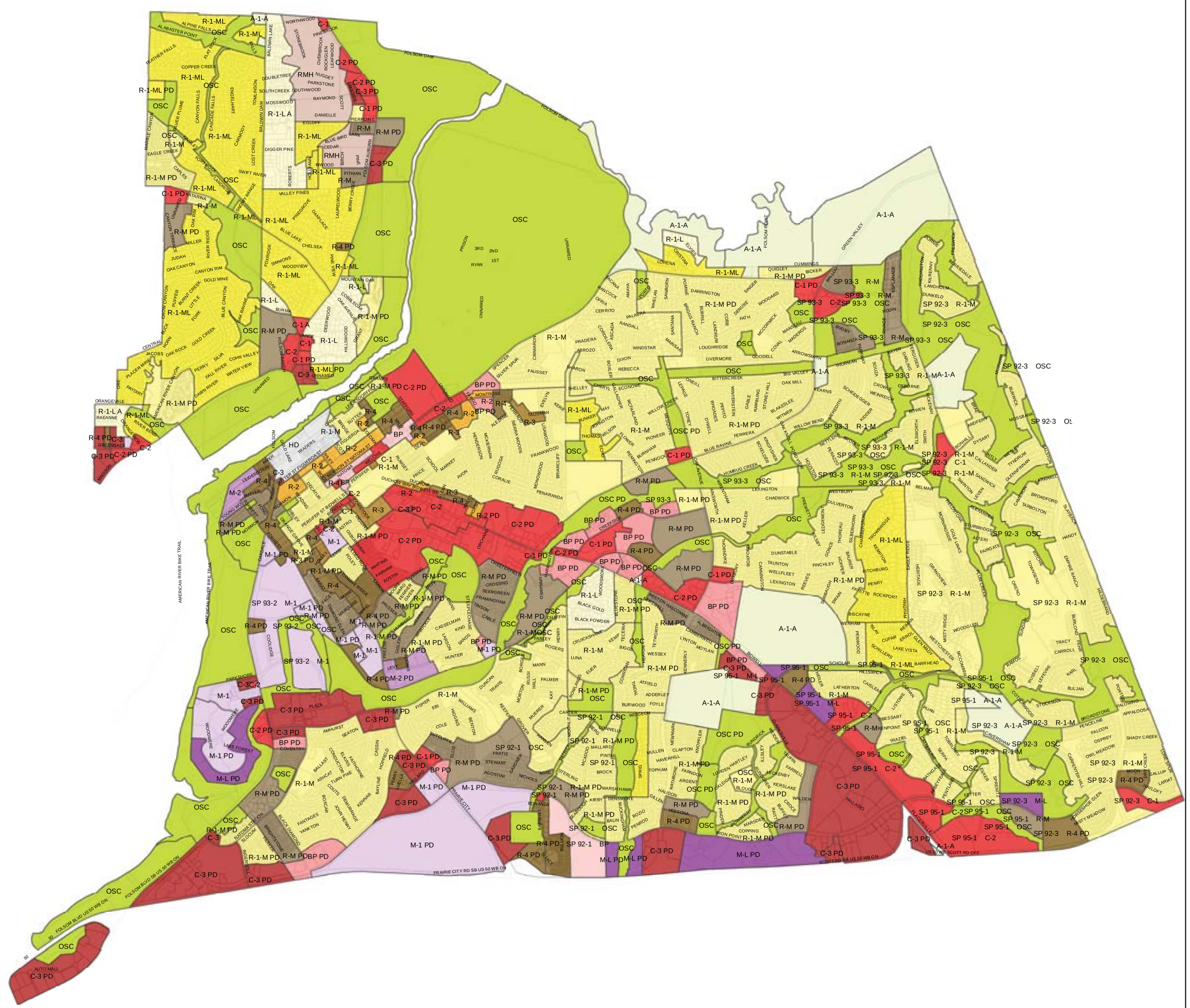

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Figure 13-2. City of Folsom Zoning

13.2 Environmental Consequences/Environmental Impacts

13.2.1 Assessment Methods

This analysis examines potential conflicts with Federal, State and local land use plans and zoning policies from the MIAD Modification Project alternatives. The FLSRA, Sacramento County ARPP, City of Folsom, and El Dorado County planning documents were used to determine if the action alternatives and the No Action/No Project Alternative would be in conflict with existing plans and policies. General Plan Land Use designations refer to areas designated by the General Plan to allow for certain uses, based upon existing land uses and proposed future land uses. Consideration is given to trends in development and population increases. Zoning refers to areas defined as zoning districts, which allow for specific uses such as residential and commercial. Zoning districts define permitted uses, discretionary permitting requirements for other uses, development standards, and other issues determined by the local Planning Commission.

13.2.2 Significance Criteria

Implementation of the MIAD Modification Project would result in a significant land use impact if it would:

- Conflict with an applicable land use plan, zoning policy, ordinance or regulation of an agency with jurisdiction over the project area that was adopted for the purpose of avoiding or mitigating an environmental effect; or
- Create land use incompatibility or alter the existing land use function.

13.2.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative could conflict with local planning policies related to Public Health and Safety goals.

The No Action/No Project Alternative would result in no improvements to MIAD and no new habitat at Mississippi Bar. The conditions at Folsom Reservoir and Mississippi Bar would remain similar to existing conditions. The safety objectives of Reclamation would not be met and the risk to public safety from a catastrophic earthquake capable of damaging MIAD would remain similar to existing conditions, but could actually increase over time because of future population growth and development.

The General Plan documents for El Dorado County and the City of Folsom address the need to protect the public from the risk of flooding (See Section 13.1.2.2.). The expected future population growth in the region will only increase the need for these dam safety and flood damage reduction measures. The No Action/No Project Alternative would not result in the construction or implementation of the actions under the MIAD Modification Project and the risks associated with flooding would remain; therefore, the No Action/No Project Alternative would be in conflict with these planning documents.

The No Action/No Project Alternative would not result in any construction activities or land use changes and would not conflict with local zoning policies or conservation or habitat management plans, nor would it result in any land use incompatibility issues.

Habitat mitigation activities at Mississippi Bar would not occur under the No Action/No Project Alternative. This would not conflict with any land use, planning, or zoning but would conflict with the Record of Decision signed by Reclamation to mitigate the impacts of the Folsom DS/FDR Project.

Therefore, the impacts of the No Action/No Project Alternative on land use would be potentially significant. Based on the analysis presented above, it is anticipated that the environmental impacts of the No Action/No Project Alternative with completion of the Folsom DS/FDR Project (i.e., future environmental conditions if no action is taken relative to the MIAD Modification Project) would exceed the significance criteria defined herein. However, unlike a significant impact associated with an action alternative, no mitigation can be required for significant impacts associated with the No Action/No Project (i.e., within the regulatory framework of NEPA and CEQA, a project applicant cannot be required to mitigate the impacts that would result from taking no action). As such, the impacts identified above for the No Action/No Project Alternative are considered to be significant, adverse, and unmitigable.

13.2.4 Environmental Consequences/Environmental Impacts of Alternative 1

Construction activities at MIAD could affect local land use plans, policies, or zoning.

Construction activities under Alternative 1 would not interfere with existing land use or zoning designations in the area of analysis, as described in the affected environment section. All construction for MIAD would occur on Federal property owned by Reclamation and managed by DPR. The only potential impacts to land use plans and policies would be traffic and noise issues that could result from construction activities. Chapter 10, Traffic and Circulation and Chapter 11, Noise, discuss these impacts and provide appropriate mitigation.

The MIAD Modification Project includes the transport of material to and from construction sites. The transport of material along city and county roads would not result in the need for road improvements or widening. The temporary relocation of Green Valley Road under this alternative would occur within Federal property and would not affect land use or zoning in the City of Folsom or El Dorado County.

El Dorado Counties and the City of Folsom each have policies and goals within their General Plan documents expressing the need to continue to provide or improve flood protection. Some of the goals are listed above in Section 13.2.3. This alternative, as proposed, would be consistent with local jurisdictions for meeting flood protection policies and goals described in their General Plans.

Construction activities under Alternative 1 would involve the temporary relocation of Green Valley Road south into the Mormon Island Wetland Preserve. This could result in the removal of habitat including grassland, riparian woodland and would be considered inconsistent with the FLSRA GP/RMP. However, the road relocation would be temporary and the area would be restored to its previous condition. Impacts to habitat would be mitigated through mitigation measures BIO-1 and BIO-2 in Chapter 7, Biological Resources.

Therefore, construction activities under Alternative 1 would not change local land use or zoning designations and would be consistent with local land use policies. Mitigation measure BIO-1 and BIO-2 in Chapter 7, Biological Resources would mitigation impacts associated with the GP/RMP to less than significant levels.

Temporary relocation of Green Valley Road may require changes to existing easements.

Alternative 1 proposes construction of the largest overlay proposed for any of the alternatives. The possibility does exist for the relocation of Green Valley Road further south into wetland area. If Green Valley Road needs to be relocated, a detour would be created prior to closing the road for relocation. A PG&E easement for a natural gas line is also located within the City's Green Valley Road easement. The temporary relocation of Green Valley Road would affect these easements and would result in a potentially significant impact.

Impacts to the City of Folsom and PG&E easements would be potentially significant. Mitigation measure LU-1 would reduce impacts to less than significant levels.

Construction activities at Mississippi Bar could affect existing land use plans and policies.

This alternative would involve the construction of approximately 80 acres of new riparian and seasonal wetland habitat at Mississippi Bar, primarily on DPR-owned land. This work would be consistent with the management guidelines described in Section 13.1.2.1. The mitigation activities would not conflict with the Sacramento County ARPP or the FLSRA Resource Management Plan and General Plan.

There would be no impact to existing land use plans and policies applicable to Mississippi Bar.

Construction at Mississippi Bar may affect existing WAPA easements at Mississippi Bar.

During Phase 2 of restoration activities a 20 foot wide channel would be cut through an existing WAPA service road and power line easement to improve water flow and wetland vegetation. Restoration activities proposed at Mississippi Bar include construction of a channel across an existing WAPA power easement and service road. This portion of service road would be abandoned after construction. Initial discussions with WAPA indicated that this change would not affect their ability to service their power lines and would not negatively affect their operations. Access to WAPA would still be available along the rest of the road to service their facilities.

This impact would be less than significant.

13.2.5 Environmental Consequences/Environmental Impacts of Alternative 2

The potential impacts to land use associated with Alternative 2 would be similar to some of those identified for Alternative 1 including: land use policies (no effect), and WAPA service road easement (less than significant). Implementation of Alternative 2 would not affect Green Valley Road or the PG&E utility easement.

Therefore the impacts of Alternative 2 on land use would be less than significant.

13.2.6 Environmental Consequences/Environmental Impacts of Alternative 3

The potential impacts associated with Alternative 3 would be the same as those identified for Alternative 2.

Therefore the effects of Alternative 3 on land use would be less than significant.

13.2.7 Environmental Consequences/Environmental Impacts of Alternative 4

The potential impacts associated with Alternative 4 would be the same as those identified for Alternative 2.

Therefore the impacts of Alternative 3 on land use would be less than significant.

13.3 Comparative Analysis of Alternatives

The No Action/No Project Alternative would likely conflict with local General Plans because it would not reduce safety risks associated with flooding and it would not implement any dam safety or flood damage reduction measures at the MIAD. This could be a potentially significant impact.

Table 13-1 compares the potential land use actions of each of the alternatives. All of the alternatives would affect the WAPA easement on Mississippi Bar, but it has been determined that the effect would be less than significant. Alternative 1 could potentially require the relocation of Green Valley Road and an existing PG&E easement with associated utility infrastructure. Alternatives 2, 3 and 4 would not impact Green Valley Road or the PG&E easement. The impacts of relocating the road and easement would be less than significant after creation of a detour prior to relocating the road.

Table 13-1. Comparative Analysis of Alternatives

Impact	Significance					Environmental Commitment/ Mitigation Measure
	No Action/ No Project Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
MIAD						
Conflict with land use plans, policies, or zoning	SU	LTSWM	NI	NI	NI	**BIO-1:** Tree Protection and Revegetation **BIO-2:** Habitat Loss Avoidance and Compensation
Impacts to existing easements or right-of-ways	NI	LTSWM	LTS	LTS	LTS	**LU-1:** Coordination with City of Folsom and PG&E
Mississippi Bar						
Conflict with land use plans, policies, or zoning	NI	NI	NI	NI	NI	None Required
Impacts to existing easements or right-of-ways	NI	LTS	LTS	LTS	LTS	None Required

Key:
LTS = Less Than Significant
SU = Significant and Unavoidable
B = Beneficial
LTSWM = Less than Significant with Mitigation
NI = No Impact
N/A = Not Applicable

13.4 Environmental Commitments/Mitigation Measures

LU-1*:* Reclamation will coordinate with the City of Folsom and PG&E to prepare a relocation plan in accordance with their guidelines and policies.

13.5 Potentially Significant and Unavoidable Impacts

There are no potentially significant and unavoidable impacts.

13.6 Cumulative Effects

Table 22-1 provides a list of past, present and probable future projects in the general vicinity of the MIAD Modification Project area of analysis that are included in the cumulative effects analysis. The projects identified in Table 22-1 would not affect land use or zoning in the area around MIAD, with the exception of the widening of Green Valley Road which would affect an existing easement held by the City of Folsom. Reclamation is aware of this future project and has been coordinating MIAD work with the City of Folsom. Work on the road widening project would not begin until after MIAD modifications have been completed to ensure the road widening does not encroach upon the MIAD foundation and overlay. The temporary relocation of Green Valley Road during the MIAD work would have no permanent land use effects as it would be restored to its previous condition after construction. There are no cumulative projects that would affect land use or zoning at Mississippi Bar. Therefore, the cumulative effect of the MIAD Modification Project actions and the cumulative projects presented in Table 22-1 would be less than significant.

13.7 References

Bureau of Reclamation, U.S. Army Corps of Engineers, Central Valley Flood Protection Board, and Sacramento Area Flood Control Agency. 2006. *Folsom Dam Safety and Flood Damage Reduction Project Draft Environmental Impact Statement, Environmental Impact Report, December 2006.* Vol. I&II. State Clearinghouse # 2006022091.

California Department of Parks and Recreation (DPR) and Bureau of Reclamation (Reclamation). 2007. *Folsom Lake State Recreation Area & Folsom Powerhouse State Historic Park General Plan/Resource Management Plan. Volume 1: Chapters I-III, Preliminary General Plan & Resource Management Plan, November 2007.*

California Department of Parks and Recreation (DPR). 1988. *Auburn State Recreation Area, Folsom Lake State Recreation Area General Plan Amendment, Nimbus Shoals and Mississippi Bar.* December 1988.

California Department of Parks and Recreation (DPR). 1979. *Folsom Lake State Recreation Area General Plan.*

County of Sacramento Municipal Services Agency, Planning and Community Development Department. 2008. *Sacramento County American River Parkway Plan 2008.*

El Dorado County Planning Department. 2004. A Plan for Managed Growth and Open Roads; A Plan for Quality Neighborhoods and Traffic Relief. *El Dorado County General Plan.* El Dorado County, California

Wallace, Roberts, and Todd, LLC; LSA Associates; Geotechnical Consultants, Inc; Psomas; Concept Marine Inc. 2003. *Draft Resource Inventory for Folsom Lake State Recreation Area*. Prepared for: CDPR and Reclamation.

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Chapter 14
Recreation

This section presents potential impacts to recreation resources from construction of the MIAD Modification Project alternatives.

14.1 Affected Environment/Environmental Setting

This section presents the area of analysis, the regulatory requirements, and the environmental setting for recreation.

14.1.1 Area of Analysis

The area of analysis assessed as part of the evaluation of recreational resources includes the recreation resources surrounding MIAD and those available at Mississippi Bar, both part of the FLSRA.

14.1.1.1 Mormon Island Auxiliary Dam

The area of analysis for MIAD includes all FLSRA recreation facilities in the general vicinity of MIAD and in the Mormon Island Wetland Preserve south of Green Valley Road.

14.1.1.2 Mississippi Bar

The Mississippi Bar mitigation site includes 80 acres of land on the western shore of Lake Natoma, near the intersection of Sunset Avenue and Main Avenue and south of the community of Orangevale. The recreation area of analysis includes all FLSRA recreation facilities within and near the 80 acres of property owned by Reclamation and DPR proposed for mitigation.

14.1.2 Regulatory Setting

14.1.2.1 Federal

Reclamation holds title to virtually all lands and all recreation areas immediately surrounding Folsom Reservoir. One exception is certain land underlying the Jedediah Smith Bike Trail (also known as the American River Bike Trail), which is owned by DPR. Reclamation has a long-term agreement with DPR to manage recreation on Reclamation's lands designated as part of the FLSRA. At Mississippi Bar, Reclamation owns the eastern portion of the site, while DPR owns the western portion.

14.1.2.2 State

The DPR, in partnership with Reclamation, completed the integrated FLSRA General Plan and Resource Management Plan (RMP) and DEIR/DEIS (2007), which is the first comprehensive update to the FLSRA RMP since 1979. The plan guides the protection of natural and cultural resources, provides for and manages recreational opportunities, and outlines the future development of public facilities at FLSRA.

Recreation-related goals for the Mormon Island Cove area include relocating the existing trailhead and developing a Class I bike path from the trail head from MIAD to Dike 7, using the existing Folsom-Brown's Ravine trail.

A Class I bike path is proposed around the perimeter of Mormon Island Wetlands Natural Preserve, including interpretive displays and a connection to the proposed Class I bike path on Folsom-Brown's Ravine Trail.

Recreation-related goals for Mississippi Bar include eliminating off-trail access to shorelines to protect natural resources and visitor safety and providing new trails, some with interpretive educate users on restoration and habitat protection, geology and landscape features, and cultural history. Additional recreation features and facilities proposed in the plan include a new picnic area, expanded paddling channels, and improvements to existing trails.

14.1.3 Existing Conditions

This section discusses existing conditions for recreation resources in the Folsom Reservoir area, with emphasis on recreation near MIAD and Mississippi Bar.

14.1.3.1 Folsom Lake State Recreation Area

Folsom Reservoir, the primary feature in the FLSRA, supports numerous water-based activities, such as boating, waterskiing, and fishing. The reservoir's upper arms are designated slow zones for quiet cruising, fishing, and nature appreciation. The shoreline provides sandy swimming beaches, both formal (with lifeguard services) and informal. Summer water temperatures average 72º Fahrenheit, enhancing both water-oriented and shoreline activities. Land-based activities such as hiking, biking, picnicking, camping, and horseback riding also attract visitors. The reservoir serves flood control, water supply, and power generation purposes, and as a result reservoir levels typically fluctuate from a maximum of 466 feet in late winter or early spring to 405 feet during late fall.

With more than 1.5 million visitors in 2000, the FLSRA is one of the most popular sites within California for recreation in the DPR system. Recreation activities in the FLSRA have changed significantly since the first facilities were opened to the public in 1958, and even since the first General Plan for the FLSRA was adopted in 1979. The popularity of personal watercraft (jet skis), wake boarding, sailing, and bass fishing tournaments has transformed the boating environment on Folsom Reservoir. Land-based recreational activities have also changed over the years. When the FLSRA first opened, the trails were used primarily by equestrians and hikers. The popularity of running in the 1970s and mountain biking in the 1980s have greatly increased trail use. With urban development surrounding the southern half of the FLSRA, paved trails now play an important part in the region's growing transportation network as more people commute via bicycle. These changes affect the character and level of use in the FLSRA, how existing facilities are used, and what future facilities may be needed.

Throughout the year, permitted special events are held at various locations in the FLSRA. Events include bass fishing tournaments, yacht races, mountain bike races, triathlons, mountain bike triathlons, adventure races, running races, and summer camps. Past race events have included, but are not limited to: Future Pro Tour Amateur Bash Fishing Tournament at Granite Bay, Big Blue Adventure's Folsom Lake Sports Adventure Race at Granite Beach, Nissan Xterra USA Championship Real Mountain Bike Triathlon at Granite Bay and surrounding trails, Folsom Lake Yacht Club Series at Browns Ravine, American Bass Tournament at Browns Ravine, California State University Sacramento operates an aquatic center at Lake Natoma. During the summer CSUS utilizes Folsom Point at Folsom Reservoir for their youth wake board and water ski camp.

Mormon Island Wetland Preserve The Mormon Island Wetland Preserve is a wetland habitat area adjacent to MIAD and south of Green Valley Road. It is classified as a Natural Preserve in the RMP because of its sensitive resources including wetland habitat and several vernal pools (DPR and Reclamation 2007). Recreation opportunities are minimal at the wetlands. There is a small gated parking area just off of Green Valley Road and the only built facility in the area is a short boardwalk. There are some informal trails into the wetland area. Neighborhoods south of the preserve have also created informal access trails into the wetlands. According to the RMP, DPR plans to maintain and enhance its role as an important wetland preserve and expand interpretive and educational sites. Additionally, a Class I bike path around the perimeter of the preserve is planned. The City of Folsom has plans to extend the Humbug-Willow Creek Trail to connect to the proposed perimeter trail.

Mormon Island Cove Mormon Island Cove is a 276-acre area of interior live oak and blue oak woodlands that extends south from Brown's Ravine to MIAD. Recreation sites at Mormon Island Cove include a segment of the Folsom-Brown's Ravine Trail and a trailhead. The Mormon Island Cove Trailhead is at the east end of MIAD and has parking for approximately 30-40 vehicles. This facility was constructed by El Dorado County as mitigation for the Green Valley Road widening project. As part of the General Plan, DPR proposes to relocate the trailhead closer to Green Valley Road and the intersection with Sophia Parkway.

Folsom Point/Browns Ravine Trail This unpaved multi-use trail extends four miles between Folsom Point and Browns Ravine and runs atop MIAD. The trail begins in the day use area at Folsom Point and ends at the Browns Ravine/Old Salmon Falls trailhead at Browns Ravine.

Mississippi Bar Recreation facilities at Mississippi Bar are limited and include Shadow Glen Stables, an equestrian concessionaire; the Sunset/Main Avenue trailheads; the Lake Natoma bike path and equestrian/pedestrian trail; and the Middle Ridge and Snowberry equestrian/pedestrian trails. There are numerous unauthorized trails on Mississippi Bar that have been created by the users trying to access the shoreline. DPR has plans to improve existing trails at Mississippi Bar and eliminate off-trail access to shorelines. Improvements proposed include day use facilities with picnic areas, new trails and interpretive sites.

14.2 Environmental Consequences/Environmental Impacts

This section describes assessment methods, significant criteria, and environmental impacts of the No Action/No Project Alternative and the four action alternatives.

14.2.1 Assessment Methods

This analysis assesses impacts to recreation by evaluating closures or access restrictions to recreation sites at or near MIAD from construction and the resulting losses in visitation. The facilities included in this analysis are Folsom-Brown's Ravine Trail atop MIAD, Mormon Island Wetland Preserve, Mormon Island Cove, and Mississippi Bar. No construction is proposed on the water-side of MIAD; therefore, there would be no impacts to boating or aquatic activities at Folsom Reservoir.

This analysis also assesses impacts to recreation at Mississippi Bar by evaluating closures or access restrictions to recreation sites at or near the 80 acres at Mississippi Bar proposed for mitigation. Facilities included in this analysis are Lake Natoma on the shore of Mississippi Bar, the Lake Natoma bike path, and existing pedestrian/equestrian trails.

The Folsom DS/FDR EIS/EIR analyzed impacts to recreation on and near MIAD. The analysis indicated that construction activities would restrict public access from Folsom Point to the Folsom-Brown's Ravine trail on MIAD the entire time that the Folsom Point staging area is in use. Signs would be posted that redirect visitors to other trail access points. The analysis in the Folsom DS/FDR EIS/EIR concluded that restricted access to Folsom Point-Browns Ravine trail from Folsom Point would be a temporary significant and unavoidable impact. This impact would not change under the MIAD Modification Project alternatives.

The Folsom DS/FDR EIS/EIR also specified that the portion of the Folsom-Brown's trail atop over MIAD and the parking lot at MIAD to access the trail would be closed to the public during construction. This was also a temporary significant and unavoidable impact. The trail and parking lot closures would apply under the MIAD Modification Project alternatives; however, the timing of closure may change.

Other recreation sites at the FLSRA, including Folsom Point, would not be affected by the proposed construction at MIAD. Recreation impacts to other FLSRA facilities and special events at FLSRA would be the same as described in the Folsom DS/FDR EIS/EIR.

Based on average 2002 to 2005 visitation, about 78 percent of total recreation at the FLSRA occurs during the peak season of May through September and 22 percent of recreation occurs during the off-peak season of October through April (DPR 2007). Therefore, any effects to recreation sites during the peak season months would affect substantially more visitors than effects during off-peak season months. Construction of the MIAD Modification Project alternatives is expected to occur over 38 months, which would affect up to three peak recreation seasons.

14.2.2 Significance Criteria

Impacts from the action alternatives would be considered significant if:

- Recreational use on trails would be substantially reduced over the long-term[1] as a result of construction.
- Construction activities would substantially reduce access to or close recreation areas.
- Displaced recreation from sites affected by construction would substantially contribute to overcrowding or exceed the facility capacity at other recreation sites (including sites within the FLSRA).

14.2.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative would result in no improvements to MIAD and no new habitat at Mississippi Bar. The conditions at Folsom Reservoir and Mississippi Bar would remain similar to existing conditions.

[1] For this analysis, long-term is defined as greater than 1 year.

Construction would result in temporary closure or restricted access to Folsom-Brown's Ravine Trail atop MIAD, resulting in a loss of recreation opportunities.

Under the No Action/No Project Alternative, the Folsom-Brown's Ravine Trail atop MIAD would be open for public use; however, access to the trail from Folsom Point would be closed. The public could access the trail at Mormon Island Cove or Brown's Ravine. The parking lot south of MIAD and the gravel lot at Sophia Parkway would be open to the public under the No Action/No Project Alternative. Public use of the trail is expected to remain the same as existing conditions because of the available access points and parking.

There would be no impacts to recreation at Folsom-Brown's Ravine Trail under the No Action/No Project Alternative.

Construction would result in closure or restricted access to Mormon Island Wetland Preserve, resulting in a loss of recreation opportunities.

Recreation at Mormon Island Preserve would remain the same as existing conditions under the No Action/No Project Alternative. The public would have continued use of informal trails at the preserve without any closures or access restrictions.

There would be no impacts to recreation at Mormon Island Preserve under the No Action/No Project Alternative.

Construction would not result in temporary closure or restricted access to Mormon Island Cove, resulting in a loss of recreation opportunities.

Recreation at Mormon Island Cove would remain the same as existing conditions under the No Action/No Project Alternative. The public would continue use of trails at the Cove, including a portion of Folsom-Brown's Ravine Trail, without any closures or access restrictions.

There would be no impacts to recreation at Mormon Island Cove under the No Action/No Project Alternative.

Construction could displace visitors and substantially contribute to overcrowded conditions at other local and regional recreation sites.

Folsom-Brown's Ravine Trail atop MIAD, Mormon Island Preserve and Mormon Island Cove would remain open to visitors under the No Action/No Project Alternative; therefore, visitors would not need to go to other sites for recreation activities. As a result, there would no overcrowding of local and regional recreational facilities relative to the existing conditions.

There would be no impacts from visitor displacement or overcrowding at other recreation sites under the No Action/No Project Alternative.

Construction would affect recreation at Mississippi Bar.

Under the No Action Alternative, no mitigation would occur at Mississippi Bar. As a result, there would be no impacts to recreation at Mississippi Bar.

There would be no impacts to recreation at Mississippi Bar under the No Action/No Project Alternative.

14.2.4 Environmental Consequences/Environmental Impacts of Alternative 1

Construction would result in temporary closure or restricted access to Folsom-Brown's Ravine Trail atop MIAD, resulting in a loss of recreation opportunities.

The Folsom-Brown's Ravine Trail atop MIAD and parking lots at MIAD would be closed to the public during the 38 month construction period because of construction on the dam and potential public safety hazards at the construction site. A detour is not possible at this location due to the presence of Green Valley Road and Folsom Reservoir. The public would be able to access the remaining portion of the trail from Brown's Ravine. It is expected that visitation to the Folsom-Brown's Ravine Trail would substantially decrease under Alternative 1; however, impacts would be temporary.

Loss of recreational use on this trail would be a potentially significant impact. Reclamation will implement Mitigation Measure RC-1 and RC-3, which would reduce this impact to a less than significant level.

Construction would result in closure or restricted access to Mormon Island Wetland Preserve, resulting in a loss of recreation opportunities.

Excavation activities under Alternative 1 would require the temporary relocation of Green Valley Road up to 250 feet south of the existing route. This would place the road within the preserve. Most recreation opportunities would be temporarily lost at the preserve. Some informal trails at the southern end of the preserve near the neighborhoods may continue to exist; however, it is likely that the overall quality of recreation would substantially decrease during construction because of the road relocation. Visitation to the preserve would likely decrease as a result of these impacts. After construction is complete, the road would be restored to its previous location. All trails at the preserve would be restored.

The Mormon Island Preserve would have a substantial loss in visitation under Alternative 1. This would be a significant and unavoidable impact for the duration of construction.

Construction would result in temporary closure or restricted access to Mormon Island Cove, resulting in a loss of recreation opportunities.

Under Alternative 1, recreation opportunities at Mormon Island Cove could continue similar to existing conditions, but access to Mormon Island Cove would be restricted. The public access point at the east end MIAD, including the trailhead to the Folsom-Brown's Ravine Trail, would be closed due to construction activities. Visitors would not be able park at the MIAD parking lot or the gravel lot near Sophia Parkway and would need park at Brown's Ravine or find alternate parking areas. Because recreation opportunities would continue at Mormon Island Cove and the availability of alternate access points and parking, it is not expected that visitation would be substantially reduced.

This impact would be less than significant.

Construction of the detention ponds for the dewatering system would result in closure or restricted access to trails west of Mormon Island Wetland Preserve, resulting in a loss of recreation opportunities.

Construction of the detention ponds for the dewatering system would require closure of the trails west of the Mormon Island Wetland Preserve. These unimproved trails provide a connection between the FLSRA and Mormon Island Wetland Preserve and the Humbug-Willow Creek Trail and are frequently used by local residents in neighborhoods just south of MIAD. The City of Folsom plans to upgrade the trails to create a Class 1 Bike Path through this area in the future and hopes to connect it with a new Bike Path proposed by DPR in the FLSRA. After construction, the detention ponds may be modified to provide seasonal wetland and riparian habitat to address project mitigation; therefore the existing unimproved trails may be permanently removed.

This impact would be potentially significant. Mitigation measure RC-3 would reduce this impact to a less-than-significant level.

Construction could displace visitors and substantially contribute to overcrowded conditions at other local and regional recreation sites.

Because of potential interruptions to recreation at Folsom-Brown's Ravine Trail and Mormon Island Wetland Preserve, visitors would need to find alternate recreation opportunities. During the off-peak season, other facilities at FLSRA would be able to accommodate displaced users. The FLSRA is typically over crowded during the peak season and may not accommodate all displaced visitors. Sacramento, El Dorado, and Placer Counties offer multiple recreation opportunities, including many trails, parks, nature preserves, and swimming areas. Displaced visitors would be able to find a comparable substitute for recreation. Not all displaced visitor would go to the same recreation areas and some visitors may opt for non-outdoor recreational substitutes.

Displaced visitors from Folsom-Brown's Ravine Trail and Mormon Island Wetland Preserve would not contribute to overcrowding at other local or regional sites. This impact would be less than significant.

Construction could require recreation closures at Mississippi Bar.

Construction activities for the mitigation site including grading, dredging, and culvert placement could require the closure of some areas within Mississippi Bar to ensure public safety. These areas would mainly be on DPR property. Any closures would be temporary and would only last the duration of construction.

This would be a potentially significant impact. Mitigation measure RC-2 would reduce this impact to a less than significant level.

Construction of the new culvert at Mississippi Bar would require temporary closure of the existing bike trail.

Installation of the new culvert would require the closure of the bike trail for up to two weeks as a portion of it would need to be temporarily removed. Once the culvert is in place, the bike trail would be restored over the culvert.

This impact would be potentially significant. Mitigation measure RC-3 would reduce this impact to a less-than-significant level.

Habitat mitigation at Mississippi Bar would require the removal and/or relocation of informal trails.

Construction of the mitigation site at Mississippi Bar would require the removal and/or relocation of several informal trails. Reclamation would require DPR approval to close any of these trails.

This impact would be potentially significant. Mitigation measure RC-3 would reduce this impact to a less-than-significant level.

The installation of fencing at Mississippi Bar could restrict recreation activities and access to existing trails.

The development of new habitat at Mississippi Bar would require fencing for up to five years to protect the new plants from deer and other herbivores. The location for the fencing would be coordinated with DPR to ensure it does not restrict recreation activities or access to formal recreation trails.

This impact would be less than significant.

Habitat mitigation activities at Mississippi Bar would provide new recreation opportunities.

The development of habitat at Mississippi Bar would include installation of an oversized culvert for better water flow to encourage seasonal wetland development along the Lake Natoma shoreline. This culvert would provide additional paddling access to the ponds and lagoons along the Lake Natoma shoreline and, in conjunction with an existing culvert located further south, would create a complete paddling loop. Additionally, restoration of the previously mined flat area at Mississippi Bar with riparian habitat would restore a previously barren area that could eventually offer hiking trails and could provide new habitat for wildlife viewing.

The mitigation at Mississippi Bar would provide new recreation opportunities and would be considered a beneficial recreation impact.

14.2.5 Environmental Consequences/Environmental Impacts of Alternative 2

The recreation impacts associated with Alternative 2 would be the same as described for Alternative 1 with the following exception; Alternative 2 would not require relocation of Green Valley Road and would therefore have no impact on recreation at the Mormon Island Wetland Preserve.

14.2.6 Environmental Consequences/Environmental Impacts of Alternative 3

Impacts of Alternative 3 would be the same as those described for Alternative 2.

14.2.7 Environmental Consequences/Environmental Impacts of Alternative 4

Impacts of Alternative 4 would be the same as those described for Alternative 2.

14.3 Comparative Analysis of Alternatives

Alternative 1 is the only alternative that would result in significant and unavoidable recreation impacts during construction as it would require the temporary relocation of Green Valley Road south into the Mormon Island Wetland Preserve. This would alter the wetlands in the area and would likely remove the existing trails and boardwalk, resulting in a decrease in visitors to the area during construction. However, the area would be restored after construction is complete. The remaining recreation impacts would be the same under all of the alternatives. The recreation impacts associated with Mississippi Bar would be the same under each of the alternatives and would be less than significant with mitigation.

Table 14-1. Comparative Analysis of Alternatives

Environmental Consequence/ Environmental Impact	Significance					Environmental Commitment/ Mitigation Measure
	No Action/ No Project Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Temporary closure or restricted access to Folsom-Brown's Ravine Trail atop MIAD	NI	LTSWM	LTSWM	LTSWM	LTSWM	**RC-1***:* Restoration of any damaged trails after construction **RC-3***:* Establish detours with appropriate signage
Temporary closure or restricted access to Mormon Island Wetland Preserve from Green Valley Road temporary relocation	NI	SU during construction, LTSWM after construction	NI	NI	NI	**RC-1***:* Restoration of any damaged trails after construction
Temporary closure or restricted access to Mormon Island Cove	NI	LTS	LTS	LTS	LTS	None required
Detention ponds would result in closure or restricted access to trails west of Mormon Island Wetland Preserve	NI	LTSWM	LTSWM	LTSWM	LTSWM	**RC-3***:* Establish detours with appropriate signage
Displace visitors and substantially contribute to overcrowded conditions at other local and regional recreation sites	NI	LTS	LTS	LTS	LTS	None required
Temporary area closures at Mississippi Bar during construction	NI	LTSWM	LTSWM	LTSWM	LTSWM	**RC-2***:* Signage and public announcements of all closures during construction
Temporary closure of existing bike trail at Mississippi Bar	NI	LTSWM	LTSWM	LTSWM	LTSWM	**RC-3***:* Establish detours with appropriate signage
Installation of fencing may restrict recreation at Mississippi Bar	NI	LTS	LTS	LTS	LTS	None required
Removal and/or relocation of informal trails at Mississippi Bar	NI	LTSWM	LTSWM	LTSWM	LTSWM	**RC-3***:* Establish detours with appropriate signage
Creation of new recreation opportunities at Mississippi Bar	NI	B	B	B	B	None required

Key:
LTS = Less Than Significant
LTSWM = Less than Significant with Mitigation
SU = Significant and Unavoidable
NI = No Impact
B = Beneficial
N/A = Not Applicable

14.4 Environmental Commitments/Mitigation Measures

The following mitigation measures would be implemented to reduce impacts to less-than-significant levels.

RC-1*:* Any damage to existing improved trails from construction would be repaired in kind after construction is completed by the Reclamation, per agency policy and guidance.

RC-2*:* Reclamation would post signage and public announcements to inform the public of the dates/times of construction activities and closures. The signs would direct visitors to other areas of Mississippi Bar that remain open and will provide comparable recreation activities.

RC-3*:* Suitable detours would be established, with appropriate signage, for any bike, equestrian, or pedestrian trails that are interrupted by construction, per Reclamation guidance and policy. In the event that detours are not feasible (such as the Brown's Ravine Trail on the top of MIAD) other options would be developed in coordination with DPR, including developing new trails or improving existing unimproved trails elsewhere in the FLSRA. Public service announcements would be distributed and posted to inform the public of route changes. Development of detours or creation of new trails would be sited so as to minimize vegetation clearing and environmental disturbance. Because the locations for these trails have not yet been selected; additional environmental compliance will be completed for these actions, as necessary and required.

14.5 Potentially Significant and Unavoidable Impacts

Alternative 1 is the only alternative that would result in a significant and unavoidable recreation impact to Mormon Island Wetland Preserve because it would require the temporary relocation of Green Valley Road into the preserve area. This would likely divide the preserve, remove the existing unimproved trails and the boardwalk, and would introduce traffic along the relocated road. Visitation would likely be substantially reduced. However, this impact would only remain for the duration of construction. After construction is complete, mitigation would ensure the trail and trail access are restored.

14.6 Cumulative Effects

This section presents the cumulative effects analysis for recreation. A list of projects considered in the cumulative analysis is presented in Table 22-1. There are only two projects considered in the cumulative analysis that would have the potential to affect recreation at MIAD and/or Mississippi Bar.

Alternative 1 of the MIAD Modification Project would require temporary relocation of the road into the Mormon Island Wetland Preserve and would likely reduce access for the length of construction. After construction is complete, the area would be restored to its previous condition. The Green Valley Road Widening Project would involve widening Green Valley Road from two lanes to four lanes. Because the road could not be widened north as it would encroach upon the MIAD overlay, it is expected to be widened south, presumably into the Mormon Island Wetland Preserve. This would permanently reduce recreation. While these projects would have cumulative effects on recreation at the preserve, the MIAD Modification Project impacts would only be temporary. The City of Folsom would be responsible for mitigating their project's impacts. Because the MIAD Modification Project impacts to recreation would be temporary, no cumulative impacts are expected to recreation at the preserve.

Reclamation's Gravel Augmentation Program would be occurring during mitigation development at Mississippi Bar. The Gravel Augmentation Program involves harvesting, washing, and transporting gravel and may require fencing during construction. The fencing would occur in an area that is not highly visited by recreationists as it contains mine tailings. The MIAD Modification Project actions at Mississippi Bar would involve temporary restrictions to recreation during construction and plant establishment; however after the plants are established no recreation restrictions are expected. Additionally, several actions at Mississippi Bar would increase the potential for aquatic recreation. The MIAD Modification Project is not expected to result in cumulative recreation impacts at Mississippi Bar.

14.7 References

California Department of Parks and Recreation (DPR) and Bureau of Reclamation (Reclamation). 2007. *Folsom Lake State Recreation Area & Folsom Powerhouse State Historic Park General Plan/Resource Management Plan, Vol. I Chapters 1-III, and Vol. II Draft Environmental Impact Report/Environmental Impact Statement November 2007.*

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Chapter 15
Public Services and Utilities

This chapter describes the potential public services and utilities impacts of the MIAD Modification Project alternatives.

15.1 Affected Environment/Environmental Setting

This section describes the affected environment/environmental setting for public services and utilities, including the area of analysis, applicable regulatory requirements, and existing conditions.

15.1.1 Area of Analysis

The area of analysis for public services and utilities includes two distinct areas; MIAD and Mississippi Bar.

15.1.1.1 Mormon Island Auxiliary Dam

MIAD is a feature of Folsom Reservoir and is located in Sacramento and El Dorado Counties. The MIAD area of analysis includes the MIAD facility, staging and construction zones surrounding MIAD, and the Federally-owned lands south of Green Valley Road, including the Mormon Island Wetland Preserve.

15.1.1.2 Mississippi Bar

The Mississippi Bar mitigation site includes 80 acres of land on the western shore of Lake Natoma, near the intersection of Sunset Avenue and Main Avenue and south of the community of Orangevale. All proposed mitigation would occur on land parcels currently owned by DPR and Reclamation and managed by DPR as part of the FLSRA.

15.1.2 Regulatory Setting

Federal and State regulations pertaining to public services and utilities are described below.

15.1.2.1 Federal

Solid Waste The United States Environmental Protection Agency (USEPA) regulates the management of non-hazardous solid waste according to the Resource Conservation and Recovery Act (RCRA), Subtitle D. Under RCRA, the USEPA is also in charge of regulating the handling and disposal of hazardous wastes.

15.1.2.2 State

Solid Waste Under the jurisdiction of the California Environmental Protection Agency (California EPA), the California Integrated Waste Management Board manages solid waste. Title 14, Chapter 3, of the California Code of Regulations, addresses minimum standards for solid waste handling and disposal.

15.1.3 Existing Conditions

The subsections below describe existing public services and utilities at MIAD and Mississippi Bar.

15.1.3.1 Mormon Island Auxiliary Dam

Utilities There are no known utilities around MIAD or the MIAD Wetland Preserve south of Green Valley Road. The City of Folsom has an easement on Reclamation property for Green Valley Road. PG&E has a natural gas pipeline within the City of Folsom's easement.

Security The Sacramento County Sherriff's Department currently provides security at Folsom Reservoir through a contract with Reclamation. State Park Rangers provide public safety and security on lands managed by DPR.

Fire On Federal lands in the area of analysis, Reclamation provides fire protection. For all State lands (mainly Mississippi Bar), California Department of Fire and Forestry provides fire protection services.

Parks and Recreation DPR Gold Fields District currently manages the FLSRA, which includes the area surrounding MIAD and the Mormon Island Wetland Preserve. The DPR Gold Fields District Headquarters is located at Folsom Reservoir on Folsom-Auburn Road.

Solid Waste CMI currently provides solid waste services to the Reclamation Office at Folsom Reservoir.

15.1.3.2 Mississippi Bar

Utilities WAPA has a utility easement through the southern portion of Mississippi Bar for an overhead power line that originates at the Folsom Powerhouse and travels south along the Lower American River. No formal recreation facilities exist at Mississippi Bar; therefore there are no water or sewer lines that currently serve the site. One existing well is located on DPR lands at Mississippi Bar.

Security State Park Rangers provide public safety and security at the FLSRA.

Fire The California Department of Fire and Forestry provides fire protection services for all State-owned lands in the FLSRA, including Mississippi Bar.

Parks and Recreation The DPR Gold Fields District currently manages the FLSRA, which includes both MIAD and Mississippi Bar. The DPR Gold Fields District Headquarters is located at Folsom Reservoir on Folsom-Auburn Road.

Solid Waste The Mississippi Bar area currently does not have solid waste services as there are no formal recreation facilities.

15.2 Environmental Consequences/Environmental Impacts

This section presents the environmental consequences/environmental impacts of the MIAD Modification Project alternatives on public services and utilities.

15.2.1 Assessment Methods

This impacts analysis considers temporary and permanent impacts to existing utilities and public services from each of the alternatives. The 2006 Folsom DS/FDR EIS/EIR adequately assessed most utility and public service impacts that could result from the MIAD modifications. The public service and utility impacts presented in the following subsections summarizes the relevant information from the previous EIS/EIR and addresses new impacts that were not addressed in the previous EIS/EIR, such as those associated with the proposed Mississippi Bar habitat mitigation improvements.

15.2.2 Significance Criteria

Impacts to public services and utilities would be considered potentially significant if they would:

- Require the construction, expansion, or re-location of utility infrastructure or facilities, which could result in interruptions in service or adverse environmental effects;
- Exceed landfill capacity with waste generated by the project; or
- Create a demand for public services that substantially exceeds the capacity of public service agencies (by increasing response times or requiring large increases in staff).

15.2.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

Under the No Action/No Project Alternative, no construction would occur at MIAD and no mitigation would occur at Mississippi Bar. There would be no impacts to utilities or public services.

15.2.4 Environmental Consequences/Environmental Impacts of Alternative 1

Construction of Alternative 1 would affect existing electrical system utilities.
Alternative 1 would require electricity to power the MIAD dewatering system pumps and batch plant. This electricity would be obtained by tapping in to existing lines around MIAD that supply power to FLSRA and Reclamation facilities.

This impact would be less than significant.

Construction of Alternative 1 would affect existing natural gas system utilities.
Alternative 1 would require the largest open cut excavation and would require temporary relocation of Green Valley Road south into the existing wetlands. Relocation of this road could also require the relocation of PG&E's existing natural gas line within the City of Folsom's road easement.

This impact would be potentially significant, but would be reduced to less than significant with mitigation measure UT-1.

Construction of Alternative 1 would affect security services.
The construction contractor would be responsible for all construction site security during construction. No additional security would be required.

This would be less than significant.

Construction of Alternative 1 would affect fire services.
No new structures or facilities would be created that would require new fire services. Alternative 1 would not result in the need for additional fire services or fire crews.

There would be no impact to fire services.

Construction of Alternative 1 would affect public recreation services.
Construction at MIAD and Mississippi Bar would occur within the FLSRA. At MIAD, the area would be returned to its previous condition after construction and would not change existing DPR services. Mississippi Bar would involve creation of new habitat, but would not increase the demand for DPR services or create a demand for new DPR staff. Long-term operation and maintenance of the mitigation areas would become the responsibility of SAFCA after an establishment period of approximately five years. Under Alternative 1 there would be no impact to existing DPR services and no need for additional DPR staff.

There would be no impact to public recreation services.

<u>Construction of Alternative 1 would create a temporary solid waste stream.</u>
Construction of Alternative 1 would likely generate solid waste typical of a large construction site. A landfill would be selected by the construction contractor with adequate capacity to accept the waste. No permanent waste stream would result from implementation of this alternative.

This impact would be less than significant.

<u>Habitat mitigation at Mississippi Bar would not affect public services or utilities.</u>

Habitat mitigation actions proposed for Mississippi Bar would not affect any existing utilities nor would it require the use of any utilities. No public services would be affected.

There would be no impact.

15.2.5 Environmental Consequences/Environmental Impacts of Alternative 2

<u>Construction of Alternative 2 would affect existing electrical system utilities.</u>
Alternative 2 would require electricity to power the MIAD dewatering system pumps and batch plant. This electricity would be obtained by tapping in to existing utility lines around MIAD that supply power to FLSRA and Reclamation facilities.

This impact would be less than significant.

<u>Construction of Alternative 2 would not affect existing natural gas system utilities.</u>

Alternative 2 would not require the relocation of Green Valley Road; therefore it would not affect the natural gas line beneath Green Valley Road.

There would be no impact.

<u>Construction of Alternative 2 would affect security services.</u>
The construction contractor would be responsible for all construction site security during construction. No additional security would be required.

This would be less than significant.

<u>Construction of Alternative 2 would affect fire services.</u>
Alternative 2 would not result in the need for additional fire services or fire crews.

There would be no impact to fire services.

Construction of Alternative 2 would affect public recreation services.
Construction at MIAD and Mississippi Bar would occur within the FLSRA. At MIAD, the area would be returned to its previous condition after construction and would not be expected to change existing DPR services. While Mississippi Bar would involve creation of new habitat, it would also not be expected to increase the demand for DPR services or create a demand for new DPR staff. Long-term operation and maintenance of the mitigation areas would become the responsibility of the Sacramento Area Flood Control Agency after an establishment period of approximately 5 years. Under Alternative 2 there would be no impact to DPR services and there would be no change in current DPR staff levels.

There would be no impact to public recreation services.

Construction of Alternative 2 would create a temporary solid waste stream.
Construction of Alternative 2 would likely generate solid waste typical of a large construction site. A landfill would be selected by the construction contractor that has adequate capacity to accept the waste. No permanent waste stream would result from implementation of this alternative.

This impact would be less than significant.

Habitat mitigation at Mississippi Bar would not affect public services or utilities.

Habitat mitigation actions proposed for Mississippi Bar would not affect any existing utilities nor would it require the use of any utilities. No public services would be affected.

There would be no impact.

15.2.6 Environmental Consequences/Environmental Impacts of Alternative 3

The impacts of Alternative 3 would be the same as those described under Alternative 2. Mitigation measure UT-1 would reduce potentially significant impacts to a less-than-significant level.

15.2.7 Environmental Consequences/Environmental Impacts of Alternative 4

The impacts of Alternative 4 would be the same as those described under Alternative 2. Mitigation measure UT-1 would reduce potentially significant impacts to a less-than-significant level.

15.3 Comparative Analysis of Alternatives

A comparison of the alternatives and their impacts is provided in Table 15-1 below. Only Alternative 1 would result in potentially significant impacts to utilities that would require mitigation. Alternatives 1 through 4 would all require electricity to run the dewatering system and concrete batch plant, but would use existing power lines and would result in less than significant impacts to utilities. All alternatives may generate solid waste during construction, but waste would be disposed at appropriate landfills with adequate capacity. None of the alternatives would affect public services.

Table 15-1. Comparative Analysis of Alternatives

Impact	Significance					Environmental Commitment/ Mitigation Measure
	No Action/ No Project Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Need for electricity during construction	NI	LTS	LTS	LTS	LTS	None required
Relocation of PG&E gas lines	NI	LTSWM	NI	NI	NI	**UT-1:** Coordination with City of Folsom and PG&E prior to relocation of gas lines
Impacts to existing security services	NI	NI	NI	NI	NI	None required
Impacts to existing fire services	NI	NI	NI	NI	NI	None required
Impacts to existing recreation services	NI	NI	NI	NI	NI	None required
Temporary generation of solid waste during construction	NI	LTS	LTS	LTS	LTS	None required
Impacts to public services and utilities from Mississippi Bar habitat mitigation	NI	NI	NI	NI	NI	None required

Key:
NI = No Impact
LTSWM = Less than Significant with Mitigation
SU = Significant and Unavoidable

15.4 Environmental Commitments/Mitigation Measures

The following mitigation measure would reduce the potentially significant impact identified above to a less-than-significant level.

UT-1*:* If relocation is necessary, Reclamation will coordinate with PG&E and the City of Folsom to relocate the natural gas line and minimize or avoid interruptions in natural gas service. Customers will be notified if any long-term interruptions in service are expected.

15.5 Potentially Significant and Unavoidable Impacts

There would be no significant and unavoidable impacts.

15.6 Cumulative Effects

No cumulative projects in the area of analysis would have the potential to affect the PG&E gas line beneath Green Valley Road; therefore there would be no cumulative impacts to this utility. No other cumulative impacts are expected to public services and utilities.

Chapter 16
Public Health and Safety

This section describes potential public health and safety concerns associated with the MIAD Modification Project. These include risks from the presence of hazardous, toxic, and radiological wastes (HTRW) within the area of analysis, as well as other factors related to public health and safety including seismic and geology-related hazards, wildland fires, flooding, and construction-related safety issues.

16.1 Affected Environment/Environmental Setting

This section describes the affected environment/environmental setting for public health and safety, including the area of analysis, applicable regulatory requirements, and existing conditions.

16.1.1 Area of Analysis

This section describes the area of analysis for assessing impacts to public health and safety.

16.1.1.1 Mormon Island Auxiliary Dam

The area of analysis for MIAD includes Folsom Reservoir and all Federal land south of Green Valley Road.

16.1.1.2 Mississippi Bar

The Mississippi Bar mitigation site includes 80 acres of land on the western shore of Lake Natoma, near the intersection of Sunset Avenue and Main Avenue and south of the community of Orangevale. All proposed mitigation would occur on land parcels currently owned by DPR and Reclamation and managed by DPR as part of the FLSRA.

16.1.2 Regulatory Setting

Federal regulations regarding dam safety applicable to the MIAD Modification Project are described below. This section also describes Federal, State, and local regulations related to HTWR.

16.1.2.1 Federal

Public Safety The Federal Guidelines for Dam Safety require that dams be designed, inspected, and maintained to protect the structural integrity of the dam and associated structures and ensure protection of human life and property. The

Corps and Reclamation both have obligations and interests in the Folsom Facility. Reclamation is responsible for operation and maintenance of the Folsom Facility while the Corps is primarily concerned with flood protection and wetlands and waterways regulation and permitting.

The following documents contain the requirements for design floods for dams that are the responsibility of Federal agencies:

- Federal Guidelines for Dam Safety, FEMA Publication FEMA 93, June 1979, reprinted April 2004.
- Federal Guidelines for Dam Safety: Selecting and Accommodating Inflow Design Floods for Dams, FEMA Publication FEMA 94, October 1998, reprinted April 2004.

Hazardous, Toxic, and Radiological Wastes HTRW are regulated under various Federal laws, including:

- Resource Conservation and Recovery Act (RCRA, 42 United States Code 692);
- Hazardous Material Transportation Act (HMTA);
- Clean Water Act (CWA);
- Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (43 United States Code 9601);
- Superfund Amendment Reauthorization Act (SARA) Title 3;
- 40 CFR 260-279 Federal Regulations on hazardous waste management;
- 40 CFR, Section 301 et seq. Emergency Planning and Community Right to Know Act;
- Toxic Substances Control Act (15 United States Code 2601); and
- Asbestos Hazard Emergency Response Act (AHERA).

Under RCRA, the USEPA regulates the generation, transportation, and disposal of hazardous wastes. The USEPA requires permits for the treatment, storage, or disposal of hazardous wastes and tracks the wastes from generation through to disposal. The USEPA delegates some of this authority, such as permitting, to individual states.

The Department of Transportation through the HMTA regulates transportation of hazardous materials. Transporting hazardous materials requires special handling, packaging, placarding, and manifesting of cargoes. Various laws, including the SARA and HMTA, govern day-to-day management of hazardous materials. These laws define the requirements for storage of hazardous materials, safe handling practices, and employee training.

16.1.2.2 State

California state laws that regulate activities involving HTRW include:

- Hazardous Waste Control Law (California Health and Safety Code section 25100);
- Title 17, Public Health (California Code of Regulations [CCR]);
- Title 19, Public Safety (CCR);
- Title 22, Division 4.5 - Environmental Health Standards for the Management of Hazardous Waste (CCR);
- Title 26, Toxics (CCR);
- California Department of Motor Vehicles, Hazardous Waste and Materials Transportation Requirements (Vehicle Code Section 31303); and
- Unified Hazardous Waste and Hazardous Materials Management Regulatory Program.

The California Department of Toxic Substances Control (DTSC) administers the Federal RCRA for the state, and enforces the California Health and Safety Code. According to the California Government Code (Section 65962.5), DTSC and the State Water Resources Control Board are required to compile and update lists of hazardous materials sites, including land designated as hazardous waste sites, hazardous waste disposal sites, and sites where a release of HTRW has occurred. California Health and Safety Code, Division 20, Chapter 6.8 authorizes DTSC and the Regional Water Quality Control Boards to require, oversee, and recover costs for the remediation of sites where contamination of soil and water present a hazard to human health or the environment.

16.1.2.3 Local

Under the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program, designated local agencies called Certified Unified Program Agencies (CUPA) have jurisdiction to manage hazardous substances and oversee the remediation of certain hazardous materials releases, including from underground storage tanks. The Sacramento County Environmental Management Department, along with County and City Fire Agencies, are the CUPA agencies having local jurisdiction within the area of analysis.

16.1.3 Existing Conditions

16.1.3.1 Seismology/Earthquakes

The area of analysis is in the Foothills Fault system which consists of northwest trending vertical faults within the western Melones Fault zone and the western Bear Mountains Fault zone. There are no designated active faults in the area of analysis under the Alquist-Priolo Earthquake Fault Zoning Act (California Geological Survey 1999). While there are no active faults within the area of analysis, there is potential for ground-shaking and liquefaction associated with earthquakes (Reclamation 2009a). Additional details on geologic conditions in the area of analysis are provided in Chapter 8.

16.1.3.2 Landslides

In Sacramento County, only a narrow strip along the eastern boundary, from the Placer County line to the Cosumnes River, is considered to have landslide potential, whereas the American River Bluffs downstream from Folsom are considered stable and are generally not subject to fracture or landslides (County of Sacramento 1993). Since soils in the area of analysis are thin and slopes are not steep, landslides are not a major hazard (Reclamation 2006a). Additional details on the potential for landslides in the area of analysis are provided in Chapter 8.

16.1.3.3 Wildland Fires

The risk of wildfires in the area of analysis is higher during the dry season, and the hazard is of most concern where open space meets residential development. Grass fires are an annual threat in recreational areas such as the American River Parkway (County of Sacramento 1993). For the area of analysis, the wildfire hazard is considered moderate to high in the areas west and south of the reservoir, while the wildfire hazard is considered very high to the north and east of the reservoir, according to the California Fire Alliance Fire Planning and Mapping website (California Fire Alliance 2009).

16.1.3.4 Flooding

Folsom Reservoir serves as flood management for the entire Sacramento metropolitan area. In 2000, Reclamation identified deficiencies in the Folsom Facility, including insufficient flood capacity and the potential for seepage and static instability (Reclamation 2006a). If uncontrolled, seepage can progressively erode soil from the embankment or its foundation, resulting in rapid failure of the dam, with the potential for catastrophic impacts to public safety in the communities downstream. The purpose of the MIAD Modification Project is to reduce the seepage risk of failure to the dam and subsequent public exposure to this risk.

16.1.3.5 Construction Safety

The area surrounding the Folsom Facility is operated as a State Recreation Area used by visitors for hiking, biking, running, camping, picnicking, horseback riding, water-skiing, swimming, and boating. As such, threats to public safety exist from construction hazards within the construction, staging and borrow areas and on roadways near recreational areas. Potential impacts include injury or death from contact with heavy machinery and construction vehicles and falling and/or entrapment in excavation areas. There would also be the potential for impacts to the safety of construction workers themselves.

16.1.3.6 Hazardous, Toxic, and Radiological Wastes

Mormon Island Auxiliary Dam Land use at MIAD consists of Federally-owned land designated for recreation and flood control. Potential sources of hazardous materials at MIAD include historic gold-mining operations which used elemental mercury. In addition, soils in the vicinity may contain naturally-occurring arsenic and naturally-occurring asbestos. If mercury, arsenic, or asbestos are present in soil and/or sediment excavated during the project, there is potential for impact to human health from exposure to these hazardous materials. Further, if soil containing hazardous materials is released to Folsom Reservoir or the American River, there is potential for impacts to aquatic life.

In May 2005, an environmental site assessment was conducted for the Folsom Dam Modification Project (Corps 2005). The assessment included a records review and field surveys within a 1.5-mile radius of the Folsom Dam, including the area of analysis for the MIAD Modification Project. The report identified the potential presence of naturally-occurring asbestos rock in the gravel used for the MIAD foundation. No other sites of concern with respect to hazardous materials were identified within the MIAD area of analysis.

In 2006, sediment samples were collected within Folsom Reservoir at the site of the excavation for MIAD and along the shoreline (Reclamation 2006b). Samples were analyzed for total metals (including arsenic) and trace mercury concentrations, which were compared to sediment and soil standards for levels of concern to aquatic life. Results of total metals analyses indicated that total metals concentrations found in sediments were all lower than the sediment screening values. Water quality monitoring of surface water at MIAD in 2007 and 2008 detected dissolved arsenic at concentrations up to 29 micrograms per liter (ug/L), which is greater than drinking water standards for public health but less than levels of concern for chronic or acute effects on aquatic life. Additional surface water quality monitoring at Negro Bar, two miles downstream of the Folsom Reservoir on the American River, did not detect any metals, including dissolved arsenic and total mercury, at levels of concern (Reclamation 2009b).

For mercury, a screening level of 0.2 milligrams per kilogram (mg/kg) was obtained from the Central Valley Regional Water Quality Control Board and represents the fractional portion of the mercury that can easily be re-suspended and stay in suspension. The average mercury concentration in sediment collected at depth during the 2006 sampling effort was 0.16 mg/kg, while the average concentration in sediments along the shoreline was 0.12 mg/kg. These results indicate that sediments at the project site do not contain mercury at levels of concern for aquatic life.

In March 2008, an investigation of soils at the project site was conducted to determine if mercury is present at levels of concern for human health or aquatic life (Reclamation, 2008). Soil samples were collected from the haul road, constructed using materials excavated during construction of MIAD, and sampled for mercury. Results were compared to a threshold effect levels (TEC) of 0.18 mg/kg for aquatic life, and to the Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRG) “direct contact exposure pathways” concentration of 23 mg/kg for human health. Mercury concentration in soil samples collected for the study ranged from non-detect to 0.085 mg/kg, which are lower than the TEC for aquatic life and substantially lower than the PRG for human health.

Naturally-occurring asbestos is present in many areas near Folsom Reservoir and is of concern to public health if fibers or particulates are released into the air during construction. Air monitoring was conducted in July through October, 2008 at three locations along the western and southwestern sides of the Reservoir (Reclamation 2009c). Sampling was conducted prior to and during construction at Dike 5. One sample collected during construction exceeded the Asbestos Hazard Emergency Response Act (AHERA) standard for asbestos concentration. While there is no national ambient air quality standard for asbestos, the AHERA standard of 0.01 fibers/cubic centimeter is a screening level for removal of asbestos in schools. Reclamation’s report recommended further asbestos sampling. An evaluation of potential air quality impacts from the proposed project is provided in Chapter 6.

Mississippi Bar The Mississippi Bar site has been extensively mined for gold since the early 1900’s. Although mercury was used for gold processing in and around the Mississippi Bar area, it is not expected to occur in the mitigation project site or in the excavated sands that will be mixed with soil in the mitigation site.

Perchlorate contamination has been found at depths of 155 to 170 feet below ground surface in groundwater in the Roseville area, approximately 3 miles from Mississippi Bar. Use of groundwater for irrigation will not affect contamination occurring at this distance away from the Mississippi Bar mitigation site.

16.2 Environmental Consequences/Environmental Impacts

This section presents the evaluation of potential impacts related to public health and safety from the MIAD Modification Project alternatives.

16.2.1 Assessment Methods

Based on an evaluation of the existing conditions where new construction and ground-disturbing activities would occur for the project alternatives, the potential for impacts related to public health and safety during construction and operation of the MIAD Modification Project are discussed.

16.2.2 Significance Criteria

Significance criteria for this analysis were based on those found in Appendix G of the State CEQA Guidelines. Effects on public health and safety would be significant if an alternative would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; or through reasonable foreseeable upset and accident conditions resulting in the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous materials, substances, or waste within a one-quarter mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including areas where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

16.2.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

Under the No Action/No Project Alternative, no new construction would occur. There would be no change to the existing risk to public safety from landslides or wildland fires, and there would be no construction-related safety hazards under the No Action/No Project Alternative. There would be no potential impacts from HTRW, since no ground-disturbing activities would occur. The existing risks to public safety from current MIAD deficiencies, such as failure due to seismic activity or seepage would remain under this alternative. If MIAD were to fail, there would be potential for significant and unavoidable impacts to public safety, including loss of human life, under the No Action/No Project Alternative.

16.2.4 Environmental Consequences/Environmental Impacts of Alternative 1

Alternative 1 could result in adverse public health and safety effects associated with construction activities.

Potential health and safety impacts may occur to the public during construction of Alternative 1. The use of heavy equipment and construction vehicles as well as the use and storage of hazardous construction materials at MIAD and Mississippi Bar have the potential to harm the public. Construction would occur in highly used areas of the FLSRA; therefore the potential for conflicts between construction activities and recreation visitors is high.

This impact would be potentially significant; however, mitigation measure PHS-1 would reduce these impacts to a less-than-significant level.

Alternative 1 could result in adverse public health and safety effects associated with dam safety during MIAD construction.

Risks to public safety are high under Alternative 1, as it entails a very large open excavation with limited or no structural walls. With a large open excavation, the safety of construction workers would be a concern if ground-shaking and/or liquefaction occurred as a result of seismic activity. There would be potential risks associated with landslides on the sides of the excavation under this alternative. Moreover, impacts to public safety would occur if construction activities compromised the integrity of existing structures such that leakage and/or flooding occurred. There would be need for a comprehensive evaluation of the timing and duration of the excavation to ensure weather and reservoir conditions are optimal to reduce these construction risks. The work would be designed by California-licensed professional civil and structural engineers and the construction work performed by licensed professional contractors. Designs and plans would also require reviews and permits per Federal and State laws.

This impact would be potentially significant; however, mitigation measure PHS-2 would reduce these impacts to a less-than-significant level.

Construction activities under Alternative 1 could encounter hazardous materials.

Impacts at MIAD and Mississippi Bar would occur if hazardous materials, including mercury, arsenic, or asbestos particulates, are encountered in soil during excavation and released to the environment through dust or runoff to aquatic areas. Based on previous studies, as discussed in Section 16.1.3.6, the potential to encounter these hazardous materials at levels of concern to the public or to aquatic organisms is very low. However, mitigation measures would be required to ensure impacts remain less than significant throughout construction.

This impact would be potentially significant. Mitigation measures PHS-1 and PHS-3discussed below, mitigation measure WQ-1 in Chapter 4, and mitigation measure GR-1 in Chapter 8, Soils, Minerals, and Geological Resources would reduce this impact to less than significant.

Alternative 1 could increase the potential for accidental releases of construction-related hazardous materials.

Alternative 1 would involve the temporary use of HTRWs during MIAD and Mississippi Bar construction and would therefore have the potential for HTRW impacts from the accidental spill or release of construction-related hazardous materials (e.g., fuels, lubricants, solvents, etc.).

This impact would be potentially significant. Mitigation measure PHS-4 discussed below, would reduce this impact to less than significant.

Alternative 1 could increase the potential for wildland fires.

The use of hazardous materials, vehicles, and construction equipment in the MIAD and Mississippi Bar areas would increase the potential for impacts related to wildland fires.

This impact would be potentially significant. Mitigation measure PHS-5 described below would be implemented to reduce this impact to less than significant.

Alternative 1 would not handle or emit hazardous emissions or handle hazardous materials within one quarter mile of a school.

While construction activities would result in emissions from equipment and vehicles, would require the temporary use of hazardous materials, and could encounter naturally occurring asbestos, there are no schools within one-quarter mile of MIAD that would be affected. The nearest schools are Folsom Hills Elementary School, approximately 0.37 miles from MIAD, Lakeview Elementary School, which is approximately 0.79 miles from MIAD, and Victory Christian School in Fair Oaks, approximately 0.89 miles away from Mississippi Bar. Additionally, mitigation measures PHS-1, PHS-3, PHS-4, and PHS-5 described in Section 16.4 below would help to further avoid or reduce any potential impacts from HTRWs.

There are no schools within one-quarter mile of the project sites; therefore there would be no impact.

16.2.5 Environmental Consequences/Environmental Impacts of Alternative 2

Alternative 2 differs from Alternative 1 with the construction of one structural wall on the downstream side of the open excavation. As such, construction risks are considered to be less than Alternative 2, but still high. Potential impacts include safety risks to construction workers from groundshaking, liquefaction, and/or landslides during construction. Potential impacts to public safety under Alternative 2 include hazards from construction equipment near recreational areas. There would also be potential impacts from flooding if the integrity of existing structures is compromised. Other potential impacts include those from wildland fires and from the release of hazardous materials encountered in soil and/or accidentally released during construction.

Impacts under Alternative 4 would be the same as Alternative 1. Mitigation measures PHS-1 through PHS-5, discussed below, would be required to reduce these impacts to less than significant.

16.2.6 Environmental Consequences/Environmental Impacts of Alternative 3

Alternative 3, which entails construction of both an upstream and downstream wall system, creates less construction risk than Alternative 1 or Alternative 2. The duration and size of the open excavation associated with Alternative 3 would be shorter than Alternative 1 or 2; however, the overall duration of construction would be longer. Construction risk would still be relatively high under this alternative.

As with Alternative 1 and Alternative 2, potential impacts include dam safety risks to construction workers from groundshaking, liquefaction, and/or landslides during construction. Potential impacts to public safety under Alternative 2 include construction hazards and risks of flooding if the integrity of existing structures is compromised. There would also be potential impacts from wildland fires and from the release of hazardous materials encountered in soil and/or accidentally released during construction.

Impacts under Alternative 4 would be the same as Alternative 1. Mitigation measures PHS-1 through PHS-5, discussed below, would be required to reduce these impacts to less than significant.

16.2.7 Environmental Consequences/Environmental Impacts of Alternative 4

Alternative 4 entails cellular wall excavation and involves much less construction risk. Instead of a large open excavation, small cells would be formed, providing a much safer work environment for construction workers in case of seismic activity. In addition, construction risks to the dam would be much less under this alternative, such that the potential for the dam facilities to be compromised would be very low.

Potential impacts from wildland fires and from the release of hazardous materials encountered in soil and/or accidentally released during construction would still exist.

Impacts under Alternative 4 would be the same as Alternative 1. Mitigation measures PHS-1 through PHS-5, discussed below, would be required to reduce these impacts to less than significant.

16.3 Comparative Analysis of Alternatives

Dam safety and construction impacts are greatest under Alternative 1 as it would involve the largest open cut excavation and would leave the MIAD structure vulnerable. Alternatives 2 and 3 have relatively high dam safety and construction risks, however they would be less than Alternative 1 because they would involve the construction of walls that would provide some support and reduce the excavation size. Alternative 4 has the least dam safety and construction risk because it would have the smallest excavation open at any given time and may reduce or eliminate the need to excavate into the MIAD structure. Potential impacts to construction workers and public safety would be considerably reduced from Alternatives 1 through 3.

All four alternatives could encounter hazardous materials during construction, could result in the accidental spill or release of HTRWs during construction, and could increase the potential for wildfires. The magnitude of these impacts would be the same under each alternative.

Table 16-1. Comparative Analysis of Alternatives

Impact	Significance					Environmental Commitment/ Mitigation Measure
	No Action/ No Project Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
MIAD						
Construction hazards to public safety	NI	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-1**: Public Safety Management Plan
Hazards associated with dam safety	SU	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-2:** Evaluation of weather and reservoir conditions
Release of HTRW encountered in soil	NI	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-1**: Public Safety Management Plan **PHS-3:** Worker Health and Safety Plan and **GR-1:** Asbestos Dust Mitigation Plan **WQ-1**: NPDES Permit and SWPPP
Accidental release of construction-related HTRW	NI	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-4:** Spill Plan
Wildland Fires	NI	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-5:** Fire Management Plan
Emit hazardous emissions or handle hazardous materials within one-quarter mile of a school	NI	NI	NI	NI	NI	None required
Mississippi Bar						
Construction hazards to public safety	NI	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-1**: Public Safety Management Plan
Release of HTRW encountered in soil	NI	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-1**: Public Safety Management Plan **PHS-3:** Worker Health and Safety Plan and **GR-1:** Asbestos Dust Mitigation Plan **WQ-1**: NPDES Permit and SWPPP
Accidental release of construction-related HTRW	NI	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-4:** Spill Plan
Wildland Fires	NI	LTSWM	LTSWM	LTSWM	LTSWM	**PHS-5:** Fire Management Plan
Emit hazardous emissions or handle hazardous materials within one-quarter mile of a school	NI	NI	NI	NI	NI	None required

Key:
NI = No Impact
LTSWM = Less than Significant with Mitigation
SU = Significant and Unavoidable

16.4 Environmental Commitments/Mitigation Measures

Implementation of the following mitigation measures would reduce potentially significant impacts associated with public health and safety to a less than significant level.

PHS-1: A Public Safety Management Plan will be prepared and implemented to maintain public safety during all phases of construction. The plan will address:

- Public notification of the location and duration of construction activities, pedestrian/bicycle path/trail closures, and restrictions on parking lot use;
- Verification with local jurisdictions that construction blockage of existing roadways will not interfere with existing emergency evacuation plans;
- Adequate signage regarding the location of construction sites and warning of the presence of construction equipment;
- Fencing of construction staging areas and of construction areas if dangerous conditions exist when construction is not occurring;
- Temporary walkways and bike paths where an existing sidewalk or pedestrian/bicycle path/trail will be closed during construction. Appropriate markings, barriers, and signage would be used to create a safe separation between recreational visitors and vehicular traffic; and
- Emergency response procedures in the event of dam failure during construction.

PHS-2: An evaluation of weather and reservoir conditions will be conducted to determine the optimal timing and duration for construction to minimize risks to integrity of the dam facilities. Based on the evaluation, all work will be performed during the time period for optimal weather and reservoir conditions. Work will be designed by California-licensed professional civil and structural engineers and the construction work performed by licensed professional contractors. Designs and plans will also be reviewed, approved, and permitted in accordance with local, State and Federal laws.

PHS-3: A Worker Health and Safety Plan will be prepared by the construction contractor and implemented prior to the start of construction activities. All workers will be required to review and sign the plan prior to starting work. The Health and Safety Plan should, at a minimum, identify the following:

- All contaminants that could be encountered during excavation activities (e.g., mercury and naturally-occurring asbestos and arsenic);
- All appropriate worker, public health, and environmental protection equipment and procedures;
- Emergency response procedures;
- Most direct route to a hospital; and

- Site Safety Officer.

PHS-4: Prior to initiation of construction activities, the Contractor will be required to prepare a Spill Plan to reduce the potential impacts from accidental release of construction-related hazardous materials. The Spill Plan would:

- Describe spill prevention and control measures and designate a supervisor to oversee and enforce their implementation;
- Provide for spill response and prevention education for employees and subcontractors;
- Require stocking appropriate clean-up materials onsite near material storage, unloading and use areas;
- Designate hazardous waste storage areas away from storm drains or watercourses;
- Minimize production or generation of hazardous materials onsite or substituting chemicals used onsite with less hazardous chemicals;
- Designate areas for construction vehicle and equipment maintenance and fueling with appropriate control measures; and
- Arrange for regular hazardous waste removal to minimize onsite storage.

PHS-5: A Fire Management Plan will be prepared to outline the measures to be taken to reduce the risk of wildland fires caused by construction activities. The plan will require that, prior to construction, all staging areas, welding areas, or areas slated for development using spark-producing equipment will be cleared of dried vegetation or other material that could ignite. Any construction equipment that includes a spark arrestor shall be equipped with a spark arrestor in good working order. During construction, all vehicles and crews working at the project site(s) will have access to functional fire extinguishers at all times. In areas where risk of wildland fires is high, construction crews will be required to have a spotter during welding activities to look out for potentially dangerous situations, including accidental sparks.

16.5 Potentially Significant and Unavoidable Impacts

There would be no significant and unavoidable impacts. All potentially significant impacts would be reduced to a less-than-significant level with the mitigation measures described in Section 16.4.

16.6 Cumulative Effects

As described in Chapter 22, past, present, and reasonably foreseeable projects include those that would have beneficial effects on public health and safety by reducing current dam deficiencies that pose seismic and static concerns.

However, there is potential for adverse cumulative impacts related to public safety, as several projects would occur near recreational areas. In addition, there is potential for cumulative impacts associated with hazardous materials, as many of the projects listed in Chapter 22 involve ground-disturbing construction that may encounter naturally occurring asbestos, mercury, and arsenic. Finally, the potential also exists for cumulative impacts associated with wildland fires started by construction activities.

Concurrent projects would be required to comply with Federal, State, and local laws and regulations related to hazardous materials. The MIAD Modification Project would implement mitigation measures outlined in Section 16.4 to ensure that potential cumulative impacts related to public health and safety would be less than significant. All other cumulative projects would be responsible for implementing their own public health and safety measures. With the mitigation measures described in Section 16.4, the project would not contribute to any significant cumulative impacts.

16.7 References

Bureau of Reclamation. 2006a. *Folsom Dam Safety and Flood Damage Reduction Draft Environmental Impact Statement (EIS)/Environmental Impact Report (EIR). Sacramento, El Dorado, and Placer Counties, California.* U.S. Department of the Interior, Bureau of Reclamation.

Bureau of Reclamation, Mid-Pacific Region, Environmental Monitoring Branch, MP-157. 2006b. *Joint Federal Project Auxiliary Spillway Folsom Reservoir, Sediment Characterization, Trace Mercury and Total Metals.* U.S. Department of the Interior, Bureau of Reclamation.

Bureau of Reclamation Mid-Pacific Region, Environmental Monitoring Branch, MP-157. 2008. *Joint Federal Project Haul Road Folsom Reservoir, Assessment of Total Mercury In Haul Road Soil.* U.S. Department of the Interior, Bureau of Reclamation.

Bureau of Reclamation Mid-Pacific Region, Central California Area Office. 2009a. *Draft Geologic Background and Sampling Plan for Mormon Island Auxiliary Dam Dewatering Pump Test Project.* U.S. Department of the Interior, Bureau of Reclamation.

Bureau of Reclamation Mid-Pacific Region, Environmental Monitoring Branch, MP-157. 2009b. *Folsom Safety of Dams Water Quality Monitoring at Negro Bar Interim Report- April to September 2008.* U.S. Department of the Interior, Bureau of Reclamation.

Bureau of Reclamation Mid-Pacific Region, Environmental Monitoring Branch, MP-157. 2009c. *Folsom Safety of Dams Air Quality Monitoring Sampling: July 2008 – October 2008.* U.S. Department of the Interior, Bureau of Reclamation.

California Fire Alliance. 2009. Fire Planning and Mapping Tools. Accessed on 04 30 2009. Available at: http://wildfire.cr.usgs.gov/fireplanning/.

California Geological Survey. 1999. *Alquist-Priolo Earthquake Fault Zones*. Accessed on: 04 30 2009. Available at: http://www.consrv.ca.gov/cgs/rghm/ap/Pages/affected.aspx.

County of Sacramento. 1993. Safety Element of the County of Sacramento General Plan. County of Sacramento Planning and Community Development Department, General and Advance Planning Section.

U.S. Army Corps of Engineers (USACE). 2005. *Environmental Site Assessment Folsom Dam Modification, Sacramento County, California*.