17.0 Noise and Vibration

The following sections provide information regarding the affected noise environment and include discussions regarding acoustics and noise measurements and relevant laws, ordinances, regulations, and standards related to environmental noise exposure in the vicinity of the Project. This chapter also describes environmental consequences and mitigation measures, as they pertain to implementation of the Project alternatives in the Project area.

17.1 Environmental Setting

As shown in Figure 17-1, the Project is located along the San Joaquin River, extending from below Mendota Dam to the Chowchilla Bifurcation Structure, and borders unincorporated portions of the Madera and Fresno counties.

17.1.1 Fundamentals of Acoustics

Noise is defined as unwanted sound. Sound levels are measured on a logarithmic scale in decibels (dB). The most common descriptor of sound and noise associated with community noise exposure is the A-weighted sound pressure level (dBA). It is defined as the sound pressure level in decibels as measured on a sound meter using the A-weighting filter network. The A-weighted frequency filter de-emphasizes the very low and very high frequency components of sound in a manner that simulates the frequency response of human hearing, and correlates well with people's group reactions to sound and environmental noise. All sound levels in this report are A-weighted. A-weighted sound pressure levels of typical sources of noise are shown in Table 17-1.

The ambient sound level is the existing sound level resulting from natural and mechanical sources and human activity considered normally present in a particular area. The ambient noise level is composed of the cumulative sum of all noise sources, both near and far. The background noise level generally describes the mixture of indistinguishable sounds from many sources without any one dominating sound. It is the noise level that exists in the absence of identifiable, sporadic, individual noise events such as those caused by individual automobile pass-bys, aircraft overflights, intermittent dog barking, etc.

Humans are better able to perceive relative change in noise levels than absolute noise levels. Potential responses of persons to changes in the noise environment are usually assessed by evaluating differences between the existing and total predicted future noise environments.

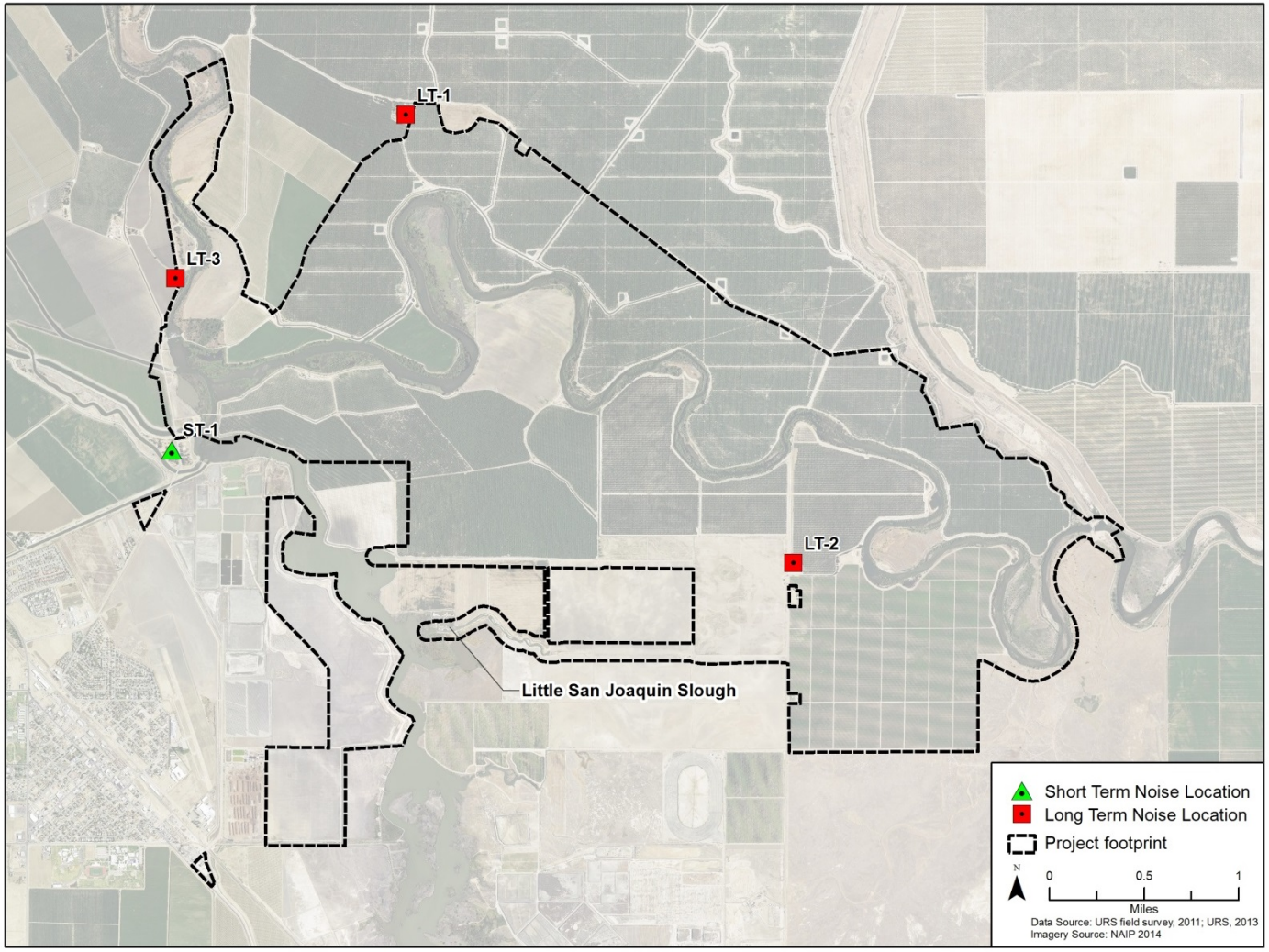


Figure 17-1.
Project Area and Ambient Noise Measurement Locations

Table 17-1.
Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at a given distance)	Scale of dBA Sound Levels	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 dBs*)
Commercial Jet Take-off (200 ft.)	120		Threshold of pain *32 times as loud
Pile Driver (50 ft.)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft.) Newspaper Press (5 ft.) Power Lawn Mower (3 ft.)	100		Very loud *8 times as loud
Motorcycle (25 ft.) Propeller Plane Flyover (1000 ft.) Diesel Truck, 40 mph (50 ft.)	90	Boiler Room Printing Press Plant	*4 times as loud
Garbage Disposal (3 ft.)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 ft.) Vacuum Cleaner (10 ft.)	70		Moderately loud *70 decibels (Reference loudness)
Normal Conversation (5 ft.) Air Conditioning Unit (100 ft.)	60	Data Processing Center Department Store	*1/2 as loud
Light Traffic (100 ft.)	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	Quiet *1/8 as loud
Soft. Whisper (5 ft.)	30	Quiet Bedroom	
	20	Recording Studio	Very quiet
	0		Threshold of hearing

Source: Harris 1991, Reherman et al. 2006, FTA 2006
Key:
dB = decibels
dBA = A-weighted decibels
ft. = feet
mph = miles per hour

The following relationships of perception and response to quantifiable noise changes are used as a basis for assessing potential effects of these changes in environmental noise level:

- Except in a carefully controlled laboratory condition, a change of 1 dBA is very difficult to perceive.
- In the outside environment, a 3 dBA change is considered just perceptible.
- An increase of 5 dBA is considered readily perceptible and could result in a change in community response.
- A 10 dBA increase is perceived as a doubling in loudness and would likely result in a widespread community response.

Because of the logarithmic nature of the dB unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is

doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB. Human perception is different. In terms of human response, a 3 dB change is just perceptible and a 10 dB change is perceived as a doubling or halving of sound level.

Because environmental noise varies with time, it is necessary to define certain measurement terms that are used to characterize this fluctuating quantity. The energy-average level over a specific period is defined as the Equivalent Sound Level (L_{eq}). The L_{eq} is the sound pressure level over a time interval that is equivalent to a perfectly constant sound pressure level containing the same acoustic energy over the same interval. Thus, L_{eq} includes all sporadic or transient events occurring during the time period.

In addition to the L_{eq} metric, the statistical distribution of measured sound levels is used to describe the range of noise levels measured during a given period. This metric is presented as $L_{N,}$ which is the sound level exceeded N percent of the time during a given measurement interval. For example, L_{10} (in dBA) is the sound level exceeded 10 percent of the time and this level is commonly used to represent loud transient events occurring during the measurement period. L_{50} is the sound level that is exceeded 50 percent of the time and represents the median sound level. L_{90} is the sound level exceeded 90 percent of the time and this level represents the background noise levels of the measurement. The maximum A-weighted noise level recorded for a single event is defined as L_{max}.

Other descriptors of noise are also commonly used to identify noise/land use compatibility guidelines and assist in the prediction of community reaction to adverse effects of environmental noise, including traffic-generated and industrial noise. These descriptors include the Day-Night Noise Level (L_{dn}); and in California, the Community Noise Equivalent Level (CNEL) descriptor is used. Each of these descriptors uses units of dBA. Both L_{dn} and CNEL noise metrics represent 24-hour periods and both apply a time-weighted factor designed to penalize noise events that occur during evening or nighttime hours, when relaxation and sleep disturbance is of more concern. The time-weighting adds a 5 dBA penalty to the hourly L_{eq} noise levels from 7:00 p.m. to 10:00 p.m. (evening period) and a 10 dBA penalty from 10:00 p.m. to 7:00 a.m. (nighttime period). For CNEL, daytime is defined as the time between 7:00 a.m. to 7:00 p.m., and for L_{dn} daytime is defined as the time between 7:00 a.m. to 10:00 p.m. The use of either the CNEL or L_{dn} noise metric is mandated by State guidelines for noise/land use compatibility planning purposes and are the predominant metrics used by local governments to describe noise environments within their jurisdictions.

Pressure waves of sound can be generated by vibrating structures and can induce vibration in structures. Vibration is caused by any force acting on a surface of a structure that causes it to move back and forth from its normal resting position. In contrast to airborne noise, ground-borne vibration is often not perceptible. For example, it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. Construction activities which

can cause perceptible vibrations include pile-driving and operating heavy earth-moving equipment.

In contrast to airborne noise, ground-borne vibration is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 vibration decibels (VdB) or lower, well below the human threshold of perception which is around 65 VdB. Although the perceptibility threshold is about 65 VdB, human response to vibration is not usually significant unless the vibration exceeds 70 VdB (Federal Transit Administration [FTA] 2006).

17.1.2 Ambient Noise Measurements

The Project would be located along Reach 2B of the San Joaquin River, primarily in between Mendota Dam and the Chowchilla Bifurcation Structure, but also along a portion of Reach 3 below Mendota Dam. Nearby jurisdictions include the city of Mendota and unincorporated areas of Fresno and Madera counties.

Ambient noise measurements were conducted at four representative locations, of which three were 24-hour measurements and one was a short-term measurement. These locations are shown in Figure 17-1. The noise measurements were taken during the last week of December, between two major holidays, well after the growing season. Accordingly, these measurements provide a conservative estimate of ambient noise. The ambient noise levels varied throughout the Project area that would be used for project equipment staging, haul routes, and construction. Noise levels vary based on population density, distance to nearby traffic, aircraft flight patterns, nearby wildlife (for example, passing birds and insects), weather and other various conditions. During the noise measurements, the temperature was on average 48 degrees Fahrenheit with an average humidity of 50 percent. Winds ranged from calm to moderate with the highest recorded wind speed of 6 miles per hour. The weather was consistently clear throughout the entire noise measurement period.

All sound level meters were set to measure dBA noise levels at the slow meter response setting.[1] The sound level meters were placed in key locations that represented the ambient noise levels at representative locations. Each meter was calibrated before and after each measurement period. Certificates of calibration for the sound level meters and the calibrator used during the ambient noise level measurement survey can be found in Appendix 17-A. Locations where measurements were conducted are considered representative receivers of existing ambient noise levels within the Project area. Existing noise levels for the noise measurement sites are presented below. The field measurement data sheets can be found in Appendix 17-B.

LT-1

The noise-sensitive receiver located at LT-1 represents a cluster of single-family residences surrounded by agricultural land. The noise-sensitive receiver is located north of the San Joaquin River in an unincorporated area of Madera County. The sound level meter was mounted to a power pole near the intersection of Eastside Drive and Drive 10

[1] The slow meter response setting is a setting where the meter detects sound level changes over at least one second in duration. It is used for evaluating continuous and average noise levels.

½ Road. Table 17-2 lists the results of the long-term measurement conducted at measurement site LT-1. The primary noise sources in the area consisted of traffic and nearby farming activity. The average daytime ambient noise level (L_{eq}) was 49.9 dBA and hourly L_{eq} values ranged from 36.2 to 57.2 dBA. The average evening ambient noise level (L_{eq}) was 49.6 dBA and hourly L_{eq} values ranged from 44.1 to 52 dBA. The average nighttime ambient noise level (L_{eq}) was 45.3 dBA and hourly L_{eq} values ranged from 36.6 to 49.1 dBA. The difference between the daytime and nighttime L_{eq} is 4.6 dBA, which is to be expected for an isolated environment with very little human activity. The ambient noise level would be equivalent to refrigerator humming or a quiet office setting.

Table 17-2.
24-hour Sound Level Measurement at LT-1 (dBA)

Date	Time (Hour-Starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
12/28/2011	10:00:00	44.0	69.3	42.9	39.5	36.7	34.0
12/28/2011	11:00:00	57.2	82.6	47.1	38.1	34.2	32.2
12/28/2011	12:00:00	55.4	80.5	50.1	36.7	32.3	30.6
12/28/2011	13:00:00	48.2	71.4	47.7	38.5	33.8	30.8
12/28/2011	14:00:00	36.2	49.8	38.9	34.8	31.0	28.2
12/28/2011	15:00:00	43.1	70.5	42.1	35.6	31.2	27.0
12/28/2011	16:00:00	43.9	67.8	45.1	38.5	34.0	28.6
12/28/2011	17:00:00	42.6	71.9	40.5	34.8	29.9	28.0
12/28/2011	18:00:00	45.8	70.7	39.7	36.2	32.6	30.9
12/28/2011	19:00:00	52.0	77.8	41.6	35.4	32.0	28.2
12/28/2011	20:00:00	44.1	69.1	45.7	39.9	30.5	26.6
12/28/2011	21:00:00	49.5	70.4	50.8	44.9	39.9	36.6
12/28/2011	22:00:00	47.3	74.2	49.4	41.7	36.3	26.6
12/28/2011	23:00:00	44.6	56.5	49.3	39.1	30.7	28.5
12/29/2011	0:00:00	44.2	56.1	49.1	38.9	33.8	29.1
12/29/2011	1:00:00	36.6	48.6	40.3	34.1	31.0	28.2
12/29/2011	2:00:00	44.2	57.3	48.2	40.4	32.8	29.8
12/29/2011	3:00:00	46.6	55.8	50.7	42.7	31.9	29.1
12/29/2011	4:00:00	45.0	56.4	49.5	41.2	36.1	29.7
12/29/2011	5:00:00	37.5	50.1	40.7	35.9	30.3	28.8
12/29/2011	6:00:00	49.1	72.3	38.6	33.3	29.9	28.4
12/29/2011	7:00:00	47.6	77.8	39.7	36.2	34.6	33.3
12/29/2011	8:00:00	44.0	60.7	46.2	42.3	39.4	36.0
12/29/2011	9:00:00	46.4	74.7	42.4	38.7	36.3	34.8

Notes:

Measurements conducted on December 28 and 29, 2011. Measurement Location: N 36° 48' 22.4", W 120° 20' 59.3."

24-hour L_{eq} = 48.7 dBA; CNEL = 53.3 dBA; Daytime L_{eq} = 49.9 dBA; Evening L_{eq} = 49.6 dBA; Nighttime L_{eq} = 45.3 dBA

Key:

dBA = A-weighted decibel
L_{eq} = equivalent sound level
L_{max} = maximum sound level
L_{min} = minimum sound level
L_{10} = sound level exceeded 10 percent of the time
L_{50} = sound level exceeded 50 percent of the time
L_{90} = sound level exceeded 90 percent of the time

LT-2

The noise-sensitive receiver located at LT-2 represents a single-family residence on San Mateo Road south of the San Joaquin River in Fresno County. The primary noise sources in the area consisted of traffic, farming activities and barking dogs. Table 17-3 lists the results of the long-term measurement conducted at measurement site LT-2. The average daytime ambient noise level (L_{eq}) was 56.5 dBA and hourly L_{eq} values ranged from 42.8 to 60.5 dBA. The average evening ambient noise level (L_{eq}) was 47.1 dBA and hourly L_{eq} values ranged from 40.3 to 49.9 dBA. The average nighttime ambient noise level (L_{eq}) was 45.6 dBA and hourly L_{eq} values ranged from 27.9 to 52.1 dBA. The difference between the daytime and nighttime L_{eq} is 10.9 dBA, which is due to farming equipment activities and barking dogs during daytime hours. The ambient noise level in this area is equivalent to an office setting or a quiet room.

Table 17-3.
24-hour Sound Level Measurement at LT-2 (dBA)

Date	Time (Hour-Starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
12/28/2011	10:00:00	59.9	88.5	44.8	38.9	37.0	34.9
12/28/2011	11:00:00	59.9	88.5	45.5	35.3	33.5	31.6
12/28/2011	12:00:00	59.0	88.0	45.1	32.6	30.6	29.5
12/28/2011	13:00:00	60.5	86.2	47.5	34.9	31.8	30.2
12/28/2011	14:00:00	51.2	81.6	38.9	34.5	30.8	27.9
12/28/2011	15:00:00	57.6	87.0	42.5	35.0	31.0	28.9
12/28/2011	16:00:00	57.6	84.9	49.7	38.8	30.6	28.3
12/28/2011	17:00:00	42.8	70.8	40.2	36.0	32.5	28.8
12/28/2011	18:00:00	47.7	76.2	44.2	36.7	33.5	31.8
12/28/2011	19:00:00	40.3	61.9	42.8	35.6	29.2	26.8
12/28/2011	20:00:00	49.9	77.5	52.4	36.4	28.6	26.6
12/28/2011	21:00:00	46.7	68.3	48.6	45.6	37.0	31.0
12/28/2011	22:00:00	49.9	77.1	43.4	31.9	25.9	23.0
12/28/2011	23:00:00	35.6	48.3	40.0	28.9	24.3	23.0
12/29/2011	0:00:00	28.8	51.2	30.2	25.8	24.3	23.1
12/29/2011	1:00:00	27.9	32.2	30.0	27.9	24.8	23.7
12/29/2011	2:00:00	39.9	52.8	44.4	34.3	27.3	25.9
12/29/2011	3:00:00	29.1	40.9	31.3	27.6	26.6	25.5
12/29/2011	4:00:00	36.8	44.6	40.7	34.9	28.2	26.2
12/29/2011	5:00:00	46.6	76.2	40.4	36.9	34.6	32.9
12/29/2011	6:00:00	52.1	72.1	50.6	39.7	34.0	31.8
12/29/2011	7:00:00	45.6	71.6	45.9	43.0	37.9	34.5
12/29/2011	8:00:00	46.9	66.8	48.2	43.6	39.2	37.1
12/29/2011	9:00:00	47.4	74.4	48.2	43.5	37.0	34.4

Notes:

Measurements conducted on December 28 and 29, 2011. Measurement Location: N 36° 46' 17.8", W 120° 18' 51.3."

24-hour L_{eq} = 53.9 dBA; CNEL = 55.8 dBA; Daytime L_{eq} = 56.5 dBA; Evening L_{eq} = 47.1 dBA; Nighttime L_{eq} = 45.6 dB

Key:
dBA = A-weighted decibel
L_{eq} = equivalent sound level
L_{max} = maximum sound level
L_{min} = minimum sound level
L_{10} = sound level exceeded 10 percent of the time
L_{50} = sound level exceeded 50 percent of the time
L_{90} = sound level exceeded 90 percent of the time

LT-3

The noise-sensitive receiver located at LT-3 represents a single-family residence at the north end of Bass Avenue. The noise-sensitive receiver is located north of the city of Mendota within an unincorporated area of Fresno County and on the northwest side of the San Joaquin River. The sound level meter was mounted on a tree at the north end of Bass Avenue. The primary noise sources in the area consisted of local traffic at the homes and barking dogs. Table 17-4 lists the results of the long-term measurement conducted at measurement site LT-3.

Table 17-4.
24-hour Sound Level Measurement at LT-3 (dBA)

Date	Time (Hour-Starting)	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
12/28/2011	10:00:00	46.4	76.1	43.1	38.9	36.9	34.1
12/28/2011	11:00:00	35.6	53.6	37.6	34.0	31.7	29.9
12/28/2011	12:00:00	43.5	66.2	38.0	33.3	31.3	29.4
12/28/2011	13:00:00	36.3	58.3	36.4	31.8	29.6	27.8
12/28/2011	14:00:00	39.6	60.7	37.4	31.9	29.8	27.8
12/28/2011	15:00:00	36.9	52.7	39.6	32.2	30.0	27.2
12/28/2011	16:00:00	40.0	56.2	42.5	37.2	28.5	25.9
12/28/2011	17:00:00	37.9	65.9	37.6	28.9	27.0	25.1
12/28/2011	18:00:00	36.7	59.9	35.4	29.5	26.7	24.1
12/28/2011	19:00:00	31.2	49.4	34.9	25.8	23.2	21.3
12/28/2011	20:00:00	34.1	56.8	33.5	29.2	25.2	22.8
12/28/2011	21:00:00	34.8	45.3	39.4	32.1	28.7	26.6
12/28/2011	22:00:00	31.2	44.0	33.4	29.3	26.7	22.6
12/28/2011	23:00:00	27.4	43.3	28.7	26.5	24.9	23.5
12/29/2011	0:00:00	33.2	56.4	30.3	27.6	26.2	24.9
12/29/2011	1:00:00	28.1	43.3	29.9	27.3	26.2	24.2
12/29/2011	2:00:00	31.7	49.0	33.1	31.3	29.0	26.8
12/28/2011	3:00:00	30.5	47.3	31.8	29.8	28.3	26.6
12/29/2011	4:00:00	32.4	47.2	34.2	31.8	29.7	28.4
12/29/2011	5:00:00	33.9	41.2	35.8	33.6	30.8	28.4
12/29/2011	6:00:00	36.8	49.6	39.8	35.1	33.1	31.8
12/29/2011	7:00:00	41.0	62.7	43.3	37.4	34.6	32.5
12/29/2011	8:00:00	42.6	70.1	43.0	39.6	36.7	35.1
12/29/2011	9:00:00	38.7	50.9	40.7	37.7	35.9	34.4

Notes:

Measurements conducted on December 28 and 29, 2011. Measurement Location: N 36° 47' 32.6", W 120° 22' 18.5."

24-hour L_{eq} = 38.5 dBA; CNEL = 41.2 dBA; Daytime L_{eq} = 40.9 dBA; Evening L_{eq} = 33.6 dBA; Nighttime L_{eq} = 32.5 dBA

Key:

dBA = A-weighted decibel

L_{eq} = equivalent sound level

L_{max} = maximum sound level

L_{min} = minimum sound level

L_{10} = sound level exceeded 10 percent of the time

L_{50} = sound level exceeded 50 percent of the time

L_{90} = sound level exceeded 90 percent of the time

The average daytime ambient noise level (L_{eq}) was 40.9 dBA and hourly L_{eq} values ranged from 35.6 to 46.4 dBA. The average evening ambient noise level (L_{eq}) was 33.6 dBA and hourly L_{eq} values ranged from 31.2 to 34.8 dBA. The average nighttime ambient noise level (L_{eq}) was 32.5 dBA and hourly L_{eq} values ranged from 27.4 to 36.8 dBA. The difference between the daytime and nighttime L_{eq} is 8.4 dBA, which is to be expected for an isolated environment with limited human activity. This very quiet ambient noise level in this area is equivalent to whispering or a faint hum from a refrigerator.

ST-1

The noise-sensitive receiver located at ST-1 represents the Mendota Pool Park located ~~within~~ near the city of Mendota in an unincorporated area of Fresno County. The sound level meter was mounted to a tripod for daytime, evening and nighttime measurements. The primary noise sources in the park consisted of passing traffic on Bass Road, traffic driving through the park, birds chirping, distant traffic and a distant power plant during the evening and nighttime measurement periods. Table 17-5 lists the results of the short-term measurement conducted at measurement site ST-1. The average daytime ambient noise level (L_{eq}) was found to be 41.3 dBA. The average evening ambient noise level (L_{eq}) was found to be 38.6 dBA. The average nighttime ambient noise level (L_{eq}) was found to be 35.4 dBA. The difference between the daytime and nighttime L_{eq} is 5.9 dBA, which is to be expected for an isolated environment with limited human activity. This very quiet ambient noise level in this area is equivalent to whispering or a refrigerator humming.

Table 17-5.
Short-Term Sound Level Measurements at ST-1 (dBA)

Date	Start Time	End Time	L_{eq}	L_{10}	L_{50}	L_{90}
12/28/2011	10:30:00	12:30:00	41.3	43.6	36.1	31.3
12/28/2011	20:00:00	22:00:00	38.6	35.2	31.1	27.5
12/28/2011	23:00:00	1:00:00	35.4	36.3	33.2	30.8

Notes:

Measurements conducted on December 28 and 29, 2011. Measurement Location: N 36° 46' 43.6", W 120° 22' 23.7."

24-hour L_{eq} = 39.0 dBA; CNEL = 43.7 dBA; Daytime L_{eq} = 41.3 dBA; Evening L_{eq} = 38.6 dBA; Nighttime L_{eq} = 35.4 dBA

Key:

dBA = A-weighted decibel

L_{eq} = equivalent sound level

L_{10} = sound level exceeded 10 percent of the time

L_{50} = sound level exceeded 50 percent of the time

L_{90} = sound level exceeded 90 percent of the time

17.2 Regulatory Setting

Applicable laws, ordinances, regulations or standards and noise guidelines are used at the local level for planning purposes. Local noise guidelines are often based on the broader guidelines of State and Federal agencies and many are implemented as enforceable noise ordinances. Laws, ordinances, regulations or standards that are applicable to the Project are presented in this section.

17.2.1 Federal

There are a number of laws and guidelines at the Federal level that direct the consideration of a broad range of noise and vibration issues. For perspective, several of the more significant noise-related Federal regulations and guidelines are provided below:

Noise Control Act of 1972 (42 United States Code [USC] 4910)

This Act establishes a national policy to promote an environment free from noise that jeopardizes human health and welfare. To accomplish this, the Act establishes a means for the coordination of Federal research and activities in noise control, authorizes the establishment of Federal noise emissions standards for products distributed in commerce, and provides information to the public respecting the noise emission and noise reduction characteristics of such products.

U.S. Environmental Protection Agency (EPA) Levels Document

In response to a Federal mandate, EPA provided recommendations in *Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety*, NTIS 550\9-74-004 (EPA 1974). The guidance in this document, commonly referenced as the "Levels Document," establishes an L_{dn} of 55 dBA as the requisite level, with an adequate margin of safety, for areas of outdoor uses including residences and recreation areas. This document does not constitute EPA regulations or standards but identifies safe levels of environmental noise exposure without consideration for methods of achieving these levels or other potentially relevant considerations. It is intended to "provide State and local governments as well as the Federal government and the private sector with an informational point of departure for the purpose of decision making." EPA is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues and therefore should not be construed as standards or regulations. This document is generally considered the most relevant Federal guidelines applicable to community noise exposure.

Federal Highway Administration Noise Abatement Procedures (23 Code of Federal Regulations [CFR] Part 772)

The purpose of 23 CFR Part 772 is to provide procedures for noise studies and noise abatement measures to help protect public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways. It establishes five categories of noise sensitive receptors and prescribes the use of the hourly L_{eq} as the criterion metric for evaluating traffic noise impacts.

Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure; Hearing Conservation Amendment (Federal Register [FR] 48 (46), 9738 – 9785 (1983).

The OSHA standard stipulates that protection against the effects of noise exposure are required for employees when sound levels exceed 90 dBA over an 8-hour exposure period. Protection would consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to within acceptable levels, personal protective equipment would be provided and used to reduce exposure of the employee. Additionally, a Hearing Conservation Program must be instituted by the employers

whenever employee noise exposure equals or exceeds the action level of an 8-hour time-weighted average sound level of 85 dBA. The Hearing Conservation Program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

Federal Transit Administration

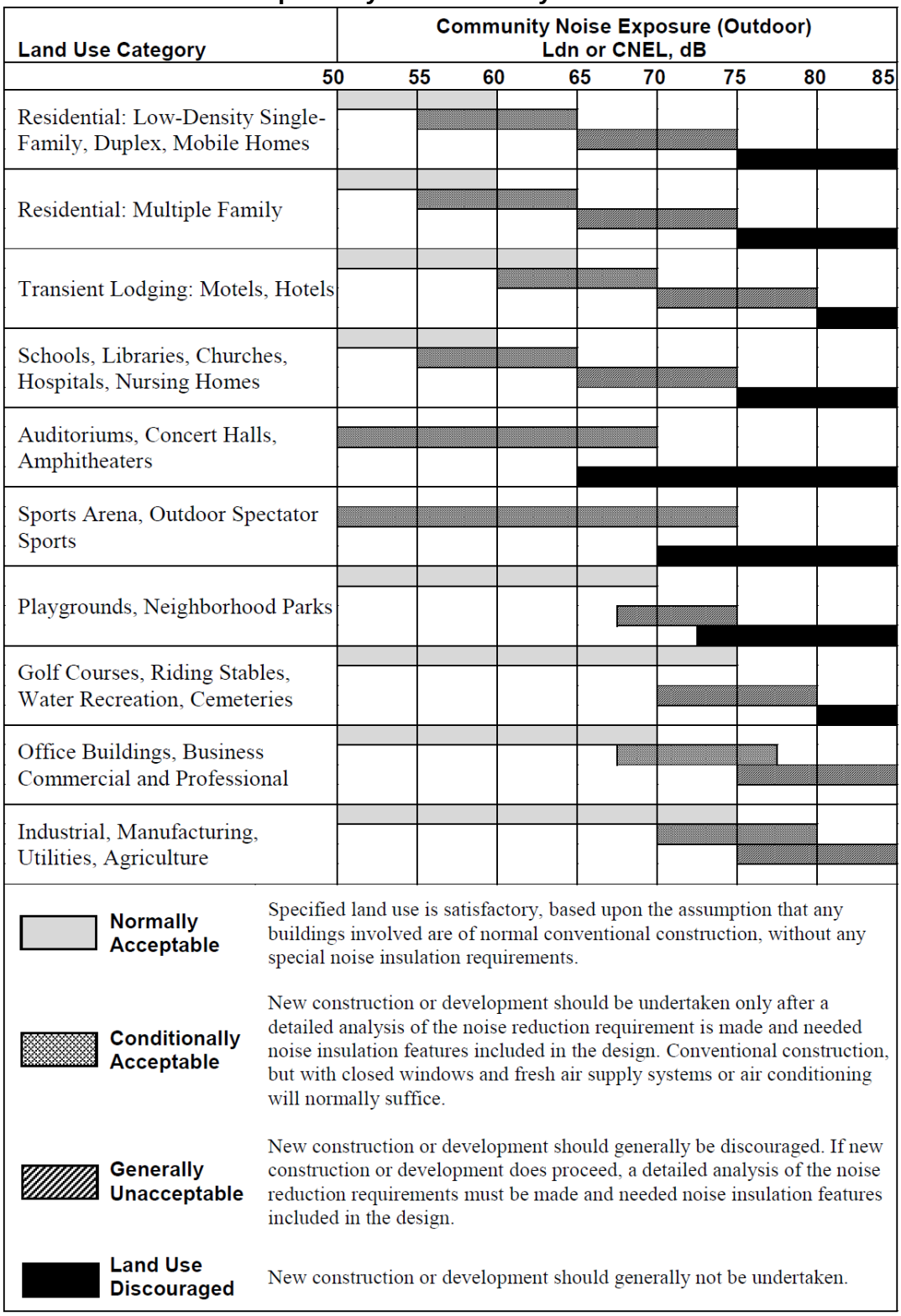
To address the human response to groundborne vibration, FTA has set forth guidelines for criteria related to maximum acceptable vibration for different types of land uses. For frequent events, these include 65 VdB for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-technology manufacturing, and laboratory facilities), 72 VdB for residential uses and buildings where people normally sleep, and 75 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, and offices) (FTA 2006).

Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bioacoustics, and Biomechanics at the request of EPA (FTA 2006). For fragile structures, the Committee of Hearing, Bioacoustics, and Biomechanics recommends a maximum limit of 0.25 in/sec peak particle velocity (FTA 2006). Peak particle velocity is a measure of the intensity of ground vibration, specifically the time rate of change of the amplitude of ground vibration.

17.2.2 State of California

The State establishes noise compatibility guidelines. These guidelines are used to ensure compatible noise levels at various noise sensitive land uses from transportation related noise sources related to new projects. Land use categories and their corresponding maximum allowable noise exposure levels (in terms of CNEL) can be found in Table 17-6. As shown in Table 17-6, the maximum allowable noise exposure level for residential land use is 60 dBA CNEL.

Table 17-6.
Land Use Compatibility of Community Noise Environments



Source: Fresno County 2000: Chart HS-1 of the Fresno County Health and Safety Element

17.2.3 Regional and Local

Fresno County

Noise level limits associated with fixed noise sources are found in the Fresno County Noise Ordinance. These limits are presented in Table 17-7. The noise standards found in Table 17-7 applies to all residences, schools, hospitals, churches, and public libraries. Table 17-7 lists the exterior noise standards by time of exposure within a one-hour time period. A 50 dBA L_{50} is the daytime baseline criterion noise level and a 45 dBA L_{50} is the nighttime baseline noise criterion. Impulsive, or pure tone, noise is penalized by a reduction of 5 dBA for each noise standard. In Fresno County, construction noise is exempt from local noise standards on weekdays from 6:00 a.m. to 9:00 p.m. and on Saturday and Sunday from 7:00 a.m. to 5:00 p.m.

Table 17-7.
Fresno County Exterior Noise Level Standards for Noise-Sensitive Land Uses Affected by Non-Transportation Noise Sources (dBA)

Cumulative Number of Minutes in Any 1-Hour Period	Corresponding $L_{percent}$	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
30	L_{50}	50	45
15	L_{25}	55	50
5	$L_{8.3}$	60	55
1	$L_{1.7}$	65	60
0	-	70	65

Source: Fresno County 1978
Key: dBA = A-weighted decibels

Madera County

Madera County establishes local exterior noise level limits from non-transportation noise sources in the Madera County Noise Element. Noise level limits associated with fixed noise sources are found in Table 17-8. The noise standards found in Table 17-8 apply to all residences, transient lodging, churches, meeting halls, schools, theaters, auditoriums, music halls, hospitals, nursing homes, office buildings, museums, playgrounds, parks, and public libraries. A 50 dBA L_{eq} is the daytime baseline criterion noise level and a 45 dBA L_{eq} is the nighttime baseline noise criterion. Impulsive, or pure tone, noise is penalized by a reduction of 5 dBA for each noise standard. In Madera County, construction noise is exempt from local noise standards on weekdays from 7:00 a.m. to 7:00 p.m. and on Saturday from 9:00 a.m. to 5:00 p.m. Construction noise is not exempt from noise standards on Sundays.

Table 17-8.
Madera County Exterior Noise Level Standards for Noise-Sensitive Land Uses Affected by Non-Transportation Noise Sources (dBA)

Noise Level Descriptor	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly Average (L_{eq}), dBA	50	45
Maximum (L_{max}), dBA	70	65

Source: Madera County 1995
Key: dBA = A-weighted decibels

City of Mendota

The city of Mendota (2009) establishes local exterior noise level limits in the city of Mendota Noise Element. Noise level limits associated with fixed noise sources are found in Table 17-9. The noise standards found in Table 17-9 apply to all residences, transient lodging, churches, meeting halls, schools, theaters, auditoriums, music halls, hospitals, nursing homes, office buildings, museums, playgrounds, parks, and public libraries. A 55 dBA L_{eq} is the daytime baseline criterion noise level, a 50 dBA L_{eq} is the evening baseline criterion noise level, and a 45 dBA L_{eq} is the nighttime baseline noise criterion. Impulsive, or pure tone, noise is penalized by a reduction of 5 dBA for each noise standard.

The city of Mendota's (2010) Excessive Noise Standard states that between the hours of 10:00 p.m. and 7:00 a.m., operation of equipment or performance of any outside construction or repair work on buildings, structures or projects or operations of construction type device is not allowed if the activity takes place within 500 feet of any residential zone. Noise generated by construction activities are required to be limited to the daytime hours between 7:00 a.m. and 7:00 p.m. and are prohibited on Federal holidays. If nighttime construction activities are necessary, the city of Mendota's Public Works director would need to be contacted.

Table 17-9.
City of Mendota Exterior Noise Level Standards for Noise-Sensitive Land Uses Affected by Non-Transportation Noise Sources (dBA)

Noise Level Descriptor	Daytime (7:00 a.m. to 7:00 p.m.)	Evening (7:00 p.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly Average (L_{eq}), dBA	55	50	45
Maximum (L_{max}), dBA	70	60	55

Source: City of Mendota 2009
Key: dBA = A-weighted decibels

17.3 Environmental Consequences and Mitigation Measures

17.3.1 Impact Assessment Methodology

This section describes the methodology used to determine potential noise impacts generated by noise and vibration associated with construction activities, increased off-site traffic, and operational activities related to the Project. The noise impact assessment is based on four potential Project Alternatives: Alternative A (Compact Alignment Bypass with Narrow Floodplain and South Canal), Alternative B (Compact Alignment Bypass with Consensus-Based Floodplain and Bifurcation Structure), Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal) and Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal).

Construction Noise Related Effects on Sensitive Receivers Noise levels generated by construction activities associated with Alternatives A, B, C and D at nearby noise-sensitive receptors were evaluated using the FTA's Transit Noise and Vibration Impact Assessment (FTA 2006). Noise levels for each type of construction equipment that would be used throughout the duration of construction for the Project were derived from the Federal Highway Administration's (FHWA's) Road Construction Noise Model. Table 17-10 lists the noise emission levels at a distance of 50 feet from the source for each type of construction equipment that would be used during the construction phase of the Project.

Table 17-10.
Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 50 feet from Source
Air Compressor (Sullair 125)	78
Asphalt Paver	77
Compactor Cat 815	83
Compactor Cat 825	83
Concrete Pump Mack Truck & 36-47M Pump	81
Crane Grove RT990	81
Double Bottom Dump Truck (25 TN)	76
Dozer Cat D10	82
Dozer Cat D6	82
Dozer Cat D8	82
Excavator Cat 330L	81
Excavator Cat 345	81
Excavator with Auger Attachment Cat 330L	81
Excavator with Driver Attachment Cat 330L	81
Flatrack Truck	74
Fork Lift Cat TH560B Telescopic Handler	75
Hydraulic Pile Driver Power Bruce PQ-700V	101
Hydraulic Pile Hammer Driver Bruce SGH-4212	101
Loader Cat 966	79

Table 17-10.
Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 50 feet from Source
Loader JD 210C 4x4 (Cat 416)	79
Loader/Backhoe JD 710 (Cat 446)	79
Low Bed Truck	74
Motor Grader Cat 14H	85
Pickup	75
Roller 7-9 Ton	80
Scraper Cat 623	84
Scraper Cat 657 Push-Pull	84
Semi End Dump Truck (25 TN)	76
Sheet Pile Driver Power Bruce PQ-700V	101
Skid Steer Loader Cat 277B	79
Street Sweeper/Pickup Broom	82
Transfer Truck (25 TN)	76
Vibratory Sheet Pile Driver Bruce SGV-500	101
Water Truck (4,000 Gal)	76

Note: Construction equipment inventory was developed by the California Department of Water Resources for the appraisal-level designs.

Emission levels from the FHWA Road Construction Noise Model and usage factors for construction equipment were used in order to calculate an L_{eq} for the loudest construction activity within each designated group for all four Project alternatives. If the specific equipment was not found in the Road Construction Noise Model, then the emission level of similar equipment was used.

The following equation calculates the resulting L_{eq} at a sensitive receiver for an individual piece of construction equipment. This formula is used to adjust the noise level generated by the individual piece of construction equipment based on the estimated time that it is planned to be used during an hour.

$$L_{eq}(equip) = E.L. + 10\log(U.F.)$$

where:

$L_{eq}(equip)$ = L_{eq} at a receiver resulting from the operation of a single piece of equipment over a specified time period.

$E.L.$ = noise emission level of the particular piece of equipment at a reference distance of 50 feet (found in Table 17-10).

$U.F.$ = usage factor that accounts for the fraction of time that the equipment is in use over the specified period of time.

The FTA's General Assessment for construction noise assumes that the two loudest pieces of equipment are operating simultaneously for each construction activity. The associated noise level, in terms of L_{eq}, was calculated for each type of construction activity, and the distance to the daytime 50 dBA L_{eq} and nighttime 45 dBA L_{eq} noise contours was derived. Local noise standards are based on L_{50} and L_{eq} noise standards. In order to generate a conservative estimate for potential noise impacts, the L_{eq} noise standards were used as the local noise standard threshold for noise impacts as a worst-case scenario because an L_{eq} noise standard is more stringent and it assumes a steady-state noise level from construction equipment. Appendix 17-C lists the associated noise levels for each construction activity, in addition to listing the distances to the nighttime 45 dBA and daytime 50 dBA L_{eq} noise contours.

Additional modeled noise-sensitive receivers were added to the noise model where ambient noise level measurements were not conducted. Figure 17-2 depicts the location of all ambient noise measurement locations in addition to the modeled receiver locations. There are four residences located approximately 500 feet west of LT-1. These four residences are identified as Modeled Receiver 4 (R-4) and referenced as such throughout the analysis. There are several homes located near LT-2. R-5 is a single-family home located near Little San Joaquin Slough. R-6 is a single-family home located approximately 3,500 feet south of LT-2 along San Mateo Avenue. R-7 is two single-family homes located approximately 1,000 feet south of LT-2 along San Mateo Avenue. There are also several homes located near LT-3. R-2 is a group of homes located approximately 3,700 feet northwest of LT-3. R-3 is a group of homes located approximately 2,000 feet northwest of LT-3. R-1 is a group of homes located along Bass Avenue.

Due to the size of the Project footprint, the amount of equipment, and the non-stationary nature of the construction activities, it is difficult to estimate an exact location where construction equipment would be situated. In order to determine the minimum allowable distance to each construction activity for each noise-sensitive receiver, the maximum allowable hourly L_{eq} values for each construction activity for each Alternative were calculated. It was also assumed for the purpose of calculating an hourly L_{eq} noise level for each construction activity that the two loudest pieces of equipment were operating simultaneously. These noise levels were then used to calculate the distances to the daytime 50 dBA L_{eq} and nighttime 45 dBA L_{eq} noise contours.

The potential for noise to impact wildlife is addressed in Section 7.0, Biological Resources–Wildlife.

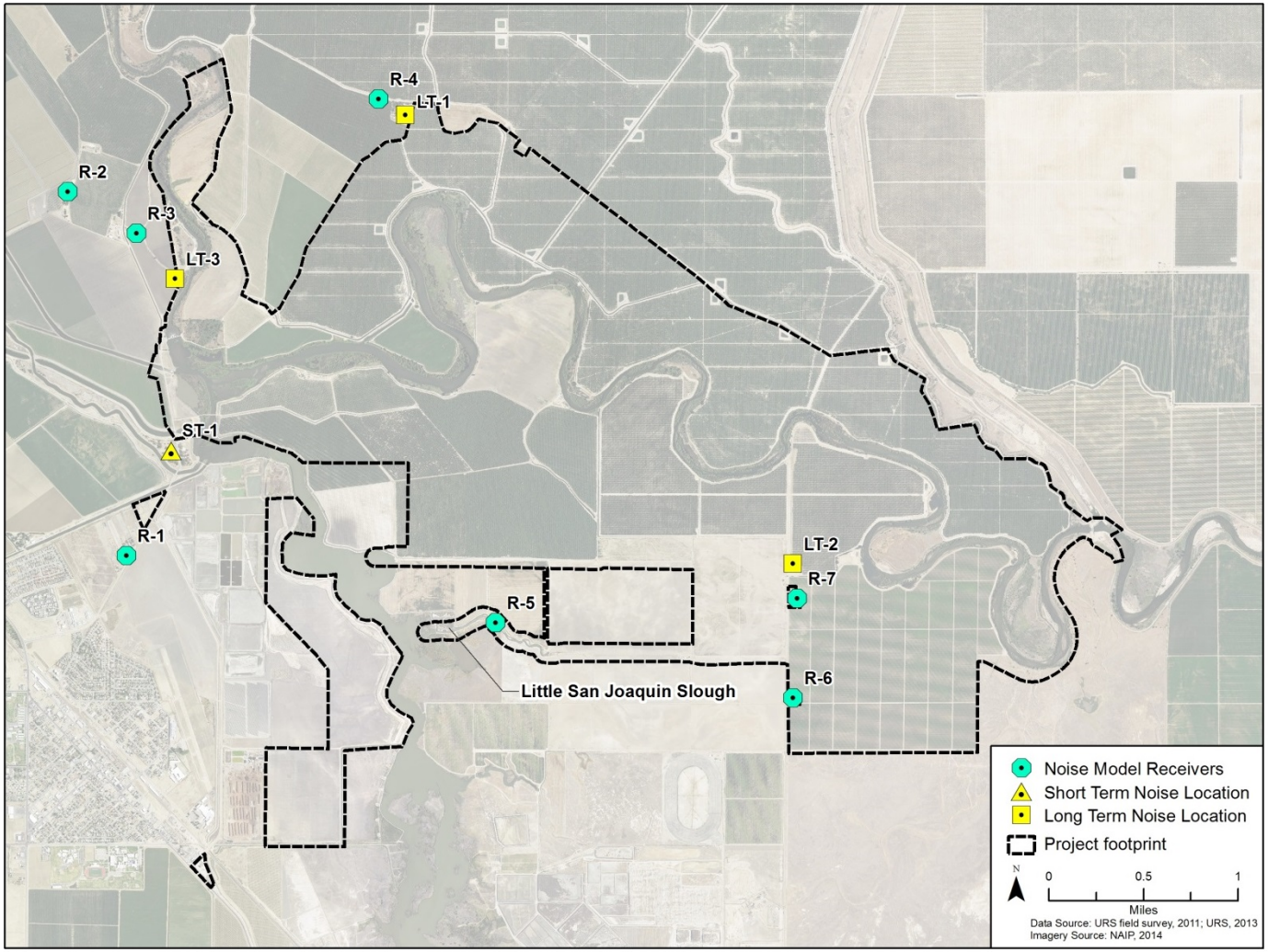


Figure 17-2.
Ambient Noise Level Measurement and Modeled Receiver Locations

Construction Vibration Related Effects on Sensitive Receptors

Table 17-11 is reproduced from Table 12-2 of the FTA Manual (2006) and it lists vibration source levels for typical construction equipment. Impact pile driving activities would be conducted during the construction of Project components and the vibration source level listed for impact pile drivers (104 VdB at a distance of 25 feet) is the reference level that is used for estimating potential annoyance generated by pile driving activities.

Table 17-11.
Vibration Source Levels for Construction Equipment

Equipment	Peak particle velocity at 25 ft (in/sec)	Approximate RMS vibration velocity at 25 ft (VdB)
Pile Driver (impact), upper range	1.518	112
Pile Driver (impact), typical	0.644	104
Pile Driver (sonic), upper range	0.734	105
Pile Driver (sonic), typical	0.170	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall), in soil	0.008	66
Hydromill (slurry wall), in rock	0.017	75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: FTA 2006

Key:
RMS = root mean square velocity
VdB = vibration decibels

It is assumed, as a worst-case scenario for ground-borne vibration levels, that more than 70 vibration events would be conducted per day during pile driving activities. Utilizing this assumption results in a vibration standard of 72 VdB at residences and buildings where people normally sleep. Using the reference level of 104 VdB at a distance of 25 feet, the distance to 72 VdB was be calculated. Vibration-sensitive receivers within this calculated distance may be subjected to vibration levels that could cause annoyance and have an adverse effect.

Off-site Vehicular Traffic Noise Effects due to Construction-Related Trips

Acoustic calculations were performed for noise generated by traffic during construction activities related to Project alternatives. The access routes to the Project area were assumed to be along Bass Avenue, San Mateo Avenue, State Route (SR)-180, and SR-33 (north and south of the SR-180/33 junction).

Average daily traffic (ADT) volumes and traffic mixes for each roadway segment were taken from the California Department of Transportation (Caltrans) Operational Traffic Data Branch during the year 2011, which was used to represent existing conditions (Caltrans 2011).[2] An estimated 2035 ADT was used to represent the No-Action Alternative. A traffic growth rate of 1 percent per year starting from 2011 was used to estimate the 2035 ADT.

For Alternatives A through D, it was assumed that: (1) all construction workers going to the Project site would originate from the construction office, which is located on the southwest corner of the Project area; (2) construction workers would generate 200 trips (100 round trips) going to and from the construction office each day throughout the full duration of the construction phase of the Project; and (3) workers would be traveling along Bass Avenue, SR-180 and SR-33 (north and south of the SR-180/33 junction). During the construction phase of the Project, heavy trucks would haul off-site materials to and from the stockpile staging area located on the southeast corner of the Project area along San Mateo Avenue. The ADT for heavy trucks was derived using construction schedules and estimates of truck trips developed by California Department of Water Resources (DWR) for the appraisal-level designs.

The traffic noise prediction equations derived by the FHWA were used to estimate the CNEL for existing conditions, the No-Action Alternative and Alternatives A through D at 50 feet from each respective roadway segment. The estimated CNEL for each alternative was individually compared to the No-Action Alternative and existing conditions, respectively, to determine the change in CNEL for each alternative. For this traffic noise analysis, a change of 5 dBA CNEL at 50 feet from a roadway segment is considered to be an impact.

Noise Effects due to Operation and Maintenance Activities

Increases in Project-related ADT volumes were estimated for operational and maintenance activities to evaluate potential Project-related changes in traffic noise. Vehicle traffic would be associated with operation and maintenance activities such as inspection and adjustment of water control structure gates, inspection and cleaning of fish screens, fish barriers, and fish ladders, inspection of gates at Mendota Dam, installation and removal of flashboards at Mendota Dam, sediment removal from channels and canals, and removal of debris from culverts. Operation and maintenance-related traffic were compared to ambient traffic along access routes leading into the Project area to assess effect on nearby noise sensitive receivers.

17.3.2 Significance Criteria

The most restrictive noise level limits at noise-sensitive receivers in the Project area and vicinity during daytime and nighttime hours are Fresno County's exterior noise standards. For noise-sensitive receivers located in the Project area, the daytime noise standard of 50 dBA L_{50} and nighttime standard of 45 dBA L_{50} are the applicable noise standards at nearby noise-sensitive receivers. Madera County and city of Mendota use L_{eq} values.

[2] Although the Notice of Intent/Notice of Preparation was filed in 2009, traffic counts from 2011 were used to represent existing conditions. There was no significant increase in traffic volume between these 2 years.

Because the usage factor that is applied to construction activities throughout the noise analysis, the L_{50} and L_{eq} noise metrics are considered to be equivalent. Fresno County's Noise Ordinance, Madera County's Noise Ordinance, and the city of Mendota's Noise Element have different construction noise exempt times. All three jurisdictions' construction noise exempt times have been taken into consideration in order to generate one set of construction noise exempt times so that no individual jurisdiction's regulations regarding construction noise exempt times are violated. Construction noise for the Project would be exempt from local noise standards in all relevant jurisdictions on weekdays from 7:00 a.m. to 7:00 p.m. and on Saturday from 9:00 a.m. to 5:00 p.m. Construction noise is prohibited on Federal holidays. Construction activities conducted on Sundays would have to meet the daytime and nighttime noise standards.

California Environmental Quality Act (CEQA) guidelines and thresholds require that significant environmental impacts be identified and that these impacts be eliminated or mitigated to the extent feasible. According to CEQA, resource impact assessment involves the comparison of existing or "baseline" conditions with Project conditions. Section XI of Appendix G of the State CEQA Guidelines (Cal. Code Regs., tit. 14, Appendix G) sets forth characteristics that may signal a potentially significant impact. The following thresholds for determining the significance of impacts related to noise are contained in the Environmental Checklist Form in Appendix G of the State CEQA Guidelines, as amended. Under National Environmental Policy Act (NEPA) Council on Environmental Quality Regulations, effects must be evaluated in terms of their context and intensity. These factors have been considered when applying the CEQA Guidelines. The State CEQA Guidelines ask whether a proposed project would result in:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- Exposure of people residing or working in the project area to excessive noise levels for a project located within an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, or for a project within the vicinity of a private airstrip.

The State CEQA Guidelines do not provide a definition for "substantial increase" in noise and they do not provide a threshold of significance for potential noise or vibration impacts. Therefore, the effects from noise and vibration would be considered when above the following thresholds. These thresholds apply to both the proposed project's impacts for all of the project alternatives and cumulative impacts.

Changes in a noise level of less than 3 dBA are not typically noticed by the human ear. Some individuals who are extremely sensitive to changes in noise may notice changes from 3 to 5 dBA. Based on this information, the following thresholds have been used to evaluate effects for both long-term, permanent increases and temporary or periodic increases in ambient noise levels:

- An increase of 3 dBA or greater in noise level that occurs due to Project-related activities would be significant if the resulting noise levels would cause local noise standards to be exceeded, or result in a 3 dBA increase in noise to a land use experiencing levels above local noise compatibility thresholds of "normally acceptable." A noise level increase of less than 3 dBA under either of the previously described scenarios is not considered to be significant.
- An increase of 5 dBA or less in noise level that occurs from Project-related activities would not be considered significant if the resulting noise levels remain below the "acceptable" thresholds established by local standards.
- Increases in noise greater than 5 dBA would be considered significant if the resulting noise levels are above local standards.
- Otherwise the effects of increasing noise levels greater than 5 dBA due to Project-related activities would be evaluated by comparison to other applicable guidelines.

The effects of temporary, short-, and long-term ground-borne vibration due to Project-related activities have been evaluated qualitatively where Project implementation would generate or result in the exposure of sensitive receptors to vibration levels that exceed FTA's vibration standard of 72 VdB. The ground-borne vibration and ground-borne noise impact criteria for general assessments are described in Table 8-1 of the FTA Manual (2006). This table is reproduced below as Table 17-12.

Table 17-12.
Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels (VdB)			Ground-Borne Noise Impact Levels (dB)		
	Frequent Events	Occasional Events	Infrequent Events	Frequent Events	Occasional Events	Infrequent Events
Category 1: Buildings where vibrations would interfere with interior operations	65	65	65	NA	NA	NA
Category 2: Residences and buildings where people normally sleep	72	75	80	35	38	43
Category 3: Institutional land uses with primary daytime use	75	78	83	40	43	48

Source: FTA 2006

Notes:

Frequent events are defined as more than 70 vibration events of the same source per day.

Occasional events are defined as 30 to 70 vibration events of the same source per day.

Infrequent events are defined as fewer than 30 vibration events of the same kind per day.

17.3.3 Impacts and Mitigation Measures

This section provides an evaluation of direct and indirect effects of the Project alternatives on noise sensitive receivers. It includes analyses of potential effects relative to the No-Action Alternative in accordance with NEPA and potential impacts compared to existing conditions to meet CEQA requirements. The analysis is organized by Project alternative with specific impact topics numbered sequentially under each alternative. With respect to noise and vibration, the environmental impact issues and concerns are:

1. Exposure of Sensitive Receptors to Temporary Construction Noise.
2. Exposure of Sensitive Receptors to Temporary Construction Vibration.
3. Increased Off-site Vehicular Traffic Noise due to Construction Related Trips.
4. Noise Effects due to Operation and Maintenance Activities.

No-Action Alternative

Under the No-Action Alternative, the Project would not be implemented and none of the Project features would be developed in Reach 2B of the San Joaquin River. However, other proposed actions under the San Joaquin River Restoration Program (SJRRP) would be implemented, including habitat restoration in other reaches, augmentation of river

flows, and reintroduction of salmon. Without the Project in Reach 2B, however, these Program-level activities would not achieve Settlement goals. The analysis is a comparison to existing conditions, and no mitigation is required for the No-Action Alternative.

Impact NOI-1 (No-Action Alternative): *Exposure of Sensitive Receptors to Temporary Construction Noise.* Under the No-Action Alterative, the Project would not be implemented and there would be no short-term construction activities in the Project area. In addition, there would be no construction equipment or construction related activities in the Project area. As a result, there would be **no impact** on any nearby existing noise sensitive receptors.

Impact NOI-2 (No-Action Alternative): *Exposure of Sensitive Receptors to Temporary Construction Vibration.* Under the No-Action Alterative, the Project would not be implemented and there would be no short-term construction activities in the Project area. In addition, there would be no construction equipment or construction related activities in the Project area. As a result, there would be **no impact** on any nearby existing vibration sensitive receptors.

Impact NOI-3 (No-Action Alternative): *Increased Off-Site Vehicular Traffic Noise due to Construction Related Trips.* Under the No-Action Alternative, the Project would not be implemented and there would be no short-term construction activities in the Project area. In addition, there would be no construction-related vehicular trips going to and from the Project area. Table 17-13, shown below, shows the change in CNEL between existing conditions and the No-Action Alternative as a result of traffic conditions would be less than 1 dBA CNEL. As a result, there would be a **less than significant** impact.

Table 17-13.
Change in Traffic Noise between Existing Conditions and No-Action Alternative

Road Segments	Speed Limit (mph)	Existing (2009)		No-Action (2035)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	510	50	632	50	1
San Mateo Road north of SR-180	25	547	50	678	51	1
SR-33 south of SR-180/33 Junction	55	11,800	73	14632	74	1
SR-33 north of SR-180/33 Junction	55	5,600	71	6944	72	1
SR-180 west of San Mateo Avenue	55	8,200	70	10168	71	1
SR-180 east of San Mateo Avenue	55	8,200	70	10168	71	1

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

Impact NOI-4 (No-Action Alternative): ***Noise Effects due to Operations and Maintenance Activities.*** Under the No-Action Alterative, the Project would not be implemented and there would be no operation and maintenance activities in the Project area. In addition, there would be no operation and maintenance related vehicular trips going to and from the Project area. As a result, there would be a **no impact** due to increases in off-site vehicular traffic.

Alternative A (Compact Bypass with Narrow Floodplain and South Canal)

Alternative A would entail construction of new Project facilities, including a new levee system to establish a bypass channel to the north/east of the existing river channel. Other key features include construction of a fish barrier below Mendota Dam, the Mendota Pool Dike (separating the San Joaquin River and Mendota Pool), and the South Canal and South Canal bifurcation structure further upstream. No construction activities are proposed at or near Mendota Dam, which falls outside the Project boundary under Alternative A. Construction activity is expected to occur intermittently over an approximate 132-month timeframe.

Impact NOI-1 (Alternative A): ***Exposure of Sensitive Receptors to Temporary Construction Noise.*** Compared to the No-Action Alternative, construction activities associated with Alternative A have the potential to generate a short-term increase in noise on the surrounding environs. The loudest construction activities that would be conducted during Alternative A would be the construction of the Compact Bypass grade control structures, South Canal bifurcation structure, fish passage facilities, fish screens, and a fish barrier where the use of pile driving equipment is expected or possible. Appendix 17-C lists the distances to the daytime 50 and nighttime 45 dBA L_{eq} noise contours for all groups of construction activities that originate from the Project construction activities that would be conducted for Alternative A. Although the majority of the construction activities are anticipated to be conducted during construction noise exempt hours (weekdays 7:00 a.m. to 7:00 p.m., Saturday 9:00 a.m. to 5:00 p.m.), nighttime construction may occur. Construction activities associated with Alternative A have the potential to generate temporary adverse effects at noise-sensitive receivers if construction activities are conducted within the daytime 50 dBA L_{eq} or nighttime 45 dBA L_{eq} noise contours during nights and weekends (outside of the construction noise exempt hours).

When comparing Alternative A to existing conditions, impacts to noise would be similar to those discussed in the preceding paragraph (i.e., the comparison of Alternative A to the No-Action Alternative). Depending on the construction activity, distances to the daytime 50 dBA L_{eq} noise contours range from 2,500 to 21,700 feet and the nighttime 45 dBA L_{eq} noise contours range from 4,400 to 38,600 feet. Although the majority of the construction activities are anticipated to be conducted during the daytime and during construction noise exempt hours, nighttime construction may occur. Construction activities associated with Alternative A would generate a **potentially significant** impact.

Mitigation Measure NOI-1 (Alternative A): ***Reduce Temporary and Short-Term Noise Levels from Construction-Related Equipment Near Sensitive Receptors***.

Construction activities in the Project area will be modified to minimize adverse effects to noise sensitive receptors when construction activities occur within daytime 50 dBA Leq

noise contours or nighttime 45 dBA Leq noise contours outside of construction noise exempt hours. Implementation of the following measures would reduce potential construction noise-related impacts to sensitive receptors to a less-than-significant level. This impact would be **less than significant with mitigation**.

Implementation Action: Project proponents will ensure that the following noise-reduction protocols are implemented, as needed, to reduce temporary and short-term construction-related noise impacts near sensitive receptors.

- Equipment will be used as far away as practical from noise-sensitive uses.
- Construction equipment will be properly maintained per manufacturers' specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). All impact tools will be shrouded or shielded, and all intake and exhaust ports on power equipment will be muffled or shielded.
- Equipment that is quieter than standard equipment will be used, including electrically powered equipment instead of internal combustion equipment where use of such equipment is a readily available substitute that accomplishes Project tasks in the same manner as internal combustion equipment.
- Construction site and haul road speed limits will be established and enforced.
- The use of bells, whistles, alarms, and horns will be restricted to safety and warning purposes only.
- Construction equipment will not idle for extended periods of time when not being used during construction activities.
- When construction activities are conducted within 2,000 feet of noise-sensitive uses, noise measurements will be taken at the nearest noise-sensitive land uses relative to construction activities with a sound-level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 or Type 2). This would allow that construction noise levels to comply with applicable daytime and nighttime noise standards. When construction noise exceeds applicable daytime and nighttime standards, berms, or stockpiles will be used in an attempt to lower noise levels to within acceptable nontransportation standards. If noise levels are still determined to exceed noise standards, temporary barriers will be erected as close to the construction activities as feasible, breaking the line of sight between the source and receptor where noise levels exceed applicable standards. All acoustical barriers would be constructed with material having a minimum surface weight of 2 pounds per square foot or greater and a demonstrated Sound Transmission Class (STC) rating of 25 or greater, as defined by Test Method E90 of the American Society for Testing and Materials. Placement, orientation, size, and density of acoustical barriers will be specified by a qualified engineer.
- A disturbance coordinator will be designated to post contact information in a conspicuous location near the construction site entrance so that it is clearly

visible to nearby receivers. The coordinator will manage complaints resulting from the construction noise. Reoccurring disturbances will be evaluated by a qualified acoustical consultant to ensure compliance with applicable standards. The disturbance coordinator will contact nearby noise-sensitive receptors, advising them of the construction schedule.

Location: Project areas where construction activities will be conducted within 2,000 feet of noise-sensitive receptors.

Effectiveness Criteria: Effectiveness will be based on public complaints to the SJRRP.

Responsible Agency: Reclamation and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and California State Lands Commission (CSLC) monitors.

Timing: Ongoing when construction activities occur outside of construction noise exempt hours.

Impact NOI-2 (Alternative A): ***Exposure of Sensitive Receptors to Temporary Construction Vibration.*** Compared to the No-Action Alternative, vibration levels generated by Project construction activities related to Alternative A have the potential to temporarily increase ground-borne vibration levels near sensitive receptors. Table 17-11 lists vibration source levels for typical construction equipment. Impact pile driving activities would be conducted during the construction of Alternative A and the vibration source level listed for impact pile drivers (104 VdB at a distance of 25 feet) is the reference level that is used for estimating potential annoyance generated by pile driving activities.

It is assumed, as a worst-case scenario for ground-borne vibration levels, that more than 70 vibration events would be conducted per day during pile driving activities. Using this assumption results in a vibration standard of 72 VdB at residences and buildings where people normally sleep. Ground-borne vibration levels generated by pile drivers located less than 300 feet away from sensitive receivers would have an adverse effect on the sensitive receivers. However, all noise-sensitive receivers would be located more than 300 feet away from pile driving activities and effects generated by ground-borne vibration would be minimal.

When comparing Alternative A to existing conditions, impacts to noise would be similar to those discussed in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). All sensitive receivers would be located more than 300 feet away from pile driving activities and there would be a **less than significant** impact.

Impact NOI-3 (Alternative A): ***Increased Off-Site Vehicular Traffic Noise due to Construction Related Trips.*** Compared to the No-Action Alternative, off-site traffic noise levels generated by Project construction worker and truck trips (related to

Alternative A) traveling to and from the Project area have the potential to create a noticeable increase in traffic noise. Tables 17-14 and 17-15 show the change in CNEL (dBA) for the No-Action Alternative (2035) and existing conditions compared to Alternative A, respectively. The largest increase in vehicular traffic noise would be along San Mateo Avenue where three noise-sensitive receivers (LT-2, R-7 and R-6) would experience a traffic noise increase of up to 15 dBA CNEL, as compared to the No-Action Alternative. The increase in traffic noise is the result of construction-related truck traffic traveling up and down San Mateo Avenue delivering materials to the designated stockpile staging areas. This increase in noise would have a temporary adverse effect on the homes along San Mateo Avenue.

Table 17-14.
Change in Traffic Noise between No-Action Alternative and Alternative A

Road Segments	Speed Limit (mph)	No-Action (2035)		Alternative A (2035)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	632	50	832	51	0
San Mateo Road north of SR-180	25	678	51	2,690	66	15
SR-33 south of SR-180/33 Junction	55	14,632	74	15,098	74	1
SR-33 north of SR-180/33 Junction	55	6,944	72	7,225	73	0
SR-180 west of San Mateo Avenue	55	10,168	71	10,853	72	2
SR-180 east of San Mateo Avenue	55	10,168	71	10,950	73	2

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

Table 17-15.
Change in Traffic Noise between Existing Condition and Alternative A

Road Segments	Speed Limit (mph)	Existing (2009)		Alternative A (2009)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	510	50	710	50	1
San Mateo Road north of SR-180	25	547	50	2,559	66	16
SR-33 south of SR-180/33 Junction	55	11,800	73	12,266	73	1
SR-33 north of SR-180/33 Junction	55	5,600	71	5,881	72	1
SR-180 west of San Mateo Avenue	55	8,200	70	8,885	72	2
SR-180 east of San Mateo Avenue	55	8,200	70	8,982	72	2

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

When comparing Alternative A to existing conditions, impacts to construction-related traffic noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative A to the No-Action Alternative). The noise-sensitive receivers located along San Mateo Avenue would experience a noise increase of up to 16 dBA CNEL from construction-related truck traffic (which is greater than the 5 dBA CNEL significance criteria) and this increased traffic would not necessarily occur during construction exempt times. Therefore, impacts would be **potentially significant**.

Mitigation Measure NOI-3 (Alternative A): *Reduce Temporary Noise Levels from Construction-Related Traffic Increases Near Sensitive Receptors*. Construction-related activities will be modified to reduce temporary and short-term traffic noise at sensitive receptors along San Mateo Avenue when construction-related traffic noise is generated outside of construction noise exempt hours. Implementation of the following measures would reduce potential construction-related traffic noise impacts along San Mateo Avenue to a less-than-significant level. This impact would be **less than significant with mitigation**.

Implementation Action: Project proponents will ensure that the following noise-reduction protocols are implemented on haul routes near sensitive receptors along San Mateo Avenue to reduce temporary and short-term construction-related traffic noise generated outside of construction noise exempt hours.

- Equip all heavy trucks with noise-control devices (e.g., mufflers) in accordance with manufacturers' specifications.
- Inspect all heavy trucks periodically to ensure proper maintenance and presence of noise-control devices (e.g., lubrication, non-leaking mufflers, and shrouding).
- Establish and implement measures to reduce haul truck operation speeds, limit the amount of borrow site material to be hauled daily, and limit the hours of operation for haul trucks.
- Install temporary noise barriers adjacent to sensitive receptor locations, as needed.

Location: Haul routes near sensitive receptors along San Mateo Avenue.

Effectiveness Criteria: Effectiveness will be based on public complaints to the SJRRP.

Responsible Agency: Reclamation and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing when construction activities occur outside of construction noise exempt hours.

Impact NOI-4 (Alternative A): ***Noise Effects due to Operation and Maintenance Activities.*** Compared to the No-Action Alternative (which would not require additional operation and maintenance activities), operation and maintenance activities associated with Alternative A would not generate a noticeable increase in noise on the surrounding environs. The primary noise source due to operation of the Project would be generated by the increase in traffic caused by the workers going to and from the Project site for operational and maintenance activities. Tables 17-16 and 17-17 illustrate the increases in ADT volumes going into the Project area during both operational and maintenance activities, respectively. The highest possible increase in traffic would occur during maintenance activities at the South Canal control structures and San Mateo Avenue, and would result in an increase of eight trips to the traffic volume. When compared to the traffic along the access routes leading into the Project area, an addition of eight trips would not result in a noticeable change in traffic noise. As a result, there would be a minimal effect on all nearby noise-sensitive receivers.

When comparing Alternative A to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative A to the No-Action Alternative). The increase in traffic due to operation and maintenance activities would result in a **less than significant** impact.

Table 17-16.
Alternative A Operational Activity ADTs

Operational Activity	Assumptions	ADT
South Canal - river side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
Inspection of ladder	periodically throughout flows into the bypass channel, 1 staff for 1 hour during inspection of gates	2
South Canal - canal side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
San Mateo Avenue		
Road closure	1 worker for 4 hours, 2x per year	2
Fish Screen		
Inspections, flow verification, clear debris	1 Water Tech, 120 days.	2
Velocity measurements	2 DWR Divers, 2x per year, 8 hours per screen, 4 screens	4
Fish Barrier		
Inspection, flow verification, clear debris	1 Water Tech, 120 days.	2
Install/Remove barrier screens	2 Water Techs, one week to install the barrier screens and one week for removal	4

ADT = average daily traffic

Table 17-17.
Alternative A Maintenance Activity ADTs

Maintenance Activity	Assumptions	ADT
South Canal - river side control structure		
Sediment removal from channel	2 workers for one day, 2x per year	4
Lube gates	2 workers for one day, 1x per year	4
Fish Ladder Cleaning	periodically throughout flows into the river, 2 staff	4
Fish attraction pipeline Cleaning	periodically throughout flows into the river, 2 staff	4
South Canal - canal side control structure		
Sediment removal from channel	4 workers for one week, 1x per year	8
Lube gates	2 workers for one day, 1x per year	4
Channel Survey	Survey crew of 4, 2 engineers and 2 techs for one week 1x per year	8
Channel reshaping	4 workers for one week, 1x per year	8
San Mateo Avenue		
Cleaning out culverts	4 workers, 2 days, 1x per year	8
Cleaning of debris off roadway	completed periodically just prior road opening, 2 workers, dozer, truck	4
Fish Screen		
Sediment removal from channel	2 workers for one day, 2x per year	4
Screens removal for cleaning	3 Techs; 4 panels; 2 panels/day; 10 hours/day	6
Screens removal for cleaning	Crane operator; 4 panels; 2 panels/day; 10 hours/day	2
Screens removal for cleaning	Engineer for inspection; 4 panels; 2 panels/day; 1 hour/day	2
Grease and inspect pump/motor	2 Techs (10 hours/month)	4
Brush inspection	2 Techs (10 hours/month)	4
Trash Rack	2 Techs (10 hours/month)	4

ADT = average daily traffic

Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the Preferred Alternative

Key features of Alternative B include construction of a new levee system to establish a bypass channel northeast of the existing river channel, Compact Bypass Control Structure, Mendota Pool Control Structure, and re-route of Drive 10 ½. No construction activities are proposed at or near Mendota Dam, which falls outside the project boundary under Alternative B. Construction activity is expected to occur intermittently over an approximate 157-month timeframe.

Impact NOI-1 (Alternative B): ***Exposure of Sensitive Receptors to Temporary Construction Noise.*** Compared to the No-Action Alternative, construction activities associated with Alternative B have the potential to generate a short-term increase in noise on the surrounding environs. The loudest construction activities that would be conducted during Alternative B would be the construction of the Compact Bypass grade control structures, the Mendota Pool Control Structure, the Compact Bypass ~~Bifurcation~~ Control Structure, fish passage facilities, and fish screens~~, and a fish barrier~~ where the use of pile driving equipment is expected or possible. Appendix 17-C lists the distances to the

daytime 50 and nighttime 45 dBA L_{eq} noise contours for all groups of construction activities that would be conducted for Alternative B. Although the majority of the construction activities are anticipated to be conducted during construction noise exempt hours (weekdays 7:00 a.m. to 7:00 p.m., Saturday 9:00 a.m. to 5:00 p.m.), nighttime construction may occur. Construction activities associated with Alternative B have the potential to generate temporary adverse effects at noise-sensitive receivers as compared to the No-Action Alternative if construction activities are conducted within the daytime 50 dBA L_{eq} or nighttime 45 dBA L_{eq} noise contours during nights and weekends (outside of the construction noise exempt hours).

When comparing Alternative B to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative B to the No-Action Alternative). Depending on the construction activity, distances to the daytime 50 dBA L_{eq} noise contours range from 2,200 to 21,700 feet and the nighttime 45 dBA L_{eq} noise contours range from 4,000 to 38,600 feet. Although the majority of the construction activities are anticipated to be conducted during the daytime and during construction noise exempt hours, nighttime construction may occur. Construction activities associated with Alternative B would generate a **potentially significant** impact.

Mitigation Measure NOI-1 (Alternative B): ***Reduce Temporary and Short-Term Noise Levels from Construction-Related Equipment Near Sensitive Receptors.*** Refer to Mitigation Measure NOI-1 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact NOI-2 (Alternative B): ***Exposure of Sensitive Receptors to Temporary Construction Vibration.*** Refer to Impact NOI-2 (Alternative A) for more information. Pile driving activities are anticipated to be conducted more than 300 feet away from each identified sensitive receiver, and there would be a **less than significant** impact.

Impact NOI-3 (Alternative B): ***Increased Off-Site Vehicular Traffic Noise due to Construction Related Trips.*** Compared to the No-Action Alternative, off-site traffic noise levels generated by Project construction worker and truck trips (related to Alternative B) traveling to and from the Project area have the potential to create a noticeable increase in traffic noise. Tables 17-18 and 17-19, shown below, show the change in CNEL (dBA) for the No-Action Alternative and existing conditions compared to Alternative B, respectively. The largest increase in vehicular traffic noise, as compared to the No-Action Alternative, would be along San Mateo Avenue where three noise sensitive receivers (LT-2, R-7 and R-6) would experience a traffic noise increase of up to 15 dBA CNEL. This increase in traffic noise is a result of construction related truck traffic traveling up and down San Mateo Avenue delivering construction related materials to the designated stockpile staging areas. This increase in noise would have a temporary adverse effect on the homes along San Mateo Avenue.

When comparing Alternative B to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative B to the No-Action Alternative). The noise sensitive receivers located along San Mateo Avenue would experience a noise increase of up to 16 dBA CNEL from construction related truck

traffic and this increased traffic would not necessarily occur during construction exempt times. Therefore, impacts would be **potentially significant**.

Table 17-18.
Change in Traffic Noise between No-Action Alternative and Alternative B

Road Segments	Speed Limit (mph)	No-Action (2035)		Alternative B (2035)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	632	50	832	51	0
San Mateo Road north of SR-180	25	678	51	2,574	66	15
SR-33 south of SR-180/33 Junction	55	14,632	74	15,068	74	1
SR-33 north of SR-180/33 Junction	55	6,944	72	7,226	73	0
SR-180 west of San Mateo Avenue	55	10,168	71	10,794	72	2
SR-180 east of San Mateo Avenue	55	10,168	71	10,922	73	2

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

Table 17-19.
Change in Traffic Noise between Existing (2009) Condition and Alternative B (2009) (CNEL dBA)

Road Segments	Speed Limit (mph)	Existing (2009)		Alternative B (2009)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	510	50	710	50	1
San Mateo Road north of SR-180	25	547	50	2,443	66	16
SR-33 south of SR-180/33 Junction	55	11,800	73	12,236	73	1
SR-33 north of SR-180/33 Junction	55	5,600	71	5,882	72	1
SR-180 west of San Mateo Avenue	55	8,200	70	8,826	72	2
SR-180 east of San Mateo Avenue	55	8,200	70	8,954	72	2

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

Mitigation Measure NOI-3 (Alternative B): *Reduce Temporary Noise Levels from Construction-Related Traffic Increases Near Sensitive Receptors*. Refer to Mitigation Measure NOI-3 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact NOI-4 (Alternative B): ***Noise Effects due to Operation and Maintenance Activities.*** Compared to the No-Action Alternative (which would not require additional operation and maintenance activities), operation and maintenance activities associated with Alternative B would not generate a noticeable increase in noise on the surrounding environs. The primary noise source due to operation of the Project would be generated by the increase in traffic caused by the workers going to and from the Project site for operational and maintenance activities. Tables 17-20 and 17-21, shown below, illustrate the increases in ADT volumes going into the Project area during both operational and maintenance activities, respectively. The highest possible increase in traffic would occur during maintenance activities at the Compact Bypass ~~Bifurcation~~ Control Structure and San Mateo Avenue, which would result in an increase of eight trips to the traffic volume. When compared to the ambient traffic along the access routes leading into the Project area, an addition of eight trips would not result in a noticeable change in traffic noise. As a result, there would be a minimum effect on all nearby noise sensitive receivers.

When comparing Alternative B to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative B to the No-Action Alternative). The increase in traffic due to operation and maintenance activities would result in a **less than significant** impact.

Table 17-20.
Alternative B Operational Activity ADTs

Operational Activity	Assumptions	ADT
Compact Bypass Bifurcation - river side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
Inspection of ladder	periodically throughtout flows into the bypass channel, 1 staff for 1 hour during inspection of gates	2
Compact Bypass Bifurcation - canal side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
San Mateo Avenue		
Road closure	1 worker for 4 hours, 2x per year	2
Chowchilla - river side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
Inspection of ladder	periodically throughtout flows into the bypass channel, 1 staff for 1 hour during inspection of gates	2
Fish Screen		
Inspections, flow verification, clear debris	1 Water Tech, 120 days.	2
Velocity measurements	2 DWR Divers, 2x per year, 8 hours per screen at 4 screens	4

Table 17-20.
Alternative B Operational Activity ADTs

Operational Activity	Assumptions	ADT
Fish Barrier		
Inspection, flow verification, clear debris	1 Water Tech, 120 days.	2
Install/Remove barrier screens	2 Water Techs, one week to install the barrier screens and one week for removal	4

ADT = average daily traffic

Table 17-21.
Alternative B Maintenance Activity ADTs

Maintenance Activity	Assumptions	ADT
Compact Bypass Bifurcation - river side control structure		
Sediment removal from channel	2 workers for one day, 2x per year	4
Lube gates	2 workers for one day, 1x per year	4
Fish Ladder Cleaning	periodically throughtout flows into the river, 2 staff	4
Fish attraction pipeline Cleaning	periodically throughtout flows into the river, 2 staff	4
Compact Bypass Bifurcation - canal side control structure		
Sediment removal from channel	4 workers for one week, 1x per year	8
Lube gates	2 workers for one day, 1x per year	4
Channel Survey	Survey crew of 4, 2 engineers and 2 techs for one week 1x per year	8
Channel reshaping	4 workers for one week, 1x per year	8
San Mateo Avenue		
Cleaning out culverts	4 workers, 2 days, 1x per year	8
Cleaning of debris off roadway	completed periodically just prior road opening, 2 workers, dozer, truck	4
Fish Screen		
Sediment removal from channel	2 workers for one day, 2x per year	4
Screens removal for cleaning	3 Techs; 4 panels; 2 panels/day; 10 hours/day	6
Screens removal for cleaning	Crane operator; 4 panels; 2 panels/day; 10 hours/day	2
Screens removal for cleaning	Engineer for inspection ; 4 panels; 2 panels/day; 1 hour/day	2
Grease and inspect pump/motor	2 Techs (10 hours/month)	4
Brush inspection	2 Techs (10 hours/month)	4
Trash Rack	2 Techs (10 hours/month)	4

ADT = average daily traffic

Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)

Key features of Alternative C for noise and vibration include construction of new fish passage facilities at Mendota Dam, grade control structures downstream of Mendota Dam, a new Fresno Slough Dam, and Main Canal and Helm Ditch relocations.

Construction activity is expected to occur intermittently over an approximate 133-month timeframe.

Impact NOI-1 (Alternative C): ***Exposure of Sensitive Receptors to Temporary Construction Noise.*** Compared to the No-Action Alternative, construction activities associated with Alternative C have the potential to generate a short-term increase in noise on the surrounding environs. The loudest construction activities that would be conducted during Alternative C would be the construction of the Fresno Slough Dam, Short Canal control structure, fish passage facilities and fish screens, modifications of Mendota Dam including installation of downstream grade control structures where the use of pile driving equipment is expected or possible. Appendix 17-C lists the distances to the daytime 50 and nighttime 45 dBA L_{eq} noise contours for all groups of construction activities that would be conducted for Alternative C. Although the majority of the construction activities are anticipated to be conducted during construction noise exempt hours (weekdays 7:00 a.m. to 7:00 p.m., Saturday 9:00 a.m. to 5:00 p.m.), nighttime construction may occur. Construction activities associated with Alternative C, as compared to the No-Action Alternative, have the potential to generate temporary adverse effects at noise-sensitive receivers if construction activities are conducted within the daytime 50 L_{eq} dBA or nighttime 45 dBA L_{eq} noise contours during nights and weekends (outside of the construction noise exempt hours).

When comparing Alternative C to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative C to the No-Action Alternative). Depending on the construction activity, distances to the daytime 50 dBA L_{eq} noise contours range from 2,900 to 21,700 feet and the nighttime 45 dBA L_{eq} noise contours range from 5,200 to 38,600 feet. Although the majority of the construction activities are anticipated to be conducted during the daytime and during construction noise exempt hours, nighttime construction may occur. Construction activities associated with Alternative C would generate a **potentially significant** impact.

Mitigation Measure NOI-1 (Alternative C): ***Reduce Temporary and Short-Term Noise Levels from Construction-Related Equipment Near Sensitive Receptors.*** Refer to Mitigation Measure NOI-1 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact NOI-2 (Alternative C): ***Exposure of Sensitive Receptors to Temporary Construction Vibration.*** Compared to the No-Action Alternative, vibration levels generated by Project construction activities related to Alternative C have the potential to temporarily increase ground-borne vibration levels near sensitive receptors. Ground-borne vibration levels generated by pile drivers located less than 300 feet away from sensitive receivers would have an adverse effect on the sensitive receivers. (Refer to Impact NOI-2 (Alternative A) for more information.) One residential structure would be located approximately 260 feet away from pile driving activities under Alternative C and therefore effects generated by ground-borne vibration could be noticeable.

When comparing Alternative C to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative C to the

No-Action Alternative). Pile driving activities are anticipated to be conducted within 300 feet of an identified sensitive receiver, and therefore impacts would be **potentially significant**.

Mitigation Measure NOI-2 (Alternative C): *Minimize Vibration Related Effects.* Construction activities in the Project area will be modified to minimize adverse effects to the public or the environment, including implementing control measures prior to and during pile driving activities. Implementation of the following measures would reduce potential vibration-related effects to a less-than-significant level. This impact would be **less than significant with mitigation**.

Implementation Action: The contractors will implement the following actions to minimize potential vibration-related effects:

- Notify nearby homeowners of pile driving activities when pile driving would be conducted within 300 feet or less of residential structures.
- Conduct pile driving activities during daytime hours only (between 7:00 a.m. to 7:00 p.m.).
- Utilize drill-and-casing methods or a vibratory pile driver when conducting pile driving activities within 300 feet or less of residential structures.

Location: Project areas where pile driving construction activities will be conducted within 300 feet or less of sensitive receptors.

Effectiveness Criteria: Effectiveness will be based on public complaints to the SJRRP.

Responsible Agency: Reclamation and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing during pile driving construction activities within 300 feet or less of residential structures.

Impact NOI-3 (Alternative C): *Increased Off-Site Vehicular Traffic Noise due to Construction Related Trips.* Compared to the No-Action Alternative, off-site traffic noise levels generated by Project construction worker and truck trips (related to Alternative C) traveling to and from the Project area have the potential to create a noticeable increase in traffic noise. Tables 17-22 and 17-23, shown below, show the change in CNEL (dBA) for the No-Action Alternative and existing conditions compared to Alternative C, respectively. The largest increase in vehicular traffic noise, compared to the No-Action Alternative, would be along San Mateo Avenue where three noise sensitive receivers (LT-2, R-7 and R-6) would experience a traffic noise increase of up to 14 dBA CNEL. This increase in traffic noise is a result of construction related truck traffic traveling up and down San Mateo Avenue delivering construction related materials

to the designated stockpile staging areas. This increase in noise would have a temporary adverse effect on the homes along San Mateo Avenue.

When comparing Alternative C to existing conditions, impacts to construction-related traffic noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative C to the No-Action Alternative). The noise sensitive receivers located along San Mateo Avenue would experience a noise increase of up to 15 dBA CNEL from construction related truck traffic and this increased traffic would not necessarily occur during construction exempt times. Therefore, impacts would be **potentially significant**.

Table 17-22.
Change in Traffic Noise between No-Action Alternative and Alternative C

Road Segments	Speed Limit (mph)	No-Action (2035)		Alternative C (2035)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	632	50	832	51	0
San Mateo Road north of SR-180	25	678	51	2,139	65	14
SR-33 south of SR-180/33 Junction	55	14,632	74	15,012	74	0
SR-33 north of SR-180/33 Junction	55	6,944	72	7,149	73	0
SR-180 west of San Mateo Avenue	55	10,168	71	10,670	72	1
SR-180 east of San Mateo Avenue	55	10,168	71	10,744	72	1

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

Table 17-23.
Change in Traffic Noise between Existing Conditions and Alternative C

Road Segments	Speed Limit (mph)	Existing (2009)		Alternative C (2009)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	510	50	710	50	1
San Mateo Road north of SR-180	25	547	50	2,008	65	15
SR-33 south of SR-180/33 Junction	55	11,800	73	12,180	73	1
SR-33 north of SR-180/33 Junction	55	5,600	71	5,805	72	0
SR-180 west of San Mateo Avenue	55	8,200	70	8,702	71	2
SR-180 east of San Mateo Avenue	55	8,200	70	8,776	71	2

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

Mitigation Measure NOI-3 (Alternative C): ***Reduce Temporary Noise Levels from Construction-Related Traffic Increases Near Sensitive Receptors.*** Refer to Mitigation Measure NOI-3 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact NOI-4 (Alternative C): ***Noise Effects due to Operation and Maintenance Activities.*** Compared to the No-Action Alternative (which would not require additional operation and maintenance activities), operation and maintenance activities associated with Alternative C would not generate a noticeable increase in noise on the surrounding environs. The primary noise source due to operation of the Project would be generated by the increase in traffic caused by the workers going to and from the Project site for operational and maintenance activities. Tables 17-24 and 17-25, shown below, illustrate the increases in ADT volumes going into the Project area during both operational and maintenance activities, respectively. The highest possible increase in traffic would occur during maintenance activities at the Short Canal Control Structure and San Mateo Avenue, which would result in an increase of eight trips to the traffic volume. When compared to the ambient traffic along the access routes leading into the Project area, an addition of eight trips would not result in a noticeable change in traffic noise. As a result, there would be a minimum effect on all nearby noise sensitive receivers.

Table 17-24.
Alternative C Operational Activity ADTs

Operational Activity	Assumptions	ADT
Fresno Slough Dam Estimate		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Monitor for seepage	when flows to the bypass cease	2
Short Canal - canal side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
Mendota Dam		
Installation/Removal of Flashboards	installation during flows into the bypass channel and removal when flows are no longer needed, 4 water techs for 2 days every 4 years	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
Inspection of ladder	periodically throughtout flows into the bypass channel, 1 staff for 1 hour during inspection of gates	2
San Mateo Avenue		
Road closure	1 worker for 4 hours, 2x per year	2
Chowchilla Bifurcation - river side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
Inspection of ladder	periodically throughtout flows into the bypass channel, 1 staff for 1 hour during inspection of gates	2

Table 17-24.
Alternative C Operational Activity ADTs

Operational Activity	Assumptions	ADT
Fish Screen		
Inspections, flow verification, clear debris	1 Water Tech, 120 days.	2
Velocity measurements	2 DWR Divers, 2x per year, 8 hours per screen, 4 screens	4
Fish Barrier		
Inspection, flow verification, clear debris	1 Water Tech, 120 days.	2
Install/Remove barrier screens	2 Water Techs, one week to install the barrier screens and one week for removal	4

ADT = average daily traffic

Table 17-25.
Alternative C Maintenance Activity ADTs

Maintenance Activity	Assumptions	ADT
Fresno Slough Dam Estimate		
Sediment removal from channel	2 workers for one day, 2x per year	4
Lube gates	2 workers for one day, 1x per year	4
Short Canal - canal side control structure		
Sediment removal from channel	4 workers for one week, 1x per year	8
Lube gates	2 workers for one day, 1x per year	4
San Mateo Avenue		
Cleaning out culverts	4 workers, 2 days, 1x per year	8
Cleaning of debris off roadway	completed periodically just prior road opening, 2 workers, dozer, truck	4
Chowchilla Bifurcation Structure Estimate		
Sediment removal from channel	2 workers for one day, 2x per year	8
Lube gates	2 workers for one day, 1x per year	8
Mendota Dam		
Fish Ladder Cleaning	periodically throughout flows into the bypass channel, 2 staff	4
Sediment removal from channel	2 workers for one day, 2x per year every 4 years	4
Fish Screen		
Sediment removal from channel	2 workers for one day, 2x per year	4
Screens removal for cleaning	3 Techs; 4 panels; 2 panels/day; 10 hours/day	6
Screens removal for cleaning	Crane operator; 4 panels; 2 panels/day; 10 hours/day	2
Screens removal for cleaning	Engineer for inspection ; 4 panels; 2 panels/day; 1 hour/day	2
Grease and inspect pump/motor	2 Techs (10 hours/month)	4
Brush inspection	2 Techs (10 hours/month)	4
Trash Rack	2 Techs (10 hours/month)	4

ADT = average daily traffic

When comparing Alternative C to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative C to the No-Action Alternative). The increase in traffic due to operation and maintenance activities would result in a **less than significant** impact.

Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)

Key features of Alternative D for noise and vibration include construction of new fish passage facilities at Mendota Dam, grade control structures downstream of Mendota Dam, Fresno Slough Dam, Main Canal and Helm Ditch relocations, and the North Canal. Construction activity is expected to occur intermittently over an approximate 158-month timeframe.

Impact NOI-1 (Alternative D): ***Exposure of Sensitive Receptors to Temporary Construction Noise.*** Compared to the No-Action Alternative, construction activities associated with Alternative D have the potential to generate a short-term increase in noise on the surrounding environs. The loudest construction activities that would be conducted during Alternative D would be the construction of Fresno Slough Dam, North Canal bifurcation structure, fish passage facilities, fish screens, and a fish barrier where the use of pile driving equipment is expected or possible. Appendix 17-C lists the distances to the daytime 50 and nighttime 45 dBA L_{eq} noise contours for all groups of construction activities that would be conducted for Alternative D. Although the majority of the construction activities are anticipated to be conducted during construction noise exempt hours (weekdays 7:00 a.m. to 7:00 p.m., Saturday 9:00 a.m. to 5:00 p.m.), nighttime construction may occur. Construction activities associated with Alternative D, in comparison to the No-Action Alternative, have the potential to generate temporary adverse effects at noise-sensitive receivers if construction activities are conducted within the daytime 50 dBA L_{eq} or nighttime 45 dBA L_{eq} noise contours during nights and weekends (outside of the construction noise exempt hours).

When comparing Alternative D to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative D to the No-Action Alternative). Depending on the construction activity, distances to the daytime 50 dBA L_{eq} noise contours range from 2,200 to 21,700 feet and the nighttime 45 dBA L_{eq} noise contours range from 4,000 to 38,600 feet. Although the majority of the construction activities are anticipated to be conducted during the daytime and during construction noise exempt hours, nighttime construction may occur. Construction activities associated with Alternative D would generate a **potentially significant** impact.

Mitigation Measure NOI-1 (Alternative D): ***Reduce Temporary and Short-Term Noise Levels from Construction-Related Equipment Near Sensitive Receptors.*** Refer to Mitigation Measure NOI-1 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact NOI-2 (Alternative D): ***Exposure of Sensitive Receptors to Temporary Construction Vibration.*** Refer to Impact NOI-2 (Alternative C) for more information. Pile driving activities are anticipated to be conducted within 300 feet away from an identified sensitive receiver, and therefore impacts would be **potentially significant**.

Mitigation Measure NOI-2 (Alternative C): ***Minimize Vibration Related Effects.*** Refer to Mitigation Measure NOI-2 (Alternative C). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact NOI-3 (Alternative D): ***Increased Off-Site Vehicular Traffic Noise due to Construction Related Trips.*** Compared to the No-Action Alternative, off-site traffic noise levels generated by Project construction worker and truck trips (related to Alternative D) traveling to and from the Project area have the potential to create a noticeable increase in traffic noise. Tables 17-26 and 17-27, shown below, show the change in CNEL (dBA) for the No-Action Alternative and existing conditions compared to Alternative D, respectively. The largest increase in vehicular traffic noise, as compared to the No-Action Alternative, would be along San Mateo Avenue where three noise sensitive receivers (LT-2, R-7 and R-6) would experience a traffic noise increase of up to 14 dBA CNEL. This increase in traffic noise is a result of construction related truck traffic traveling up and down San Mateo Avenue delivering construction related materials to the designated stockpile staging areas. This increase in noise would have a temporary adverse effect on the homes along San Mateo Avenue.

When comparing Alternative D to existing conditions, impacts to construction-related traffic noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative D to the No-Action Alternative). The noise sensitive receivers located along San Mateo Avenue would experience a noise increase of up to 15 dBA CNEL from construction related truck traffic and this increased traffic would not necessarily occur during construction exempt times. Therefore, impacts would be **potentially significant**.

Table 17-26.
Change in Traffic Noise between No-Action Alternative and Alternative D

Road Segments	Speed Limit (mph)	No-Action (2035)		Alternative D (2035)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	632	50	832	51	0
San Mateo Road north of SR-180	25	678	51	2,137	65	14
SR-33 south of SR-180/33 Junction	55	14,632	74	15,011	74	0
SR-33 north of SR-180/33 Junction	55	6,944	72	7,152	73	0
SR-180 west of San Mateo Avenue	55	10,168	71	10,661	72	1
SR-180 east of San Mateo Avenue	55	10,168	71	10,749	72	1

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

Table 17-27.
Change in Traffic Noise between Existing Conditions and Alternative D

Road Segments	Speed Limit (mph)	Existing (2009)		Alternative D (2009)		Change in CNEL (dBA)
		ADT	CNEL (dBA) at 50 feet (feet)	ADT	CNEL (dBA) at 50 feet (feet)	
Bass Avenue east of SR-33	25	510	50	710	50	1
San Mateo Road north of SR-180	25	547	50	2,006	65	15
SR-33 south of SR-180/33 Junction	55	11,800	73	12,179	73	1
SR-33 north of SR-180/33 Junction	55	5,600	71	5,808	72	0
SR-180 west of San Mateo Avenue	55	8,200	70	8,693	71	1
SR-180 east of San Mateo Avenue	55	8,200	70	8,781	72	2

ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel(s)
mph = miles per hour

Mitigation Measure NOI-3 (Alternative D): ***Reduce Temporary Noise Levels from Construction-Related Traffic Increases Near Sensitive Receptors.*** Refer to Mitigation Measure NOI-3 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact NOI-4 (Alternative D): ***Noise Effects due to Operation and Maintenance Activities.*** Compared to the No-Action Alternative (which would not require additional operation and maintenance activities), operation and maintenance activities associated with Alternative D would not generate a noticeable increase in noise on the surrounding environs. The primary noise source due to operation of the Project would be generated by the increase in traffic caused by the workers going to and from the Project site for operational and maintenance activities. Tables 17-28 and 17-29, shown below, illustrate the increases in ADT volumes going into the Project area during both operational and maintenance activities, respectively. The highest possible increase in traffic would occur during maintenance activities at the North Canal control structures and San Mateo Avenue, which would result in an increase of eight trips to the traffic volume. When compared to the ambient traffic along the access routes leading into the Project area, an addition of eight trips would not result in a noticeable change in traffic noise. As a result, there would be a minimum effect on all nearby noise sensitive receivers.

When comparing Alternative D to existing conditions, impacts to noise would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative D to the No-Action Alternative). The increase in traffic due to operation and maintenance activities would result in a **less than significant** impact.

Table 17-28.
Alternative D Operational Activity ADTs

Operational Activity	Assumptions	ADT
Fresno Slough Dam Estimate		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Monitor for seepage	when flows to the bypass cease	2
Mendota Dam		
Inspection of ladder	periodically throughtout flows into the bypass channel, 1 staff for 1 hour during inspection of gates	2
North Canal - river side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
Inspection of ladder	periodically throughtout flows into the bypass channel, 1 staff for 1 hour during inspection of gates	2
North Canal - canal side control structure		
Inspection of gates, seals	periodically throughout flows into the bypass channel	2
Make adjustments	when needed	2
Assessment after flows	when flows to the bypass cease	2
Fish Screen		
Inspections, flow verification, clear debris	1 Water Tech, 120 days.	2
Velocity measurements	2 DWR Divers, 2x per year, 8 hours per screen, 4 screens	4
Fish Barrier		
Inspection, flow verification, clear debris	1 Water Tech, 120 days.	2
Install/Remove barrier screens	2 Water Techs, one week to install the barrier screens and one week for removal	4

ADT = average daily traffic

Table 17-29.
Alternative D Maintenance Activity ADTs

Maintenance Activity	Assumptions	ADT
Fresno Slough Dam Estimate		
Sediment removal from channel	2 workers for one day, 2x per year	4
Lube gates	2 workers for one day, 1x per year	4
North Canal - river side control structure		
Sediment removal from channel	2 workers for one day, 2x per year	4
Lube gates	2 workers for one day, 1x per year	4
Fish Ladder Cleaning	periodically throughtout flows into the river, 2 staff	4
Fish attraction pipeline Cleaning	periodically throughtout flows into the river, 2 staff	4
North Canal - canal side control structure		
Sediment removal from channel	4 workers for one week, 1x per year	8
Lube gates	2 workers for one day, 1x per year	4

Table 17-29.
Alternative D Maintenance Activity ADTs

Maintenance Activity	Assumptions	ADT
Channel Survey	Survey crew of 4, 2 engineers and 2 techs for one week 1x per year	8
Channel reshaping	4 workers for one week, 1x per year	8
Mendota Dam		
Fish Ladder Cleaning	periodically throughtout flows into the bypass channel, 2 staff	4
Sediment removal from channel	2 workers for one day, 2x per year every 4 years	4
Fish Screen		
Sediment removal from channel	2 workers for one day, 2x per year	4
Screens removal for cleaning	3 Techs; 4 panels; 2 panels/day; 10 hours/day	6
Screens removal for cleaning	Crane operator; 4 panels; 2 panels/day; 10 hours/day	2
Screens removal for cleaning	Engineer for inspection ; 4 panels; 2 panels/day; 1 hour/day	2
Grease and inspect pump/motor	2 Techs (10 hours/month)	4
Brush inspection	2 Techs (10 hours/month)	4
Trash Rack	2 Techs (10 hours/month)	4

ADT = average daily traffic

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18.0 Paleontological Resources

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants. This chapter describes environmental and regulatory settings for scientifically important fossil remains, as well as environmental consequences and mitigation measures, as they pertain to implementation of the Project alternatives in the Project area.

18.1 Environmental Setting

18.1.1 Physiographic Environment

The Project area is located in the San Joaquin Valley. The San Joaquin Valley and the Sacramento Valley comprise the Great Valley, commonly referred to as the Central Valley of California. The Great Valley geomorphic province is located between the Sierra Nevada geomorphic province on the east and the Coast Range geomorphic province on the west, as described in Chapter 10.0, "Geology and Soils."

The Great Valley is composed of thousands of feet of sedimentary deposits that have undergone periods of subsidence and uplift over millions of years. During the Jurassic (approximately 206 million years Before Present [B.P.]) and Cretaceous (approximately 144 million years B.P.) periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic era, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. Geologic evidence suggests that the Sacramento Valley and San Joaquin Valley gradually separated into two separate water bodies as uplift and sedimentation continued. By the time of the Miocene epoch (approximately 24 million years B.P.), sediments deposited in the Sacramento Valley were mostly of terrestrial origin. In contrast, the San Joaquin Valley continued to be inundated with water for another 20 million years, as indicated by marine sediments dated to the late Pliocene epoch (approximately 5 million years B.P.). Most of the surface of the Great Valley is covered with Holocene (i.e., less than 11,000 years B.P.) and Pleistocene (11,000 to 1.5 million years B.P.) alluvium. This alluvium is composed of sediments originating from the Sierra Nevada to the east and the Coast Ranges to the west that were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits.

18.1.2 Geologic Setting

Geologic history and conditions are relevant to the evaluation of paleontological resources because they influence the type of fossils that may be found (i.e., aquatic vs. terrestrial organisms) and the probability that any prehistoric remains would be subject to fossilization rather than normal decay. The depositional history of the San Joaquin Valley during the late Quaternary included several cycles related to fluctuations in regional and global climate that caused alternating periods of deposition followed by periods of subsidence and erosion. Thus, the San Joaquin Valley during the Pleistocene consisted of

stages of wetlands and floodplain creation as tidewaters rose in the valley from the west, areas of erosion when tidewaters receded, and alluvial fan deposition from streams emanating from the adjacent mountain ranges (Bartow 1991).

Regional and local surficial geologic mapping and correlation of the various geologic units in the Project area and vicinity have been provided by Jennings and Strand (1958). Geologic mapping by Jennings and Strand (1958) indicates that the Project components and a surrounding 1-mile buffer zone are located in the following geological rock units:

- **Qsc – Recent River and Major Stream Channel Deposits in the Great Valley (Holocene).** This unit is comprised of sediments along the river channels and major streams including adjacent natural levees.
- **Qf – Recent Alluvial Fan Deposits in the Great Valley (Holocene).** This unit is comprised of granitic sand and silt sediments deposited from streams emerging from highlands surrounding the Great Valley.
- **Qb – Recent Basin Deposits in the Great Valley (Holocene).** This unit is comprised of sediments deposited during flood stages of major streams between natural stream levees and fans.

In addition to these three geological units, the following three geological units likely occur underneath portions of Project area and may be encountered during ground disturbance activities greater than a few feet.

- **Qf – Modesto Formation (Pleistocene).** This unit is comprised of granitic sand and silt river terrace or coalescing alluvial fan deposits emerging from surrounding highlands.
- **Qc – Riverbank Formation (Pleistocene).** This unit is comprised of granitic sand, silt and clay older alluvium and dissected fan deposits.
- **Qp – Turlock Lake Formation (Pliocene-Pleistocene).** This unit is comprised of granitic sand, silt, clay and cobbles alluvium deposits.

18.1.3 Local Paleontological Resources

The following is an inventory and assessment of paleontological resources by rock unit (see Table 18-1). In general, to be considered a fossil, a specimen must be older than recent (approximately 10,000 years old). Because sediments of the Recent River and Major Stream Channel Deposits in the Great Valley (Qsc), the Recent Alluvial Fan Deposits in the Great Valley (Qf), and the Recent Alluvial Fan Deposits in the Great Valley (Qb) are considered Holocene (recent) in age, these sediments are unlikely to contain significant paleontological resources and are considered to have low paleontological sensitivity. These three Holocene (recent) geological units are likely underlain by older Pleistocene age units including the Modesto (Qf) Formation, Riverbank (Qc) Formation, and the Pliocene- Pleistocene Turlock Lake (Qp) Formation. These Pliocene-Pleistocene sediments in the Great Valley are reported to contain significant vertebrate fossils (Stirton 1951, Savage 1951, Jefferson 1991a, Jefferson 1991b and Dundas et al. 1996) and are considered to have high paleontological sensitivity.

Table 18-1.
Rock Unit Description in Reach 2B, San Joaquin Valley, CA

Unit within 1-Mile Buffer Zone of Project Area	Name/Description of Unit	Age	Paleontological Sensitivity
Qsc	Stream Channel Deposits	Holocene	Low
Qf	Fan Deposits	Holocene	Low
Qb	Basin Deposits	Holocene	Low
Qf	Modesto Formation	Pleistocene	High
Qc	Riverbank Formation	Pleistocene	High
Qp	Turlock Lake Formation	Pliocene-Pleistocene	High

A University of California Museum of Paleontology (UCMP) on-line catalogue database search of the Restoration Area, completed in 2009 as part of the Program Environmental Impact Statement/Report (PEIS/R) (San Joaquin River Restoration Program [SJRRP] 2011, page 18-4), located two known fossil localities (V4401 and V6806). In addition, this investigation searched the UCMP on-line catalogue database for Pleistocene vertebrate localities in Fresno and Madera Counties (UCMP 2013) which resulted in four additional locations (V5206, V65100, V81121 and V93128). The paleontological sensitivity of all six areas is high. Details of the localities are provided below and in Table 18-2:

- **V4401:** This locality is in the Modesto Formation and located in the Tranquility area in Fresno County. The area is Pleistocene in age. There are 149 fossil records containing mammals (moles, gophers, mice, wood rats, voles, jack rabbits, coyote, red fox, grey fox, badger, horse, camel, pronghorn antelope, elk, deer, and bison), birds, reptiles (turtles and snakes), and bony fish.
- **V5206**: This locality is located Madera County but the name of the specific Formation was not included in the UCMP database. The area is Pleistocene in age. There is one fossil record containing a mammal (horse).
- **V6806:** This locality is in the Modesto Formation and located in the Merced River 1 area in Merced County. The area is Pleistocene in age. There are four fossil records containing mammals (horse, bison, sloth, and camel).
- **V65100:** This locality is located in the Riverdale area in Fresno County but the name of the specific Formation was included in the UCMP database. The area is Pleistocene in age. There is one fossil record containing a mammal (camel).
- **V81121:** This locality is in the Riverbank Formation and located in the Laguna Seca Ranch area in Fresno County. The area is Pleistocene in age. There is one fossil record containing a mammal (horse).
- **V93128:** is in the Turlock Lake Formation[1] and is located near Fairmead Landfill in Madera County. There are 213 fossil records containing mammals (mammoth,

[1] The UCMP on-line catalogue database lists this locality in the Riverbank Formation but detailed studies by Dundas et al. (1996) place the fossil bearing strata in the Turlock Lake Formation.

ground sloth, giant short-faced bear, saber tooth cat, wolf, deer, camel, horse, antelope, rodents, birds, reptiles, and fish).

Table 18-2.
UCMP Locality Results for the Project Vicinity (Fresno County, Madera County, and the Restoration Area)

Locality Identification Number	Locality Name	Age	Number of Specimens	Paleontological Sensitivity
V4401	Tranquility	Pleistocene	149	High
V5206	Ehrreich	Pleistocene	1	High
V6806	Merced River 1	Pleistocene	4	High
V65100	Riverdale	Pleistocene	1	High
V81121	Laguna Seca Ranch	Pleistocene	1	High
V93128	Fairmead Landfill	Pleistocene	213	High

UCMP = University of California Museum of Paleontology

18.2 Regulatory Setting

Paleontological resources are included among nonrenewable scientific resources by governmental agencies. Protection of such resources is provided by Federal and State legislation and by some local ordinances as described below.

18.2.1 Federal

The National Environmental Policy Act (NEPA) requires that objects of historic or scientific interest be considered in assessing the environmental consequences of any proposed project. Paleontological resources are afforded Federal protection under 40 Code of Federal Regulations 1508.27 as a subset of scientific resources.

Federal regulations protect paleontological resources on Federal or public land. These regulations are listed below:

- **Antiquities Act of 1906 (16 United States Code [USC] 431–433).** This Act authorizes the Federal government to regulate the disturbance of objects of antiquity on Federal lands through the responsible managing agency and to prosecute unauthorized damage or removal.
- **The Federal Land Policy and Management Act of 1976 (Public Law [PL] 94-579; 90 Stat. 2743, USC 1701-1782).** This Act requires that public lands be managed in a manner that protects the quality of their scientific values.
- **The Paleontological Resources Preservation Act (Omnibus Public Land Management Act of 2009, PL 111-011).** This Act regulates who may collect fossils on Federal lands and where such fossils must be curated.

18.2.2 State of California

The primary State environmental law that protects fossils is the California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq. CEQA requires that public agencies and private interests identify the significance of the impacts of their proposed projects on any object or site of significance to the scientific annals of California (Pub. Resources Code, § 15064.5, subd. (a)(3)), and this requirement applies to paleontological resources. Appendix G of the State CEQA Guidelines contains an Environmental Checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts. One of the questions to be answered in this Environmental Checklist (Cal. Code Regs., § 15063; Appendix G, Section V, Part c) is the following: "Would the project directly or indirectly destroy a unique paleontological resource or site…?"

Other State requirements for the management of paleontological resources are contained in Public Resources Code Chapter 1.7, section 5097.5 (Statutes 1965, Chapter 1136, Page 2792) under the heading of "Archaeological, Paleontological, and Historical Sites." This statute defines any unauthorized disturbance or removal of a fossil site or remains on public land as a misdemeanor and specifies that State agencies may undertake surveys, excavations, or other operations as necessary on publicly owned lands to preserve or record paleontological resources. Public Resources Code section 30244 requires reasonable mitigation of adverse impacts to paleontological resources on State-owned land.

18.2.3 Regional and Local

The Fresno County General Plan (Fresno County 2000) calls for the identification and protection of paleontological resources. These goals and policies are listed below:

- Goal OS-J is "to identify, protect, and enhance Fresno County's important … paleontological … sites and their contributing environment."
- Policy OS-J.1 states that "The County shall require that discretionary development projects, as part of any required CEQA review, identify and protect important … paleontological … sites and their contributing environment from damage, destruction, and abuse to the maximum extent feasible."

The Madera County General Plan (Madera County 1995) calls for preservation incentive programs for owners of important cultural and paleontological resources. These goals and policies are listed below:

- Goal 4.D is "to identify, protect, and enhance Madera County's important … paleontological … sites and their contributing environment."
- Policy 4.D.2 states that "The County shall coordinate with the cities and advisory councils in the county to promote the preservation and maintenance of Madera County's paleontological … resources."
- Policy 4.D.3 states that "The County shall require that discretionary development projects identify and protect from damage, destruction, and abuse, important … paleontological … sites and their contributing environment."

18.3 Environmental Consequences and Mitigation Measures

18.3.1 Impact Assessment Methodology

The Society of Vertebrate Paleontology (SVP) has developed guidelines and professional standards for assessing the impact of projects on paleontological resources and for mitigation of adverse impacts (SVP 1995, SVP 2010).

Paleontological Resource Assessment Criteria

The SVP (1995) Conformable Impact Mitigation Guidelines outline criteria to assess paleontological sensitivity based on the potential of a geologic unit to contain significant paleontological resources. Based on the SVP Guidelines, a vertebrate fossil is considered significant unless otherwise demonstrated, due to the relative rarity of vertebrate fossils. Vertebrate fossils are so uncommon that, in many cases, each recovered specimen will provide additional important information about the morphological variation or the geographic distribution of its species. Additionally, certain invertebrate or botanical fossils are considered significant paleontological resources if they provide new and substantial taxonomic, phylogenetic, ecologic, or stratigraphic data.

An individual fossil specimen may be considered scientifically important if it contains one or more of the following characteristics:

- It is well preserved.
- Can be identified.
- More complete than most specimens for that species.
- Preserves one or more elements not known in most specimens of that species.
- Indicative of a particular time period.
- Has not been recorded from that sedimentary unit.
- Provides information concerning the environment in which it lived.
- Could be the basis for description of a new species or comes from a site that produced the type (definitive) specimen of its species.
- Belongs to a species rarely encountered.

A rock unit is considered "sensitive" to adverse impacts if there is a high probability that grading, excavation, or other earth-moving would jeopardize significant fossil remains. The paleontological importance or sensitivity of each rock unit exposed is the measure most amenable to assessing the significance of paleontological resources because the areal distribution of each rock unit can be delineated on a topographic or geologic map. The paleontological sensitivity of a stratigraphic unit reflects its potential paleontological productivity and sensitivity as well as the scientific significance of the fossils it has produced. This method of paleontological resource assessment is the most appropriate because discrete levels of paleontological importance can be delineated on a topographic or geologic map.

The SVP Guidelines establish three categories of sensitivity for paleontological resources under the standard guidelines for assessment of paleontological resources. The three categories are low, high, and undetermined, as described below.

- Rock units that are not sedimentary in origin (e.g., most igneous and metamorphic rocks) are categorized as low sensitivity paleontological resources. However, sedimentary rock units may also be categorized as low sensitivity if they have been well examined and have not produced paleontological resources. (Monitoring is not usually recommended or needed during excavation in a rock unit with low sensitivity.)
- High sensitivity paleontological resources are categorized as rock units older than Holocene (recent)[2] for which vertebrate or significant invertebrate or suite of plant fossils have been recovered. (In areas of high paleontological sensitivity, full-time monitoring is recommended during ground disturbance activities.)
- Paleontological resources in sedimentary rock units for which little information is available are categorized as undetermined paleontological sensitivity. It is often possible for an experienced paleontologist to determine whether such a rock unit should be assigned a high or low sensitivity after a pedestrian survey is performed and detailed observations of both natural and artificial exposures of the rock unit are made.

Identification of Local Paleontological Resources

A literature review was performed to aid in the evaluation of the paleontological sensitivity of each geologic unit that would be encountered during Project activities. The paleontological literature was reviewed to assess the locations of published fossil localities at the Project area and within a 1-mile buffer zone, and in the geologic units that would be encountered by Project activities. The paleontological literature was also used to assess the types of fossils that might be encountered as well as the scientific importance of the fossils. The review was conducted by a database search at the UCMP on-line catalogue to locate known fossil localities at the Project area and a 1-mile buffer zone. The geological units, the potential for paleontological resources in these geological units, and known fossil in the Project area and vicinity are discussed in Section 18.1.3.

A key aspect used to assess the Project's potential impacts to paleontological resources is the consideration of locations and depths of Project-related ground disturbance in context of the paleontological sensitivity of the affected soils. Paleontological resources can be affected by earth-moving activities; therefore, the impact analysis discusses only those areas where earth-moving activities may occur. Surface sediments in the Project area are unlikely to contain fossils because of the relatively recent formation of the geological units (i.e., sediments deposited less than 10,000 years ago). Therefore, paleontological resources are unlikely to be affected by streambed erosion or by shallow excavations. However, these surface sediments are underlain by older Pleistocene age formations that may contain vertebrate fossils (see Section 18.1.3). Subsurface soil penetrations (e.g., to construct a foundation for a water control structure) potentially could encounter

[2] Holocene or recent age sediments (less than 10,000 years old) are generally considered to be too young to preserve significant fossils.

paleontological resources. Based on the 5 percent design level, subsurface pilings and excavations would extend up to 35 feet in depth.

18.3.2 Significance Criteria

Because most fossils are of now extinct organisms, they are nonrenewable resources. Therefore, fossils are valuable scientific and educational resources that are protected by Federal, State, and local laws and regulations. The primary State environmental law protecting fossils is CEQA, which requires that public agencies and private interests identify the environmental consequences of their proposed projects on any object or site of significance to the scientific annals of California. The thresholds of significance for potential paleontological impacts were based on the Environmental Checklist Form in Appendix G of the State CEQA Guidelines, as amended. Under NEPA Council on Environmental Quality Regulations, effects must be evaluated in terms of their context and intensity. These factors were considered when applying the CEQA Guidelines Appendix G. The Environmental Checklist Form (Cal. Code Regs., tit. 14 § 15063; Appendix G, Section V, c) includes the following: "Would the project directly or indirectly destroy a unique paleontological resource or site…?"

Although neither CEQA nor the State CEQA Guidelines define what is "a unique paleontological resource or site." CEQA section 21083.2, subdivision (g) defines a "unique archaeological resource" as "…an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person."

18.3.3 Impacts and Mitigation Measures

This section provides a project-level evaluation of direct and indirect effects of the Project alternatives on paleontological resources. It includes analyses of potential effects relative to No-Action conditions in accordance with NEPA and potential impacts compared to existing conditions to meet CEQA requirements. The analysis is organized by Project alternative. With respect to paleontological resources, the environmental impact issue and concern is:

1. Possible Damage to or Destruction of Unique Paleontological Resources.

Other paleontological-related issues covered in the PEIS/R are not covered here because they are programmatic in nature and/or are not relevant to the Project area.

No-Action Alternative

Under the No-Action Alternative, the Project would not be implemented and none of the Project features would be developed in Reach 2B of the San Joaquin River. However, other proposed actions under the SJRRP would be implemented, including habitat restoration in other reaches, augmentation of river flows, and reintroduction of salmon. Without the Project in Reach 2B, however, these activities would not achieve the Settlement goals. The potential effects of the No-Action Alternative are described below. The analysis is a comparison to existing conditions, and no mitigation is required for No-Action.

Impact PAL-1 (No-Action Alternative): *Possible Damage to or Destruction of Unique Paleontological Resources.* Under the No-Action Alternative, there would be no Project-related construction or ground disturbing activities within the Project area. Therefore, there would be **no impact** on paleontological resources from the Project.

Alternative A (Compact Bypass with Narrow Floodplain and South Canal)

Alternative A would include construction of Project facilities including a Compact Bypass channel, a new levee system encompassing the existing river channel in a narrow floodplain, and the South Canal. Other key features include construction of the Mendota Pool Dike (separating the San Joaquin River and Mendota Pool), a fish barrier below Mendota Dam, and the South Canal bifurcation structure, fish passage facility, and fish screens, modification of the San Mateo Avenue crossing, and the removal of the San Joaquin River control structure at the Chowchilla Bifurcation Structure. Construction activity is expected to occur intermittently over an approximate 132-month timeframe.

Borrow material would primarily be required for the construction of the levees, but it may also be utilized in the construction of other structures for foundation or backfill material. Levees may be constructed entirely of local borrow material, a mix of local and imported borrow material, or just imported borrow material. Borrow locations would be determined after a geotechnical exploration of potential local borrow areas is complete. It is estimated that up to 350 acres of land would be needed for borrow areas. Some of the soils excavated to construct the Compact Bypass and the South Canal might be used for levee construction, and if this is possible, then the size of the borrow areas may be reduced.

Impact PAL-1 (Alternative A): *Possible Damage to or Destruction of Unique Paleontological Resources.* Compared to the No-Action Alternative, Alternative A includes construction and ground-disturbing activities in areas that are underlain by Holocene-age (less than 11,000 years old) alluvium. Construction activities that occur in Holocene alluvium including Recent River and Major Stream Channel Deposits; Recent Alluvial Fan Deposits; and Recent Basin Deposits would not affect paleontological resources.

However, below the Holocene-age alluvium, the Project area is underlain by Pleistocene-age sediments of the Modesto and Riverbank Formations and the Pliocene-Pleistocene-age sediments of the Turlock Lake Formation, which are considered paleontologically sensitive rock units under SVP Guidelines (SVP 1995). Numerous vertebrate fossil

specimens have been recovered or recorded from the Modesto, Riverbank and Turlock Lake Formations throughout the San Joaquin Valley and near the Restoration Area. Consequently, potential exists for uncovering additional, similar fossil remains during construction-related earthmoving activities in the Project area.

When comparing Alternative A to existing conditions, impacts to paleontological resources would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). Implementation of Alternative A may uncover Pleistocene-age fossil remains during construction-related earthmoving activities in the Project area. This impact is considered **potentially significant**.

Mitigation Measure PAL-1 (Alternative A): *Stop Work if Paleontological Resources Are Encountered During Earthmoving Activities and Implement Recovery Plan.* To minimize potential adverse impacts on unique, scientifically important paleontological resources during earthmoving activities, the following measures would be implemented during construction to reduce possible damage to unique paleontological resources. The contractor will conduct employee training for the construction workers at the site on identification of paleontological resources. If paleontological resources are discovered in local borrow areas, during earthmoving activities, or in the river channel, the construction crew will immediately cease work in the vicinity of the find. A paleontologist approved by Reclamation and/or CSLC staff will evaluate the resource and prepare a recovery plan in accordance with SVP Guidelines (SVP 1995). The recovery plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations in the recovery plan will be implemented before construction activities could resume at the site where the paleontological resources were discovered.

Implementing this mitigation measure would reduce potentially significant impacts related to potential damage to unique paleontological resources to a less-than-significant level because if resources were encountered, fossil specimens would be recovered, recorded, and would undergo appropriate curation.[3] This impact would be **less than significant after mitigation**.

> **Implementation Action:** The contractor will conduct employee training for the construction workers at the site on identification of paleontological resources. If paleontological resources are discovered in local borrow areas, during earthmoving activities, or in the river channel, the construction crew would immediately cease work in the vicinity of the find. A paleontologist approved by Reclamation and/or CSLC staff will evaluate the resource and prepare a recovery plan in accordance with SVP Guidelines. Recommendations in the recovery plan will be implemented before construction activities could resume at the site.
>
> **Location:** Construction areas with active excavation.

[3] Curation is management and care of collections according to standard professional practice, which may include inventorying, accessing, labeling, cataloging, identifying, evaluating, documenting, storing, maintaining, periodically inspecting, and/or conserving original collections.

Effectiveness Criteria: Performance tracking of this mitigation measure will be based on the stoppage in work in the vicinity of the find and meeting the recommendations in the recovery plan.

Responsible Agency: U.S. Department of the Interior, Bureau of Reclamation.

Monitoring/Reporting Action: Preparation of a recovery plan in accordance with SVP Guidelines, if paleontological resources are discovered during earthmoving activities and notification of California State Lands Commission (CSLC) monitors if find is on land under the CSLC's jurisdiction.

Timing: Mitigation would be ongoing over the construction timeframe.

Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the Preferred Alternative

Alternative B would include construction of Project features including a Compact Bypass channel, a new levee system with a wide, consensus-based floodplain encompassing the river channel, the Mendota Pool Control Structure, and the Compact Bypass ~~Bifurcation~~ Control Structure with fish passage facility and fish screen. Other key features include construction of a fish passage facility at the San Joaquin River control structure at the Chowchilla Bifurcation Structure, the re-route of Drive 10 ½ (across the Compact Bypass C~~c~~ontrol S~~s~~tructure), and the removal of the San Mateo Avenue crossing. Construction activity is expected to occur intermittently over an approximate 157-month timeframe.

Borrow material would primarily be required for the construction of the levees, but it may also be used in the construction of other structures for foundation or backfill material. Levees may be constructed entirely of local borrow material, a mix of local and imported borrow material, or just imported borrow material. Borrow locations would be determined after a geotechnical exploration of potential local borrow areas is complete; the exploration would determine the suitability of local soils for use as borrow material. It is estimated that up to 350 acres of land would be needed for borrow areas. Some of the soils excavated to construct the Compact Bypass might be used for levee construction, and if this is possible, then the size of the borrow areas may be reduced.

Impact PAL-1 (Alternative B): ***Possible Damage to or Destruction of Unique Paleontological Resources.*** Refer to Impact PAL-1 (Alternative A). Potential impacts of Alternative B would be the same as potential impacts of Alternative A with the following exception. The Compact Bypass design in Alternative B includes fewer grade control structures than the other alternatives, which would initiate channel bed erosion in Reach 2B to remove sediment that has been deposited in the San Joaquin River arm of Mendota Pool. This channel bed erosion is anticipated to be up to 7 to 8 feet deep near the upstream end of the Compact Bypass and gradually decrease to zero erosion approximately 4 miles further upstream (River Mile 210). Since this erosion would be of lake deposited sediments in the Mendota Pool and of the Holocene age, the erosion would not likely affect paleontological resources. However, Alternative B may uncover Pleistocene-age fossil remains during construction-related earthmoving activities in the Project area. This impact would be **potentially significant**.

Mitigation Measures PAL-1 (Alternative B): *Stop Work if Paleontological Resources Are Encountered During Earthmoving Activities and Implement Recovery Plan.* Refer to Mitigation Measures PAL-1 (Alternative A). The same measures would be used here. This impact would be **less than significant** after mitigation.

Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)

Alternative C would include construction of Project features including Fresno Slough Dam, a new levee system with a narrow floodplain encompassing the river channel, and the Short Canal. Other key features include construction of the Mendota Dam fish passage facility, the Fresno Slough fish barrier, the Short Canal control structure and fish screen, the Chowchilla Bifurcation Structure fish passage facility, modification of San Mateo Avenue crossing, and Main Canal and Helm Ditch relocations. Construction activity is expected to occur intermittently over an approximate 133-month timeframe.

Borrow material would primarily be required for the construction of the levees, but it may also be utilized in the construction of other structures for foundation or backfill material. Levees may be constructed entirely of local borrow material, a mix of local and imported borrow material, or just imported borrow material. Borrow locations would be determined after a geotechnical exploration of potential local borrow areas is complete; the exploration would determine the suitability of local soils for use as borrow material. It is estimated that up to 350 acres of land is needed for borrow areas. Some of the soils excavated to construct the Short Canal might be used for levee construction, and if this is possible, then the size of the borrow areas may be reduced.

Impact PAL-1 (Alternative C): *Possible Damage to or Destruction of Unique Paleontological Resources.* Refer to Impact PAL-1 (Alternative A). Potential impacts of Alternative C would be the same as potential impacts of Alternative A. This impact would be **potentially significant**.

Mitigation Measures PAL-1 (Alternative C): *Stop Work if Paleontological Resources Are Encountered During Earthmoving Activities and Implement Recovery Plan.* Refer to Mitigation Measures PAL-1 (Alternative A). The same measures would be used here. This impact would be **less than significant** after mitigation.

Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)

Alternative D would include construction of Project features including Fresno Slough Dam, a new levee system with a wide floodplain encompassing the river channel, and the North Canal. Other key features include construction of the Mendota Dam fish passage facility, the Fresno Slough fish barrier, the North Canal bifurcation structure and North Canal fish passage facility, removal of the San Joaquin River control structure at the Chowchilla Bifurcation Structure, removal of San Mateo Avenue crossing, and Main Canal and Helm Ditch relocations. Construction activity is expected to occur intermittently over an approximate 158-month timeframe.

Borrow material would primarily be required for the construction of the levees, but it may also be utilized in the construction of other structures for foundation or backfill material. Levees may be constructed entirely of local borrow material, a mix of local and

imported borrow material, or just imported borrow material. Borrow locations would be determined after a geotechnical exploration of potential local borrow areas is complete; the exploration would determine the suitability of local soils for use as borrow material. It is estimated that up to 350 acres of land is needed for borrow areas. Some of the soils excavated to construct the North Canal might be used for levee construction, and if this is possible, then the size of the borrow areas may be reduced.

Impact PAL-1 (Alternative D): ***Possible Damage to or Destruction of Unique Paleontological Resources.*** Refer to Impact PAL-1 (Alternative A). Potential impacts of Alternative D would be the same as potential impacts of Alternative A. This impact would be **potentially significant**.

Mitigation Measures PAL-1 (Alternative D): ***Stop Work if Paleontological Resources Are Encountered During Earthmoving Activities and Implement Recovery Plan.*** Refer to Mitigation Measures PAL-1 (Alternative A). The same measures would be used here. This impact would be **less than significant** after mitigation.

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19.0 Public Health and Hazardous Materials

This section describes the potential impacts that implementation of Project alternatives may have on public health and hazardous materials and explains the environmental setting, applicable regulatory framework, and appropriate mitigation measures.

19.1 Environmental Setting

This section describes the potential hazardous materials that would be handled, stored, and utilized and hazardous wastes that would be generated during Project construction. It also describes the procedures and engineering controls to be used to manage the Project's potential hazardous material and hazardous waste impacts to public health and the environment.

The Project area is located in Fresno and Madera Counties, near the city of Mendota, California. The Project includes the area of the San Joaquin River between the Chowchilla Bifurcation Structure and downstream of Mendota Dam in Fresno and Madera Counties, California. The size and location of the Project area, including the Project alternatives, are shown on Figure 1-2. The Project area includes land currently developed as farmland including row crops, orchards, and vineyards, and the associated roadway, utility, and drainage infrastructure. It also includes three farmhouses and associated outbuildings on the southeastern portion of the Project area.

Public health and hazardous materials include the following categories.

- Anthropogenic materials found at the site before the start of Project construction including vehicular fuels, other vehicular fluids such as antifreeze, lubricants, hydraulic fluid, and residual pesticide and herbicide impacts from past agricultural land uses.
- Anthropogenic materials used during construction or operation of the Project such as vehicular fuels and other vehicular fluids such as antifreeze, lubricants, and hydraulic fluid.
- Naturally occurring hazardous materials at the site such as metals, asbestos, and biological hazards in the soils.
- Project generated wastes, such as construction debris from the demolition of the existing structures within the Project area, including wood, roofing materials, metal, brick, cinder block, etc., contaminated soil from areas around potentially leaking underground storage tanks, waste treated wood from utility poles, fence posts, and grape stakes, metal from fencing and metal fence posts, and asphalt and concrete from roadway and building foundation removal.

19.1.1 Known Hazardous Material Sites

The San Joaquin River Restoration Program (SJRRP) retained Environmental Data Research to conduct an environmental regulatory agency database search to evaluate past and current project and surrounding land uses that may have potentially contributed to site contamination for the Project area. Various Federal and State regulatory databases were researched as part of the Draft Phase I Environmental Site Assessment (Appendix 19-A). The Draft Phase I Environmental Site Assessment included a review of historical aerial photographs and topographic maps of the Project area. A copy of the Phase I Environmental Site Assessment is provided in Appendix 19-A.

The database search of facilities on the Federal and State lists was reviewed for information on whether hazardous substances, wastes, or petroleum products have been improperly handled, stored, or disposed on the Project footprint and adjacent properties. The following sites were identified as hazardous material sites within the Project area or on the boundary of the Project area in the database report. These sites are described below.

- Paramount Farming Company, 10317 Eastside Drive, Firebaugh, CA.
- Mendota Solid Waste Disposal, ½ mile east of Bass Avenue, Mendota, CA.
- Frank A Logoluso Farms, 2369 San Mateo Avenue, Mendota, CA.
- AES Mendota/Covanta Mendota LP, 400 Guillen Parkway, Mendota, CA.

Paramount Farming Company, at 10317 Eastside Drive in Firebaugh, CA, is located on the northern boundary of the Project area. This site was listed in the Hazardous Waste Tracking System database, a California Department of Toxic Substances Control (DTSC) database of hazardous waste manifests (DTSC 2015). This site has been identified as having 2.4 tons of asbestos containing waste, and the disposal method is listed as landfill or surface impoundment that will be closed as a landfill (to include on-site treatment and/or stabilization). The site represents a potential environmental concern to the Project area due to the presence of asbestos containing waste.

Mendota Solid Waste Disposal facility is located ½ mile east of Bass Avenue, near Fresno Slough in Mendota, CA. The site is located on the southwestern boundary of the Project area, near Mendota Pool. The site was listed in the California Department of Resources, Recycling, and Recovery (CalRecycle) Solid Waste Information System database as a Solid Waste Facility/Landfill site. The Mendota Solid Waste Disposal facility was a permitted solid waste disposal site that was clean closed on December 31, 1981. The site is not expected to represent an environmental concern to the Project area.

Frank A. Logoluso Farms, at 2369 San Mateo Avenue in Mendota, CA, is located within the Project area south of the San Joaquin River. This site was listed in the Hazardous Waste Tracking System database, a DTSC database of hazardous waste manifests. This site has been identified as having 0.3753 tons of waste oil and mixed oil. The site is not expected to represent an environmental concern to the Project area.

AES Mendota/Covanta Mendota LP facility, at 400 Guillen Parkway in Mendota, CA, is located on the western boundary of the Project area, near Mendota Airport. The biomass power plant was listed in several Federal and State databases. The AES Mendota/Covanta Mendota LP facility is located downgradient of the Project area and on the southwestern boundary; therefore, the site is not expected to represent an environmental concern to the Project area.

The following historic recognized environmental condition was identified in connection with the Project area. Because the Project area was historically used as farmland, pesticide and herbicide residuals may be present in the soil. However, features were not identified (e.g., impoundments, bulk storage facilities or crop dusting air strips) that suggested the handling or storage of significant quantities of pesticides and/or herbicides in the Project area.

19.1.2 Exposure to Disease

Public health hazards also include exposure to disease vectors. Diseases found in the Project vicinity include West Nile virus (WNV), Hantavirus, and valley fever.

Exposure to West Nile Virus

All mosquito species are potential vectors that can cause disease to pets, domestic animals, wildlife, and humans. Public concern regarding WNV, a disease transmitted to humans, has increased since the virus was first detected in the United States in 1999. WNV is mosquitos borne arbovirus that is not transmitted from person to person contact. Approximately 20 percent of infected persons develop symptoms. There were 2,765 cases reported in California from 2003 to 2008 (California Department of Public Health [CDPH] 2010). A mosquito acquires WNV by feeding on the blood of infected birds. All species of mosquitoes require standing water to complete their growth cycle; therefore, any standing body of water represents a potential mosquito breeding area. WNV is transmitted by infected mosquito bites.

Local mosquito abatement districts implement controls such as spraying to protect public health. In Madera County, the mosquito abatement district is the Madera County Mosquito and Vector Control District located in Madera. In Fresno County, the mosquito abatement district is the Fresno Westside Mosquito Abatement District in Firebaugh.

Exposure to Hantavirus

Hantavirus is an often fatal lung disease transmitted by rodents. It is transmitted in California only by deer mice. Most transmittal to humans is through breathing air contaminated with rodent droppings or urine. This happens most frequently in small closed spaces. Infrequent transmittal occurs from consuming food contaminated with rodent droppings or urine or touching surfaces contaminated with rodent dropping or urine and then putting fingers in the mouth, or being bitten by an infected rodent (CDPH 2009a). Demolition of buildings may expose workers to rodent wastes that may be contaminated with Hantavirus.

Exposure to Valley Fever

Valley fever is caused by a fungus that usually affects the lungs. People become infected by breathing dust contaminated with the fungal spores. Approximately 150,000 cases occur in the United States annually, although approximately half of the cases do not produce symptoms. It is not transmitted from person to person (CDPH 2009b).

19.2 Regulatory Setting

This section discusses the regulatory setting for public health and hazardous materials in the Project area.

19.2.1 Federal

Table 19-1 provides a summary of Federal environmental hazardous materials laws, ordinances and regulations, and indicates the agencies providing regulatory oversight. Selected Federal laws and regulations pertaining to public health and hazardous materials in the Project area are also discussed briefly below.

Table 19-1.
Summary of Federal Regulations Applicable to Hazardous Materials/Waste Handling

Authority	Administering Agency	Requirements and Compliance
CERCLA, as amended by SARA; Title III, Emergency Planning and Community Right-to-Know Act of 1986, 42 USC 11001 et seq., 40 CFR Parts 302, 355, 370, and 372.	EPA Region IX; National Response Center; California OES; Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	CERCLA release notification requirements; SARA Title III includes reporting requirements for storing, handling, or producing regulated substances.
29 CFR 1910 et seq. 29 CFR 1926 et seq.	Occupational Safety and Health Administration (OSHA)	Requirements pertaining to employers whose employees handle hazardous materials and extremely hazardous chemicals.
Clean Air Act Amendments of 1990, Section 112(r), Accidental Release Prevention Program, 42 USC 7412 (r), 40 CFR Part 68	EPA Region IX; California OES; Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	Requirements pertaining to risk management of regulated substances.
Clean Water Act, Spill Prevention, Control, and Countermeasure Plan, 40 CFR 112	EPA Region IX, Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	Requirements designed to prevent the discharge of oil into navigable waters.
RCRA, 42 USC 6901 et seq., 40 CFR 260 et seq., 49 CFR 172, 173, and 179	EPA Region IX	Requirements for a hazardous waste generator identification number coordinated through the EPA and the DTSC.

Table 19-1.
Summary of Federal Regulations Applicable to Hazardous Materials/Waste Handling

Authority	Administering Agency	Requirements and Compliance

Key:
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR = Code of Federal Regulations
DTSC = California Department of Toxic Substances Control
EPA = U.S. Environmental Protection Agency
OES = Office of Emergency Services
OSHA = Occupational Safety and Health Administration
RCRA = Resource Conservation and Recovery Act
SARA = Superfund Amendments and Reauthorization Act of 1986
USC = United States Code

Hazardous Materials Handling

At the Federal level, the principal agency regulating the generation, transport, and disposal of hazardous substances is U.S. Environmental Protection Agency (EPA), under the authority of the Resource Conservation and Recovery Act (RCRA). The RCRA established an all-encompassing Federal regulatory program for hazardous substances that is administered by EPA. Under the RCRA, EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous substances. The RCRA was amended in 1984 by the Hazardous and Solid Waste Amendments of 1984, which specifically prohibits the use of certain techniques to dispose of various hazardous substances. The Federal Emergency Planning and Community Right to Know Act of 1986 imposes hazardous-materials planning requirements to help protect local communities in the event of accidental release of hazardous substances. EPA has delegated much of the RCRA requirements to the DTSC.

Worker Safety Requirements

The U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), is responsible at the Federal level for ensuring worker safety. OSHA sets Federal standards for implementing workplace training, exposure limits, and safety procedures for the handling of hazardous substances (as well as other hazards). OSHA also establishes criteria by which each state can implement its own health and safety program.

Regulation of Polychlorinated Biphenyls

The Toxic Substances Control Act of 1976 (United States Code [USC] Title 15, Section 2605) banned the manufacture, processing, distribution, and use of polychlorinated biphenyls (PCBs) in totally enclosed systems. The EPA Region 9 PCB Program regulates remediation of PCBs in several states, including California. Title 40 of the Code of Federal Regulations (CFR), Section 761.30(a)(1)(vi)(A) states that all owners of electrical transformers containing PCBs must register their transformers with EPA. Specified electrical equipment manufactured between July 1, 1978, and July 1, 1998, that does not contain PCBs must be marked by the manufacturer with the statement “No PCBs” (Section 761.40[g]). Transformers and other items manufactured before July 1, 1978, and containing PCBs must be marked as such.

Asbestos

The Federal Clean Air Act (CAA) was enacted in 1970. The most recent major amendments by Congress were made in 1990. The CAA required EPA to establish primary and secondary national ambient air quality standards. It also required each state to prepare an air quality control plan, referred to as a State Implementation Plan. Section 112 of the CAA defines "hazardous air pollutants" and sets threshold limits. Asbestos-containing substances are regulated by EPA under the CAA. Additional information about the CAA is presented in Chapter 4.0, "Air Quality."

Airport and Airspace Safety

Part 77 of the Federal Aviation Regulations, "Objects Affecting Navigable Airspace," has been adopted as a means of monitoring and protecting the airspace required for safe operation of aircraft and airports. Objects that exceed certain specified height limits constitute airspace obstructions. Federal Aviation Regulations Section 77.13 requires that the Federal Aviation Administration be notified of proposed construction or alteration of certain objects in a specified vicinity of an airport.

19.2.2 State of California

Table 19-2 provides a summary of State environmental hazardous materials laws, ordinances and regulations, and indicates the agencies providing regulatory oversight. Selected State laws and regulations pertaining to public health and hazardous materials in the Project area are also discussed briefly below.

Table 19-2.
Summary of State Regulations Applicable to Hazardous Materials/Waste Handling

Authority	Administering Agency	Requirements and Compliance
California Health & Safety Code, Chapter 6.95, Art. 1	Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	Facilities handling hazardous materials are required to submit a Hazardous Materials Business Plan (HMBP) to the Certified Uniform Program Agency.
California Health & Safety Code § 25270	Central Valley Regional Water Quality Control Board	Above ground petroleum storage tanks must be registered with the State Water Resources Control Board.
8 CCR § 5194	Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	Requirements pertaining to employers whose employees are exposed to dusts, fumes, mists, vapors, and gases.
California Health & Safety Code §§ 25500–25520; 19 CCR §§ 2720–2734	Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	Requirement to prepare an HMBP.
California Accidental Release Prevention Program, California Health & Safety Code § 25531 et seq., 19 CCR Division 2, Chapter 4.5	California OES, Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	HMBP requirements and requirements to prepare a risk management plan.

Table 19-2.
Summary of State Regulations Applicable to Hazardous Materials/Waste Handling

Authority	Administering Agency	Requirements and Compliance
8 CCR § 339, § 3200 et seq., § 5139 et seq., § 5160 et seq., § 5189 et seq.	Cal/OSHA	Requirements pertaining to the control and management of hazardous substances.
Hazardous Waste Control Act, California Health & Safety Code; 22 CCR § 66001 et seq.	Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	Requirements pertaining to the management of hazardous waste.
22 CCR § 67100, Hazardous Waste Source Reduction and Management Review	Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	Requirements pertaining to waste generators developing a plan for reducing their hazardous wastes.
22 CCR §§ 66260-66270	Fresno County Department of Public Health - Environmental Health Division; Madera County Department of Environmental Health	Requirements pertaining to hazardous waste regulations for generators and transporters of hazardous wastes and owners of hazardous waste Treatment, Storage, and Disposal Facilities.
Porter-Cologne Water Quality Control Act	Central Valley Regional Water Quality Control Board	Reportable quantities of hazardous wastes and hazardous materials are established by the RWQCB based on their potential to degrade the waters of the state.
Uniform Fire Code, Article 80 and others	Fresno County Fire Protection District; Madera County Fire Department	Provisions regarding fire protection and neutralization systems for hazardous materials.
California Vehicle Code § 32100.5	Caltrans	Requirements for transportation materials that may pose an inhalation hazard.
State Building Standard Code	Various agencies	Requirements pertaining to fire prevention, building safety, etc.

Key:
Cal/OSHA = California Occupational Safety and Health Administration
Caltrans = California Department of Transportation
CCR = California Code of Regulations
HMBP = Hazardous Material Business Plan
OES = Office of Emergency Services
RWQCB = Regional Water Quality Control Board

Hazardous Materials Handling

The California Hazardous Materials Release Response Plans and Inventory Law of 1985 requires preparation of hazardous materials business plans and disclosure of hazardous materials inventories. A business plan includes an inventory of hazardous materials handled, facility floor plans showing where hazardous materials are stored, an emergency response plan, and provisions for employee training in safety and emergency response procedures (Health & Saf. Code, Div. 20, Ch. 6.95, Art. 1). Statewide, DTSC has primary regulatory responsibility for managing hazardous materials, with delegation of authority to local jurisdictions that enter into agreements with the State. Local agencies administer these laws and regulations.

Worker Safety Requirements

California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations in California. Cal/OSHA regulations pertaining to the use of hazardous materials in the workplace (Cal. Code Regs., tit. 8) include requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and preparation of emergency action and fire prevention plans.

Emergency Response to Hazardous Materials Incidents

California has developed an emergency response plan to coordinate emergency services provided by Federal, State, and local governments and private agencies. Response to hazardous material incidents is one part of this plan. The plan is managed by the Governor's Office of Emergency Services (OES), which coordinates the responses of other agencies, including the California Environmental Protection Agency (Cal/EPA), California Highway Patrol (CHP), California Department of Fish and Wildlife, and Central Valley Regional Water Quality Control Board.

Hazardous Materials Transport

The U.S. Department of Transportation (DOT) regulates transportation of hazardous materials between states. State agencies with primary responsibility for enforcing Federal and State regulations and responding to hazardous materials transportation emergencies are the CHP and California Department of Transportation (Caltrans). Together, these agencies determine container types used and license hazardous waste haulers for transportation of hazardous waste on public roads.

The DOT Federal Railroad Administration enforces the hazardous materials regulations, which are promulgated by the Pipeline and Hazardous Materials Safety Administration for rail transportation. These regulations include requirements that railroads and other transporters of hazardous materials, including shippers, have and adhere to security plans and train their employees involved in offering, accepting, or transporting hazardous materials on both safety and security matters.

California Accidental Release Prevention Program

The goal of the California Accidental Release Prevention Program is to reduce the likelihood and severity of consequences of extremely hazardous materials releases. Any business that handles regulated substances (chemicals that pose a major threat to public health and safety or the environment because they are highly toxic, flammable, or explosive, including ammonia, chlorine gas, hydrogen, nitric acid, and propane) is required to prepare a risk management plan. A risk management plan describes current and past practices and releases, what the impact of releases may be, and what the business does or plans to do to prevent releases and minimize their impact if they occur.

Government Code Section 65962.5 (Cortese List)

The provisions of Government Code section 65962.5 are commonly referred to as the "Cortese List" (after the legislator who authored the legislation that enacted it). The *Cortese List* is a planning document used by State and local agencies to comply with California Environmental Quality Act (CEQA) requirements in providing information

about the location of hazardous materials release sites. Government Code section 65962.5 requires Cal/EPA to develop an updated *Cortese List* annually at minimum. DTSC is responsible for a portion of the information contained in the *Cortese List*. Other California State and local government agencies are required to provide additional hazardous material release information for the *Cortese List*.

Multi-Hazard Mitigation Plan

OES issued the *State of California Multi-Hazard Mitigation Plan* (OES 2013) in October 2013. It provides an updated and comprehensive description of California's historical and current hazard analysis, mitigation strategies, goals and objectives. The Federal Disaster Mitigation Act required all State emergency services agencies to issue such plans by November 1, 2004, for the states to receive Federal grant funds for disaster assistance and mitigation under the Stafford Act (44 CFR 201.4).

Public Resources Code and California Code of Regulations, Title 14, Chapter 4

California Department of Conservation Division of Oil, Gas, and Geothermal Resources (DOGGR) is responsible for section 3000 et seq. of the Public Resources Code and California Code of Regulations, Title 14, Chapter 4, which address the drilling, operation, maintenance, plugging, and abandonment of onshore and offshore oil, gas, and geothermal wells. In addition, DOGGR's programs include well permitting and testing, safety inspections, oversight of production and injection projects, environmental lease inspections, idle-well testing, inspecting oilfield tanks, pipelines, and sumps, hazardous and orphan well plugging and abandonment contracts, and subsidence monitoring (DOGGR 2012).

19.2.3 Regional and Local

Regional or local plans pertain to public health and hazardous materials in the Project area are discussed below.

General Plans

The Fresno County General Plan (Fresno County 2000) and the Madera County General Plan (Madera County 1995) identify goals and policies that describe approaches to public health and hazardous materials used by each county. The Fresno County General Plan Health and Safety element sets policies on wildland fires (Policies HS-B.1 and HS-B.5), airport hazards (Policy HS-E.1), and hazardous materials (Policy HS-F.5). Similarly, the Madera County General Plan provides policies on emergency services and fire protection (Policies 3.G.5, 3.H.2, and 6.C.10), airport hazards (Policy 6.D.1), and hazardous materials (Policies 6.G.4 and 6.G.5).

19.3 Environmental Consequences and Mitigation Measures

This section describes how the potential hazards and hazardous materials impacts are evaluated, what the impacts may be, and how the impacts would be mitigated.

19.3.1 Impact Assessment Methodology

This section provides the methodology that was used to evaluate the potential human health and environmental impacts of hazardous materials related to the Project.

Various Federal and State regulatory databases were researched for past and current land uses that may have potentially contributed to site contamination for the environmental setting/existing conditions section. A Phase I Environmental Site Assessment (Phase I) was conducted on the Project area to evaluate past and current land uses that may have potentially contributed to site contamination that could impact Project construction or have longer term impacts on Project operation. Various Federal and State of California regulatory databases were researched as part of this Phase I effort.

Federal, State, and local statutes regulating hazardous waste were reviewed for the analysis of potential impacts associated with hazards and hazardous materials. The applicable regulations establish handling and management requirements associated with hazards and hazardous materials management.

The transport, use, and disposal of hazardous materials that may be involved in Project construction were described. The potential for upset or accidents involving hazardous materials on the Project site during and after construction completion was discussed. The emission of hazardous or acutely hazardous materials from the Project during and after construction within ¼ mile of an existing school was evaluated. The locations of known hazardous waste sites in the Project area were evaluated; this evaluation included oil and gas wells in the area. The potential impacts of the use of hazardous materials and/or site construction work on public airports within 2 miles of the Project was evaluated. Potential impacts to private airstrips near the Project were discussed. Potential impacts to implementation of local emergency response plans were evaluated. The Project's potential to contribute or cause wildland fires (from the operation of construction equipment) were evaluated.

19.3.2 Significance Criteria

The thresholds of significance for impacts are based on the Environmental Checklist Form in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under the National Environmental Policy Act (NEPA) to determine the significance of an action in terms of its context and the intensity of its effects. Impacts resulting from the Project would be significant if they would cause any of the following:

- Create a substantial hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a substantial hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ 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 substantial hazard to the public or the environment.
- Result in a safety hazard for people residing or working in the Project area for areas designated in an airport land use plan, within 2 miles of an airport, or in the vicinity of a private airstrip.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Expose people or structures to a substantial risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.
- Expose people to new or increased risk from disease vectors.

19.3.3 Impacts and Mitigation Measures

This section provides an evaluation of the long-term and temporary effects of the Project alternatives on public health and hazardous materials. It includes analyses of potential effects relative to No-Action conditions in accordance with NEPA and potential impacts compared to existing conditions to meet CEQA requirements. With respect to public health and hazardous materials, the environmental impact issues and concerns are:

1. Creation of a Substantial Hazard through the Routine Transport, Use, or Disposal of Hazardous Materials or through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials.
2. Increased Exposure to Hazardous Materials of People Residing or Working in the Project Area.
3. Creation of a Substantial Hazard from Disturbance of Known Hazardous Material Sites.
4. Creation of a Substantial Hazard from Mobilization of Soil Contaminants on the Floodplain.
5. Exposure of People to Increased Risk of Diseases.
6. Creation of a Substantial Hazard from Decommissioned Wells.
7. Increased Hazardous Emissions or Handling of Hazardous Materials, Substances, or Wastes within ¼ mile of a School.
8. Exposure of People or Structures to a Substantial Risk of Loss, Injury, or Death involving Wildland Fires.
9. Creation of a Substantial Hazard in Areas Designated by Airport Land Use Plans, within 2 miles of an Airport, or in the Vicinity of a Private Airstrip.
10. Impairment of the Implementation or Physical Interference with an Adopted Emergency Response or Emergency Evacuation Plan.

Other public health and hazardous materials related issues covered in the Program Environmental Impact Statement/Report are not covered here because they are

programmatic in nature and/or are not relevant to the Project area. This includes mobilization of naturally occurring asbestos.

Issues Eliminated from Further Analysis

Mobilization of Naturally Occurring Asbestos. Inhalation of naturally occurring asbestos can cause lung cancer and other long-term respiratory problems. Due to local Project area geology, it is unlikely that naturally occurring asbestos is present in the site soils. Therefore, impacts from naturally occurring asbestos are not evaluated.

No-Action Alternative

Under the No-Action Alternative, the Project would not be implemented and none of the Project features would be developed in Reach 2B of the San Joaquin River. However, other proposed actions under the SJRRP would be implemented, including habitat restoration in other reaches, augmentation of river flows, and reintroduction of salmon. Without the Project in Reach 2B, however, these activities would not achieve the Settlement goals. The potential effects of the No-Action Alternative are described below. The analysis is a comparison to existing conditions, and no mitigation is required for No-Action.

Impact HAZ-1 (No-Action Alternative): *Creation of a Substantial Hazard through the Routine Transport, Use, or Disposal of Hazardous Materials or through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials.* The No-Action Alternative would not involve Project-related construction or operations/maintenance activities involving the storage, use, or transport of hazardous materials (or the accidental release of those materials) and would not have the potential to create a substantial hazard to the public or the environment. Although hazardous materials are used under existing conditions (e.g., for agricultural and/or Program-related activities), no additional hazardous materials would be used under No-Action. There would be **no impact** relative to existing conditions.

Impact HAZ-2 (No-Action Alternative): *Increased Exposure to Hazardous Materials for People Residing or Working in the Project Area.* Project-related actions and construction activities would not occur under the No-Action Alternative. Existing ground-disturbing activities and agricultural spraying activities would continue to occur into the future. The effect of these activities may include exposure of construction workers or others in the area to existing hazardous materials including asbestos; petroleum hydrocarbons, pesticides, herbicides, and fertilizers; contaminated debris; elevated levels of chemicals that could be hazardous; or hazardous substances. However, implementation of the No-Action Alternative would not increase exposure to hazardous materials. There would be **no impact** relative to existing conditions.

Impact HAZ-3 (No-Action Alternative): *Creation of a Substantial Hazard from Disturbance of Known Hazardous Material Sites.* Project-related actions and construction activities would not occur under the No-Action Alternative. Therefore, implementation of the No-Action Alternative would not increase public exposure to hazardous materials in known hazardous materials sites. There would be **no impact** relative to existing conditions.

Impact HAZ-4 (No-Action Alternative): ***Creation of a Substantial Hazard from Mobilization of Soil Contaminants on the Floodplain.*** Under No-Action, flows would be constrained in Reach 2B by the existing levees. Implementation of the No-Action Alternative would not mobilize soil contaminants located outside of existing levees. There would be **no impact**.

Impact HAZ-5 (No-Action Alternative): ***Exposure of People to Increased Risk of Diseases.*** Prominent areas for WNV to occur include wetted portions of the San Joaquin River that provide mosquito habitat. Exposure to Valley Fever can occur during earth-moving activities, which release spores living in the soil. The No-Action Alternative would not involve Project-related construction or operations/maintenance activities. People residing or working in the Project area have some degree of exposure to WNV and Valley Fever under existing conditions. Implementation of the No-Action Alternative would not increase the risk of exposure to WNV or Valley Fever. **No impact** would occur relative to existing conditions.

Impact HAZ-6 (No-Action Alternative): ***Creation of a Substantial Hazard from Decommissioned Wells.*** The No-Action Alternative would not involve any Project-related actions in addition to ongoing agricultural or Program-related operations. For this reason, Project-related ground-disturbing activities that could disrupt an active, idle, or abandoned well would not occur. As a result, implementing the No-Action Alternative would not have the potential to create a new or increased hazard from idle and abandoned wells. **No impact** would occur.

Impact HAZ-7 (No-Action Alternative): ***Increased Hazardous Emissions or Handling of Hazardous Materials, Substances, or Wastes within ¼ mile of a School.*** The No-Action Alternative would not involve any Project-related actions in addition to ongoing operations or operations planned in the future in the vicinity of the Project area. Although schools are located in the cities of Firebaugh and Mendota, these schools are located more than ¼ mile from the Project area. The No-Action Alternative would not have the potential to create a new or increased hazard to school safety because Project-related construction or operations/maintenance activities would not occur under this alternative. **No impact** would occur.

Impact HAZ-8 (No-Action Alternative): ***Exposure of People or Structures to a Substantial Risk of Loss, Injury, or Death involving Wildland Fires.*** The No-Action Alternative would not include any activities that would increase the risk of sparking a wildland fire. Therefore, impacts related to the creation of hazards associated with wildland fires would not occur. There would be **no impact**.

Impact HAZ-9 (No-Action Alternative): ***Creation of a Substantial Hazard in Areas Designated by Airport Land Use Plans, within 2 miles of an Airport, or in the Vicinity of a Private Airstrip.*** The No-Action Alternative would not include any Project actions that could create a new or increased hazard to aircraft safety. Therefore, impacts related to the creation of a new or increased hazard to aircraft safety would not occur. There would be **no impact**.

Impact HAZ-10 (No-Action Alternative): ***Impairment of the Implementation or Physical Interference with an Adopted Emergency Response or Emergency Evacuation Plan.*** Project actions would not be implemented under the No-Action Alternative. Therefore emergency response and evacuation plans would not be affected by Project-related actions. There would be **no impact**.

Alternative A (Compact Bypass with Narrow Floodplain and South Canal)

Alternative A would include construction of Project facilities including a Compact Bypass channel, a new levee system encompassing the existing river channel in a narrow floodplain, and the South Canal. Other key features include construction of the Mendota Pool Dike (separating the San Joaquin River and Mendota Pool), a fish barrier below Mendota Dam, and the South Canal bifurcation structure with fish passage facility and fish screens, modification of the San Mateo Avenue crossing, and the removal of the San Joaquin River control structure at the Chowchilla Bifurcation Structure. Construction activity is expected to occur intermittently over an approximate 132-month timeframe.

Impact HAZ-1 (Alternative A): ***Creation of a Substantial Hazard through the Routine Transport, Use, or Disposal of Hazardous Materials or through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials.*** In contrast to the No-Action Alternative, Alternative A would use hazardous materials in varying amounts during construction and operation/maintenance activities. If these materials are not transported, used, stored or disposed of appropriately, they could impact the environment and/or public health. Materials typically used during construction that could contain hazardous substances include paints, solvents, cements, glues, lubricants, and fuels. Materials used during Project operation/maintenance may include lubricants, fuels, and paints. Construction workers and others could be exposed to hazards and hazardous materials as a result of improper handling or use during construction activities, transportation accidents, or fires, explosions, or other emergencies. Construction workers and others could also be exposed to hazards associated with accidental releases of hazardous materials, which could result in adverse health effects.

The use, storage, and transport of hazardous materials are regulated by Federal, State, and local agencies, and compliance with relevant laws is required during Project construction and operation. Transportation of hazardous materials on area roadways is regulated by the CHP and Caltrans. Hazardous materials regulations, which are codified in California Code of Regulations, Titles 8, 22, and 26, and their enabling legislation set forth in the California Health and Safety Code (§ 25100 et seq.), were established at the State level to ensure compliance with Federal regulations to reduce the risk to human health and the environment from the routine use of hazardous substances. These regulations must be implemented, as appropriate, and are monitored by the State (e.g., Cal/OSHA in the workplace, DTSC for hazardous waste, and California Air Resources Board for lead) and/or local jurisdictions (i.e., Madera County Department of Environmental Health and Fresno County Department of Public Health, Environmental Health Division).

All construction would be required to comply with Cal/EPA's Unified Program; regulated activities would be managed by Madera County Department of Environmental

Health and/or Fresno County Department of Public Health, Environmental Health Division in accordance with the regulations for their respective jurisdiction's Unified Program (e.g., hazardous materials release response plans and inventories, California Uniform Fire Code hazardous material management plans and inventories). Such compliance would reduce the potential for accidental release of hazardous materials during construction and improvement activities. As a result, compliance with each county's Unified Program would lessen the risk of exposure of construction workers and others to accidental release of hazardous materials.

Workplace regulations addressing the use, storage, and disposal of hazardous materials included in California Code of Regulations, Title 8 also would apply to Project construction and improvement activities. Compliance with these regulations would be monitored by local agency, such as Madera County Department of Environmental Health and/or Fresno County Department of Public Health, Environmental Health Division when they perform inspections for flammable and hazardous materials storage. Other mechanisms in place to enforce the Title 8 regulations include compliance audits and reporting to State and local agencies. Implementation of the workplace regulations would further reduce the potential for hazardous materials releases during project construction and improvement activities.

The Project would implement and comply with Federal, State, and local hazardous materials regulations monitored by the State (e.g., Cal/OSHA, DTSC, CHP) and/or local jurisdictions (e.g., Madera County Department of Environmental Health, Fresno County Department of Public Health, Environmental Health Division); therefore, impacts related to creation of substantial hazards to the public through routine transport, use, disposal, and risk of upset would be unlikely with Project construction activities.

When comparing Alternative A to existing conditions, impacts to the public or the environment through the use of hazardous materials would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). Therefore, this impact would be **less than significant**.

Impact HAZ-2 (Alternative A): ***Increased Exposure to Hazardous Materials for People Residing or Working in the Project Area.*** In contrast to the No-Action Alternative, construction and operation/maintenance activities would occur in the Project area under Alternative A. As a result, implementing this alternative could expose construction workers and others to hazardous materials that could be inadvertently spilled or otherwise spread. Hazardous materials used by the Project are expected to be limited to vehicular fuel, antifreeze, and lubricant use for earthmoving and transportation vehicles; lubricants and paints used for maintaining structures, fish passage facilities, and fish screens; and fuels used to support sediment removal near Project facilities. Existing hazardous materials in Project area could include asbestos, petroleum hydrocarbons, pesticides, herbicides, fertilizers, contaminated debris, elevated levels of chemicals that could be hazardous, or hazardous substances. Alternative A would involve construction and operation/maintenance activities in agricultural areas which are likely to contain hazardous materials.

Potential hazardous materials issues include hazardous building components from demolition of existing facilities, release of pesticides/herbicides from demolition of existing agricultural facilities, disturbance of discolored or odiferous soils, and underground storage tank removal. These issues were identified as potential concerns in the Project area.

- *Hazardous Building Components from Demolition of Existing Facilities.* Hazardous building components include asbestos containing materials, lead based paint and PCBs containing materials and universal wastes such as: electronic devices, batteries, electric lamps, e.g., fluorescent lighting tubes, mercury containing equipment, cathode ray tubes, and non-empty aerosol cans from demolition of existing buildings (DTSC 2010). If these items are not found and removed before demolition, contaminants can be released.
- *Release of Pesticide and Herbicides from Demolition of Existing Agricultural Facilities.* Residual bags or containers of pesticides or herbicides may be found in the process of demolishing agricultural structures within the Project footprint. Failure to manage these materials properly could cause **i**mpacts to soil, surface water, and groundwater.
- *Disturbance of Discolored or Odiferous Soils.* If discolored or odiferous soils are found during the Project earthwork it may indicative a hazardous materials spill or leak. Failure to identify and manage these soils can cause impacts to surface water and groundwater.
- *Removal of Underground Storage Tanks.* Potentially, underground storage tanks may need to be removed from houses or farms that would be demolished to construct the Project. If the underground storage tanks are not emptied and the contents managed properly, the resulting spills and leaks can impact the local soil and groundwater.

Implementing Alternative A in the Project area would have the potential to expose construction workers and others to hazardous materials.

When comparing Alternative A to existing conditions, impacts to construction workers and the public would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). This impact would be **potentially significant**.

Mitigation Measure HAZ-2A (Alternative A): *Follow General Hazardous Materials Guidelines.* Construction and operations and maintenance activities in the Project area will be modified to minimize adverse effects to the public or the environment, including implementing general hazardous material guidelines such as: (1) using less toxic alternative materials when available, (2) minimizing leaks and spills, and (3) following regulatory guidelines.

Implementation Action: The contractors and operators will follow regulatory guidelines for transportation, storage, use, and disposal of hazardous materials. This includes training of personnel using hazardous materials, use of secondary

containment, storing incompatible materials separately, having emergency and spill clean-up equipment on-site, and contracts in place for emergency responses, if needed. This also includes requirements for delivery of fuels and lubricants by service trucks to the ~~construction~~ site.

The following measures will be used to minimize spills and leaks of hazardous materials used during Project construction and during operations and maintenance.

- The contractors and operators will develop a project-specific Health and Safety Plan and Hazardous Materials Control, Spill Prevention and Response Plan for the work.
- The contractors and operators will provide hazardous materials material safety data sheets to Project personnel.
- The contractors and operators will use personal protective equipment during hazardous materials work.
- The contractors and operators will use good housekeeping methods on the Project worksite.
- The contractors and operators will use proper sampling, analysis, characterization and disposal of hazardous waste. Spills and leaks of hazardous materials will be disposed of appropriately.
- Less toxic alternative materials will be used when available.
- The contractor and operators will use licensed contractors and transportation companies for hazardous materials work.

Location: Project areas with active construction or used by construction personnel including access roads, staging and storage areas, and borrow sites. Project facilities with long-term operations and maintenance.

Effectiveness Criteria: Effectiveness will be based on incidence of hazardous material spills.

Responsible Agency: U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and California State Lands Commission (CSLC).

Monitoring/Reporting Action: Adequacy of the proposed ~~construction~~ practices will be confirmed with Reclamation construction and operations managers and CSLC monitors.

Timing: Ongoing over the construction timeframe and ongoing over the life of the project for operations and maintenance.

Mitigation Measure HAZ-2B (Alternative A): ***Properly Dispose of Hazardous Building Components.*** Construction activities in the Project area will be modified to minimize adverse effects to the public or the environment, including proper disposal of

hazardous building components such as lead based paint, components with PCBs, and asbestos containing material.

Implementation Action: Hazardous building components will be handled in the following manner.

- Building components will be tested for lead based paint and PCBs before demolition is conducted. Remediate poor condition lead based paint and building components with PCBs before the remaining building is demolished. Properly characterize, profile, and dispose of lead based paint and PCB containing materials.
- The contractor will test structures to be demolished for asbestos containing materials. If asbestos containing materials are present, use trained workers to remove the asbestos containing materials before the demotion is conducted. Asbestos containing materials wastes will be disposed of in an approved landfill.
- The contractor will remove, store, package, and ship universal wastes (e.g., fluorescent lighting tubes) off-site for proper disposal.

Location: Construction areas with potential hazardous building components.

Effectiveness Criteria: Effectiveness will be based on compliance with health and safety guidelines.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

Mitigation Measure HAZ-2C (Alternative A): *Properly Dispose of Pesticides.* Construction activities in the Project area will be modified to minimize adverse effects to the public or the environment, including proper disposal of pesticides.

Implementation Action: If pesticide or herbicide containers are found during the building demolition, the contents will be recycled to the degree possible that is consistent with the product label. Unusable materials and containers will be disposed of in accordance with applicable regulations.

Location: Project areas with active construction or used by construction personnel with pesticide or herbicide containers.

Effectiveness Criteria: Effectiveness will be based on compliance with disposal guidelines.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

Mitigation Measure HAZ-2D (Alternative A): *Properly Manage Discolored or Odiferous Soils.* Construction activities in the Project area would be modified to minimize adverse effects to the public or the environment, including proper management of discolored or odiferous soils.

Implementation Action: If discolored or odiferous soils are found during the Project earthwork, the contractor will excavate the soil using Hazardous Waste and Emergency Response 40-hour trained personnel. Engineering dust control methods, such as soil wetting and using dust suppressants, will be used during movement of impacted soil. Appropriate monitoring and reporting is required during the construction work.

The contractor will segregate the soil on plastic sheeting, sample, analyze, characterize and profile the soil for on-site use, off-site reuse, or off-site disposal in accordance with applicable regulations. While the soil pile is not being worked, it will be covered to minimize dust and odor generation.

Location: Project areas with active construction or used by construction personnel with discolored or odiferous soils.

Effectiveness Criteria: Effectiveness will be based on compliance with regulatory guidelines.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

Mitigation Measure HAZ-2E (Alternative A): *Properly Remove Underground Storage Tanks.* Construction activities in the Project area will be modified to minimize adverse effects to the public or the environment, including proper removal of underground storage tanks.

Implementation Action: Removal of underground storage tanks will be handled in the following manner.

- The tanks will be emptied and the contents used or recycled by a licensed underground storage tank contractor. The tanks can also be recycled.
- Contaminated soil will be excavated, stockpiled on plastic sheeting, sampled, analyzed, characterized, profiled, and disposed of in compliance with relevant

regulations (e.g., California Underground Storage Tank Regulations [State Water Resources Control Board 2012]).

Location: Project areas with active construction or used by construction personnel including access roads, staging and storage areas, and borrow sites with underground storage tanks.

Effectiveness Criteria: Effectiveness will be based on compliance with regulatory guidelines.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

Implementation of Mitigation Measures HAZ-2A through HAZ-2E would reduce exposure of construction workers and others to existing hazardous materials to a less-than-significant level. This impact would be **less than significant with mitigation**.

Impact HAZ-3 (Alternative A): ***Creation of a Substantial Hazard from Disturbance of Known Hazardous Material Sites.*** In contrast to the No-Action Alternative, Project construction and other ground-disturbing activities could occur under Alternative A at a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, could create a significant hazard to the public or the environment. SJRRP conducted a Draft Phase I Environmental Site Assessment to evaluate known hazardous materials sites in the Project area or vicinity (Appendix 19-A). The Draft Phase I Environmental Site Assessment search included standard regulatory agency databases which identified potential hazardous materials sites.

Oil and Gas Wells. There are two closed or active oil and gas wells within the Project boundary and six closed or active oil and gas wells within a 1 mile radius of the Project footprint (Appendix 19-A). If other unknown oil and gas wells are found during Project work, well closure would be negotiated with the owners. Project activities would not be a threat to properly closed oil and gas wells. If active wells are damaged during Project construction, impacts to local soil, surface water, and/or groundwater could occur from spills or leaks. However, oil and gas well destruction or closure would be conducted in accordance with DOGGR regulations (see Section 2.2.4).

Buried Asbestos Containing Material. Long term asbestos exposure can cause lung cancer and other respiratory problems. The Paramount Farming Company in Firebaugh, located on the northern border of the Project area, has 2.4 tons of buried asbestos containing waste material (SJRRP 2011). Failure to manage asbestos appropriately could adversely affect public health of construction workers and others.

When comparing Alternative A to existing conditions, impacts to construction workers and the public would be similar to those described in the preceding paragraphs (i.e., the

comparison of Alternative A to the No-Action Alternative). Therefore, impacts from decommissioning oil and gas wells would be less than significant, however failure to manage asbestos appropriately, if disturbed, could cause a **potentially significant** impact to Project workers and public health.

Mitigation Measure HAZ-3 (Alternative A): ***Minimize Disturbance to Known Hazardous Material Sites.*** Construction activities in the Project area will be modified to minimize adverse effects to the public or the environment, including minimizing disturbance to known hazardous material sites. With implementation of the following measures, the potentially significant impacts can be reduced to **less-than-significant** levels.

Implementation Action: The location of the hazardous materials at the site will be identified and disturbance to this material will be avoided to the extent possible. If active oil and gas wells cannot be avoided, the destruction or closure of those wells will be conducted in accordance with the DOGGR regulations.

If asbestos containing material is located in an area that requires excavation, the following mitigation measures are required.

- All Federal, State and local permits to conduct this work will be obtained before the work is conducted.
- The contractor will develop an asbestos mitigation plan which will include dust control, ambient and personnel air monitoring, disposal, transportation planning, and reporting. The plan would be reviewed and approved by the San Joaquin Valley Air Pollution Control District. Upon approval of the mitigation plan, the plan will be implemented during construction activities.
- The contractor will use only asbestos trained personnel for the work.
- The asbestos containing material waste will be disposed of in only approved asbestos containing material disposal landfills.

Location: Project areas with active construction or used by construction personnel including access roads, staging and storage areas, and borrow sites that have abandoned oil and gas wells or asbestos containing material.

Effectiveness Criteria: Effectiveness will be based on compliance with regulatory guidelines.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

Impact HAZ-4 (Alternative A): ***Creation of a Substantial Hazard from Mobilization of Soil Contaminants on the Floodplain.*** In contrast to the No-Action Alternative,

Alternative A would allow inundation on an expanded floodplain such that flows would not be confined to the existing channel. There may be residual pesticide and herbicides in soil within the existing agricultural portion of the Project area from historical farming operations. Contaminates could include heavy metals such as arsenic, copper and zinc and chlorinated pesticides and herbicides.

Reclamation would require site cleanup prior to land acquisition if concentrated areas of contaminates are found during a Phase I Environmental Site Assessment; however, the type of remediation that would occur is not determined at this point. These soils would be sampled, analyzed, characterized for on-site use and/or off-site disposal options. High levels of pesticides and herbicides may exceed the hazardous waste criteria if the soil is moved. Lower levels of pesticides and herbicides may exceed aquatic toxicity criteria and may not be appropriate for use as borrow in berms or levees during Project construction. If soils are disposed of offsite, appropriate testing would occur to characterize the soil. Soil testing would also be required prior to selection of the final borrow areas and only soil with acceptable concentrations would be used for levee construction.

When comparing Alternative A to existing conditions, impacts to the public or the environment would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative A to the No-Action Alternative). Failure to identify and manage these soils can cause **potentially significant** impacts to surface water and groundwater.

Mitigation Measure HAZ-4 (Alternative A): ***Minimize Use of Pesticide and Herbicide Contaminated Soil.*** Construction activities in the Project area will be modified to minimize adverse effects to the public or the environment, including minimizing use of pesticide or herbicide contaminated soil. Implementation of this mitigation measure would reduce this impact to a **less-than-significant** level.

> **Implementation Action:** The contactor will collect samples in conformance with EPA SW-846 methodology and analyze the samples for heavy metals and chlorinated pesticides and herbicides. The analytical results will be evaluated against the Title 22 California hazardous waste criteria, the Regional Water Quality Control Board's Environmental Screening Levels, the EPA's Regional Screening Levels, or other regulatory and literature guidance documents for aquatic toxicity for reuse on the Project levees. Alternatively, aquatic testing may be conducted on representative soil samples for this purpose. (The aquatic toxicity evaluation for soil that will be exposed to the river is particularly important for the levee river side construction.)
>
> If the soil pesticide and herbicide conglomerate toxicity factors and/or toxicity testing shows unacceptable toxicity levels, that soil will not be used in the construction of Project levees or in other Project areas where the soil could come in direct contact with the San Joaquin River water.
>
> **Location:** Project areas with active construction or used by construction personnel including borrow sites.

Effectiveness Criteria: Effectiveness will be based on compliance with testing and risk assessment guidelines.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

Impact HAZ-5 (Alternative A): ***Exposure of People to Increased Risk of Diseases.*** In contrast to the No-Action Alternative, Alternative A would involve construction and operation/maintenance activities in the area located along the San Joaquin River between the Chowchilla Bifurcation Structure and areas below Mendota Dam. These activities may increase the risk of exposure to disease vectors for construction workers, maintenance staff, and others. Prominent areas for WNV to occur include wetted portions of the San Joaquin River that provide mosquito habitat. Failure to prevent mosquito breeding areas can increase exposure to this vector. Potential exposure to Hantavirus could occur during demolition of existing structures or when maintaining enclosed, uninhabited structures. Failure to train and equip workers to prevent Hantavirus infections could cause construction workers to be exposed to this vector. Exposure to Valley Fever can occur during earth-moving activities, which release spores living in the soil. Failure to train workers and to use dust control measures to prevent Valley Fever infections could increase exposure to this vector.

When comparing Alternative A to existing conditions, impacts to construction workers, maintenance staff, and the public would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative A to the No-Action Alternative). This impact would be **potentially significant**.

Mitigation Measure HAZ-5A (Alternative A): ***Minimize Exposure to Potential West Nile Virus Carrying Vectors.*** Construction activities in the Project area will be modified to minimize adverse effects to the public or the environment, including minimizing exposure to potential WNV carrying vectors.

Implementation Action: The following mitigation measures will be used to minimize the opportunity of mosquito bites.

- Good housekeeping will be used on the Project site to reduce areas of ponding water (including standing water in buckets and cans) to prevent mosquitos from breeding in the ponded water and then transmitting the disease. For example, work areas will be inspected, uncovered, upright containers that could accumulate water will be eliminated, and potholes and other areas where water is likely to accumulate will be filled or drained.
- Workers will be alerted to use mosquito repellants, particularly early in the morning and in the evening hours.

- If mosquitos continue to be a problem with the Project personnel after implementing the above strategies, the issue will be discussed with the local mosquito abatement district(s) and additional controls such as spraying may be implemented.

Location: Project areas with active construction or used by construction personnel.

Effectiveness Criteria: Effectiveness will be based on evidence of mosquitos and complaints of mosquito bites.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

Mitigation Measure HAZ-5B (Alternative A): ***Minimize Exposure to Potential Hantavirus Vectors.*** Construction activities in the Project area will be modified to minimize adverse effects to the public or the environment, including minimizing exposure to potential Hantavirus vectors.

Implementation Action: The following mitigation measures will minimize worker exposure to this disease.

- Educate workers on the virus, how it is transmitted, and safety precautions such as wearing masks around areas where rodents may have lived.
- Avoid stirring up dust in spaces where rodents may have lived.

Location: Project areas with active construction or used by construction personnel, particularly in enclosed buildings.

Effectiveness Criteria: Effectiveness will be based on implementation of construction training.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

Mitigation Measure HAZ-5C (Alternative A): ***Minimize Exposure to Valley Fever.*** Construction activities in the Project area would be modified to minimize adverse effects to the public or the environment, including minimizing exposure to Valley Fever.

Implementation Action: The contractor will:

- Educate workers on exposure to Valley Fever, how to recognize symptoms of illness, and ways to minimize exposure.
- Wet soil before and during earthwork to minimize visible dust generation.
- Limit vehicle speeds on uncontrolled, unpaved access/haul roads within the Project construction site.
- Use dust suppressants, as needed.
- Monitor for dust, and if dust levels exceed regulatory requirements, increase soil wetting and/or dust suppressant addition until the dust levels drop to acceptable levels.
- Use personal protective equipment to avoid breathing dust, if dust levels exceed regulatory requirements.
- Position workers upwind, where possible, when performing soil-disturbing tasks.
- Suspend work during heavy wind or dust storms and minimize amount of soil disturbed.

Location: Project areas with active construction or used by construction personnel.

Effectiveness Criteria: Effectiveness will be based on compliance with dust control measures.

Responsible Agency: Reclamation, CSLC, and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

With implementation of mitigation measures HAZ-5A through HAZ5-C, impacts from disease vectors can be reduced to **less-than-significant** levels.

Impact HAZ-6 (Alternative A): ***Creation of a Substantial Hazard from Decommissioned Wells.*** In contrast to the No-Action Alternative, Alternative A would result in the floodproofing or removal from service of drinking water wells and/or agricultural wells used for irrigation of crop land. Drinking water and agricultural supply wells within the Project footprint could provide conduits for surface water to contaminate local groundwater when taken out of service, if not properly closed. However, drinking water and agricultural wells taken out of service within the Project boundaries would be destroyed in compliance with California Department of Water Resources (DWR) (2013) and/or local regulations (see Section 2.2.4). These measures would be protective of groundwater quality.

The Project would also involve ground-disturbing activities in the Project area that could disrupt active, idle, or abandoned wells. Although Project proponents would survey

construction sites for unknown idle and abandoned wells before initiating ground-disturbing activities (see Section 2.2.4), without appropriate protection, ground-disturbing activities in the Project area could disrupt these wells and create a substantial hazard to the public or the environment.

When comparing Alternative A to existing conditions, impacts to the public or the environment would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). Impacts from idle and abandoned wells would be **potentially significant**.

Mitigation Measure HAZ-6 (Alternative A): ***Minimize the Disturbance of Idle or Abandoned Wells.*** Construction activities in the Project area will be modified to minimize disturbance of idle or abandoned wells. Implementation of this mitigation measure would reduce the impact to a **less than significant** impact level.

> **Implementation Action:** Project proponents will survey all project sites for unknown idle and abandoned wells before initiating ground-disturbing activities. If the survey discovers an idle or abandoned well, ground-disturbing activities will not occur within 100 feet of the well, if feasible. If ground-disturbing activities need to occur within 100 feet of the abandoned well, Project proponents would either cover, fence, or otherwise clearly mark the well location and take measures to reduce hazards to workers and/or ensure that the well has been abandoned in accordance with State and local regulations, whichever is appropriate. Fresno County Department of Public Health, Environmental Health Division, or Madera County Department of Environmental Health will be notified, as appropriate.
>
> **Location:** Project areas with active construction or used by construction personnel, including borrow sites.
>
> **Effectiveness Criteria:** Effectiveness will be based on implementation of the pre-construction measures.
>
> **Responsible Agency:** Reclamation, CSLC, and the construction contractor.
>
> **Monitoring/Reporting Action:** Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.
>
> **Timing:** Ongoing over the construction timeframe.

Impact HAZ-7 (Alternative A): ***Increased Hazardous Emissions or Handling of Hazardous Materials, Substances, or Wastes within ¼ mile of a School.*** Local public schools are operated by Firebaugh Las Deltas School District and Mendota Unified School District (Table 19-3). These schools are located more than ¼ mile from the Project area. In contrast to the No-Action Alternative, Alternative A would include the use of hazardous materials in varying amounts during construction and Project operation/maintenance. Potential impacts from accidental release of hazardous materials used during the Project construction or operation/maintenance are unlikely to impact

local schools. Hazardous materials transported to the Project area and used during construction or maintenance of the Project facilities would almost exclusively be diesel fuel used for earthmoving equipment. The diesel would typically be delivered to job sites via service trucks with trained personnel and spill kits on board to address any minor drips and leaks. No known acutely hazardous materials, with the possible exception of minor uses of acetylene/oxygen torches for demolition purposes, are likely to be used on during the Project construction. Because local schools are located more than ¼ mile from the Project area, the Project would have no impact to local schools.

Table 19-3.
Local Public Schools

Firebaugh Las Deltas Unified School District	Mendota Unified School District
Firebaugh High School 1976 Morris Kyle Dr., Firebaugh, CA	Mendota High School 1200 Belmont Avenue, Mendota, CA
Firebaugh Middle School 1600 16th Street, Firebaugh, CA	Mendota Continuation High School 211 Smooth Street, Mendota, CA
Hazel M. Baily Elementary School 1691 Q Street, Firebaugh, CA	McCabe Junior High School 250 South Derrick Street, Mendota, CA
A.F. Mills Intermediate 1191 P Street, Firebaugh, CA	McCabe Elementary School 250 South Derrick Street, Mendota, CA
Alternative Education 1666 Saipan Avenue, Firebaugh, CA	Washington Elementary School 1599 Fifth Street, Mendota, CA

Source: Firebaugh Las Deltas Unified School District 2013, Mendota Unified School District 2013

When comparing Alternative A to existing conditions, impacts to school safety would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative A to the No-Action Alternative). The Project would have **no impact** to local schools.

Impact HAZ-8 (Alternative A): ***Exposure of People or Structures to a Substantial Risk of Loss, Injury, or Death involving Wildland Fires.*** California's Central Valley natural grasslands and forested foothills are subject to wildfires. Therefore, the California Department of Forestry and Fire Protection (CAL FIRE) publishes, on its website, Fire Hazard Severity Zone Maps for all counties in California. The maps for Fresno and Madera counties that include the Project area show that the majority of the Project area is located in a Local Responsibility Area that is Unzoned with small area located in a Moderate Fire Hazard Severity Zone (CAL FIRE 2007a, 2007b).

The Project area is not located near any heavily wooded wildland areas. In addition, the riverine vegetation along the San Joaquin River is not typically very flammable. The Project area is located within a farming area, where crops are irrigated during the hot summer months which also reduces the plant flammability. Small localized brush fires are the most likely type of wildfire and can be easily contained by local fire departments. Local fire departments located in the vicinity of the Project area are described in Table 19-4. Incorporated Madera County fire protection is provided by the Madera County Fire

Department. The department has 17 fire stations throughout the county to provide coverage.

Table 19-4.
Fire Stations in the Project Vicinity

Local Fire Stations	
Caruthers Station 90 2701 W. Tahoe Ave. Caruthers, CA 93609 559-864-3211	Mendota Station 96 101 McCabe Mendota, CA 93640 559-655-4107
Tranquillity Station 95 25101 Morton St. / P.O.Box 645 Tranquillity, CA 93668 559-698-5500	1575 11th Street, Firebaugh, CA 93622 559-659-2061

Source: Fresno County Fire Protection District 2012, Madera County Fire Department 2012.

When comparing Alternative A to existing conditions, impacts to the public or the environment would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). This impact would be **less than significant**.

Impact HAZ-9 (Alternative A): ***Creation of a Substantial Hazard in Areas Designated by Airport Land Use Plans, within 2 miles of an Airport, or in the Vicinity of a Private Airstrip.*** The only airport in the vicinity of the Project area is the William Robert Johnston Municipal Airport (Mendota Airport), located within ½ mile of the southwestern boundary of the Project area. The airport is a general aviation airport, open to the public. It is operated only in daylight hours and does not have fueling facilities. It does not have an operations tower and has no regularly scheduled commercial service (Federal Aviation Administration 2013).

In contrast to the No-Action Alternative, Alternative A would involve construction activities and improvements in the Project area. However, these construction activities and improvements would not have the potential to affect aircraft flight patterns or affect operations at the local airport. Specifically, implementation of the Alternative A would not involve construction at or near the airport, constructing tall structures or operating tall construction equipment (e.g., a crane) that could pose a hazard to airplanes. Dust control measures employed for other mitigation measures would prevent dust clouds from affecting air traffic. One threat to aircraft is bird strikes from birds the Project area. However, implementation of Alternative A would reduce the amount of ponding (on the San Joaquin River arm of Mendota Pool) that would attract birds that then could be an aircraft hazard. As a result, implementing Alternative A would not create a hazard to aircraft safety in the area. Based on these factors, the Project would have no impact on airport safety or local residents due to impacts to airport safety.

When comparing Alternative A to existing conditions, impacts to aircraft safety would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). The Project would have **no impact**.

Impact HAZ-10 (Alternative A): ***Impairment of the Implementation or Physical Interference with an Adopted Emergency Response or Emergency Evacuation Plan.*** The Madera County Sheriff is the Director of Disaster Services and Operational Area Coordinator and the Sheriff activates the County's Emergency Operations Center under prescribed conditions (Madera County OES 2010). The Fresno County OES is located in Fresno and each of the 15 unincorporated cities within the county maintains an OES function for its incorporated areas and coordinates with the County OES (Fresno County OES 2015).

The Project area is located in agricultural lands with very low population and structure density and does not encompass any major thoroughfares. The Project may increase emergency evacuation times in areas immediately north of the San Mateo Avenue crossing due to temporary closures for upgrades at the crossing. However, residences are not located to the north within the vicinity of the crossing, workers would be able to evacuate using alternative routes, and closure of the San Mateo Avenue crossing would be temporary to provide for upgrades. Therefore, conflicts with the local emergency response plans or plan implementation are not anticipated.

When comparing Alternative A to existing conditions, impacts to the public or the environment would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). The Project is not anticipated to impair local emergency response plans, so the Project poses **no impact** to these plans.

Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the Preferred Alternative

Alternative B would include construction of Project features including a Compact Bypass channel, a new levee system with a wide, consensus-based floodplain encompassing the river channel, the Mendota Pool Control Structure, and the Compact Bypass ~~Bifurcation~~ Control Structure with fish passage facility and fish screens. Other key features include construction of a fish passage facility at the San Joaquin River control structure at the Chowchilla Bifurcation Structure, the re-route of Drive 10 ½ (across the Compact Bypass C~~c~~ontrol S~~s~~tructure), and removal of the San Mateo Avenue crossing. Construction activity is expected to occur intermittently over an approximate 157-month timeframe.

Impact HAZ-1 (Alternative B): ***Creation of a Substantial Hazard through the Routine Transport, Use, or Disposal of Hazardous Materials or through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials.*** Refer to Impact HAZ-1 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. Because the Project would implement and comply with Federal, State, and local hazardous materials regulations monitored by the State and/or local jurisdictions, impacts related to creation of substantial hazards to the public through routine transport, use, disposal, and risk of upset would be

unlikely with Project construction activities. There would be a **less than significant impact**.

Impact HAZ-2 (Alternative B): ***Increased Exposure to Hazardous Materials for People Residing or Working in the Project Area.*** Refer to Impact HAZ-2 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. Implementing the Project alternative would have the potential to expose construction workers and others to hazardous materials. There would be a **potentially significant** impact.

Mitigation Measures HAZ-2A, HAZ-2B, HAZ-2C, HAZ-2D, and HAZ-2E (Alternative B): ***Follow General Hazardous Materials Guidelines, Properly Dispose of Hazardous Building Components, Properly Dispose of Pesticides, Properly Manage Discolored or Odiferous Soils, Properly Remove Underground Storage Tanks.*** Refer to Mitigation Measures HAZ-2A, HAZ-2B, HAZ-2C, HAZ-2D, and HAZ-2E (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of mitigation measures.

Impact HAZ-3 (Alternative B): ***Creation of a Substantial Hazard from Disturbance of Known Hazardous Material Sites.*** Refer to Impact HAZ-3 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. Project construction and other ground-disturbing activities could occur at a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, could create a hazard to the public or the environment. There would be a **potentially significant** impact.

Mitigation Measure HAZ-3 (Alternative B): ***Minimize Disturbance to Known Hazardous Material Sites.*** Refer to Mitigation Measure HAZ-3 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-4 (Alternative B): ***Creation of a Substantial Hazard from Mobilization of Soil Contaminants on the Floodplain.*** Refer to Impact HAZ-4 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. There may be residual pesticide and herbicides in soil within the existing agricultural portion of the Project area from historical farming operations that could be mobilized due to Project operations. There would be a **potentially significant** impact.

Mitigation Measure HAZ-4 (Alternative B): ***Minimize Use of Pesticide and Herbicide Contaminated Soil.*** Refer to Mitigation Measure HAZ-4 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-5 (Alternative B): ***Exposure of People to Increased Risk of Diseases.*** Refer to Impact HAZ-5 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. Project activities may increase the risk of

exposure to disease vectors for construction workers. There would be a **potentially significant** impact.

Mitigation Measures HAZ-5A, HAZ-5B, and HAZ-5C (Alternative B): ***Minimize Exposure to Potential West Nile Virus Carrying Vectors, Minimize Exposure to Potential Hantavirus Vectors, and Minimize Exposure to Valley Fever.*** Refer to Mitigation Measures HAZ-5A, HAZ-5B, and HAZ-5C (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of mitigation measures.

Impact HAZ-6 (Alternative B): ***Creation of a Substantial Hazard from Decommissioned Wells.*** Refer to Impact HAZ-6 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. Without appropriate protection ground-disturbing activities in the Project area could disrupt active, idle, or abandoned wells. This would be a **potentially significant** impact.

Mitigation Measure HAZ-6 (Alternative B): ***Minimize the Disturbance of Idle or Abandoned Wells.*** Refer to Mitigation Measure HAZ-6 (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-7 (Alternative B): ***Increased Hazardous Emissions or Handling of Hazardous Materials, Substances, or Wastes within ¼ mile of a School.*** Refer to Impact HAZ-7 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. Local public schools are located more than ¼ mile from the Project area and therefore potential releases of hazardous materials used during the Project construction are unlikely to impact local schools. There would be **no impact**.

Impact HAZ-8 (Alternative B): ***Exposure of People or Structures to a Substantial Risk of Loss, Injury, or Death involving Wildland Fires.*** Refer to Impact HAZ-8 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. Because the Project would implement reasonable wildland fire safety measures, the potential for construction activities to spark an uncontrollable wildland fire is considered remote. There would be a **less than significant** impact.

Impact HAZ-9 (Alternative B): ***Creation of a Substantial Hazard in Areas Designated by Airport Land Use Plans, within 2 miles of an Airport, or in the Vicinity of a Private Airstrip.*** Refer to Impact HAZ-9 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. Project construction activities would not have the potential to adversely affect aircraft flight patterns, operations at the local airport, or airport safety of local residents. There would be **no impact**.

Impact HAZ-10 (Alternative B): ***Impairment of the Implementation or Physical Interference with an Adopted Emergency Response or Emergency Evacuation Plan.*** Refer to Impact HAZ-10 (Alternative A). Potential impacts of Alternative B would be similar to potential impacts of Alternative A. The Project would not impair local emergency response plans. There would be **no impact**.

Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)
Alternative C would include construction of Project features including Fresno Slough Dam, a new levee system with a narrow floodplain encompassing the river channel, and the Short Canal. Other key features include construction of the Mendota Dam fish passage facility, the Fresno Slough fish barrier, the Short Canal control structure and fish screen, the Chowchilla Bifurcation Structure fish passage facility, modification of San Mateo Avenue crossing, and Main Canal and Helm Ditch relocations. Construction activity is expected to occur intermittently over an approximate 133-month timeframe.

Impact HAZ-1 (Alternative C): ***Creation of a Substantial Hazard through the Routine Transport, Use, or Disposal of Hazardous Materials or through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials.*** Refer to Impact HAZ-1 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. Because the Project would implement and comply with Federal, State, and local hazardous materials regulations monitored by the State and/or local jurisdictions, impacts related to creation of substantial hazards to the public through routine transport, use, disposal, and risk of upset would be unlikely with Project construction activities. There would be a **less than significant** impact.

Impact HAZ-2 (Alternative C): ***Increased Exposure to Hazardous Materials for People Residing or Working in the Project Area.*** Refer to Impact HAZ-2 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. Implementing the Project alternative would have the potential to expose construction workers and others to hazardous materials. There would be a **potentially significant** impact.

Mitigation Measures HAZ-2A, HAZ-2B, HAZ-2C, HAZ-2D, and HAZ-2E (Alternative C): ***Follow General Hazardous Materials Guidelines, Properly Dispose of Hazardous Building Components, Properly Dispose of Pesticides, Properly Manage Discolored or Odiferous Soils, Properly Remove Underground Storage Tanks.*** Refer to Mitigation Measures HAZ-2A, HAZ-2B, HAZ-2C, HAZ-2D, and HAZ-2E (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of mitigation measures.

Impact HAZ-3 (Alternative C): ***Creation of a Substantial Hazard from Disturbance of Known Hazardous Material Sites.*** Refer to Impact HAZ-3 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. Project construction and other ground-disturbing activities could occur at a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, could create a hazard to the public or the environment. There would be a **potentially significant** impact.

Mitigation Measure HAZ-3 (Alternative C): ***Minimize Disturbance to Known Hazardous Material Sites.*** Refer to Mitigation Measure HAZ-3 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-4 (Alternative C): ***Creation of a Substantial Hazard from Mobilization of Soil Contaminants on the Floodplain.*** Refer to Impact HAZ-4 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. There may be residual pesticide and herbicides in soil within the existing agricultural portion of the Project area from historical farming operations that could be mobilized due to Project operations. There would be a **potentially significant** impact.

Mitigation Measure HAZ-4 (Alternative C): ***Minimize Use of Pesticide and Herbicide Contaminated Soil.*** Refer to Mitigation Measure HAZ-4 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-5 (Alternative C): ***Exposure of People to Increased Risk of Diseases.*** Refer to Impact HAZ-5 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. Project activities may increase the risk of exposure to disease vectors for construction workers. There would be a **potentially significant** impact.

Mitigation Measures HAZ-5A, HAZ-5B, and HAZ-5C (Alternative C): ***Minimize Exposure to Potential West Nile Virus Carrying Vectors, Minimize Exposure to Potential Hantavirus Vectors, Minimize Exposure to Valley Fever.*** Refer to Mitigation Measures HAZ-5A, HAZ-5B, and HAZ-5C (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of mitigation measures.

Impact HAZ-6 (Alternative C): ***Creation of a Substantial Hazard from Decommissioned Wells.*** Refer to Impact HAZ-6 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. Without appropriate protection ground-disturbing activities in the Project area could disrupt active, idle, or abandoned wells. This would be a **potentially significant** impact.

Mitigation Measure HAZ-6 (Alternative C): ***Minimize the Disturbance of Idle or Abandoned Wells.*** Refer to Mitigation Measure HAZ-6 (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-7 (Alternative C): ***Increased Hazardous Emissions or Handling of Hazardous Materials, Substances, or Wastes within ¼ mile of a School.*** Refer to Impact HAZ-7 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. Local public schools are located more than ¼ mile from the Project area and therefore potential releases of hazardous materials used during the Project construction are unlikely to impact local schools. There would be **no impact**.

Impact HAZ-8 (Alternative C): ***Exposure of People or Structures to a Substantial Risk of Loss, Injury, or Death involving Wildland Fires.*** Refer to Impact HAZ-8 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. Because the Project would implement reasonable wildland fire safety

measures, the potential for construction activities to spark an uncontrollable wildland fire is considered remote. There would be a **less than significant** impact.

Impact HAZ-9 (Alternative C): ***Creation of a Substantial Hazard in Areas Designated by Airport Land Use Plans, within 2 miles of an Airport, or in the Vicinity of a Private Airstrip.*** Refer to Impact HAZ-9 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. Project construction activities would not have the potential to adversely affect aircraft flight patterns, operations at the local airport, or airport safety of local residents. There would be **no impact**.

Impact HAZ-10 (Alternative C): ***Impairment of the Implementation or Physical Interference with an Adopted Emergency Response or Emergency Evacuation Plan.*** Refer to Impact HAZ-10 (Alternative A). Potential impacts of Alternative C would be similar to potential impacts of Alternative A. The Project would not impair local emergency response plans. There would be **no impact**.

Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)

Alternative D would include construction of Project features including Fresno Slough Dam, a new levee system with a wide floodplain encompassing the river channel, and the North Canal. Other key features include construction of the Mendota Dam fish passage facility, the Fresno Slough fish barrier, the North Canal bifurcation structure with fish passage facility and fish screens, removal of the San Joaquin River control structure at the Chowchilla Bifurcation Structure, removal of San Mateo Avenue crossing, and Main Canal and Helm Ditch relocations. Construction activity is expected to occur intermittently over an approximate 158-month timeframe.

Impact HAZ-1 (Alternative D): ***Creation of a Substantial Hazard through the Routine Transport, Use, or Disposal of Hazardous Materials or through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials.*** Refer to Impact HAZ-1 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. Because the Project would implement and comply with Federal, State, and local hazardous materials regulations monitored by the State and/or local jurisdictions, impacts related to creation of substantial hazards to the public through routine transport, use, disposal, and risk of upset would be unlikely with Project construction activities. There would be a **less than significant** impact.

Impact HAZ-2 (Alternative D): ***Increased Exposure to Hazardous Materials for People Residing or Working in the Project Area.*** Refer to Impact HAZ-2 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. Implementing the Project alternative would have the potential to expose construction workers and others to hazardous materials. There would be a **potentially significant** impact.

Mitigation Measures HAZ-2A, HAZ-2B, HAZ-2C, HAZ-2D, and HAZ-2E (Alternative D): ***Follow General Hazardous Materials Guidelines, Properly Dispose of Hazardous Building Components, Properly Dispose of Pesticides, Properly Manage***

Discolored or Odiferous Soils, Properly Remove Underground Storage Tanks. Refer to Mitigation Measures HAZ-2A, HAZ-2B, HAZ-2C, HAZ-2D, and HAZ-2E (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of mitigation measures.

Impact HAZ-3 (Alternative D): ***Creation of a Substantial Hazard from Disturbance of Known Hazardous Material Sites.*** Refer to Impact HAZ-3 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. Project construction and other ground-disturbing activities could occur at a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, could create a hazard to the public or the environment. There would be a **potentially significant** impact.

Mitigation Measure HAZ-3 (Alternative D): ***Minimize Disturbance to Known Hazardous Material Sites*****.** Refer to Mitigation Measure HAZ-3 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-4 (Alternative D): ***Creation of a Substantial Hazard from Mobilization of Soil Contaminants on the Floodplain.*** Refer to Impact HAZ-4 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. There may be residual pesticide and herbicides in soil within the existing agricultural portion of the Project area from historical farming operations that could be mobilized due to Project operations. There would be a **potentially significant** impact.

Mitigation Measure HAZ-4 (Alternative D): ***Minimize Use of Pesticide and Herbicide Contaminated Soil.*** Refer to Mitigation Measure HAZ-4 (Alternative A). The same measure would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-5 (Alternative D): ***Exposure of People to Increased Risk of Diseases.*** Refer to Impact HAZ-5 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. Project activities may increase the risk of exposure to disease vectors for construction workers. There would be a **potentially significant** impact.

Mitigation Measures HAZ-5A, HAZ-5B, and HAZ-5C (Alternative D): ***Minimize Exposure to Potential West Nile Virus Carrying Vectors, Minimize Exposure to Potential Hantavirus Vectors, Minimize Exposure to Valley Fever.*** Refer to Mitigation Measures HAZ-5A, HAZ-5B, and HAZ-5C (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of mitigation measures.

Impact HAZ-6 (Alternative D): ***Creation of a Substantial Hazard from Decommissioned Wells.*** Refer to Impact HAZ-6 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. Without appropriate

protection ground-disturbing activities in the Project area could disrupt active, idle, or abandoned wells. This would be a **potentially significant** impact.

Mitigation Measure HAZ-6 (Alternative D): ***Minimize the Disturbance of Idle or Abandoned Wells.*** Refer to Mitigation Measure HAZ-6 (Alternative A). The same measures would be used here. Impacts would be **less than significant** with implementation of the mitigation measure.

Impact HAZ-7 (Alternative D): ***Increased Hazardous Emissions or Handling of Hazardous Materials, Substances, or Wastes within ¼ mile of a School.*** Refer to Impact HAZ-7 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. Local public schools are located more than ¼ mile from the Project area and therefore potential releases of hazardous materials used during the Project construction are unlikely to impact local schools. There would be **no impact**.

Impact HAZ-8 (Alternative D): ***Exposure of People or Structures to a Substantial Risk of Loss, Injury, or Death involving Wildland Fires.*** Refer to Impact HAZ-8 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. Because the Project would implement reasonable wildland fire safety measures, the potential for construction activities to spark an uncontrollable wildland fire is considered remote. There would be a **less than significant** impact.

Impact HAZ-9 (Alternative D): ***Creation of a Substantial Hazard in Areas Designated by Airport Land Use Plans, within 2 miles of an Airport, or in the Vicinity of a Private Airstrip.*** Refer to Impact HAZ-9 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A. Project construction activities would not have the potential to adversely affect aircraft flight patterns, operations at the local airport, or airport safety of local residents. There would be **no impact**.

Impact HAZ-10 (Alternative D): ***Impairment of the Implementation or Physical Interference with an Adopted Emergency Response or Emergency Evacuation Plan.*** Refer to Impact HAZ-10 (Alternative A). Potential impacts of Alternative D would be similar to potential impacts of Alternative A, with the exception that the San Mateo Avenue crossing would be removed instead of modified. Although the Project could increase emergency evacuation times in areas immediately north of the San Mateo Avenue crossing, residences are not located to the north within the vicinity of the crossing and workers would be able to evacuate using alternative routes. The Project would not impair local emergency response plans. There would be **no impact**.

20.0 Recreation

This chapter evaluates the potential effects of the Project on recreation opportunities in the Project area. First, information is presented on existing recreation resources and activities known to occur in proximity to Reach 2B of the San Joaquin River. The overview of recreation resources presented in this section is based primarily on recreation information documented in the *San Joaquin River Recreation Study* (Blumenshine et al. 2012, California Department of Fish and Wildlife [DFW] 2013a).[1] Using this information as context, the analysis of recreation-related impacts of the Project is presented based on the characteristics of the Project alternatives, including the type, location, and duration of restoration activities.

20.1 Environmental Setting

Water from the San Joaquin River supports multiple uses, including recreation. Across the entire Restoration Area, recreation activity is diverse with people actively engaging in fishing, boating, environmental interpretation and education, trail use, camping, hunting, picnicking, and wildlife viewing/nature observation. However, the type and extent of recreation activity in Reach 2B are more limited because most of the property adjacent to the river is in private ownership and few public facilities exist. As a result, recreation opportunities are mainly water-oriented uses, primarily fishing. In addition, because the upstream portion of Reach 2B was typically dry prior to Interim Flows, except during high-flow events, recreation activity in the Project area is centered on the Mendota Pool area, which contains water on a year-round basis (except during dewatering periods) and is accessible by public roads and a local park. A comprehensive description of recreation uses, facilities, and public access located within the Project area is presented below.

20.1.1 Recreation Uses

The primary recreation activity in the Project area is fishing, although other activities occur including hunting, boating, and swimming, as well as general recreation and day use. Local residents use the Mendota Pool area for fishing, however, the number of anglers is low compared to fishing sites in Reach 1 (e.g., Lost Lake and Friant Cove), averaging only 1.2 anglers per site visit as compared to 6.7 anglers per site visit at Lost Lake in Reach 1. Non-angling recreation use is also low at Mendota Pool compared to activities in Reach 1, with about 0.25 non-angling recreationists found at Mendota Pool per site visit as compared to 61.7 non-angling recreationists per site visit at Skaggs Bridge Park (Blumenshine et al. 2012, DFW 2013a). The peak month for angling (and overall recreation) activity at Mendota Pool was October. Target species at Mendota Pool include warm-water game and non-game fisheries, including striped bass, catfish, largemouth bass, smallmouth bass, crappie and bluegill (Blumenshine et al. 2012).

[1] Mendota Pool was included in the sampling of lower river recreation sites during 2011/2012. A total of 75 site visits were made to the Mendota Pool during the sampling period.

Although fishing activity is known to occur at Mendota Pool, recreational fisheries have been constrained at this location due to approximate biennial winter dewatering, high water exchange rates, turbidity, poor recruitment, and lack of microhabitats (U.S. Department of the Interior, Bureau of Reclamation [Reclamation] 2007). Anglers at Mendota Dam are evenly distributed between fishing for consumptive purposes and catch and release (Blumenshine et al. 2012); however, the extent of subsistence fishing is unknown.

Fishing activity is concentrated just below Mendota Dam and above the dam in Mendota Pool, with anglers engaging in both shore-fishing along the riverbank and fishing directly from the dam. One popular shore-fishing and day-use site is a small dirt landing on the west bank of the river immediately downstream of Mendota Dam; this area is readily accessible from Bass Avenue and parking is available. It also serves as a boat launch for small watercraft (e.g., aluminum boats with motors) providing access to downstream stretches of the river. This hand launch is routinely used by DFW to facilitate boat patrols. Because this site is privately-owned by Central California Irrigation District, fishing and boat launching activity by the public are considered unauthorized uses. Fishing from Mendota Dam is also unauthorized, as access to the dam is restricted as evident by permanent barriers and "No Trespassing" signage restricting access. Further, DFW regulations prohibit fishing from any dam or any weir or rack which has a fishway or an egg-taking station (DFW 2013b); however, this regulation is not currently being enforced at Mendota Dam (Spada, pers. comm. 2011a). Shore fishing on Mendota Pool is also common, with access provided primarily by Mendota Pool Park. There is likely some fishing activity on private lands along Reach 2B, but site visits indicate the extent of fishing on private property at Mendota Pool is limited (Blumenshine et al. 2012).

Fishing activities also occur from boats in both the San Joaquin River and Fresno Slough arms of Mendota Pool. Small watercraft can enter the San Joaquin River arm of Mendota Pool at the San Mateo Avenue crossing, which is accessible by public roads. Fishing opportunities from boats available in the Fresno Slough arm of Mendota Pool can be accessed from the boat launch just south of Mowry Bridge.

Overall, fishing is the primary recreation activity in the Mendota Pool area for the local community, including residents of the city of Mendota, as demonstrated by the presence of anglers, particularly on weekends, during peak fishing seasons in the spring and fall. Fishing at Mendota Pool is consistent, occurring daily on a year-round basis (Blumenshine et al. 2012). A substantial proportion of anglers at Mendota Pool are from the community of Mendota (about 35 percent), and nearly all anglers are from Fresno County. In addition, many of the anglers appear to be experienced fisherman, averaging 26 fishing trips per year. Mendota Pool is one of the few locations with public fishing access in the Project area due to the extensive private land holdings in proximity to the river. When anglers at Mendota Pool were asked where they would fish if they could not fish in the San Joaquin River, the top two alternative sites were local irrigation canals and

the Kings River, both of which are outside the Project area (Blumenshine et al. 2012).[2] Fishing opportunities are also found elsewhere in the Project vicinity. Further upstream in Fresno Slough (outside the Project area, approximately 5 miles from Mendota Dam), a public campground and boat launch facility are located at the Highway 180 Bridge, which can be used to access the Project area (to the north) and the Mendota Wildlife Area (to the south). Downstream of the Project area, recreation and fishing opportunities on the San Joaquin River are available in the city of Firebaugh, approximately 8 miles ~~south~~ northwest of Mendota Dam. The San Joaquin River borders about two-thirds of the town and access appears likely from several public roads. In addition, a community park (Dunkle Park) is located adjacent to the river. River-oriented recreation facilities, including a launch site for small watercraft, are also available just north of the 13th Street/Firebaugh Boulevard Bridge (American Whitewater Association 2012).

Hunting also occurs near the Project area within the San Joaquin River, primarily below Mendota Dam and within the Mendota Wildlife Area, which can be accessed via Fresno Slough. However, hunting in Reach 2B itself is limited. Downstream of Mendota Dam, hunting occurs from small boats, which typically access the river from the unpaved boat launch immediately downstream of Mendota Dam. Target species are generally waterfowl, such as ducks, and dove and quail. It is estimated that approximately 10 percent of the recreation use below Mendota Dam is hunting (Spada, pers. comm. 2011b).

Recreational boating is another activity occurring in the Project area. Flat-water boating opportunities are available on Mendota Pool. Boat access to Mendota Pool is provided at informal locations along the river, mainly on private land, as well as a paved boat launch just north of Mendota Pool Park that provides direct access to the Fresno Slough arm of Mendota Pool. In addition, unmotorized watercraft, such as kayaks and canoes, have been observed accessing the San Joaquin River downstream of Mendota Dam using the unpaved boat launch downstream of Mendota Dam as a put-in location.

People also visit the Mendota Pool area for general recreation and day use, including swimming during the summer season. Swimming activity is concentrated in Mendota Pool; swimming is limited downstream of the dam during periods of high flows.

20.1.2 Recreation Facilities and Areas

Developed recreation facilities and access points are limited in the Project area; however, there are several recreational facilities and areas that support the recreation activities described above.

Mendota Pool Park is the only public recreation facility in the Project area and serves local people. The land underlying the park west of Bass Avenue is owned by the city of Mendota and the land east of Bass Avenue is owned by the Central California Irrigation

[2] A total of 65 people responded to the question on alternative fishing sites to Mendota Pool. The responses are as follows: "The Canals" (9 responses), Kings River (8), California Aqueduct (3), Hume Lake (3), Imperial Valley (3), Kern County (2), Lodi Delta (2), Ocean (2), Pine Flat Lake (2), Salt Slough (2), Avocado Lake (1), DK (1), Hensley Lake (1), Los Banos (1), Regional Sports Center (1), and San Luis Reservoir (1)

District, but ~~is leased and~~ managed by the city of Mendota. The ~~85~~20-acre park provides picnic tables, playground, ballfield, performance stage, and open space. The park is located adjacent to and provides direct access to the Fresno Slough arm of Mendota Pool. Access from the park to Mendota Pool is available at both the southeast and northeast corners of the park. Informal paths lead directly to the shoreline where trash receptacles and picnic tables are provided. There are no official boat launch facilities within the park; however unregulated self-launching from the shoreline could occur.

Boat access to the Project area is facilitated by several boat launches located near the Mendota Pool area. A developed (paved) boat launch is located off the gravel road leading to Mowry Bridge just north of Mendota Pool Park and the Delta-Mendota Canal (DMC). This facility primarily provides access to Fresno Slough south of Mowry Bridge because the bridge can serve as a barrier to downstream access depending on size of watercraft and water levels. However, low-profile watercraft can navigate under the bridge and access the Mendota Dam area and the San Joaquin River arm of Mendota Pool. This boat launch is located on Central California Irrigation District property~~was constructed and is operated by the city of Mendota~~. In addition, as described above, there is an undeveloped, user-defined hand launch below Mendota Dam providing access to Reach 3 of the San Joaquin River, which can be used for canoes and kayaks.

The Mendota Wildlife Area is located several miles south of the Project area along Fresno Slough. This area consists of nearly 12,000 acres of managed impoundments and wetland and upland habitat, providing opportunities for waterfowl hunting, fishing, camping, bird watching, and other activities.

20.1.3 Public Access

Land along Reach 2B of the San Joaquin River is predominantly in private ownership and used for agricultural production; therefore, is not publicly accessible. As a result, authorized public access is limited to Mendota Pool Park and the areas immediately downstream and upstream of Mendota Dam. Public access to Mendota Dam itself is restricted.

Another access point for recreation is the San Mateo Avenue crossing, located at the upstream end of the San Joaquin River arm of Mendota Pool. The public can access the river from the north via Chowchilla Canal Road, a public roadway. This location provides approximately 7 miles of downstream river access year-round and upstream river access at certain times of the year when flows are present. In addition to general recreation activities, anglers use this location to launch boats; and it is also a put-in location for other non-motorized watercraft.

Informal access points are also found along the bank of the San Joaquin River. Because the riverbank is predominantly in private ownership, authorized access at these locations is primarily for local landowners and/or their guests. However, the public commonly accesses the river from private lands along the river, which is considered trespassing.

20.2 Regulatory Setting

There are no established management plans for the Mendota Pool area or any specific guidelines for recreation management applicable to the Project area. There are, however, regulations pertaining to fishing and hunting that are enforced at the State level by DFW. In addition, there are general policies related to recreation found in the local city and county general plans.

20.2.1 Federal

Federal Water Project Recreation Act of 1965, Public Law 89-72

The Federal Water Project Recreation Act requires that Federal navigation, flood control, reclamation, hydroelectric, or multipurpose water resource projects consider opportunities for outdoor recreation and for fish and wildlife enhancement. Since the passage of Public Law 89-72, recreational development is considered for Reclamation projects. However, if a project does not have specific recreation authority, Public Law 89-72 authorizes Reclamation to cost share for development of public recreation and wildlife facilities when a non-federal partner indicates through long-term agreement their willingness and ability to share in the costs of recreation development and to operate and maintain those recreation facilities after construction. Without a recreation partner agreeing to assist in the development and long-term management of these facilities, Reclamation is limited to providing only "limited basic" recreation facilities to protect the health and safety of the general public.

20.2.2 State of California

Freshwater Sport Fishing Regulations, California Code of Regulations Title 14

DFW maintains and enforces statewide fishing and hunting regulations. Currently, from the Friant Dam to the Highway 140 bridge and from the Highway 140 bridge downstream to the Interstate 5 bridge at Mossdale, fishing in the San Joaquin River is open year round; however, this stretch of the river is closed to salmonid fishing with the exception of hatchery trout and hatchery steelhead. In addition, DFW fishing regulations state that fishing is not allowed within 250 feet of: (a) any fishway or any egg-taking station; (b) any dam or any weir or rack which has a fishway or an egg-taking station; or (c) the upstream side of any fish screen (DFW 2013b). DFW patrols the Mendota Pool area on a routine basis.

Public Trust Lands

The California State Lands Commission (CSLC) has mapped State lands and public trust lands in Reach 2B. In or about April 2008, Reclamation requested the technical and specialized assistance of CSLC staff to help identify all sovereign and public trust lands under the jurisdiction of the CSLC, in connection with the San Joaquin River Restoration Program (SJRRP). There is no other State or Federal agency, or private entity, with the historical records, mapping, expertise and experience to satisfy Reclamation's request for technical assistance. CSLC's San Joaquin River Administrative Maps will facilitate the construction of the channel modifications and improvements needed for the SJRRP. The CSLC, at its regular public meeting on August 14, 2012, by approval of Calendar/Minute

Item No. 53, authorized CSLC staff to file the Record of Survey for the San Joaquin River Administrative Map for Reach 2B (CSLC 2011). These maps depict the location and extent of sovereign land title interest claims of the State in and to the bed of the San Joaquin River within Reach 2B and indicate the following: "Except where the original grant under which the adjoining land is held indicates a different intent, the State asserts fee ownership between the low water lines as shown, and a public trust easement over the lands between the high and low water lines pursuant to Civil Code Section 830, as interpreted in *People v. Superior Court (Lyon)*, 29 Cal. 3d 210 (1981), and in *People v. Superior Court (Fogerty)*, 29 Cal. 3d 240 (1981)" (CSLC 2011). See Chapter 16, "Land Use Planning and Agricultural Resources" for a description of the public trust easement. To access the easement, legal access is required; the public is not entitled to cross private lands to use the public trust easement area.

20.2.3 Regional and Local

The local general plans of Fresno and Madera counties provide policy direction related to recreation in the Project vicinity; however, most of the policies are specific to areas outside the Project area.

The Fresno County General Plan (Fresno County 2000) includes sections on parks and recreation and on recreational trails. These sections focus on designating land for recreation and promoting the development of recreational facilities and a trail system. General plan policies applicable to this Project include policies encouraging agencies providing recreational facilities to maintain and improve, if possible, their current levels of service (Policy OS-H.5).

The Madera County General Plan (Madera County 1995) identifies goals and policies related to public recreation and parks, private recreational facilities and opportunities, and recreational trails. General plan policies applicable to this Project include policies encouraging agencies providing recreation facilities to maintain and improve, if possible, their current levels of service (Policy 4.A.7).

The nearest municipality to the Project area is the city of Mendota. The city of Mendota General Plan (City of Mendota 2009) references the Mendota Pool Park ~~and boat launch~~, but notes that ~~these facilities are~~it is located in unincorporated Fresno County outside the City's planning area. Therefore, the city of Mendota does not administer any plans or policies related to recreation in the Project area. The city of Firebaugh is located outside the Project area, approximately 8 miles from Mendota Pool Park.

20.3 Environmental Consequences and Mitigation Measures

20.3.1 Impact Assessment Methodology

This section describes the approach for the analysis of recreation resources in the Project area. The evaluation of impacts on recreation considers the extent to which existing public access and recreation activities are currently available in the Project area, including opportunities for fishing, hunting, boating, and general recreation at Mendota Pool, Mendota Pool Park, and downstream of the Pool to the point where the Mendota

Pool Bypass connects to the San Joaquin River (in Reach 3). Recreational use information is based primarily on the results of the *San Joaquin River Recreation Study* (Blumenshine et al. 2012).

The characteristics of Project construction, including the extent and duration of construction activities, have been reviewed to determine whether the Project would physically affect existing recreational features and access points and/or diminish the quality of recreation opportunities due to construction-related externalities (i.e., noise and dust). Most of the construction-related effects at sites within the Project area would occur during active construction, i.e., occurring intermittently over the 11- to 13-year construction period (depending on alternative) as identified in Section 2. There would be limitations on public access to existing recreation use areas in proximity to construction activity, which would occur primarily during daylight hours on weekdays. Under all of the Project alternatives, the use of borrow material would be required during construction and would come from nearby land in the Project area (located within the larger areas identified in Figure 1-2 as potential borrow areas). Potential borrow areas are primarily on private land and would not affect recreation uses in the Project area.

The long-term effects on recreation are considered in context of Restoration Flows and fish passage improvements and the related effects on recreational angling, general water recreation, and public access in Reach 2B (including Mendota Pool) and the upper portion of Reach 3 below the Pool. The analysis also considers the direct effects on recreation downstream of Mendota Dam at the point where the proposed bypass facility would enter in the river. The evaluation is based on comparisons to existing conditions[3] as well as to the No-Action condition, which includes Restoration Flows.

Potential effects further downstream from changes in river flows are incorporated by reference from the Program Environmental Impact Statement/Report (PEIS/R), which indicates that boating activity is likely to increase in Reaches 3, 4, and 5 due to increased flows (SJRRP 2011, page 21-51).

20.3.2 Significance Criteria

The Project is evaluated in accordance with the recreation section of Appendix G of the California Environmental Quality Act (CEQA) Environmental Checklist and professional judgment on anticipated impacts on existing recreation resources. Under National Environmental Policy Act (NEPA) Council on Environmental Quality Regulations, effects are evaluated in terms of their context and intensity. These factors have been considered when applying the State CEQA Guidelines, Appendix G. The Project would result in a significant impact on recreation if it would do any of the following:

[3] Existing conditions are defined as the conditions existing when the Notice of Intent and Notice of Preparation were filed, which was July 2009 for this Project and prior to Interim Flows. However, in certain cases, field data were collected at a later date. Often, this means that the data were collected after the start of Interim Flows. Therefore, in some cases, the existing conditions described will include the conditions after the start of Interim Flows.

- Have a substantial adverse effect, either directly or indirectly, through modifications to the recreation setting, or the availability or quality of recreational facilities, services, or recreational opportunities.
- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Develop new recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

20.3.3 Impacts and Mitigation Measures

This section provides an evaluation of direct and indirect effects of the Project Alternatives on recreation resources. It includes analyses of potential effects relative to No-Action conditions in accordance with NEPA and potential impacts compared to existing conditions to meet CEQA requirements. The analysis is organized by Project alternative with specific impact topics numbered sequentially under each alternative. With respect to recreation, the environmental impact issues and concerns are:

1. Construction-Related Effects on Recreation Opportunities and Facilities.
2. Permanent Displacement of Existing Recreation Uses and Access Restrictions from Project Facilities.
3. Effects on Recreational Angling at Project Structures.
4. Effects of Aquatic Habitat Improvements on Recreational Angling.
5. Effects of Increased Flows on Recreation Opportunities and Facilities.
6. Conflicts with Recreation Goals and Policies.

Other recreation-related issues covered in the PEIS/R are not covered here because they are programmatic in nature and/or are not relevant to the Project area. These include recreation effects at Millerton Lake (outside the Project area) and wildlife-based recreation effects in downstream reaches (not applicable to the Project area).

No-Action Alternative

Under the No-Action Alternative, the Project would not be implemented and none of the Project features would be developed in Reach 2B of the San Joaquin River. However, other Program actions would be implemented, including habitat restoration in other reaches, augmentation of river flows, and reintroduction of salmon. Without the Project, these activities would not achieve the Settlement goals. The analysis is a comparison to existing conditions, and no mitigation is required for No-Action.

Impact REC-1 (No-Action Alternative): *Construction-Related Effects on Recreation Opportunities and Facilities*. Under the No-Action Alternative, the Project would not be implemented and there would be no associated construction activities in the Project area. In addition, there would be no additional construction workers in the Project area that may increase the demand for local recreation opportunities. As a result, there would be **no impact** on existing recreation opportunities or facilities.

Impact REC-2 (No-Action Alternative): ***Permanent Displacement of Existing Recreation Uses and Access Restrictions from Project Facilities.*** Under the No-Action Alternative, the public would continue to be able to access the Fresno Slough arm of Mendota Pool at the ~~city of Mendota~~ boat launch north of Mendota Pool Park, access Reach 3 of the San Joaquin River at the informal hand launch below Mendota Dam, and access the San Joaquin arm of Mendota Pool at San Mateo Avenue. In addition, none of the proposed facilities that are part of the Project would be developed. Shore fishing opportunities and boating access would not be restricted by new Project facilities. Therefore, there would be no displacement of existing recreation opportunities or access restrictions in the Project area from Project structures. As a result, there would be **no impact** on recreation opportunities as compared to existing conditions.

Impact REC-3 (No-Action Alternative): ***Effects on Recreational Angling at Project Structures.*** While the No-Action Alternative does not include the Project, Program-wide restoration activities would still be implemented, including reintroduction of salmon in the San Joaquin River. Consequently, fishing regulations designed to protect salmon populations would likely be enforced throughout the Program's Restoration Area, including seasonal and geographic fishing closures and restrictions on specific fish species. These regulations would not affect the majority of the existing recreational angling in the Project area because Reach 2B is mainly a warm-water recreational fishery (i.e., few steelhead or trout) and salmon fishing is already prohibited under existing conditions. However, existing regulations designed to protect salmon populations would likely be enforced in areas that have not historically had salmon. In the context of Reach 2B, this means that provisions that restrict fishing within 250 feet of a fish ladder, dam or barrier (as outlined in Section 2.35 of the California Freshwater Sport Fishing Regulations; see Section 20.2.2) would likely be enforced at Mendota Dam. The enforcement of this regulation at Mendota Dam would displace anglers that currently fish from or below the dam, a popular fishing site for locals in the Mendota area. (Existing fishing activity at Mendota Dam is considered unauthorized because it occurs on private land, as well as violating Section 2.35 of the California Freshwater Sport Fishing Regulations.) Seasonal and geographic fishing closures may also occur under the No-Action Alternative. This could displace anglers in a portion of the Project area.

In response to the displacement of anglers from Mendota Dam, the demand for recreational fishing opportunities would likely be redirected to other nearby fishing sites in the Project area or vicinity, although fishing opportunities outside of the Project area and in proximity to the Mendota area are relatively limited. It is expected that anglers would seek fishing opportunities in other parts of the San Joaquin River, such as in the Firebaugh area, at Mendota Pool Park or other areas of Mendota Pool (primarily warm-water species), at local irrigation canals including the DMC, and/or at the Kings River and other locations outside the Project area (see Section 20.1.1). However, based on the number of anglers affected (relatively small number compared to other reaches of the San Joaquin River), it is unlikely that displaced fishing activity would cause deterioration of existing facilities at these alternative sites.

Compared to existing conditions, the No-Action Alternative would have an adverse effect on recreational angling within the Project area (primarily at Mendota Dam). However,

because existing recreational angling at Mendota Dam is unauthorized and other fishing sites are available, which would not deteriorate from displacement of angling activities, these impacts are considered **less than significant**.

Impact REC-4 (No-Action Alternative): ***Effects of Aquatic Habitat Improvements on Recreational Angling.*** Under the No-Action Alternative, Program-level actions would still be implemented across the Program's Restoration Area, including reintroduction of salmon into the San Joaquin River. In conjunction with salmon reintroduction, riverine habitat would be improved as a result of restoration activities in other reaches and increased flows, which would generally improve the health of the aquatic ecosystem and benefit cold-water fish species, causing a change in species composition from a predominately warm-water fishery to include more cold-water fish.

Prior to Interim and Restoration flows, the portion of Reach 2B upstream of the San Mateo Avenue crossing was typically dry. With implementation of these flows, aquatic habitat in Reach 2B above Mendota Pool has improved and is used by fish recruited from Mendota Pool or from upper reaches (see Chapter 5.0, "Biological Resources – Fisheries"). Increasing the range of aquatic habitat benefits fish, including recreational fisheries found in the San Joaquin River. This includes warm-water species, such as crappie, blue-gill, largemouth and smallmouth bass and catfish, and cold-water species, such as striper and steelhead, that are found in the Project area. Accordingly, these Program-level actions are expected to improve the quality of recreational fishing in Reach 2B above Mendota Pool, although salmon harvest would continue to be prohibited. Compared to existing conditions, a **beneficial** effect on recreational fishing is expected.

Impact REC-5 (No-Action Alternative): ***Effects of Increased Flows on Recreation Opportunities and Facilities.*** As described in REC-4, Reach 2 B would receive Restoration Flows up to the current capacity of the reach under the No-Action Alternative. In addition to benefits attributed to recreational fisheries above Mendota Pool, increased flows also have the potential to improve recreation conditions throughout the Program's Restoration Area, including Reach 2B, particularly for boating and other water-dependent activities. Specifically, increased river flows would provide more opportunities for motorized and non-motorized watercraft (e.g., kayaking and canoeing) to access the San Joaquin River because water would typically remain in the river year round rather than going dry at certain times of the year as is the case prior to Interim Flows. Similarly, there would be more opportunities for swimming. In the context of the Project area, these additional recreational opportunities would extend from the Chowchilla Bifurcation Structure to Mendota Dam and into Reach 3 (below Mendota Dam). Compared to existing conditions, the No-Action Alternative would have a **beneficial** effect on recreation associated with increased flows on the San Joaquin River.

Impact REC-6 (No-Action Alternative): ***Conflicts with Recreation Goals and Policies***. Under the No-Action Alternative, as described above, recreation conditions in the Project area would be enhanced (e.g., improvements to recreational fisheries and boating opportunities), while at the same time, fishing activity may be displaced due to enforcement of existing and future fishing regulations. Both the Fresno County General Plan and Madera County General Plans, call for encouraging agencies providing

recreational facilities to maintain and improve, if possible, their current levels of service (see Fresno County General Plan Policy OS-H.5 and Madera County General Plan Policy 4.A.7). The No-Action Alternative may conflict with these goals and policies due to displacement of fishing activity at Mendota Dam. However, fishing at Mendota Dam is unauthorized and the general plans designate the land in the Project area for agricultural uses and do not specifically provide for recreation management at Mendota Dam. Therefore, compared to existing conditions, potential conflicts with recreation-related goals and policies of locally-adopted plans would be **less than significant**.

Alternative A (Compact Bypass with Narrow Floodplain and South Canal)

Alternative A would entail construction of new Project facilities, including a levee system encompassing the existing river channel and the proposed bypass channel around Mendota Dam. Other key features include construction of a fish barrier below Mendota Dam, the Mendota Pool Dike (separating the San Joaquin River and Mendota Pool), the South Canal, South Canal bifurcation structure, and removal of the San Joaquin River control structure of the Chowchilla Bifurcation Structure. No construction activities would occur at or near Mendota Dam, which falls outside the Project boundary under Alternative A. Construction activity is expected to occur intermittently over an approximate 132-month timeframe.

Impact REC-1 (Alternative A): *Construction-Related Effects on Recreation Opportunities and Facilities*. Compared to No-Action, Project construction has the potential to result in short-term displacement of existing recreation uses near construction activities due to access restrictions near construction areas (e.g., construction fencing). Construction of facilities or other Project features in or near the river are likely to take place in the dry season when Restoration Flows are low, which could conflict with some water-dependent recreation activities (e.g., swimming, boating, and fishing) occurring in the Project area during summer months. Construction of off-river facilities is not seasonally dependent.

Construction-related restrictions along the proposed Compact Bypass and South Canal would primarily affect private lands where public access and recreation activity is already limited. Recreation activities that could be affected include shoreline fishing by private property owners and/or other individuals trespassing on private property to fish near the proposed bypass channel. In these cases, people engaging in recreation activities would likely relocate to other nearby areas along the river that are not otherwise restricted by Project construction.

Recreation opportunities outside construction zones would remain available to the public, such as general recreation at Mendota Pool Park and water-oriented activities (e.g., swimming) near Mendota Dam. However, Alternative A may diminish the quality of these local recreation opportunities due to construction-related externalities, such as noise and dust, which would be generated on a periodic or limited basis over the 132-month construction period.

When comparing Alternative A to existing conditions, impacts to recreation would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative

A to the No-Action Alternative). Because construction-related impacts would occur over an extended (multi-year) timeframe, which may include periods of peak recreation use, these impacts are considered **potentially significant**.

Mitigation Measure REC-1 (Alternative A): ***Minimize Construction Effects on Recreation Uses.*** Construction activities in the Project area will be modified to minimize adverse effects on recreation uses, including the following provisions: (1) allow access to recreation use areas when active construction is not occurring, and (2) configure construction zones to minimize access restrictions to recreation use areas. The proposed construction modifications would provide comparable access to recreation use areas as under existing conditions when active construction is not occurring (subject to public safety constraints). The impact would be **less than significant** after mitigation.

> **Implementation Action:** Allow access to recreation use areas at Mendota Pool and below Mendota Dam when active construction is not occurring, and configure construction zones to minimize access restrictions to these and other recreation use areas (e.g., San Mateo Avenue crossing) during periods when active construction is not occurring.
>
> **Location:** The location of proposed construction area security modifications will vary as construction activities move throughout the Project area but would be focused primarily at Mendota Pool.
>
> **Effectiveness Criteria:** Effectiveness will be based on public complaints to the SJRRP.
>
> **Responsible Agency:** Reclamation and CSLC.
>
> **Monitoring/Reporting Action:** Adequacy of the proposed construction practices will be confirmed with Reclamation managers and CSLC monitors.
>
> **Timing:** Mitigation will be ongoing over the construction timeframe.

Impact REC-2 (Alternative A): ***Permanent Displacement of Existing Recreation Uses and Access Restrictions from Project Facilities.*** Compared to No-Action, Alternative A would result in permanent displacement of recreation opportunities in the Project area due to Project design features that restrict public access as described below.

One of the most prominent effects on recreation would be associated with the fish barrier facility below Mendota Dam. The fish barrier facility would restrict the public from launching watercraft at the informal hand launch just below Mendota Dam and floating downstream (beyond the fish barrier) to engage in recreation activities. This would eliminate opportunities to access Reach 3 from the Mendota Dam area for fishing, hunting, and boating (including kayaking and canoeing) without portaging around the barrier, which could result in trespassing on private property at new locations. Further, the fish barrier would also limit the quantity of fish just below Mendota Dam, as salmon and other large fish would be directed up the bypass channel. There is the potential that some smaller fish species could make it past the fish barrier, which could support fishing

opportunities between Mendota Dam and the barrier, but the quantity of fish would be limited relative to No-Action conditions. (Restrictions on fishing opportunities associated with enforcement of existing fishing regulations near fish passage facilities, fish screens, fish barriers, and dams are addressed in REC-3 below.)

Alternative A would also result in additional access restrictions from Mendota Pool to the San Joaquin River upstream of the proposed Mendota Pool Dike. This facility would restrict boating access in Reach 2B, thereby adversely affecting fishing and kayaking/canoeing opportunities upstream of Mendota Dam, particularly for people accessing the river at the ~~city of Mendota~~ boat launch north of Mendota Pool Park and traversing under Mowry Bridge.[4] People using this ~~public~~ boat launch would be limited to recreation opportunities in Mendota Pool (below the dike) and Fresno Slough, the latter providing access to the Mendota Wildlife Area.

Alternative A includes the grade control structures in the Compact Bypass channel, which would restrict recreational boating between Reach 2B and Reach 3 of the San Joaquin River during periods of low river flows. Currently, Mendota Dam serves as a similar barrier,[5] so there would be minimal change compared to No-Action.

The addition of the South Canal bifurcation structure would represent a barrier to boating access. Adverse recreation effects associated with the proposed South Canal bifurcation structure would be minor because the existing San Joaquin River control structure of the Chowchilla Bifurcation Structure already represents a barrier to boating access under existing conditions, and the South Canal bifurcation structure would be added while the San Joaquin River Control Structure would be removed.

Public road access to Mendota Dam and Pool from Drive 10 ½ would be permanently restricted under Alternative A as Drive 10 ½ would terminate at the east side of the Compact Bypass channel, thereby limiting fishing access. However, public access to these facilities would remain available from the west side of the Project area.

Lastly, there would be minimal, if any, change to public access at the San Mateo Avenue crossing of the river, which would be upgraded under this alternative.

In response to these access restrictions, people that typically visit specific sites in the Project area (e.g., Mendota Dam) may elect to recreate elsewhere in the Project area or vicinity to meet their outdoor recreation demands or they may forego outdoor recreation opportunities for other forms of recreation. Alternative locations for fishing and boating exist within the Project area (e.g., the Fresno Slough arm of Mendota Pool) and outside the Project area. Because many of the people recreating in the Reach 2B area are local residents, it is likely that they would seek recreation opportunities in the local area, but may visit other sites in the region. Other fishing sites mainly consist of nearby irrigation canals, including the DMC, and other parts of the San Joaquin River, such as the

[4] Mowry Bridge is a barrier to boating access for large watercraft, but not for kayaks and canoes.
[5] Although there is a hand launch on the downstream side of Mendota Dam there are no portage facilities on the upstream side of the dam. Due to relatively steep slopes on the west bank, entering or exiting the river upstream of the dam would be difficult without trespassing on private property.

Firebaugh area. However, the quality of fishing may be inferior compared to the Mendota Dam area, which represents a prime location for certain species, such as striper and catfish. People wanting to fish and hunt (from boats) in Reach 3 may try to access the river below the proposed fish barrier, but most of the land along this stretch of the river is privately owned and informal access may constitute trespassing. The anticipated level of recreation pressure at these alternative locations is not expected to result in deterioration of existing recreation facilities and adverse physical effects on the environment.

When comparing Alternative A to existing conditions, impacts to local recreation would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to the No-Action Alternative). Although other recreation opportunities for fishing, boating, and hunting exist in the vicinity of the Project area, the proposed fish barrier below Mendota Dam would impact boating access between Reach 3 and Reach 2B below Mendota Dam and constrain regional boating recreationists' ability to link to the other reaches of the river. Also, the Mendota Pool Dike introduces an access constraint upstream of the dam, and the South Canal bifurcation structure introduces an access constraint once the San Joaquin River control structure of the Chowchilla Bifurcation Structure is removed. The loss of boating access would be a **potentially significant** impact.

Mitigation Measure REC-2 (Alternative A): ***Establish Boat Portage Facilities Around Project Facilities.*** Portage facilities for small watercraft will allow for boating access around Project structures (e.g., the fish barrier) and facilitate connectivity to downstream areas in Reach 3. Another portage facilities will be added at the Mendota Pool Dike and at the new South Canal bifurcation structure. The new portage facilities will incorporate signs to direct boaters around the fish barrier, the dam, the dike, and the South Canal bifurcation structure (and associated fish passage facilities and fish screens), showing them how to connect with the river safely while minimizing impacts to adjacent private lands at each location. The portage improvements would provide comparable access to recreation use of the river equivalent to the "ease of use" associated with the existing hand launch facility, subject to public safety constraints. The impact to boating access would be **less than significant** after mitigation.

Implementation Action: Design boat portage into the bank improvements at Project structures. Allow continued boating access to recreation use areas at Mendota Pool and below Mendota Dam.

Location: The location of the new portage facilities will be at Project structures.

Effectiveness Criteria: Effectiveness will be based on public complaints to the SJRRP.

Responsible Agency: Reclamation and CSLC.

Monitoring/Reporting Action: Adequacy of the proposed portage facilities will be confirmed with Reclamation managers and CSLC monitors.

Timing: Mitigation will be completed at the time of structure installations.

Impact REC-3 (Alternative A): *Effects on Recreational Angling at Project Structures.* Under all the Project alternatives, potential effects of fishing regulations on recreational angling at existing Project structures would be similar to the No-Action Alternative because regulations would be enforced irrespective of Project implementation in Reach 2B, including restrictions on fishing at Mendota Dam. The fishing regulations enforcement would not affect the majority of recreational angling in Reach 2B because Mendota Pool is mainly a warm-water recreational fishery and salmon fishing is already prohibited under existing conditions. However, enforcement of existing fishing regulations, namely Section 2.35 of the California Freshwater Sport Fishing Regulations (see Section 20.2.2), would result in displacement of anglers from Mendota Dam, thereby redirecting recreational fishing demand to other nearby fishing sites in the Project area and vicinity. Refer to Impact REC-3 (No-Action Alternative) for more information.

In addition, fishing regulations would likely be enforced at new projects facilities that provide fish passage, including the proposed Compact Bypass and the South Canal ~~bifurcation~~ control structures. As a result, Alternative A would restrict fishing opportunities in proximity to these Project features, thereby affecting additional stretches of the river that are not currently restricted. As a result, there would be an adverse effect on recreational angling, as compared to No-Action conditions, due to the construction of new water control structures that would restrict fishing at new locations within the San Joaquin River.

Compared to existing conditions, where current fishing regulations have not been fully enforced at Mendota Dam, Alternative A would result in fishing restrictions at Mendota Dam and other Project facilities, namely the Compact Bypass and South Canal ~~bifurcation~~ control structures as described above. Enforcement of existing fishing regulations would be in response to implementation of the Restoration Program (as discussed under the No-Action Alternative) and is not a Project action. Because fishing activity is small in comparison to other reaches of the river (Section 20.1.1) and alternative fishing sites are available in the Project area and vicinity, which would not be subject to deterioration from the displaced recreation activity, and existing fishing activity at Mendota Dam is unauthorized, this impact on recreational angling would be **less than significant**.

Impact REC-4 (Alternative A): *Effects of Aquatic Habitat Improvements on Recreational Angling.* Under all of the Project alternatives, Program-level activities, including restoration activities in other reaches and increased flows would improve the health of aquatic habitat in the Project area, particularly in the San Joaquin River above Mendota Pool. Use of previously dry sections of the river by recreational fisheries would generate benefits for recreational angling in the Project area. Refer to Impact REC-4 (No-Action Alternative) for more information. However, with implementation of the Project, these Program-level actions would be more successful than under the No-Action Alternative, because of the increased conveyance capacity of the river used by higher, more frequent flows resulting in more fish (cold-water species) in the river. Therefore, benefits to recreational angling opportunities are expected to be greater under Alternative A relative to No-Action conditions.

Compared to existing conditions, a **beneficial** effect on recreational angling is expected from habitat improvements in the San Joaquin River above Mendota Pool, in conjunction with improvements to fish passage, which would allow use of this area by recreational fish recruited from Mendota Pool or from other reaches under Alternative A.

Impact REC-5 (Alternative A): ***Effects of Increased Flows on Recreation Opportunities and Facilities.*** Under all of the Project alternatives, increased flows in the San Joaquin River would improve conditions for boating and other water-dependent activities in previously dry sections of the Project area, which represents a recreation benefit attributed to the Restoration Program. Refer to Impact REC-5 (No-Action Alternative) for more information. However, with implementation of Alternative A, increases in river flows would be accommodated more effectively in the Project area compared to the No-Action Alternative, including new connectivity between Reach 2B and Reach 3 provided by the Compact Bypass that would allow boats to travel between these reaches when river flows are adequate to safely navigate the grade control structures in the Compact Bypass channel. This connection is not available under existing conditions as the Mendota Dam serves as barrier between these reaches of the river. Therefore, benefits to recreational boating are expected to be greater under Alternative A relative to No-Action conditions.

Compared to existing conditions, Alternative A would have a **beneficial** effect on recreation associated with facilities to accommodate increased flows on the San Joaquin River.

Impact REC-6 (Alternative A): ***Conflicts with Recreation Goals and Policies***. Compared to the No-Action Alternative, Alternative A would potentially conflict with recreation-related goals and policies in the Fresno County General Plan and Madera County General Plans, both of which call for encouraging agencies providing recreational facilities to maintain and improve, if possible, their current levels of service (see Fresno County General Plan Policy OS-H.5 and Madera County General Plan Policy 4.A.7). Such conflicts are attributed to displacement of fishing opportunities near fish passage facilities, fish screens, fish barriers, and dams due to enforcement of existing fishing regulations, and by restrictions in boating access from Project facilities; see Impact REC-2 and REC-3 (Alternative A). Overall, recreation opportunities in the Project area (e.g., fishing) would not be maintained, thereby potentially conflicting with local recreation goals and policies to maintain and improve current levels of service. However, both county general plans designate the land in the Project area for agricultural uses and do not specifically provide for recreation management at Mendota Dam.

Compared to existing conditions, Alternative A would result in potential conflicts with local recreation goals and policies as described above. However, because the Project area is not managed specifically for recreational purposes, with only limited public access points along the river, the conflict with local plans is minimal. Furthermore, established recreation opportunities in the Mendota Pool Park area and the Mendota Wildlife Area would not be affected under Alternative A. Consequently, this impact to local plan goals and policies would be **less than significant**.

Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the Preferred Alternative

Key features of Alternative B include construction of a levee system to establish a bypass channel to the northeast of the existing river channel, the Mendota Pool Control Structure, the Compact Bypass ~~Bifurcation~~ Control Structure, and re-route of Drive 10 ½. No construction activities are proposed at or near Mendota Dam, which falls outside the Project boundary under Alternative B. Construction activity is expected to occur intermittently over an approximate 157-month timeframe.

Impact REC-1 (Alternative B): ***Construction-Related Effects on Recreation Opportunities and Facilities.*** Compared to No-Action, construction-related effects on recreation opportunities and facilities under Alternative B would generally be the same as those described for Alternative A with several exceptions; refer to Impact REC-1 (Alternative A) for details on general construction-related effects on recreation from the Project alternatives. Unlike Alternative A, this alternative includes the Compact Bypass ~~Bifurcation~~ Control Structure and excludes the South Canal ~~bifurcation~~ Control S~~s~~tructure. As a result, there would potentially be more construction-related restrictions and nuisance effects on recreation in the proposed bypass area, which is relatively close to Mendota Dam and Mendota Pool Park, two higher-use recreation areas. Installation of a fish passage facility would also occur at the San Joaquin River control structure of the Chowchilla Bifurcation Structure. In addition, Project construction, and therefore potential effects on recreation, is expected over a longer timeframe, approximately 157 months.

When comparing Alternative B to existing conditions, impacts to recreation would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative B to the No-Action Alternative). Because construction-related impacts would occur over an extended (multi-year) timeframe, which may include periods of peak recreation use, these impacts are considered **potentially significant**.

Mitigation Measure REC-1 (Alternative B): ***Minimize Construction Effects on Recreation Uses.*** Refer to Mitigation Measure REC-1 (Alternative A). The same measure would be used here. Construction activities in the Project area will be modified to minimize adverse effects on recreation uses, including the following provisions: (1) allow access to recreation use areas when active construction is not occurring; and (2) configure construction zones to minimize access restrictions to recreation use areas. This impact would be **less than significant** after mitigation.

Impact REC-2 (Alternative B): ***Permanent Displacement of Existing Recreation Uses and Access Restrictions from Project Facilities.*** Compared to No-Action, Alternative B would result in permanent displacement of recreation opportunities in the Project area due to Project features that reduce the extent of public access to the river or Pool from public access points. Effects under Alternative B would generally be the same as those described under Alternative A; refer to REC-2 (Alternative A). There are several notable differences under Alternative B described below.

Alternative B includes the Compact Bypass ~~Bifurcation~~ Control Structure, which would permanently restrict recreational boating between Reach 2B and Reach 3 of the San Joaquin River (as opposed to temporary/seasonal restrictions due to the grade control structures alone). Currently, Mendota Dam serves as a similar barrier. With respect to boating access on the San Joaquin arm of Mendota Pool, the Mendota Pool ~~Bifurcation~~ Control Structure in Alternative B would cause similar restrictions to recreational boating as the Mendota Pool Dike in Alternative A.

Alternative B does not include the South Canal bifurcation structure (and South Canal), so there would be no additional access restrictions in proximity to these features in the upstream portion of Reach 2B. However, the San Joaquin River control structure of the Chowchilla Bifurcation Structure would not be removed under Alternative B.

Alternative B does not include the Reach 3 Fish Barrier and therefore the public could continue to launch small watercraft at the informal hand launch just below Mendota Dam and float downstream to engage in recreation activities. The quantity of fish at Mendota Dam would likely be reduced relative to No-Action conditions, as fish migrate up the Compact B~~b~~ypass channel; however some fish will still reach the plunge pool just below Mendota Dam. (Restrictions on fishing opportunities associated with enforcement of existing fishing regulations near fish passage facilities, fish screens, and dams are addressed in REC-3 below.)

When comparing Alternative B to existing conditions, impacts to recreation would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative B to the No-Action Alternative). Although other recreation opportunities exist in the Project area and vicinity, the Project would reduce the extent of public boating access to the river or Pool from public access points. This would be a **potentially significant** impact.

Mitigation Measure REC-2 (Alternative B): ***Establish boat portage facilities around Project facilities.*** Refer to Mitigation Measure REC-2 (Alternative A). The same measure would be used here. Portage facilities for small watercraft will allow for boating access around Project structures and facilitate connectivity to downstream areas in Reach 3. Portage facilities will incorporate signs to direct boaters around water control structures, fish passage facilities, and/or fish screens showing boaters how to connect with the river safely while minimizing impacts to adjacent private lands at each location. The impact to boating access would be **less than significant** after mitigation.

Impact REC-3 (Alternative B): *Effects on Recreational Angling at Project Structures.* Under all of the Project alternatives, potential effects of fishing regulations on recreational angling at existing Project structures would be the similar to the effects explained under the No-Action Alternative because these regulations would be enforced irrespective of the Project. Refer to Impact REC-3 (No-Action Alternative) and REC-3 (Alternative A) for more information.

In addition, existing fishing regulations would also apply to new Project facilities that provide fish passage, including the proposed Mendota Pool Control Structure and

Compact Bypass ~~and Bifurcation~~ Control Structure. As a result, Alternative B would restrict fishing opportunities in proximity to these Project features, thereby affecting additional stretches of the river that are not currently restricted. The Chowchilla Bifurcation Structure, which would include a new fish passage facility in Alternative B, would also likely be subject to enforcement of existing fishing regulations. As a result, in comparison to No-Action, there would be a greater adverse effect on recreational angling due to enforcement of existing fishing regulations at new Project facilities that would restrict fishing at new locations within the San Joaquin River.

Compared to existing conditions, Alternative B would result in fishing restrictions at Mendota Dam and new fish passage facilities throughout the Project area. This impact would be **less than significant**.

Impact REC-4 (Alternative B): *Effects of Aquatic Habitat Improvements on Recreational Angling.* Under all of the Project alternatives, Program-level activities, including restoration activities in other reaches and increased flows would improve the health of aquatic habitat in the Project area, particularly in the San Joaquin River above Mendota Pool. Use of previously dry sections of the river by recreational fisheries would generate benefits for recreational angling throughout the Project area. Refer to Impact REC-4 (No-Action Alternative) for more information. However, with implementation of the Project which includes additional floodplain habitat and new fish passage improvements, these Program-level actions would likely be more successful for fish production because of the increased conveyance capacity of the river used by higher, more frequent flows as compared to the No-Action Alternative. Therefore, benefits to recreational angling opportunities are expected to be greater under Alternative B relative to No-Action conditions.

Compared to existing conditions, a **beneficial** effect on recreational angling is expected from habitat improvements in the San Joaquin River above Mendota Pool, in conjunction with improvements to fish passage, which would allow use of this area by recreational fish recruited from Mendota Pool or from other reaches under Alternative B.

Impact REC-5 (Alternative B): *Effects of Increased Flows on Recreation Opportunities and Facilities.* Under all of the Project alternatives, increased flows in the San Joaquin River would improve conditions for boating and other water-dependent activities in previously dry sections of the Project area, which represents a recreation benefit attributed to the Restoration Program. Refer to Impact REC-5 (No-Action Alternative) for more information. However, with implementation of the Project, increases in river flows would be accommodated more effectively in the Project area compared to the No-Action Alternative. Therefore, benefits to recreational boating and other water-dependent activities are expected to be greater under Alternative B than No-Action conditions, although the Compact Bypass ~~Bifurcation~~ Control Structure would still limit boating connectivity between Reach 2B and Reach 3 of the San Joaquin River similar to No-Action conditions.

Compared to existing conditions, Alternative B would have a **beneficial** effect on recreation associated with increased flows on the San Joaquin River.

Impact REC-6 (Alternative B): *Conflicts with Recreation Goals and Policies*. Compared to the No-Action Alternative, Alternative B would potentially conflict with recreation-related goals and policies in the Fresno County General Plan and Madera County General Plans, both of which call for encouraging agencies providing recreational facilities to maintain and improve, if possible, their current levels of service (see Fresno County General Plan Policy OS-H.5 and Madera County General Plan Policy 4.A.7). Such conflicts are attributed to displacement of fishing opportunities near fish passage facilities, fish screens, and dams due to enforcement of existing fishing regulations at the dam and by restrictions in boating access from Project facilities. Additional recreational impacts are expected under Alternative B where existing recreational access would be restricted as a result of Project facilities (see Impact REC-2). Overall, recreation opportunities in the Mendota Dam area and elsewhere in Reach 2B would not be maintained, thereby potentially conflicting with local recreation goals and policies to maintain and improve current levels of service. However, both county general plans designate the land in the Project area for agricultural uses and do not specifically provide for recreation management at Mendota Dam.

Compared to existing conditions, Alternative B would result in the conflicts with local recreation goals and policies as described above. However, because the Project area is not managed specifically for recreational purposes, with only limited public access points along the river, the conflict with local plans is minimal. This impact would be **less than significant**.

Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)

Key features of Alternative C include construction of fish passage facilities at Mendota Dam, grade control structures downstream of Mendota Dam, Fresno Slough Dam, Short Canal, and Main Canal and Helm Ditch relocations. Construction activity is expected to occur intermittently over an approximate 133-month timeframe.

Impact REC-1 (Alternative C): *Construction-Related Effects on Recreation Opportunities and Facilities*. Compared to No-Action, construction-related effects under Alternative C on recreation opportunities and facilities would generally be the same as those described for Alternative A; refer to Impact REC-1 (Alternative A) for details on general construction-related effects on recreation from the Project alternatives. However, construction activities would be concentrated in the Mendota Pool area within 0.5 mile of Mendota Dam, where the proposed fish passage facilities and dam are located. These facilities are located in close proximity to Mendota Pool Park and Mendota Dam, two recreation areas used frequently by local residents. As a result, access restrictions and negative externalities associated with construction (e.g., dust and noise) may be greater under Alternative C. Construction would also occur in areas upstream of Mendota Pool at the San Mateo Avenue crossing and at the San Joaquin River control structure of the Chowchilla Bifurcation Structure. Project construction, and therefore potential effects on recreation, is also expected over a longer timeframe than Alternative A, approximately 158 months.

When comparing Alternative C to existing conditions, impacts to recreation would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative

C to the No-Action Alternative). Because construction-related impacts would occur over an extended (multi-year) timeframe, which may include periods of peak recreation use, these impacts are considered **potentially significant**.

Mitigation Measure REC-1 (Alternative C): ***Minimize Construction Effects on Recreation Uses.*** Refer to Mitigation Measure REC-1 (Alternative A). The same measure would be used here. Construction activities in the Project area will be modified to minimize adverse effects on recreation uses, including the following provisions: (1) allow access to recreation use areas when active construction is not occurring; and (2) configure construction zones to minimize access restrictions to recreation use areas. This impact would be **less than significant** after mitigation.

Impact REC-2 (Alternative C): ***Permanent Displacement of Existing Recreation Uses and Access Restrictions from Project Facilities.*** Compared to No-Action, Alternative C would result in permanent restrictions to recreation opportunities in the Project area due to Project features that reduce the extent of public access to the river or Pool from public access points, as described below.

Under Alternative C, the proposed fish passage facilities (on either side of Mendota Dam) would limit access to one or both sides of the dam (depending on final Project design), thereby displacing fishing activity at Mendota Dam. Fishing from Mendota Dam, however, would be prohibited regardless with enforcement of fishing regulations (see Impact REC-3). The fish passage facilities may also result in the removal of the informal hand launch and day-use area just south of Mendota Dam, thereby displacing recreation uses from that location.

In addition, Alternative C calls for several grade control structures in the river downstream of Mendota Dam. Similar to the fish barrier (in Alternative A), these structures would restrict people from floating down the river downstream from Mendota Dam (without portage) under unsafe flow conditions, which would limit opportunities for fishing, hunting, and boating (including kayaking and canoeing) in Reach 3.

Alternative C also includes the construction of Fresno Slough Dam south of Mendota Dam. This facility would restrict access from Fresno Slough to the San Joaquin River, thereby limiting boating and fishing access, particularly for people ~~utilizing the city of Mendota~~using the boat launch just north of Mendota Pool Park. These people would still have access to recreation opportunities in Fresno Slough.

The proposed Main Canal and Helm Ditch Relocations may restrict access to the ~~city of Mendota~~ boat launch north of Mendota Pool Park. Road access (i.e., bridge) over the canal would be provided, thereby retaining access to this facility.

Similar to the other Project alternatives, in response to these access restrictions, local people that typically visit the Project area may elect to recreate elsewhere in the Project area and vicinity to meet their recreation demands or they may forego outdoor recreation opportunities for other forms of recreation. Alternative locations for fishing and boating exist outside the Project area. Alternative fishing opportunities mainly consist of nearby

irrigation canals, including the DMC; however, the quality of fishing is generally not as good relative to the Mendota Pool area, which represents a prime location for certain species, such as striped bass (*Marone saxatilis*) and catfish (*Ictalurus* spp.), particularly immediately below Mendota Dam. People wishing to fish and hunt (from boats) in Reach 3 may try to access the river below the grade control structures, but most of the land along the river near the Project area is privately-owned, and informal access may constitute trespassing. The anticipated level of recreation pressure at these alternative locations is not expected to result in deterioration of recreation facilities and adverse physical effects on the environment.

When comparing Alternative C to existing conditions, impacts to recreation would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative C to the No-Action Alternative). Although other recreation opportunities exist in the Project area and vicinity, the Project would reduce the extent of public boating access to the river or Pool from public access points. This would be a **potentially significant** impact.

Mitigation Measure REC-2 (Alternative C): ***Establish boat portage facilities around Project facilities.*** Refer to Mitigation Measure REC-2 (Alternative A). The same measure would be used here. Portage facilities for small watercraft will allow for boating access around Project structures and facilitate connectivity to downstream areas in Reach 3. Portage facilities will incorporate signs to direct boaters around water control structures, fish passage facilities, and fish screens showing boaters how to connect with the river safely while minimizing impacts to adjacent private lands at each location. The impact to boating access would be **less than significant** after mitigation.

Impact REC-3 (Alternative C): *Effects on Recreational Angling at Project Structures.* Under all of the Project alternatives, potential effects of fishing regulations on recreational angling at existing Project structures would be the same as the No-Action Alternative because these regulations would be enforced irrespective of the Project. Refer to Impact REC-3 (No-Action Alternative) for more information.

In addition, existing fishing regulations would also apply to new project facilities that provide fish passage, including the proposed fish passage facilities at Mendota Dam and the Chowchilla Bifurcation Structure. As a result, Alternative C would restrict fishing opportunities in proximity to these Project features. Such restrictions would already be enforced at Mendota Dam under No-Action, but new fish passage at the Chowchilla Bifurcation Structure would affect additional stretches of the river that are not currently restricted. As a result, in comparison to No-Action, there would be a greater adverse effect on recreational angling due to enforcement of existing fishing regulations at new Project facilities that would restrict fishing at new locations within the San Joaquin River.

Compared to existing conditions, Alternative C would result in fishing restrictions at Mendota Dam and new fish passage facilities throughout the Project area. This impact would be **less than significant**.

Impact REC-4 (Alternative C): ***Effects of Aquatic Habitat Improvements on Recreational Angling.*** Under all of the Project alternatives, Program-level activities, including restoration activities in other reaches and increased flows would improve the health of aquatic habitat in the Project area, particularly in the San Joaquin River above Mendota Pool. Use of previously dry sections of the river by recreational fisheries would generate benefits for recreational angling in the Project area. Refer to Impact REC-4 (No-Action Alternative) for more information. However, with the Reach 2B project in place, these Program-level actions would likely be more successful compared to the No-Action Alternative because of the increased conveyance capacity of the river used by higher, more frequent flows. Therefore, benefits to recreational angling opportunities are expected to be greater under Alternative C relative to No-Action conditions.

Compared to existing conditions, a **beneficial** effect on recreational angling is expected from habitat improvements in the San Joaquin River above Mendota Pool, in conjunction with improvements to fish passage, which would allow use of this area by recreational fish recruited from Mendota Pool or from other reaches under Alternative C.

Impact REC-5 (Alternative C): ***Effects of Increased Flows on Recreation Opportunities and Facilities.*** Under all of the Project alternatives, increased flows in the San Joaquin River would improve conditions for boating and other water-dependent activities in previously dry sections of the Project area, which represents a recreation benefit attributed to the Restoration Program. Refer to Impact REC-5 (No-Action Alternative) for more information. However, with the Reach 2B project in place, increases in river flows would be accommodated more completely and effectively in the Project area compared to the No-Action Alternative. Therefore, benefits to recreational boating and other water-dependent activities are expected to be greater under Alternative C relative to No-Action conditions, although the proposed Fresno Slough Dam and existing Mendota Dam would still limit boating connectivity between Fresno Slough and Reach 2B and between Reach 2B and Reach 3 of the San Joaquin River, respectively.

Compared to existing conditions, Alternative C would have a **beneficial** effect on recreation associated with increased flows on the San Joaquin River.

Impact REC-6 (Alternative C): ***Conflicts with Recreation Goals and Policies***. Compared to the No-Action Alternative, Alternative C would potentially conflict with recreation-related goals and policies in the Fresno County General Plan and Madera County General Plans, both of which call for encouraging agencies providing recreational facilities to maintain and improve, if possible, their current levels of service (see Fresno County General Plan Policy OS-H.5 and Madera County General Plan Policy 4.A.7). Such conflicts are attributed to displacement of fishing opportunities near fish passage facilities, fish screens, and dams due to enforcement of existing fishing regulations at the dam and by restrictions in boating access from Project facilities. Additional recreational impacts are expected under Alternative C where existing recreational access would be restricted as a result of Project facilities (see Impact REC-2). Overall, recreation opportunities in the Mendota Dam area and elsewhere in Reach 2B would not be maintained, thereby potentially conflicting with local recreation goals and policies to maintain and improve current levels of service. However, both county general plans

designate the land in the Project area for agricultural uses and do not specifically provide for recreation management at Mendota Dam.

Compared to existing conditions, Alternative C would result in the conflicts with local recreation goals and policies as described above. However, because the Project area is not managed specifically for recreational purposes, with only limited public access points along the river, the conflict with local plans is minimal. This impact would be **less than significant**.

Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)

Key features of Alternative D include construction of fish passage facilities at Mendota Dam, grade control structures downstream of Mendota Dam, Fresno Slough Dam, Main Canal and Helm Ditch relocations, and the North Canal. Construction activity is expected to occur intermittently over an approximate 158-month timeframe.

Impact REC-1 (Alternative D): ***Construction-Related Effects on Recreation Opportunities and Facilities.*** Compared to No-Action, construction-related effects under Alternative D on recreation opportunities and facilities would generally be the same as those described for Alternative A; refer to Impact REC-1 (Alternative A) for details on general construction-related effects on recreation from the Project Alternatives. However, similar to Alternative C, construction activities would be concentrated in the Mendota Pool area, which are located in close proximity to Mendota Pool Park and Mendota Dam, two high-use recreation areas used by locals. As a result, access restrictions and negative construction externalities (e.g., dust and noise) may be greater under Alternative D. This alternative also entails construction of the North Canal and removal of the San Joaquin River control structure of the Chowchilla Bifurcation Structure, but existing recreation use in proximity to these features is limited. Project construction, and therefore potential effects on recreation, is also expected over a longer timeframe, approximately 158 months.

When comparing Alternative D to existing conditions, impacts to recreation would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative D to the No-Action Alternative). Because construction-related impacts would occur over an extended (multi-year) timeframe, including periods of peak recreation use, these impacts are considered **potentially significant**.

Mitigation Measure REC-1 (Alternative D): ***Minimize Construction Effects on Recreation Uses.*** Refer to Mitigation Measure REC-1 (Alternative A). The same measure would be used here. Construction activities in the Project area will be modified to minimize adverse effects on recreation uses, including the following provisions: (1) allow access to recreation use areas when active construction is not occurring; and (2) configure construction zones to minimize access restrictions to recreation use areas. This impact would be **less than significant** after mitigation.

Impact REC-2 (Alternative D): ***Permanent Displacement of Existing Recreation Uses and Access Restrictions from Project Facilities.*** Compared to No-Action, Alternative D would result in permanent restrictions to recreation opportunities in the Project area due

to Project features that reduce the extent of public access to the river or Pool from public access points. These effects would be similar to those described for Alternative C; refer to Impact REC-2 (Alternative C) for more information. There are several notable differences under Alternative D described below.

Alternative D calls for construction of the North Canal bifurcation structure and North Canal. The bifurcation structure would restrict boating access on the San Joaquin River; however, such effects are considered minor because the existing Chowchilla Bifurcation Structure just upstream from this facility already serves as a barrier to boating access in this stretch of the river, and the North Canal bifurcation structure would be added while the riverside control structure of the Chowchilla Bifurcation Structure would be removed.

In addition, Alternative D would result in removal of the San Mateo Avenue crossing. Although the public would not be able to cross the river by vehicle, people could still access either bank of the river and recreation opportunities would be unaffected.

When comparing Alternative D to existing conditions, impacts to recreation would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative D to the No-Action Alternative). Although other recreation opportunities exist in the Project area and vicinity, the Project would reduce the extent of public boating access to the river or Pool from public access points. This would be a **potentially significant** impact.

Mitigation Measure REC-2 (Alternative D): ***Establish boat portage facilities around Project facilities.*** Refer to Mitigation Measure REC-2 (Alternative A). The same measure would be used here. Portage facilities for small watercraft will allow for boating access around Project structures and facilitate connectivity to downstream areas in Reach 3. Portage facilities will incorporate signs to direct boaters around water control structures, fish passage facilities, and fish screens showing boaters how to connect with the river safely while minimizing impacts to adjacent private lands at each location. The impact to boating access would be **less than significant** after mitigation.

Impact REC-3 (Alternative D): *Effects on Recreational Angling at Project Structures.* Under all of the Project alternatives, potential effects of fishing regulations on recreational angling at existing Project structures would be the same as the No-Action Alternative because these regulations would be enforced irrespective of the Project. Refer to Impact REC-3 (No-Action Alternative) for more information.

In addition, existing fishing regulations would also apply to new project facilities that provide fish passage, including the proposed fish passage facilities at Mendota Dam and the North Canal bifurcation structure. As a result, Alternative D would restrict fishing opportunities in proximity to these Project features. Such restrictions would already be enforced at Mendota Dam under No-Action, but new fish passage at the North Canal bifurcation structure would affect additional stretches of the river that are not currently restricted. As a result, in comparison to No-Action, there would be a greater adverse effect on recreational angling due to enforcement of existing fishing regulations at new Project facilities that would restrict fishing at new locations within the San Joaquin River.

Compared to existing conditions, Alternative D would result in fishing restrictions at Mendota Dam and new fish passage facilities throughout the Project area. This impact would be **less than significant**.

Impact REC-4 (Alternative D): *Effects of Aquatic Habitat Improvements on Recreational Angling.* Under all of the Project alternatives, Program-level activities, including restoration activities in other reaches and increased flows would improve the health of aquatic habitat in the Project area, particularly in the San Joaquin River above Mendota Pool. Use of previously dry sections of the river by recreational fisheries would generate benefits for recreational angling in the Project area. Refer to Impact REC-4 (No-Action Alternative) for more information. However, with implementation of the Project, these Program-level actions would likely be more successful compared to the No-Action Alternative because of the increased conveyance capacity of the river used by higher, more frequent flows. Therefore, benefits to recreational angling opportunities are expected to be greater under Alternative D relative to No-Action conditions.

Compared to existing conditions, a **beneficial** effect on recreational angling is expected from habitat improvements in the San Joaquin River above Mendota Pool, in conjunction with improvements to fish passage, which would allow use of this area by recreational fish recruited from Mendota Pool or from other reaches under Alternative D.

Impact REC-5 (Alternative D): *Effects of Increased Flows on Recreation Opportunities and Facilities.* Under all of the Project alternatives, increased flows in the San Joaquin River would improve conditions for boating and other water-dependent activities in previously dry sections of the Project area, which represents a recreation benefit attributed to the Restoration Program. Refer to Impact REC-5 (No-Action Alternative) for more information. However, with the Reach 2B project in place, increases in river flows would be accommodated more effectively in the Project area compared to the No-Action Alternative. Therefore, benefits to recreational boating and other water-dependent activities are expected to be greater under Alternative D relative to No-Action conditions, although the proposed Fresno Slough Dam and existing Mendota Dam would still limit boating connectivity between Reach 2B and Reach 3 of the San Joaquin River.

Compared to existing conditions, Alternative D would have a **beneficial** effect on recreation associated with increased flows on the San Joaquin River.

Impact REC-6 (Alternative D): *Conflicts with Recreation Goals and Policies*. Compared to the No-Action Alternative, Alternative D would potentially conflict with recreation-related goals and policies in the Fresno County General Plan and Madera County General Plans, both of which call for encouraging agencies providing recreational facilities to maintain and improve, if possible, their current levels of service (see Fresno County General Plan Policy OS-H.5 and Madera County General Plan Policy 4.A.7). Such conflicts are attributed to displacement of fishing opportunities near fish passage facilities, fish screens, and dams due to enforcement of existing fishing regulations at the dam and by restrictions in boating access from Project facilities. Additional recreational impacts are expected under Alternative D where existing recreational access would be

restricted as a result of Project facilities (see Impact REC-2). Overall, recreation opportunities in the Mendota Dam area and elsewhere in Reach 2B would not be maintained, thereby potentially conflicting with local recreation goals and policies to maintain and improve current levels of service. However, both county general plans designate the land in the Project area for agricultural uses and do not specifically provide for recreation management at Mendota Dam.

Compared to existing conditions, Alternative D would result in the conflicts with local recreation goals and policies as described above. However, because the Project area is not managed specifically for recreational purposes, with only limited public access points along the river, the conflict with local plans is minimal. This impact would be **less than significant**.

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21.0 Socioeconomics and Economics

This chapter evaluates the potential impacts of the Project as it relates to potential socioeconomic effects on local communities and economic conditions generated by habitat restoration activities and construction and operation of Project features. Economic information is included in this Environmental Impact Statement/Report to meet National Environmental Policy Act (NEPA) requirements for analysis of social and economic impacts as part of the human environment. In the context of the California Environmental Quality Act (CEQA), this information illustrates the close relationship between potential physical effects on agricultural land uses and regional economic conditions.

21.1 Environmental Setting

This section provides an overview of socioeconomic conditions in the Project area and surrounding region. Key resources evaluated include population, housing, local economic base (including employment and key industries), and fiscal resources of local governments. This section also focuses on the agricultural economy in the Project area based on the proximity of Reach 2B to land in agricultural production. The information presented here is used to establish baseline socioeconomic conditions against which the potential impacts of the Project are evaluated.

The geographic area considered for the socioeconomic analysis varies depending on the resource evaluated. It may cover the Project area, the two counties within which Reach 2B is located (i.e., Fresno and Madera counties, hereinafter referred to as the two-county region), or the three census tracts (CT) in proximity to Reach 2B (i.e., CT 39, CT 83.01, and CT 4), which capture a part of the city of Mendota, the closest municipality to the Project footprint. The locations of these CTs are shown on Figure 21-1.

21.1.1 Population Trends

As of 2010, the population in the two-county region was approximately 1.1 million persons. Fresno County accounted for 86.0 percent of population in the region, with more than half of the county residents living in the city of Fresno. Madera County accounts for 14.0 percent of the regional population, with 40.7 percent of residents living in the city of Madera. The combined population of Fresno and Madera counties represented 2.9 percent of the total population in the State. Table 21-1 shows historic, current, and projected population trends for the two-county region and the State overall.

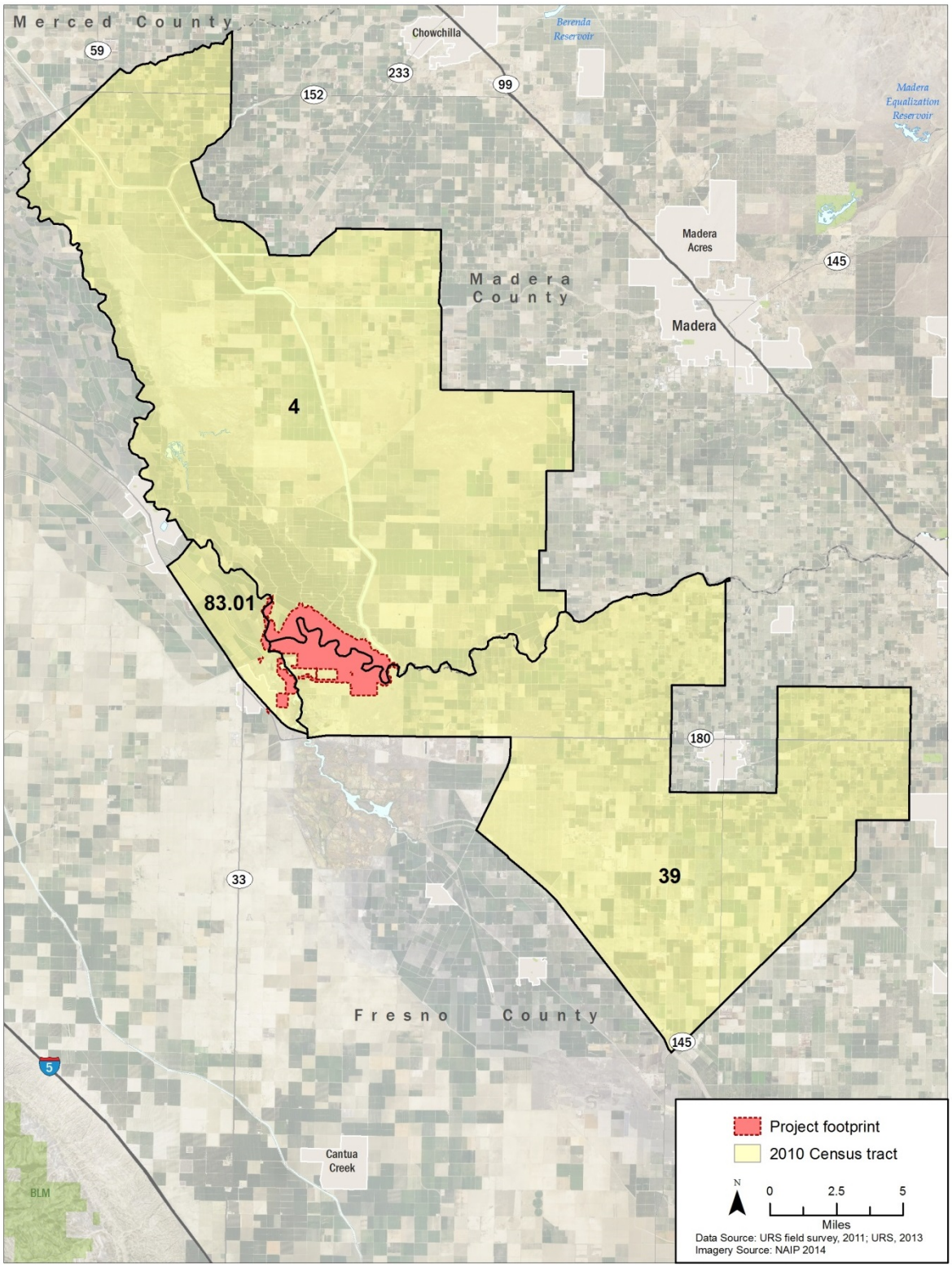

Figure 21-1.
Census Tracts near Reach 2B

Table 21-1.
Historical, Current, and Projected Population

Geo-graphic Area	Historic/Current Trends				Projected Conditions		Percent Change		
	1990	1995	2000	2010	2030	2050	1990-2000	2000-2010	2010-2050
Fresno County	667,490	748,424	799,407	930,450	1,429,228	1,928,411	19.8	16.4	107.3
Madera County	88,090	108,817	123,109	150,865	273,456	413,569	39.8	22.6	174.1
Two-County Region	755,580	857,241	922,516	1,081,315	1,702,684	2,341,980	22.1	17.2	116.6
California	29,758,213	31,617,770	33,871,648	37,253,956	44,135,923	59,507,876	6.3	10.0	59.7

Source: California Department of Finance 2007; U.S. Census Bureau 1990, 2000 (PEIS/R, SJRRP 2011, Table 22-1); U.S. Census Bureau 2010

Generally, population in the two-county region has increased substantially between 1990 and 2010 and is projected to continue growing through 2050. From 1990 to 2000, the population in the two-county region increased by 22.1 percent. During this same period, the Madera County population grew at a substantially greater rate than Fresno County, 39.8 percent versus 19.8 percent, respectively. Between 2000 and 2010, the total population of Fresno and Madera counties increased by 17.2 percent, with Madera County expanding at a greater rate (22.6 percent) than Fresno County (16.4 percent).

Population projections indicate that Fresno and Madera counties are expected to grow at a substantially greater rate than the State through 2050. Total population growth in the two-county region is projected to be 116.6 percent between 2010 and 2050, compared to 59.7 percent statewide. During this period, population in Madera County is projected to increase by 174.1 percent and Fresno County is expected to grow by 107.3 percent.

In the areas most proximate to Reach 2B, including the city of Mendota, population levels are relatively low, indicative of the rural and agricultural character of the Project area. Population levels in 2010 in the three CTs near Reach 2B are shown in Table 21-2. The combined population in all CTs was 13,081 persons. CT 83.01, which covers part of the city of Mendota, had a population of 5,989 people.[1] Overall, only 1.2 percent of the population in the two-county region resided in three CTs covered by the Project area.

21.1.2 Housing

The distribution of housing units in the two-county region is presented in Table 21-3. Mirroring the population trends shown above, the largest number of housing units is in Fresno County, with over 315,000 units in 2010. Madera County had a fewer number of units, but a higher vacancy rate (11.8 percent in 2010). As of 2010, there were 364,671 total housing units in the two-county region, which represents 2.7 percent of the housing stock in the State.

[1] The population in the city of Mendota, proper, is 11,014 (U.S. Census 2010).

Table 21-2.
Population, Reach 2B Census Tracts, 2010

Geographic Area	Census Tract	Population (2010)
Fresno County	CT 39	5,804
	CT 83.01	5,989
Madera County	CT 4	1,288
Total – Census Tracts		13,081

Source: U.S Census Bureau 2010

Table 21-3.
Housing Trends, 2000-2010

Geographic Area	Year	Total Housing Units	Occupied		Vacant	
			Number of Units	Percent of Total	Number of Units	Percent of Total
Fresno County	2000	270,767	252,940	93.4	17,827	6.6
	2010	315,531	289,391	91.7	26,140	8.3
	Percent Change	16.5	14.4	--	46.6	--
Madera County	2000	40,387	36,155	89.5	4,232	10.5
	2010	49,140	43,317	88.2	5,823	11.8
	Percent Change	21.7	19.8	--	37.6	--
Two-County Region	2000	311,154	289,095	92.9	22,059	7.1
	2010	364,671	332,708	91.2	31,963	8.8
	Percent Change	17.2	15.1	--	44.9	--
California	2000	12,214,549	11,502,870	94.2	711,679	5.8
	2010	13,680,081	12,577,498	91.9	1,102,583	8.1
	Percent Change	12.0	9.3	--	54.9	--

Source: U.S. Census Bureau 2000; U.S. Census Bureau 2010

21.1.3 Economic Base

This section describes local economic conditions in Project area, focusing on labor force, employment, and key industries within the two-county region.

Labor Force and Unemployment

The two-county region had a labor force of 510,700 in 2012, which accounts for 2.8 percent of the statewide labor force of 18,494,900 (see Table 21-4). Between 1990 and 2012, the labor force in the two-county region grew by 37.8 percent. The majority of the labor force is concentrated in Fresno County. In 2012, there were 442,500 people in the labor force in Fresno County, an increase of 34.5 percent since 1990. Madera County has a relatively small labor force at 68,200 workers, but it has experienced more substantial growth, 63.9 percent since 1990.

Table 21-4.
Historical and Current Labor Force, 1990–2012

Geographic Area	Number of Workers in Labor Force				Percent Change 1990-2012
	1990	2000	2010	2012	
Fresno County	328,900	388,300	440,600	442,500	34.5
Madera County	41,600	54,900	67,300	68,200	63.9
Two-County Region	370,500	443,000	507,900	510,700	37.8
California	15,168,500	16,857,600	18,327,000	18,494,900	21.9

Source: EDD 2013a.

Unemployment rates have increased sharply due to the nationwide financial crisis that began in 2007 (Bertaut and Pounder 2009). Unemployment rates in Project area have been slowly decreasing since 2010 as shown in Table 21-5. In Fresno County, unemployment stood at 10.4 percent in 2000, increased to 16.9 percent in 2010 and has slowly declined to 15.2 percent in 2012. Similarly, unemployment in Madera County increased from 8.7 percent in 2000 to 15.6 percent in 2010 and has decreased to 13.6 percent in 2012. These data are indicative of the economic downturn that has characterized much of the Central Valley and the State in recent years. Unemployment has also increased for farm workers due to land fallowing because of water supply and drought conditions.

Table 21-5.
Unemployment Rate, 2000-2012 (percent)

Geographic Area	2000	2010	2012
Fresno County	10.4	16.9	15.2
Madera County	8.7	15.6	13.6
California	**10.2**	**16.7**	**10.5**

Source: EDD 2013a

Employment by Industry

Total employment in 2012 in the two-county region was 376,000 jobs, with 331,800 jobs in Fresno County and 44,200 jobs in Madera County (see Table 21-6). The top four industries, based on the number of employees, in the two-county region are *Government*; *Trade, Transportation, and Utilities*; *Farm jobs*; and *Education and Health Services*. In Fresno and Madera counties, the *Government* sector supported the first and second highest number of jobs, at 19.3 percent and 22.9 percent, respectively. As shown, the agricultural sector (farm jobs) ranked first in Madera County and in third in Fresno County.

Table 21-6.
Employment by Industry Sector, 2012

Industry	Fresno County		Madera County	
	Number Jobs	Percent of Total	Number Jobs	Percent of Total
Construction	12,100	3.6	Incl. in mining category	
Educational and Health Services	42,900	12.9	6,000	13.6
Farm Jobs	48,900	14.7	11,100	25.1
Financial Activities	12,800	3.9	800	1.8
Government	64,100	19.3	10,100	22.9
Information	3,500	1.1	400	0.9
Leisure and Hospitality	28,000	8.4	2,700	6.1
Manufacturing	23,400	7.1	3,400	7.7
Natural Resources and Mining	200	0.1	1,100	2.5
Other Services	10,500	3.2	800	1.8
Professional and Business Services	27,900	8.4	2,900	6.6
Trade, Transportation, and Utilities	57,500	17.3	4,900	11.1
Total	331,800	100.0	44,200	100.0

Source: EDD 2013a

In terms of occupational projections, California Employment Development Department (EDD) projects an 8.4 percent increase in the number of jobs in the Farming, Fishing, and Forestry Occupations category and a 5.3 percent decrease in the number of jobs in the Farmers, Ranchers, and Other Agricultural Managers category in Fresno County from 2010 through 2020. Conversely, in the Farming, Fishing, and Forestry Occupations category the number of jobs is expected to decrease by about 2.3 percent in Madera County between 2008 and 2018; while the Farmers, Ranchers, and Other Agricultural Managers category is expected to grow by 9.1 percent. The annual mean income for Farming, Fishing, and Forestry Occupations category was $18,655 in Fresno County and $18,491 in Madera County in the first quarter of 2012. Incomes for Farmers, Ranchers, and Other Agricultural Managers were $72,107 in the two-county region for 2012 (EDD 2013b, 2013c).

21.1.4 Fiscal Resources of Local Governments

Local governments provide a wide range of services, including but not limited to, law enforcement and public safety, development review, and educational services using a mix of funding sources. Generally, the two largest sources of income for most local governments are property tax revenues and funding from Federal and State governments, while the two largest expenditures are public health and safety and social services. Detailed information on revenues and expenditures for Fresno and Madera counties is presented below.

Fresno County

Fresno County is one of the larger counties in the San Joaquin Valley based on land area. As shown in Table 21-7, through property taxes, Federal and State funding, permit fees and other sources, Fresno County collected nearly $1.28 billion in total revenues in fiscal

year (FY) 2010-11. Federal and State funding and property taxes were the two largest sources of revenue at $843.2 million and 186.6 million, respectively. In terms of expenditures, welfare, social services, and other public assistance have consistently been the largest sources of spending by Fresno County, inducing $531.9 million in spending in FY 2010-11. Police, fire, and other public safety activities represent the second largest category, with $333.6 million in spending.

Table 21-7.
Revenues and Expenditures in Fresno County, 2000-2011 (Select Years)

Revenues & Expenditures	FY 00 – 01	FY 05 – 06	FY 10 – 11
Revenues (dollars)			
Property Taxes	$58,006,892	$148,717,818	$186,609,789
Other Taxes	$32,815,340	$48,375,018	$38,506,111
Licenses, Permits, Fines, Forfeitures	$28,902,465	$36,424,723	$28,930,356
Federal, State, Other	$652,723,983	$774,842,183	$843,177,259
Total Miscellaneous Revenue	$15,444,782	$8,581,152	$4,010,922
All Other Financing Sources	$57,612,660	$132,315,536	$116,527,255
Total Revenue	***$845,506,122***	***$1,149,256,430***	***$1,217,761,692***
Expenditures (dollars)			
Legislative and Administrative, Finance, Counsel, and General Expenditures	$59,156,876	$72,306,641	$44,151,800
Police Protection, Corrections, Fire, Public Protection	$204,731,124	$274,530,171	$333,570,967
Transportation	$34,510,112	$40,987,820	$60,595,219
Public Health, Medical Care	$157,005,190	$194,378,202	$169,267,201
Welfare, Social Services, and Other Public Assistance	$342,533,245	$463,780,252	$531,883,473
Total Education and Library Services	$15,679,612	$23,655,343	$27,018,377
Total Recreation Facilities	$2,828,408	$3,025,932	$2,329,733
Costs Associated with Long-Term Debt (principal and interest)	$20,344,000	$25,349,227	$41,481,318
All Other Expenditures	--	$3,590,000	--
Total Expenditures	***$836,778,567***	***$1,101,603,588***	***$1,210,298,088***

Source: California State Controller 2003, 2008, 2012
Key:
FY = fiscal year

Madera County

Table 21-8 presents local government revenues and expenditures in Madera County. Revenues in Madera County totaled $190.7 million in FY 2010-11, which represents a 55.0 percent increase since FY 2000-2001. Madera County's two primary revenue sources were from Federal and State funding and property taxes. The top two categories of expenditures in Madera County in FY 2010-11 were welfare, social services, and other public assistance programs ($52.9 million) and police, fire, and other public safety programs ($51.7 million).

Table 21-8.
Revenues and Expenditures in Madera County, 2000-2011 (Select Years)

Revenues & Expenditures	FY 00 – 01	FY 05 – 06	FY 10 – 11
Revenues (dollars)			
Property Taxes	$9,882,495	$27,106,983	$29,700,508
Other Taxes	$7,084,849	$11,807,003	$12,567,370
Licenses, Permits, Fines, Forfeitures	$6,526,507	$7,911,441	$11,679,955
Federal, State, Other	$88,661,606	$90,359,816	$118,637,298
Total Miscellaneous Revenue	$1,357,089	$9,310,946	$781,512
All Other Financing Sources	$9,548,170	$34,589,714	$17,371,585
Total Revenue	***$123,060,716***	***$181,085,903***	***$190,738,228***
Expenditures (dollars)			
Legislative and Administrative, Finance, Counsel, and General Expenditures	$19,217,103	$39,915,130	$24,346,919
Police Protection, Corrections, Fire, Public Protection	$32,420,646	$43,370,167	$51,741,589
Transportation	$6,698,596	$8,778,995	$16,354,601
Public Health, Medical Care	$16,974,750	$19,685,763	$25,527,191
Welfare, Social Services, and Other Public Assistance	$36,199,179	$47,356,238	$52,876,698
Total Education and Library Services	$1,141,709	$2,676,136	$1,191,373
Total Recreation Facilities	$0	$0	$589
Costs Associated with Long-Term Debt (principal and interest)	$82,127	$650,273	$1,763,619
All Other Expenditures	$1,609,517	$947,137	$1,354,306
Total Expenditures	***$114,343,627***	***$163,379,839***	***$175,156,885***

Source: California State Controller 2003, 2008, 2012
Key:
FY = fiscal year

21.1.5 Value of Agricultural Production

Regional Agricultural Production

Fresno and Madera counties are located in the San Joaquin Valley, one of the most productive agricultural areas in the State and nation. Agriculture in the Project area is dependent on surface and groundwater supplies, including water supplies from the Friant Division of the Central Valley Project.

According to the California Agricultural Commissioner, Fresno County had the highest-value agricultural sector in the State in 2011 (California Department of Food and Agriculture [CDFA] 2012). Between 2001 and 2011, the value of agricultural production in Fresno County ranged from $3.2 billion to $6.9 billion (see Table 21-9). According to the Fresno County Agricultural Crop and Livestock Report for 2011, grapes were the leading contributor to agricultural revenue at over $961 million, followed by almonds and tomatoes with values of $831 million and $632 million, respectively (Fresno County Department of Agriculture 2011).

Table 21-9.
Agricultural Production Values, Annual Average, 2001-2011

Year	Fresno County (dollars)	Madera County (dollars)
2001	$3,220,101,800	$651,794,000
2002	$3,440,927,000	$779,510,000
2003	$4,073,338,500	$760,784,000
2004	$4,603,936,200	$1,074,578,000
2005	$4,641,194,200	$1,105,503,000
2006	$4,845,737,100	$1,032,902,000
2007	$5,347,398,000	$1,220,230,000
2008	$5,627,909,000	$1,310,875,000
2009	$5,347,381,000	$963,536,000
2010	$5,944,758,000	$1,348,505,000
2011	$6,886,213,700	$1,569,521,000

Sources: Fresno County Department of Agriculture 2011; Madera County Department of Agriculture 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011.

Madera County's agricultural productivity ranks twelfth in the State (CDFA 2012). The annual value of agricultural production in the County ranged from $652 million to $1.6 billion between 2001 and 2011. The main agricultural commodities produced in Madera County are almonds (nuts and hulls), milk, and grapes. These three commodity groups accounted for 66.4 percent of the total value of agricultural production in the County (Madera County Department of Agriculture 2011). Specifically, almond production (nuts and hulls) was valued at approximately $414 million, followed by milk and grapes, valued at $327 million and $301 million, respectively.

Agricultural Production Value in Reach 2B

Direct Production Value

The primary agricultural activity within the Project area is permanent crop production, but a range of annual crops are grown as well. The total amount of agricultural land located in the Project area under existing conditions was ~~nearly~~ more than 4,300 acres based on site survey of agricultural land conducted in 2011 (see Table 21-10). Most of the land is in almond production, followed by grapes, other row crops and pistachios. The total annual value of crops grown in the Project area under existing conditions is estimated at $~~16.8~~17.5 million, or approximately $~~3,900~~4,000 per acre, based on average crop prices from 2004–2008 adjusted to 2010 dollars using the consumer price index (CPI) for California. The value of crops grown in the Project area varies substantially. For example, nut crops, namely almonds and pistachios, account for ~~nearly~~ more than 70 percent of value of crops produced in the Project area, with an average value per acre of between $4,400 and $6,000. The value of grape production, another permanent crop, is also relatively high at about $4,000 per acre. Conversely, the value of annual crops produced in the Project area, such as alfalfa, cotton and other row crops, ranges between $1,200 and $2,000 per acre.

Table 21-10.
Existing Agricultural Production Values in the Reach 2B Project Area

Crop	Acres	Production Value [a,b]	Percent of Total Value	Value per Acre
Alfalfa	~~80~~101	$122,000~~$96,213~~	1	$1,208
Almonds	~~1,969~~2,228	$9,751,200~~$8,616,057~~	~~51~~56	$4,376
Cotton	15	$23,700~~$23,252~~	0	$1,557
Grapes	623	$2,476,600~~$2,476,627~~	~~15~~14	$3,975
Grazing	~~42~~52	$4,000~~$3,224~~	0	$77
Other Row Crops	~~604~~467	$935,700~~$1,209,662~~	~~7~~5	$2,002
Palm	10	$512,000~~$511,966~~	3	$52,769
Pistachios	519	$3,131,200~~$3,131,160~~	~~19~~18	$6,037
Agriculture-Vacant [c]	~~431~~328	$25,200~~$747,918~~	~~4~~3	$~~1,735~~77
Total	**~~4,292~~4,343**	**$16,981,600~~$16,816,078~~**	**100**	**$~~3,918~~3,910**

Source: U.S. Department of Agriculture National Agricultural Statistics Service 2005, 2006, 2007, 2008, 2009

Notes:

[a] Monetary values presented in constant 2010 dollars

[b] Based on agricultural production in 2011

[c] ~~Assumed to be part of agricultural rotation; therefore, included in e~~Estimate of existing agricultural production value based on ~~average row crop~~grazing values.

Regional Economic Benefits of Agriculture in Reach 2B

To support local and regional crop production, a comprehensive infrastructure of businesses and support services has developed in the regional economy. These businesses include suppliers of inputs such as feed, seed, chemicals, irrigation equipment, and farm machinery, financial institutions, and transportation and shipping companies. They also include cotton gins, storage businesses, food processors, shippers, and other businesses that handle or use products after they leave farms. Each of these sectors purchases from and sells to many other businesses. Consequently, changes in agricultural production have widespread ripple effects throughout the regional economy. All of these inter-industry linkages are indicative of the important role that agricultural production has on the regional economy. In other words, the economic benefits attributable to crop production in the Project area extend beyond the farm level. Based on 2011 production levels, agricultural activity within the Project area directly supported $~~16.8~~17.0 million in output (i.e., value of commodity production), $4.8 million in labor income, and 105 jobs at the farm level. Accounting for the indirect and induced effects as money "ripples" through the regional economy, the total effects include $26.6 million in output, $8.1 million in labor income, and roughly 196 jobs in the two-county region (see Table 21-11).

Table 21-11.
Regional Economic Benefits – Existing Agricultural Production in Reach 2B

Economic Measure	Type of Effect			Total Effect
	Direct	Indirect	Induced	
Output (millions) [a,b]	$~~16.8~~17.0	$4.5	$5.3	$26.~~6~~8
Labor Income (millions) [a,b]	$4.8	$1.6	$1.7	$8.1
Employment (Jobs)	105	47	44	196

Notes:
[a] Values represent effects in the two-county region (Fresno and Madera counties) based on Impact Analysis for Planning (IMPLAN) modeling.
[b] Values reported in 2010 dollars.

Total effects of existing agricultural production in the Project area at the industry level are presented in Table 21-12. As expected, the greatest benefits accrue to the agricultural sector, accounting for $17.9 million in total economic output, $5.6 million in labor income, and about 134 jobs in the region. The services sector also benefits substantially from local agricultural production, supporting 45 jobs with $1.6 million in corresponding labor income.

Table 21-12.
Regional Economic Benefits by Industry – Existing Agricultural Production in Reach 2B

Industry	Total Output (millions) [a,b]	Total Labor Income (millions) [a,b]	Total Employment
Agriculture	$17.9	$5.6	134
Mining	<$0.1	<$0.1	<1
Construction	$0.2	$0.1	1
Manufacturing	$0.3	<$0.1	1
Transportation, Information, and Public Utilities	$0.7	$0.2	3
Trade	$0.9	$0.4	10
Service	$6.2	$1.6	45
Government	$0.3	$0.1	2
Total	**$26.6**	**$8.1**	**196**

Notes:
[a] Values represent effects in the two-county region (Fresno and Madera counties) based on Impact Analysis for Planning (IMPLAN) modeling.
[b] Values reported in 2010 dollars.

21.1.6 Fiscal Resources of the Levee District

The Lower San Joaquin Levee District (LSJLD) was formed in 1955 by special act of the State legislature to operate, maintain, repair levees, bypasses and other facilities built in connection with the Lower San Joaquin River Flood Control Project. LSJLD boundaries encompasses approximately 468 square miles (300,000 acres) in Fresno, Madera, and

Merced counties with protection areas along approximately ~~35~~ 108 miles of the San Joaquin River. ~~Jurisdiction of the LSJLD includes portions of the cities of Mendota and Firebaugh and extends to portions of Madera and Merced counties.~~

The LSJLD is responsible for operation and maintenance and emergency management of State flood control facilities within the district boundaries including 191 miles of levees, channel bottoms, and flood management facilities. Important facilities maintained by the district include the Chowchilla Bypass, the Eastside Bypass, and the Mariposa Bypass. Operations and maintenance activities include vegetation management activities, sediment management and removal activities, cleaning of screens and trash racks on facilities, opening and closing gates and flap gates in the bypass systems, and flood watch. The LSJLD is not responsible for operation and maintenance of privately owned levees (San Joaquin River Flood Control Project Agency 2013).

The LSJLD is funded by property tax assessments on lands within the district boundaries that receive flood control benefits. Assessment factors are based on agricultural, residential, and commercial/industrial land use categories. Other land types, such as open space under State and Federal ownership, are not included in the tax revenues. District revenues for FY 2007 to 2008 were $930,000 (Merced County Local Agency Formation Commission 2009). Expenditures reported by the district are listed in Table 21-13.

Table 21-13.
Lower San Joaquin Levee District Maintenance Costs

Fiscal Year	Total Maintenance Costs, Expenditures
2007-2008	$871,000
2009-2010	$943,303
2010-2011	$983,649
2011-2012	$964,532
2012-2013	$1,038,960
2013-2014	$977,458[a]

Source: Merced County Local Agency Formation Commission 2009; DWR 2010, 2011, 2012, 2013

Notes:

[a] Projected value.

~~The San Joaquin River Restoration Program (SJRRP) has pursued a financial assistance agreement with the LSJLD intended to assist the district in adapting to changes in operations and maintenance activities such that the existing level of flood management is maintained during release of Interim and Restoration flows. Management activities may include controlling potential erosion and levee underseepage, control of vegetation, operation of flood control structures, removal of sediment, or other changes needed to maintain the functionality of the system. Financial assistance estimates for FY 2013 to 2015 range from $260,000 to $300,000 (SJRRP 2013).~~

21.2 Regulatory Setting

The assessment of socioeconomic resources is guided primarily by Federal laws and policies. State and local laws and policies typically guide economic development and diversity, environmental justice, public health and safety, housing, and other concerns of residents within State and local jurisdictions.

21.2.1 Federal

The major Federal law and regulation guiding the assessment of socioeconomic resources is NEPA. The Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500–1508) provide guidance related to social and economic impact assessment by noting that the "human environment" assessed under NEPA is to be "interpreted comprehensively" to include "the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.14). Furthermore, these regulations require agencies to assess "aesthetic, historic, cultural, economic, social, or health" effects, whether direct, indirect, or cumulative (40 CFR 1508.8).

21.2.2 State of California

There are no specific State laws and regulations applicable to socioeconomic resources. In the context of CEQA, economic effects are not considered significant effects on the environment (see § 15131 of the State CEQA Guidelines). State CEQA Guidelines section 15131, subdivision (a) notes that the chain of cause/effect from economic to environmental impacts can be traced. In addition, section 15131, subdivision (b) states that economics can be used to determine significance of environmental impacts.

21.2.3 Regional and Local

Generally, local governments address economic development broadly through general plans, economic development strategies, and as part of project reviews. Through these types of efforts, many local jurisdictions maintain policies intended to protect and expand local and regional economies to benefit local communities and residents, while minimizing adverse environmental effects.

21.3 Environmental Consequences and Mitigation Measures

21.3.1 Impact Assessment Methodology

Socioeconomics and Economics

This section describes the approach for evaluating effects on socioeconomic resources and the economy. The Project may have several types of economic impacts, including:

- Short-term construction spending and use of local labor from the Project area.
- Ongoing operation and maintenance expenditures.
- Loss of agricultural production values (revenues) based on permanently-idled cropland.

- Regional economic impacts (measured by output, income, and jobs) associated with local spending and changes in agricultural production, including indirect impacts on agricultural-support industries.
- Loss of tax revenue to local agencies and local jurisdictions from shift in land ownership patterns from private to public.

Initial Construction and Ongoing Operations and Maintenance Costs

The costs for Project construction and ongoing operation, maintenance, and repair activities have been evaluated to determine socioeconomic impacts in the Project area. Project construction includes purchases of goods and services, hiring of labor, and other activities. Similarly, the Project would require long-term expenditures for ongoing operations and maintenance activities. These direct effects would generate regional economic benefits across a range of support industries. Construction and operations and maintenance spending are based on cost estimates developed for the Project.

Loss of Agricultural Production Values based on Permanently-Idled Cropland

The physical impacts on agricultural operations and the effects on existing crop production in the Project area are discussed in Chapter 16, "Land Use Planning and Agricultural Resources." That information was utilized in conjunction with data on crop yields and prices to estimate changes in agricultural revenues. Information on crop yields and prices have been obtained from county agricultural commissioner reports.

Loss of Agricultural Production Values based on Seepage Impacts to Remaining Cropland

The potential for seepage and high water table impacts are discussed in Chapter 13, "Hydrology – Groundwater." This information has been reviewed to determine if agricultural lands not proposed to be removed from production could be affected from high groundwater levels. The impact on crop yields and production values of these lands that would remain in production are evaluated qualitatively.

Regional Economic Impacts

Regional economic impacts would be generated by construction and operations and maintenance spending and changes in agricultural production. Information on construction and operations and maintenance spending has been reviewed to determine the extent of local purchases and use of local labor anticipated under the Project. These direct effects have been used as inputs through a regional economic model to estimate the indirect and induced effects of Project-related spending based on inter-industry linkages. In addition, regional effects from changes in agricultural production have been evaluated. Agriculture is a goods-producing industry that affects and is affected by many other industries in a local area. As crop acreage expands or contracts, so does the purchases of such inputs as seed, chemicals, fertilizers, and machinery. As these related industries are affected, they change their purchases of goods and services required in their respective operations. Collectively, these transactions reflect the total economic impact associated with changes in agricultural production, which extends beyond the farm level.

The regional economic impacts from project spending and changes in agricultural production have been assessed using an input-output (I-O) model of the Fresno and Madera County region. I-O analysis is a means of measuring the flow of commodities and services among industries, institutions, and final consumers within an economy. An I-O model captures all monetary market transactions for consumption in a given time period accounting for inter-industry linkages and availability of regionally produced goods and services.

The primary input variable for I-O analysis is the dollar change in purchases of products or services for final use – this is referred to as "final demand." Final demand changes drive I-O models. Industries respond to meet demands directly or indirectly (by supplying goods and services to industries responding directly to final demand changes). The primary output variables are predicted changes in direct, indirect, and induced output, employment, and income effects[2] for the affected industries within a defined study area. The measurement of direct, indirect, and induced linkages within a regional economy is based on the concept of a multiplier. A multiplier is a single number that quantifies the total economic effect resulting from direct effects. Several types of multipliers are produced by an I-O model, including output, employment, and income multipliers.

For the purposes of this analysis, the Impact Analysis for Planning (IMPLAN) model has been used to perform the I-O analysis. IMPLAN is a computer-driven system of software and data commonly used to perform regional economic impact analysis. National technical relationships among industries form the basis for the model. A two-county model was developed for this analysis covering Fresno and Madera counties based on the 2010 IMPLAN dataset.

Fiscal Effects on Local Jurisdictions

Potential fiscal impacts of the Project are based on changes in land ownership patterns that would remove lands from property tax rolls and reduce property tax revenues realized by local jurisdictions. Assumptions were made relative to the assessed values of properties in the Project area and applicable property tax rates were collected to determine the extent of property tax impacts based on the assumption that all land within the Project footprint would be transferred into public ownership. This represents a worst-case scenario as easements may be purchased on some lands.

Population and Housing

This section describes the approach for the analysis of impacts on population and housing in the Project area, which is both qualitative and quantitative in nature. The socioeconomic impacts of the Project, including changes in employment, have been evaluated to determine if the Project would induce population growth in the region in the short term (associated with the construction workforce) and/or long term (associated with changes in regional economic conditions). Expected changes in population and available

[2] **Direct** effects represent the impacts for the expenditures and/or production values specified as direct final demand changes. **Indirect** effects represent the impacts caused by the iteration of industries purchasing from industries resulting from the direct final demand changes. **Induced** effects represent the impacts on all local industries caused by the expenditures of new household income generated by the direct and indirect effects resulting from the direct final demand changes.

housing stock in the region have been evaluated to determine if there are sufficient housing resources to meet the needs of the project and/or if population out-migration would lead to an over-supply of housing stock in the region.

21.3.2 Significance Criteria

Economic and Social Effects

Section 15131 of the State CEQA Guidelines states that economic and social effects of a project are not significant environmental effects; however, they may be used to determine the significance of physical changes caused by a project. Further explained, a project may result in physical environmental changes and the economic or social effects of the project on the community may be used to determine whether the physical changes would be significant. Under CEQA, determining the significance of economic impacts is not required. On the other hand, NEPA requires analysis of social and economic impacts; however, there are no standard significance criteria for socioeconomic impacts under NEPA. Accordingly, no formal thresholds of significance for economics exist, although such criteria can be developed on a project-by-project basis. For the purpose of this analysis, the magnitude of potential effects on socioeconomic conditions are determined to be "substantial" or "less than substantial." For this analysis, the Project would result in a substantial impact on socioeconomic conditions in the Project area if it would result in a substantial decrease in:

- The value of agricultural production relative to region-wide conditions.
- Regional employment and/or income levels relative to region-wide conditions.
- Property tax revenues relative to region-wide conditions.

Population and Housing

The Project is evaluated in accordance with the population and housing section of Appendix G of the CEQA Environmental Checklist. Under NEPA CEQ Regulations, effects must be evaluated in terms of their context and intensity. These factors have been considered when applying State CEQA Guidelines Appendix G. The Project would result in a significant impact on population and housing if it would do any of the following:

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

21.3.3 Impacts and Mitigation Measures

This section provides a project-level evaluation of direct and indirect effects of the Project alternatives on socioeconomic conditions in the Project area. It includes analyses of potential effects relative to No-Action conditions in accordance with NEPA and potential impacts compared to existing conditions to meet CEQA requirements. The

analysis is organized by Project alternative with specific impact topics numbered sequentially under each alternative. With respect to socioeconomics, the relevant issues and concerns are:

1. Change in Agricultural Production Values.
2. Effects on the Regional Economy from Changes in Agricultural Production.
3. Effects on the Regional Economy from Construction and Operations and Maintenance Spending.
4. Effects on Local Tax Revenues.
5. Change in Population Growth and Housing Demand.
6. Losses to the Lower San Joaquin ~~Valley~~ Levee District.

There are other socioeconomic-related issues covered in the Program Environmental Impact Statement/Report (PEIS/R) that are not covered here because they are programmatic in nature and/or are not relevant to the Project area. Not covered here are effects related to physical decay of communities.

No-Action Alternative

Under the No-Action Alternative, the Project would not be implemented and none of the Project features would be developed in Reach 2B. Nevertheless, other proposed actions under the San Joaquin River Restoration Program (SJRRP) would be implemented, including habitat restoration in other reaches, augmentation of river flows, and reintroduction of salmon. Without the Project in Reach 2B, however, these activities would not achieve the Settlement goals. The potential effects of the No-Action Alternative are described below. The analysis of the No-Action Alternative is based on a comparison to existing conditions. No mitigation is required for No-Action.

Impact ECON-1 (No-Action Alternative): *Change in Agricultural Production Values*. Under the No-Action Alternative, agricultural production in the Project area would continue similar to existing conditions, and no land would be taken out of production by the Project. There is the potential that Restoration Flows in the Project area would result in groundwater seepage that could diminish the agricultural productivity or result in crop damages on agricultural land in Reach 2B; however, Restoration Flows would be restricted in order to minimize seepage impacts (refer to Chapter 13, "Hydrology – Groundwater" for more details on potential seepage impacts). As a result, the value of agricultural production in the Project could decline under the No-Action Alternative. However, flow through Reach 2B would be managed by Program actions under the No-Action Alternative to minimize seepage impacts in Reach 2B. The maximum conveyance would be limited to the existing channel capacity by diverting excess flow through the Chowchilla Bypass. Therefore the magnitude of potential agricultural production losses under the No-Action alternative would be minor and this is considered **less than substantial** impact compared to existing conditions.

Impact ECON-2 (No-Action Alternative): *Effects on the Regional Economy from Changes in Agricultural Production*. As described under Impact ECON-1 (No-Action Alternative), the potential impact on agricultural production values due to groundwater

seepage is expected to be minor. To the extent that productivity declines could remove land from production and result in reduced crop production over the long-term, there could be a decrease in regional economic activity as farm-level expenditures in the local economy decline. This could result in a decline in economic output, income, and employment in the regional economy covering Fresno and Madera counties. However, potential seepage impacts on agricultural production values are expected to be minor and the extent of agricultural production in the Project area is comparatively minor (less than 0.2 percent) when evaluated in the context of the agricultural production in the two-county region; therefore, effects on the regional economy would likely be minor. This impact is considered **less than substantial** compared to existing conditions.

Impact ECON-3 (No-Action Alternative): *Effects on the Regional Economy from Construction and Operations and Maintenance Spending*. There would be no expenditures on construction and operations and maintenance activities under the No-Action Alternative; therefore, there would be no benefits accruing to the regional economy. **No impact** would occur compared to existing conditions.

Impact ECON-4 (No-Action Alternative): *Effects on Local Tax Revenues*. Under the No-Action Alternative, there would be no land acquisition in the Project area; therefore, there would be no change in ownership patterns and all privately-owned properties would remain privately-owned. As a result, there would be no change county-wide property tax rolls and property tax revenues accruing to Fresno and Madera counties would not change. In addition, there would be no change in local sales tax revenues because there would be no project-level expenditures occurring within the local economy. Overall, there would be **no impact** on local tax revenues under the No-Action Alternative compared to existing conditions.

Impact ECON-5 (No-Action Alternative): *Change in Population Growth and Housing Demand*. Under the No-Action Alternative, there would be no new facilities developed in the Project area that would displace people or housing. In addition, without the Project, there would be no new economic activity that would support population growth or new housing demand. **No impact** would occur compared to existing conditions.

Impact ECON-6 (No-Action Alternative): *Losses to the Lower San Joaquin Levee District.* Under the No-Action Alternative, no levee or channel improvements would be made by the Project and flows would be confined within the existing levee alignment. Restoration Flows may result in increased operation and maintenance costs for LSJLD due to increased vegetation management and sediment management activities. ~~However, SJRRP has pursued a financial assistance agreement with the LSJLD to assist the district in adapting to changes in operations and maintenance activities to maintain existing levels of flood protection during release of Restoration Flows.~~ Therefore, this impact would be **less than substantial**.

Alternative A (Compact Bypass with Narrow Floodplain and South Canal)

All of the Project alternatives, including Alternative A, entail land acquisition, construction and operation of new Project facilities, and implementation of habitat

restoration activities that could affect socioeconomic conditions in the Project area and the larger regional economy.

Impact ECON-1 (Alternative A): *Change in Agricultural Production Values*. Compared to No-Action, Alternative A would permanently remove approximately ~~1,180~~1,212 acres of agricultural land from production, temporarily displace ~~60~~ 56 acres of agricultural production during construction, and shift agricultural uses to pasture (livestock grazing) on another ~~580~~ 579 acres within the proposed floodplain; refer to Impact LU-1 (Alternative A) for more details. The farm gate value[3] of commodities produced on lands that would be removed from production is estimated at $~~6.4~~6.7 million annually, representing about ~~38~~ 39 percent of the total value of agricultural production in the Project area (see Table 21-14). There would be an additional $~~230~~270,000 in crop losses annually during the construction timeframe due to temporary displacement of agricultural production. The direct economic effect on agricultural landowners in the Project area would be negligible because privately-owned farmland would be purchased from landowners at fair market value, which is generally based on revenue potential for agricultural properties. At the regional level, the decline in agricultural production values is minor (less than 0.~~08~~ 1 percent) when compared to agricultural activity in Fresno and Madera counties, which was valued at $8.5 billion in 2011.

When comparing Alternative A to existing conditions, impacts on the value of agricultural production would be similar to those described in the preceding paragraph (i.e., the comparison of Alternative A to No-Action). In summary, the Project would remove land from agricultural production and diminish the value of agricultural commodities produced in the Project area. Because the decline in agricultural values is small relative to production values in the region (less than 0.~~08~~ 1 percent), this impact is considered **less than substantial**.

Table 21-14.
Annual Change in Agricultural Production Values

Type of Agricultural Effect	Change in Agricultural Production Values, Annual (millions)[a]			
	Alt. A	Alt. B	Alt. C	Alt. D
Permanent Agricultural Loss [b]	-$~~6.4~~6.7	-$~~7.4~~6.7	-$~~5.8~~6.0	-$~~8.8~~9.0
Temporary Agricultural Loss [c]	-$~~0.2~~0.3	-$~~0.2~~0.1	-$0.3	-$0.3
Total	-$~~6.6~~7.0	-$~~7.6~~6.8	-$6.3~~0~~	-$9.~~1~~3

Notes:
[a] Values reported in constant 2010 dollars
[b] Represents net effect of crop production losses and new grazing activity under Alternatives A, B, and D
[c] Temporary annual losses corresponding to construction timeframe

[3] The farm gate value is the value of the product when it leaves the farm, which does not include other costs incurred at the retail level such as shipping, handling, storage, marketing, and profit of the other involved companies.

Impact ECON-2 (Alternative A): ***Effects on the Regional Economy from Changes in Agricultural Production***. Compared to No-Action, Alternative A would take agricultural land out of agricultural production, which would have "ripple" (or multiplier) effects on the local economy based on inter-industry linkages between the agricultural sector and other sectors of the economy. The regional economic impacts associated with permanent and temporary changes in agricultural production are presented in Table 21-15.

Similar to all of the Project alternatives, Alternative A would have a long-term adverse effect on the regional economy due to permanent losses in agricultural production and related spending. The direct effects at the farm level include annual losses of $~~6.4~~6.7 million in economic output (or agricultural production value), $1.~~8~~ 9 million in labor income, and ~~40~~ 42 jobs. The total economic impacts (incorporating ripple effects in the regional economy) include annual losses of $10.~~1~~ 6 million in output, $3.~~1~~ 2 million in labor income, and ~~75~~ 78 jobs in the two-county economy compared to No-Action; these effects are minor when considered in the context of the total economic activity in the regional economy (e.g., annual output losses are less than 0.~~12~~ 15 percent of regional agricultural production alone). Temporary effects in the regional economy from changes in agricultural production during construction would be relatively small (e.g., annual output losses are less than 0.005 percent of the regional agricultural production).

When comparing Alternative A to existing conditions, impacts on the regional economy would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to No-Action). In summary, the Project would cause a decline in economic production, labor income, and jobs in Fresno and Madera counties. Because these adverse effects in the regional economy are small relative to total economic activity in the region, this impact is considered **less than substantial**.

Table 21-15.
Regional Economic Effects, Agricultural Production

Alternative	Output (millions)		Labor Income (millions)		Employment	
	Direct	Total	Direct	Total	Direct	Total
Permanent						
Alternative A	-$~~6.4~~6.7	-$~~10.1~~10.6	-$~~1.8~~1.9	-$~~3.1~~3.2	-~~40~~42	-~~75~~78
Alternative B	-$~~7.4~~6.7	-$~~11~~10.6~~.6~~	-$~~2.1~~1.9	-$~~3.5~~3.2	-~~46~~42	-~~85~~78
Alternative C	-$~~5.8~~6.0	-$~~9.1~~9.4	-$1.7	-$~~2.7~~2.8	-~~37~~38	-~~67~~69
Alternative D	-$~~8.8~~9.0	-$~~14.0~~14.3	-$2.6	-$4.3	-~~56~~57	-~~103~~105
Temporary						
Alternative A	-$~~0.2~~0.3	-$0.4	-$0.~~1~~08	-$0.13	-~~1~~2	-~~2~~3
Alternative B	-$~~0.2~~0.1	-$0.~~4~~2	-$0.~~1~~03	-$0.~~1~~05	-1	-~~2~~1
Alternative C	-$0.3	-$0.~~4~~5	-$0.~~1~~09	-$0.15	-2	-~~3~~4

Table 21-15.
Regional Economic Effects, Agricultural Production

Alternative	Output (millions)		Labor Income (millions)		Employment	
	Direct	Total	Direct	Total	Direct	Total
Alternative D	-$0.3	-$0.~~4~~5	-$0.~~1~~09	-$0.15	-~~1~~2	-~~3~~4

Notes:

[a] Values represent average annual effects over the long term in the two-county region (Fresno and Madera counties) based on IMPLAN modeling.

[b] Values reported in constant 2010 dollars

Impact ECON-3 (Alternative A): *Effects on the Regional Economy from Construction and Operations and Maintenance Spending*. Compared to No-Action, implementation of the Project would entail short-term construction and long-term operations and maintenance activities in the Project area, which would generate benefits within the local economy. These economic effects include both the direct benefits attributed to construction expenditures and workforce requirements within the Project area, but also capture the "ripple" (or multiplier) effects across the larger economy. The regional economic impacts associated with construction and operations and maintenance activities associated with the Project are presented in Table 21-16.

Construction of the Project would require substantial expenditures for capital equipment, construction-related goods and services, and labor. These expenditures would generate local economic activity, as measured by changes in economic output, labor income and employment, over the approximate 11-year construction period. Under Alternative A, the total cost of the Project is estimated at $517.3 million. Of that total, construction spending on goods/services and major equipment accounts for approximately $364.4 million, $123.2 million is attributed to construction labor payroll, and land acquisition costs represent the remaining $29.7 million. The direct output value of Project construction over the 10-year construction period is $487.6 million (or $44.3 million annually), which excludes land acquisition costs that are not reflective of the value of the Project.[4] Project construction would also directly support, on average, up to approximately 100 jobs annually with a corresponding payroll of $11.2 million per year; these direct construction benefits would accrue to both local and non-local workers.

To the extent that construction expenditures are made locally, construction of the Project would generate additional economic benefits in Fresno and Madera counties.[5] When considering indirect and induced effects due to inter-industry linkages and labor income

[4] Land acquisition represents an exchange of assets between the buyer and seller, which does not generate any further economic effects. There may be some ancillary economic benefits associated with the land acquisition process, such as expenditures on real estate and legal fees; however, these costs have not been quantified and are excluded from the analysis.

[5] A portion of construction expenditures would be made outside of Fresno and Madera counties, including spending on specialized equipment that is not manufactured locally. Because these products are not produced and/or sold locally, no additional economic activity in the two-county region is generated by these expenditures.

spending that is expected to occur locally, Alternative A would generate an additional $23.7 million in economic output, $8.5 million in labor income, and support another 193 jobs in the local economy on an annual basis. Overall, the total economic benefits of the Project include $68.0 million in output, $19.7 million in labor income, and 293 jobs annually in the local economy under Alternative A. These construction effects would be temporary, however, lasting only over the construction period.

In addition, ongoing Project operations would generate long-term economic benefits to the region. Conceptually, the direct output value attributed to Project operations and maintenance reflects the costs of intermediate goods and services and value added. Under Alternative A, Project operations and maintenance would generate a demand for nearly $1.5 million in ongoing expenditures on goods and services, some of which would be supplied by local industries. In addition, the operations and maintenance budget includes approximately $253,000 in labor payroll that would support roughly four jobs. The total operations and maintenance budget for the Project under Alternative A would be $1.7 million annually; this represents the direct output value of Project operations and maintenance, which drives additional economic activity in the region. When considering indirect and induced effects of money filtering through the local economy, the Project would generate an estimated $3.0 million in total economic output, $705,000 in total labor income, and over 14 total jobs annually. The benefits associated with Project operations and maintenance would be long term, extending over the life of the Project.

When comparing Alternative A to existing conditions, construction and operations and maintenance of the Project would result in similar effects on the regional economy as those described in the preceding paragraphs (i.e., the comparison of Alternative A to No-Action). In summary, the Project would generate new economic activity, namely increases in economic production, labor income, and jobs in Fresno and Madera counties over both the short and long term and this would be a **beneficial** effect.

Table 21-16.
Regional Economic Effects, Construction and Operations

Alternative	Output (millions)		Labor Income (millions)		Employment	
	Direct	Total	Direct	Total	Direct	Total
Construction						
Alternative A	$44.3	$68.0	$11.2	$19.7	100	293
Alternative B	$34.1	$51.7	$9.8	$16.1	100	244
Alternative C	$42.0	$65.0	$9.8	$18.1	99	287
Alternative D	$35.7	$55.0	$8.8	$15.8	100	258
Operations and Maintenance						
Alternative A	$1.7	$3.0	$0.3	$0.7	4	14
Alternative B	$1.2	$2.1	$0.3	$0.6	4	12
Alternative C	$1.1	$1.9	$0.3	$0.6	4	11
Alternative D	$1.1	$1.9	$0.3	$0.6	4	11

Alternative	Output (millions)		Labor Income (millions)		Employment	
	Direct	Total	Direct	Total	Direct	Total

Notes:

[a] Values represent average annual effects over the long term in the two-county region (Fresno and Madera counties) based on IMPLAN modeling

[b] Values reported in constant 2010 dollars

Impact ECON-4 (Alternative A): ***Effects on Local Tax Revenues***. Compared to No-Action, Alternative A would involve a shift in land ownership patterns in the Project area, namely privately-owned lands being acquired and placed into public ownership. Such a shift in land ownership would remove land from property tax rolls maintained by Fresno and Madera counties, thereby resulting in a reduction in property tax revenues realized by these two counties. The assessed value and tax liability of properties in the Project area are unknown;[6] therefore, it is not possible to precisely calculate losses in property tax revenues accruing to Fresno and Madera counties, but a range of estimated losses are provided below for comparative purposes.

Under Alternative A, the fair market value of land within the Project area is estimated at approximately $53.8 million, and roughly 90 percent of the land area is in private ownership. This estimate is based on agricultural land values in the region and excludes the value of any structures or contiguous land outside the Project footprint. Assuming that the assessed value of land is equivalent to fair market value and the applicable property tax rate is 1 percent,[7] implementation of Alternative A would result in the loss of up to $482,000 in annual property tax revenues. However, the assessed value of land is typically lower than fair market value based on provisions of Proposition 13 and other tax exemptions. It has been estimated that Fresno and Madera counties collect approximately 0.65 percent and 0.59 percent, respectively, of a property's fair market value in property taxes ~~()~~. Based on these figures, property tax losses are an estimated $323,000 annually. Reductions in property tax revenues could affect the counties' ability to provide key public services to local residents. However, the estimated decline in property tax revenues, ranging from $323,000 to $482,000 annually, accounts for less than 0.2 percent of the total combined property tax revenue in the two counties, nearly $216 million in FY 2010-11.

When comparing Alternative A to existing conditions, impacts on property tax revenues would be similar to those described in the preceding paragraphs (i.e., the comparison of Alternative A to No-Action). In summary, the Project would shift land from private to public ownership, thereby removing land from property tax rolls and reducing the property tax revenues accruing to Fresno and Madera counties. Because the potential loss

[6] The assessed value of agricultural land is also affected by Williamson Act contracts on properties in the Project area. In these cases, property taxes paid by private landowners are reduced, but counties may be eligible for subvention payments from the state to compensate for property tax losses.

[7] The base property tax rate in California is 1 percent of assessed value. Property tax rates also commonly include special assessments and other levies that bring the tax rate to greater than 1 percent.

in property tax revenues is minor compared to property tax revenues generated in the region (less than 0.2 percent), this impact is considered **less than substantial**.

Impact ECON-5 (Alternative A): ***Change in Population Growth and Housing Demand***. Compared to No-Action, Alternative A would displace some local residents from the Project area as private land is acquired to implement the Reach 2B Project. Although not all of the land within the Project area would be subject to habitat restoration or facility development, it is assumed that all land within the Project area would be acquired and transferred into public ownership. Approximately two homes would be impacted within the Project area, but because the area is relatively rural and predominantly in agricultural production, the extent of population and housing displacement would not be substantial relative to existing population levels and housing stock in Fresno and Madera counties. Accordingly, the Project would not necessitate the construction of replacement housing elsewhere in the region based on direct displacement of local residents.

There could, however, be an increase in the demand for temporary housing, such as hotels, motels and apartments, during Project construction. It is estimated that Project construction under all of the Project alternatives would require about 100 direct workers. The extent of the construction workforce that would come from within the local region is unknown; however, it is anticipated that many workers would be based within the local area and housing would not be required. However, some non-local workers would travel from outside the region to work on the Project and utilize local temporary housing resources. There is a multitude of temporary housing resources in Fresno and Madera counties, which would likely have sufficient capacity to accommodate the construction workforce required for this Project. In addition, based on the regional economic modeling conducted for the Project, another 158 to 194 jobs (depending on alternative) would be created in the local economy over the construction timeframe; these new jobs are expected primarily in agricultural and service industries and likely filled by local residents that would not require new housing. During operations, the Project would also require about four long-term employees, which are expected to reside permanently in the local area. The potential increases in housing demand outlined above would be offset to some degree by declines in agricultural employment at the farm level and in support industries in the local economy that may reduce the demand for local housing.

When comparing Alternative A to existing conditions, impacts on population growth and housing demand would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative A to No-Action). In summary, the Project would likely result in a limited increase in housing demand during construction, which would be accommodated by local housing resource; no long-term housing effects are anticipated. This impact is considered **less than significant**.

Impact ECON-6 (Alternative A): ***Losses to the Lower San Joaquin Levee District.*** Similar to the No-Action Alternative, Restoration Flows may result in increased operation and maintenance costs for LSJLD due to increased vegetation management and sediment management activities~~ at Project facilities~~. ~~However, SJRRP has pursued a financial assistance agreement with the LSJLD on a Program-level to assist the district in~~

~~adapting to changes in operations and maintenance activities, including changes in Reach 2B, such that existing levels of flood management are maintained during release of Restoration Flows.~~

Alternative A would permanently remove approximately 1,180 acres of agricultural land from production, temporarily displace 60 acres of agricultural production during construction, and shift agricultural uses to pasture (livestock grazing) on another 580 acres within the proposed floodplain. The permanent loss of agricultural lands would reduce LSJLD's tax revenues by about $6,600 to $9,300; however, this reduction is small (less than 1 percent) relative to total revenues for the district.

When comparing Alternative A to existing conditions, impacts would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative A to No-Action). Because increased operations and maintenance costs are accounted for by Program-level actions and because the permanent loss of agricultural lands would cause a relatively small reduction in the district's tax revenues (less than 1 percent) relative to total tax revenues, this impact is considered **less than substantial**.

Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the Preferred Alternative

All of the Project alternatives, including Alternative B, would entail land acquisition, construction and operations and maintenance of new Project facilities, and implementation of habitat restoration activities that could affect socioeconomic conditions in the Project area and the larger regional economy.

Impact ECON-1 (Alternative B): ***Change in Agricultural Production Values***. Under Alternative B, there would be a permanent removal of approximately ~~1,032~~990 acres of agricultural land from production, temporary displacement of another ~~42~~ 46 acres of agricultural production during construction and shift in agricultural uses on another ~~886~~ 894 acres within the proposed floodplain; refer to Impact AG-LU-1 (Alternative B) for more details. The farm gate value of commodities produced on lands permanently taken out of production would be nearly $~~7.4~~ 6.7 million annually, representing about ~~44~~ 39 percent of the total value of agricultural production in the Project area (see Table 21-14). There would be an additional $~~200~~100,000 in annual crop losses during the construction timeframe due to temporary displacement of agricultural production. The direct economic effect on farmers would be negligible because privately-owned farmland would be purchased and property owners compensated at fair market value for their land, which is generally based on revenue potential for agricultural properties. At the regional level, the decline in agricultural production values is minor (less than 0.1 percent) when compared to agricultural activity in Fresno and Madera counties, which was valued at $8.5 billion in 2011.

When comparing Alternative B to existing conditions, impacts on the value of agricultural production would be similar to those described in the preceding paragraph (i.e., comparison of Alternative B to No-Action). In summary, the Project would remove land from agricultural production and diminish the value of agricultural commodities produced in the Project area. Because the decline in agricultural values is small relative to

production values in the region (less than 0.1 percent), this impact is considered **less than substantial**.

Impact ECON-2 (Alternative B): *Effects on the Regional Economy from Changes in Agricultural Production*. Under Alternative B, effects on the regional economy from changes in agricultural production would be similar to those described under Alternative A; refer to Impact ECON-2 (Alternative A) above. The regional economic impacts associated with permanent and temporary changes in agricultural production are presented above in Table 21-15. Compared to No-Action Alternative B would have a long-term adverse effect on the regional economy due to permanent losses in agricultural production and related spending. Specifically, the direct effects at the farm level include annual losses of nearly $~~7.4~~ 6.7 million in economic output (or agricultural production value), $~~2.1~~1.9 million in labor income, and ~~46~~ 42 jobs. The total economic impacts (incorporating ripple effects in the regional economy) include annual losses of $~~11~~10.6 million in output, $3.~~5~~ 2 million in labor income, and ~~85~~ 78 jobs in the two-county economy compared to No-Action; these effects are minor when considered in the context of the total economic activity supported throughout the regional economy (e.g., annual output losses are less than 0.15 percent of regional agricultural production alone). Temporary effects in the regional economy from changes in agricultural production during construction would be relatively small (e.g., annual output losses are less than 0.005 percent of the regional agricultural production).

When comparing Alternative B to existing conditions, impacts on the regional economy from reduced agricultural production would be similar to those described in the preceding paragraph (i.e., comparison of Alternative B to No-Action). In summary, the Project would cause a decline in economic production, labor income, and jobs in Fresno and Madera counties. Because these adverse effects in the regional economy are small relative to total economic activity in the region, this impact is considered **less than substantial**.

Impact ECON-3 (Alternative B): *Effects on the Regional Economy from Construction and Operations and Maintenance Spending*. Compared to No-Action, implementation of Alternative B would generate regional economic benefits to Fresno and Madera counties during construction and operations and maintenance, which are presented above in Table 21-16; refer to Impact ECON-3 (Alternative A) for more details.

In summary, the total cost of the Project under Alternative B is estimated at $480.0 million over the approximate 13-year construction period. The direct economic benefits of Project construction include $34.1 million in economic output, $9.8 million in labor income, and approximately 100 jobs annually. Accounting for the “ripple” (or multiplier) effects in the regional economy, the annual construction benefits of the Reach 2B project under Alternative B total $51.7 million in economic output, $16.1 million in labor income, and 244 jobs throughout the local economy. These construction effects would be temporary, however, lasting only over the construction period.

Project operations and maintenance would also generate long-term economic benefits to the region. Under Alternative B, the total operations and maintenance budget is

approximately $1.2 million (corresponding to the direct output value of Project operations), which includes $963,000 for expenditures on goods and services and $278,000 in labor payroll that would support roughly four jobs. When considering the additional economic activity supported by these expenditures, Alternative B would generate an estimated $2.1 million in total economic output, $600,000 in total labor income, and nearly 12 total jobs annually. The benefits associated with Project operations and maintenance would be long term, extending over the life of the Project.

When comparing Alternative B to existing conditions, effects on the regional economy from construction and operations and maintenance of the Project would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative B to No-Action). In summary, the Project would generate new economic activity, namely increases in economic production, labor income, and jobs in Fresno and Madera counties over both the short and long term and this would be a **beneficial** effect.

Impact ECON-4 (Alternative B): ***Effects on Local Tax Revenues***. Under Alternative B, effects on local tax revenues would be similar to those described under Alternative A; refer to Impact ECON-4 (Alternative A) for more details. Compared to No-Action, it is estimated that Alternative B may result in a reduction in property tax revenues ranging between $322,000 and $483,000 annually, which accounts for less than 0.3 percent of the total combined property tax revenues collected in Fresno and Madera counties.

When comparing Alternative B to existing conditions, impacts on property tax revenues would be similar to those described in the preceding paragraph (i.e., comparison of Alternative B to No-Action). In summary, the Project would shift land from private to public ownership, thereby removing land from property tax rolls and reducing the property tax revenues accruing to Fresno and Madera counties. Because the potential loss in property tax revenues is minor compared to property tax revenues generated in the region (less than 0.3 percent), this impact is considered **less than substantial**.

Impact ECON-5 (Alternative B): ***Change in Population Growth and Housing Demand***. Under Alternative B, effects on population growth and housing demand would be similar as those described under Alternative A; refer to Impact ECON-5 (Alternative A) for more details. Compared to existing conditions, Alternative B would likely result in a limited increase in housing demand during construction, which would be accommodated by local housing resources; no long-term housing effects are anticipated. This impact is considered **less than significant**.

Impact ECON-6 (Alternative B): ***Losses to the Lower San Joaquin Levee District.*** Refer to Impact ECON-6 (Alternative A). Potential impacts of Alternative B are similar to potential impacts of Alternative A. Under Alternative B, there would be a permanent removal of approximately 2,032 acres of agricultural land from production and temporary displacement of another 56 acres of agricultural production during construction. Although this would cause a reduction in the LSJLD's tax revenues, the amount of revenues lost would be small (less than 1 percent) compared to total revenues. This impact would be **less than substantial**.

Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)
All of the Project alternatives, including Alternative C, would entail land acquisition, construction and operations and maintenance of new Project facilities, and implementation of habitat restoration activities that could affect socioeconomic conditions in the Project area and the larger regional economy.

Impact ECON-1 (Alternative C): *Change in Agricultural Production Values*. Under Alternative C, there would be a permanent loss of about 1,~~516~~ 547 acres of agricultural land from production and temporary displacement of another 73 acres of agricultural production during construction; refer to Impact AG-LU-1 (Alternative C) for more details. The farm gate value of commodities produced on lands permanently taken out of production would be approximately $~~5.8~~6.0 million annually, representing about ~~34~~ 35 percent of the total value of agricultural production in the Project area (see Table 21-14). There would be an additional $~~268~~320,000 in annual crop losses during the construction timeframe due to temporary displacement of agricultural production. The direct economic effect on farmers would be negligible because privately-owned farmland would be purchased and property owners compensated at fair market value for their land, which is generally based on revenue potential for agricultural properties. At the regional level, the decline in agricultural production values is minor (less than 0.~~07~~ 1 percent) when compared to agricultural activity in Fresno and Madera counties, which was valued at $8.5 billion in 2011.

When comparing Alternative C to existing conditions, impacts on the value of agricultural production would be similar to those described in the preceding paragraph (i.e., comparison of Alternative C to No-Action). In summary, the Project would remove land from agricultural production and diminish the value of agricultural commodities produced in the Project area. Because the decline in agricultural values is small relative to production values in the region (less than 0.~~07~~ 1 percent), this impact is considered **less than substantial**.

Impact ECON-2 (Alternative C): *Effects on the Regional Economy from Changes in Agricultural Production*. Under Alternative C, effects on the regional economy from changes in agricultural production would be similar to those described under Alternative A; refer to Impact ECON-2 (Alternative A) for more details. The regional economic impacts associated with permanent and temporary changes in agricultural production are presented above in Table 21-15. Compared to No-Action Alternative C would have a long-term adverse effect on the regional economy due to permanent losses in agricultural production and related spending. Specifically, the direct effects at the farm level include annual losses of $~~5.8~~6.0 million in economic output (or agricultural production value), $1.7 million in labor income, and ~~37~~ 38 jobs. The total economic impacts (incorporating ripple effects in the regional economy) include annual losses of $9.~~1~~ 4 million in output, $2.~~7~~ 8 million in labor income, and ~~67~~ 69 jobs in the two-county economy compared to No-Action; these effects are minor when considered in the context of the total economic activity supported throughout the regional economy (e.g., annual output losses are less than 0.~~11~~ 15 percent of regional agricultural production alone). Temporary effects in the regional economy from changes in agricultural production during construction would be

relatively small (e.g., annual output losses are less than 0.005 percent of the regional agricultural production).

When comparing Alternative C to existing conditions, impacts on the regional economy as a result of decreased agricultural production would be similar to those described in the preceding paragraph (i.e., comparison of Alternative C to No-Action). In summary, the Project would cause a decline in economic production, labor income, and jobs in Fresno and Madera counties. Because these adverse effects in the regional economy are small relative to total economic activity in the region, this impact is considered **less than substantial**.

Impact ECON-3 (Alternative C): *Effects on the Regional Economy from Construction and Operations and Maintenance Spending*. Compared to No-Action, implementation of Alternative C would generate regional economic benefits to Fresno and Madera counties during construction and operations and maintenance, which are presented above in Table 21-16; refer to Impact ECON-3 (Alternative A) for more details.

In summary, the total cost of the Project under Alternative C is estimated at $490.2 million over the approximate 11-year construction period. The direct economic benefits of Project construction include $42.0 million in economic output, $9.8 million in labor income, and approximately 99 jobs annually. Accounting for the "ripple" (or multiplier) effects in the regional economy, the annual construction benefits of the Reach 2B project under Alternative C total $65.0 million in output, $18.1 million in labor income, and 287 jobs throughout the local economy. These construction effects would be temporary, however, lasting only over the construction period.

Project operations and maintenance would also generate long-term economic benefits to the region. Under Alternative C, the total operations and maintenance budget is approximately $1.1 million (corresponding to the direct output value of Project operations), which includes $829,000 for expenditures on goods and services and $271,000 in labor payroll that would support roughly four jobs. When considering the additional economic activity supported by these expenditures, Alternative C would generate an estimated $1.9 million in total economic output, $557,000 in total labor income, and about 11 total jobs annually. The benefits associated with Project operations and maintenance would be long term, extending over the life of the Project.

When comparing Alternative C to existing conditions, effects on the regional economy as a result of construction and operations and maintenance of the Project would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative C to No-Action). In summary, the Project would generate new economic activity, namely increases in economic production, labor income, and jobs in Fresno and Madera counties over both the short and long term and this would be a **beneficial** effect.

Impact ECON-4 (Alternative C): *Effects on Local Tax Revenues*. Under Alternative C, effects on local tax revenues would be similar to those described under Alternative A; refer to Impact ECON-4 (Alternative A) for more details. Compared to No-Action, it is

estimated that Alternative C would result in a reduction in property tax revenues ranging between $322,000 and $478,000 annually, which accounts for less than 0.2 percent of the total combined property tax revenue collected in Fresno and Madera counties.

When comparing Alternative C to existing conditions, impacts on property tax revenues would be similar to those described in the preceding paragraph (i.e., comparison of Alternative C to No-Action). In summary, the Project would shift land from private to public ownership, thereby removing land from property tax rolls and reducing the property tax revenues accruing to Fresno and Madera counties. Because the potential loss in property tax revenues is minor compared to property tax revenues generated in the region (less than 0.2 percent), this impact is considered **less than substantial**.

Impact ECON-5 (Alternative C): *Change in Population Growth and Housing Demand*. Under Alternative C, effects on population growth and housing demand would be similar to those described under Alternative A; refer to Impact ECON-5 (Alternative A) above. Compared to existing conditions, Alternative C would likely result in a limited increase in housing demand during construction, which would be accommodated by local housing resource; no long-term housing effects are anticipated. This impact is considered **less than significant**.

Impact ECON-6 (Alternative C): *Losses to the Lower San Joaquin Levee District.* Refer to Impact ECON-6 (Alternative A). Potential impacts of Alternative C are similar to potential impacts of Alternative A. Under Alternative C, there would be a permanent loss of about 1,516 acres of agricultural land from production and temporary displacement of another 73 acres of agricultural production during construction. Although this would cause a reduction in the LSJLD's tax revenues, the amount of revenues lost would be small (less than 1 percent) compared to total revenues. This impact would be **less than substantial**.

Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)

All of the Project alternatives, including Alternative D, would entail land acquisition, construction and operations and maintenance of new Project facilities, and implementation of habitat restoration activities that could affect socioeconomic conditions in the Project area and the larger regional economy.

Impact ECON-1 (Alternative D): *Change in Agricultural Production Values*. Alternative D would permanently remove approximately 1,~~291~~ 327 acres of agricultural land from production, temporarily displace 69 acres of agricultural production during construction, and shift agricultural uses on another 956 acres within the proposed floodplain; refer to Impact AG-LU-1 (Alternative D) for more details. The farm-gate value of commodities produced on lands subject to permanent losses would be roughly $~~8.8~~9.0 million annually, representing about ~~53~~ 53 percent of the total value of agricultural production in the Project area (see Table 21-14). There would be an additional $~~270~~300,000 in annual crop losses during the construction timeframe due to temporary displacement of agricultural production. The direct economic effect on farmers would be negligible because privately-owned farmland would be purchased and property owners compensated at fair market value for their land, which is generally based on

revenue potential for agricultural properties. At the regional level, the decline in agricultural production values is minor (about 0.1 percent) when compared to agricultural activity in Fresno and Madera counties, which was valued at $8.5 billion in 2011.

When comparing Alternative D to existing conditions, impacts on the value of agricultural production would be similar to those described in the preceding paragraph (i.e., comparison of Alternative D to No-Action). In summary, the Project would remove land from agricultural production and diminish the value of agricultural commodities produced in the Project area. Because the decline in agricultural values is small relative to production values in the region (about 0.1 percent), this impact is considered **less than substantial**.

Impact ECON-2 (Alternative D): *Effects on the Regional Economy from Changes in Agricultural Production*. Under Alternative D, effects on the regional economy from changes in agricultural production would be similar to those described under Alternative A; refer to Impact ECON-2 (Alternative A) for more details. The regional economic impacts associated with permanent and temporary changes in agricultural production are presented above in Table 21-15. Compared to No-Action Alternative D would have a long-term adverse effect on the regional economy due to permanent losses in agricultural production and related spending. Specifically, the direct effects at the farm level include annual losses of $~~8.8~~9.0 million in economic output (agricultural production value), $2.6 million in labor income, and ~~56~~ 57 jobs. The total economic impacts (incorporating ripple effects in the regional economy) include annual losses of $14.~~0~~ 3 million in output, $4.3 million in labor income, and ~~103~~ 105 jobs in the two-county economy compared to No-Action; these effects are minor when considered in the context of the total economic activity supported throughout the regional economy (e.g., annual output losses are less than 0.17 percent of regional agricultural production alone). Temporary effects in the regional economy from changes in agricultural production during construction would be relatively small (e.g., annual output losses are less than 0.005 percent of the regional agricultural production).

When comparing Alternative D to existing conditions, impacts on the regional economy as a result of decreased agricultural production would be similar to those described in the preceding paragraph (i.e., comparison of Alternative D to No-Action). In summary, the Project would cause a decline in economic production, labor income, and jobs in Fresno and Madera counties. Because these adverse effects in the regional economy are small relative to total economic activity in the region, this impact is considered **less than substantial**.

Impact ECON-3 (Alternative D): *Effects on the Regional Economy from Construction and Operations and Maintenance Spending*. Compared to No-Action, implementation of Alternative D would generate regional economic benefits to Fresno and Madera counties during construction and operations and maintenance, which are presented above in Table 21-16; refer to Impact ECON-3 (Alternative A) for more details.

In summary, the total cost of the Project under Alternative D is estimated at $505.4 million over the approximate 13-year construction period. The direct economic benefits of Project construction include $35.7 million in economic output, $8.8 million in labor income, and approximately 100 jobs annually. Accounting for the "ripple" (or multiplier) effects in the regional economy, the annual construction benefits of the Project under Alternative D total $55.0 million in output, $15.8 million in labor income, and 258 jobs throughout the local economy. These construction effects would be temporary, however, lasting only over the construction period.

Project operations and maintenance would also generate long-term economic benefits to the region. Under Alternative D, the total operations and maintenance budget is approximately $1.1 million (corresponding to the direct output value of Project operations), which includes $822,000 for expenditures on goods and services and $278,000 in labor payroll that would support roughly four jobs. When considering the additional economic activity supported by these expenditures, Alternative D would generate an estimated $1.9 million in total economic output, $564,000 in total labor income, and about 11 total jobs annually. The benefits associated with Project operations and maintenance would be long term, extending over the life of the Project.

When comparing Alternative D to existing conditions, effects on the regional economy as a result of construction and operations and maintenance of the Project would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative D to No-Action). In summary, the Project would generate new economic activity, namely increases in economic production, labor income, and jobs in Fresno and Madera counties over both the short and long term and this would be a **beneficial** effect.

Impact ECON-4 (Alternative D): ***Effects on Local Tax Revenues***. Under Alternative D, effects on local tax revenues would be similar to those described under Alternative A; refer to Impact ECON-4 (Alternative A) for more details. Compared to No-Action, it is estimated that Alternative D would result in a reduction in property tax revenues ranging between $329,000 and $490,000 annually, which accounts for less than 0.3 percent of the total combined property tax revenue collected in Fresno and Madera counties.

When comparing Alternative D to existing conditions, impacts on property tax revenues would be similar to those described in the preceding paragraph (i.e., comparison of Alternative D to No-Action). In summary, the Project would shift land from private to public ownership, thereby removing land from property tax rolls and reducing the property tax revenues accruing to Fresno and Madera counties. Because the potential loss in property tax revenues is minor compared to property tax revenues generated in the region (less than 0.3 percent), this impact is considered **less than substantial**.

Impact ECON-5 (Alternative D): ***Change in Population Growth and Housing Demand***. Under Alternative D, effects on population growth and housing demand would be roughly the same as those described under Alternative A; refer to Impact ECON-5 (Alternative A) for more details. Compared to existing conditions, Alternative D would likely result in a limited increase in housing demand during construction, which would be

accommodated by local housing resource; no long-term housing effects are anticipated. This impact is considered **less than significant**.

Impact ECON-6 (Alternative D): ***Losses to the Lower San Joaquin Levee District.*** Refer to Impact ECON-6 (Alternative A). Potential impacts of Alternative D are similar to potential impacts of Alternative A. Alternative D would permanently remove approximately 1,291 acres of agricultural land from production, temporarily displace 69 acres of agricultural production during construction, and shift agricultural uses on another 956 acres within the proposed floodplain. Although this would cause a reduction in the LSJLD's tax revenues, the amount of revenues lost would be small (less than 1 percent) compared to total revenues. This impact would be **less than substantial**.

22.0 Transportation and Traffic

This chapter evaluates the potential effects of the Project on transportation and traffic in the Project area. The analysis primarily examines impacts on roadway circulation system levels of service (LOS) within the Project area during construction and operation of the Project. This section also identifies and reviews applicable laws, ordinances, regulations, and standards relevant to traffic and transportation activities.

Information sources include data collected from the California Department of Transportation (Caltrans) traffic count database (2013), traffic counts collected for local roadways, traffic field review and observation of current roadway operating conditions, and field reconnaissance survey of the roadway circulation system of the Project area. Site reconnaissance was performed on August 2, 2011, to document roadway characteristics, identify physical constraints, and assess general traffic conditions. In addition to the Caltrans traffic counts, new roadway traffic counts for five local roadway segments were collected on the last week of August 2011 (Appendix 22-A).

22.1 Environmental Setting

The following section provides information regarding the affected transportation and traffic environment and includes a discussion of roadway operating conditions in terms of LOS. The Project area is generally located along the San Joaquin River east of State Route (SR) 33 in Fresno and Madera Counties and the Project area is located east of the city of Mendota. As shown in Figure 22-1, the Project footprint is located in the along the San Joaquin River and extends from below Mendota Dam to the Chowchilla Bifurcation Structure.

22.1.1 Roadway Network

Several regionally and locally significant roadways traverse the Project area. Key characteristics of the roadway circulation system within the Project area are as follows:

- *State Route 33* - SR 33 is north-south State highway located west and southwest of the Project area. It is also referred to as Derrick Avenue within the Mendota city limits. The highway provides for one to two lanes in each direction in the Project vicinity and has a current Average Daily Traffic (ADT) of 11,800 vehicles per day south of the SR 180 junction.

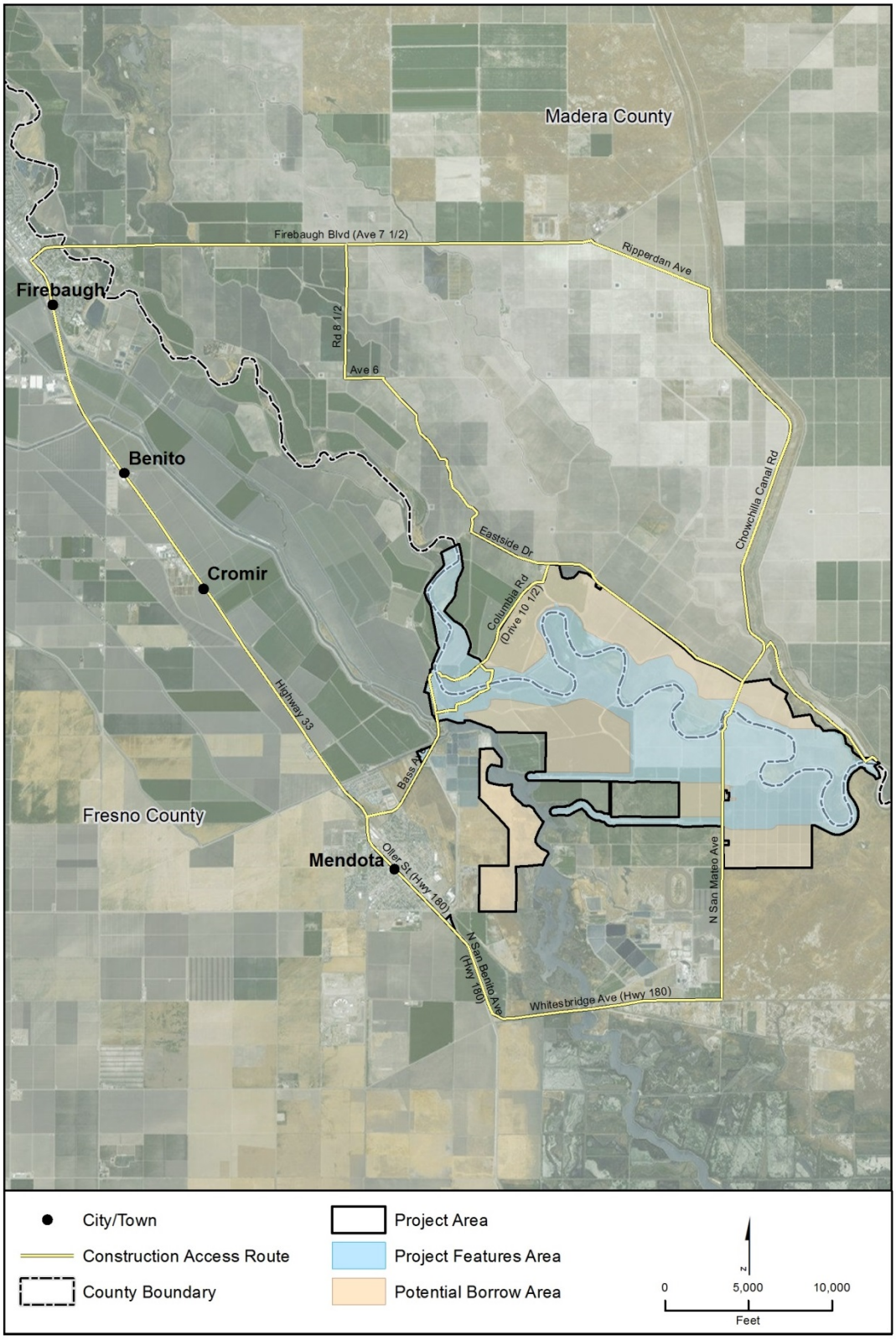

Figure 22-1.
Transportation Setting of the Project Area and Affected Roadways

- *State Route 180* - SR 180 is an east-west State highway located south of the Project area. It is also referred to as Whitebridge Avenue. The highway provides for one lane in each direction in the Project area and has a current ADT of 8,200 vehicles per day. It has a speed limit of 55 miles per hour. Caltrans is proposing that the California Transportation Commission adopt a new segment of SR 180, from Interstate 5 to the end of the freeway portion of SR 180, near Valentine Avenue in the city of Fresno.
- *Firebaugh Boulevard* - Firebaugh Boulevard is a two lane east-west roadway located north of the Project area. East of the San Joaquin River, Firebaugh Boulevard is also referred to as Avenue 7 ½ on Madera County documents. West of Ripperdan Avenue, it has an ADT of 5,460 vehicles per day. East of Ripperdan Avenue, the ADT is 3,039 vehicles per day.
- *Ripperdan Avenue* - Ripperdan Avenue is a two lane east-west roadway connecting with Firebaugh Boulevard. It has an ADT of 3,097 vehicles per day. East of the Chowchilla Bypass Canal the road becomes Avenue 7. The intersection of Ripperdan Avenue and Firebaugh Boulevard is controlled by a STOP sign on Ripperdan Avenue and no controls on Firebaugh Boulevard.
- *Bass Avenue* - Bass Avenue is a two-lane north-south local roadway originating from SR 33 and providing direct access to the Mendota Dam area and its immediate vicinity. Bass Avenue has an ADT of 510 vehicles per day.
- *San Mateo Avenue* - San Mateo Avenue is a north-south two-lane road west of the Chowchilla Bifurcation Structure. The segment of San Mateo Avenue north of SR 180 has an ADT of 547 vehicles per day. The intersection of San Mateo Avenue and SR 180 is controlled by a STOP sign on San Mateo Avenue and no controls on SR 180.

22.1.2 Study Roadway Segments

Site reconnaissance and the traffic study field review identified five local roadway segments that could potentially be impacted by the Project. Subsequently, segments of SR 33 and SR 180 were included to evaluate regional traffic impacts. Table 22-1 describes the cross-sectional characteristics of the study roadway segments and their respective administering jurisdictional agencies.

22.1.3 Existing Traffic Volume

Traffic data collected for the Project included 24-hour ADT counts collected on the month of August 2011 by National Data Services. The 24-hour ADT traffic count data sheets for the roadway segments evaluated in this report are included in Appendix 22-A. The August 2011 condition is similar to the July 2009 condition because there has not been substantial growth in the Project area during this time period; therefore, it is used to represent the existing condition baseline for the California Environmental Quality Act (CEQA) analysis of environmental impacts.

Table 22-1.
Study Roadway Segments

Roadway Segment	No. of Lanes	Jurisdiction
1. Firebaugh Boulevard east of Ripperdan Avenue	1/U	Madera County
2. Firebaugh Boulevard west of Ripperdan Avenue	1/U	Madera County
3. Ripperdan Avenue south of Firebaugh Boulevard	1/U	Madera County
4. San Mateo Avenue north of SR 180	1/U	Fresno County
5. Bass Avenue south of the Delta-Mendota Canal	1/U	Fresno County
6. SR 33 south of SR 180/33 Junction	2/U	Fresno County
7. SR 33 north of SR 180/33 Junction	1/U	Fresno County
8. SR 180 west of San Mateo Avenue	1/U	Fresno County
9. SR 180 east of San Mateo Avenue	1/U	Fresno County

Key:
1/U – One lane/undivided roadway
2/U – Two lane/undivided roadway
SR = State route

22.1.4 Existing Level of Service

LOS is an indicator of operating conditions on a roadway and is defined in categories ranging from LOS A to LOS F, with LOS A representing the best traffic flow and LOS F representing poor conditions. LOS A indicates free-flowing traffic and LOS F indicates substantial congestion with stop-and go traffic and long delays at intersections. The following sections discuss the LOS on the study roadway segments under existing conditions. See Section 22.3.1 for more detailed discussion of the LOS criteria and methodology used in the assessment of potential Project traffic impacts.

Roadway Segment Analysis

Table 22-2 summarizes the existing roadway segment LOS for the study roadway segments. As shown in Table 22-2, the study roadway segments are all currently operating at acceptable LOS A under existing conditions.

Table 22-2.
Study Roadway Segments – Existing Conditions

Roadway Segment	No. of Lanes (Each Direction)	ADT	LOS
1. Firebaugh Boulevard east of Ripperdan Avenue	1/U	3,036	A
2. Firebaugh Boulevard west of Ripperdan Avenue	1/U	5,460	A
3. Ripperdan Avenue south of Firebaugh Boulevard	1/U	3,097	A
4. San Mateo Avenue north of SR 180	1/U	547	A
5. Bass Avenue south of the Delta-Mendota Canal	1/U	510	A
6. SR 33 south of SR 180/33 Junction	2/U	11,800	A
7. SR 33 north of SR 180/33 Junction	1/U	5,600	A
8. SR 180 west of San Mateo Avenue	1/U	8,200	A
9. SR 180 east of San Mateo Avenue	1/U	8,200	A

Source: Caltrans 2013, National Data Surveying data (Appendix 22-A)
Key:
1/U – One lane/undivided roadway
2/U – Two lane/undivided roadway
ADT = average daily traffic
LOS = level of service
SR = State route

22.2 Regulatory Setting

This section discusses the regulatory setting for transportation and infrastructure in the Project area. This section identifies and reviews applicable laws, ordinances, regulations, and standards relevant to traffic and transportation activities.

22.2.1 Federal

Title 23, Code of Federal Regulations [CFR], Highways

The U.S. Department of Transportation (DOT) sets policy regarding the placement of utility facilities within the freeway rights-of-way. Federal statutes specify requirements for facilities that received Federal assistance. These include Federal interstate freeways and U.S. highways, most state routes, and certain local roads. The Federal Highway Administration (FHWA) regulations require each State to develop its own policy regarding the accommodation of utility facilities within freeway-rights-of-way. Once FHWA has approved a State's policy, the State can approve any proposed utility installation without referral to FHWA, unless it does not conform to the federally approved policy. Federal law does not directly control how States accommodate utilities within freeway rights-of-way. But, in determining whether a right-of-way on a federally aided freeway should be used for accommodating a utility facility, the Secretary of Transportation must (1) ascertain the effect accommodation of utilities would have on freeway and traffic safety, since no such use may be authorized or permitted that would adversely affect safety; (2) evaluate the direct and indirect environmental and economic effects of any loss of productive agricultural land or any impairment of its productivity that would result from disapproving accommodation of the utility facility; and (3) consider the environmental and economic effects together with any interference with or impairment of the use of the freeway that would result from accommodation of the utility facility (23 United States Code [USC] Section 109[l]). In addition, 23 USC Section 116 requires State transportation agencies to ensure proper maintenance of freeway facilities, which implies adequate control over non-freeway facilities such as utility facilities. Finally, 23 USC Section 123 specifies 25 when Federal funds can be used to pay for the costs of relocating utility facilities in connection with freeway construction projects (McCarthy 2004).

Title 49, CFR, Sections 171-177

Title 49 governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles. The administering agencies for this are the California Highway Patrol and the DOT, Pipeline and Hazardous Materials Safety Administration. The Project would conform to this law by requiring that shippers of construction related hazardous materials use the required markings on their transportation vehicles.

22.2.2 State of California

State of California Department of Transportation

Caltrans is one of several departments within the Business, Transportation and Housing Agency. Caltrans' Right of Way and Asset Management Program, through the district

offices, is primarily responsible for acquisition and management of property required for State transportation purposes. Transportation purposes may include roads, mass transit guideways and related facilities, airports, shops, maintenance stations, storage yards, material sites, and any other purpose that may be necessary for Caltrans operations (Caltrans 2008a). Right of Way and Asset Management Program responsibilities include managing Caltrans' real property for transportation purposes, reducing the costs of operations, and disposing of property no longer needed and monitoring right-of-way activities on federally assisted local facilities.

An encroachment, as defined in Streets and Highways Code section 660, can be any tower, pole, pole line, pipe, pipe line, fence, billboard, stand, or building, or any structure or object of any kind or character that is within the right-of-way but not a part of the Caltrans facility. Authority for Caltrans to control encroachments within the State roadway is contained in the Streets and Highways Code starting with section 660.

Encroachments allow temporary or permanent use of roadway right-of-way by a utility, a public entity, or a private party. Encroachments include all public and private utilities within State rights-of-way, such as: communication, electric power, water, gas, oil, petroleum products, steam, sewer, drainage, irrigation, and similar facilities. Encroachments also include any temporary or permanent break in access or use of the roadway rights-of-way: for grading, excavating, or filling or removing of materials by public agencies, developers, or private individuals (Caltrans 2008b).

Encroachment permits are issued by Caltrans to other agencies or parties that perform construction activities within its right-of-way. Typical projects performed by other agencies or parties that require encroachment permits include roadway improvement construction and utility work. Under an encroachment permit, Caltrans requires the agency or party to implement an appropriate stormwater protection program. Caltrans retains ultimate responsibility for ensuring that the portion of the project within the Caltrans right-of-way is in compliance with Federal, State, and local stormwater protection regulations.

Caltrans specifically has interest in projects that may structurally modify deck slabs (not including raised sidewalks or utility attachments), girders (not including utility attachments), bottom slabs of superstructures, columns and supporting foundations, and abutments and supporting foundations.

California Vehicle Code, Sections 13369, 15275, 15278

California Vehicle Code addresses the licensing of drivers and the classification of license required for the operation of particular types of vehicles, requires a commercial driver’s license to operate commercial vehicles, and requires an endorsement issued by the Department of Motor Vehicles to drive any commercial vehicle identified in section 15278. The administering agency for these statutes is the Department of Motor Vehicles. The Project would comply with these codes by requiring that contractors and employees be properly licensed and endorsed when operating such vehicles.

California Vehicle Code, Section 35550

California Vehicle Code section 35551 imposes weight guidelines and restrictions on vehicles traveling on freeways and highways. The section holds that "a single axle load shall not exceed 20,000 pounds. The load on any one wheel or wheels supporting one end of an axle is limited to 10,500 pounds. The front steering axle load is limited to 12,500 pounds." Furthermore, California Vehicle Code section 35551 defines the maximum overall gross weight as 80,000 pounds and adds that "the gross weight of each set of tandem axles shall not exceed 34,000 pounds." The administering agency for this statute is Caltrans. The Project would comply with this code by requiring compliance with weight restrictions and by requiring heavy haulers to obtain permits, if required, prior to delivery of any heavy haul load.

California Vehicle Code, Section 35780

California Vehicle Code section 35780 requires a Single-Trip Transportation Permit to transport oversized or excessive loads over State highways. The permit can be acquired through Caltrans. The Project would comply with this code by requiring that heavy haulers obtain a Single-Trip Transportation Permit for oversized loads for each vehicle, prior to delivery of any oversized load.

California Streets and Highways Code, Section 117

Unless otherwise specified, the acquisition of any right-of-way over any real property for State highway purposes includes the right of the Department of Transportation to issue, under Chapter 3 (commencing with § 660), permits for any structures or fixtures necessary to telegraph, telephone, or electric power lines or of any ditches, pipes, drains, sewers, or underground structures located in the public rights-of-way. The administering agency for this statute is Caltrans. The Project would coordinate with Caltrans with regard to use of public rights-of-way.

California Streets and Highways Code, Sections 660, 670, 672, 1450, 1460, 1470, 1480 et seq.

This code defines highways and encroachment, requires encroachment permits for projects involving excavation in State highways and county/city streets. This law is generally enforced at the local level. The administering agencies for this regulation are Caltrans, and Fresno and Madera counties. The Project would apply for encroachment permits for any excavation in State and county roadways prior to construction.

California Manual on Uniform Traffic Control Devices, Part 6

This regulation requires a temporary traffic control plan to be provided for "continuity of function (movement of traffic, pedestrians, bicyclists, transit operations), and access to property/utilities" during any time the normal function of a roadway is suspended. The administering agencies for this regulation are Caltrans, and Fresno and Madera counties. If applicable, a Traffic Control Plan would be prepared prior to the start of construction.

22.2.3 Regional and Local

Fresno Council of Governments' Regional Transportation Plan

The Fresno Council of Governments' Regional Transportation Plan (RTP) (2010) is a comprehensive assessment of all forms of transportation available in Fresno County and of needs for travel and goods movement projected into the future until the year 2030. The first RTP was adopted in 1975; this Plan is the latest edition, and is a continuation of a process of intergovernmental cooperation, coordination and long-range planning which has involved the 15 cities within Fresno County, staff from related local public agencies, the Air District, Caltrans, and the public. This process has been accomplished within the framework of the Council of Fresno County Governments, which is the Regional Transportation Planning Agency for the Fresno County area. Updated editions are required every 4 years and are refinements of the original and subsequent plans. Federal and State legislation mandate that long-range transportation planning be done every 4 years for a period of at least 20 years into the future.

Madera County Council of Governments' Regional Transportation Plan

The Madera County RTP (2010) was previously prepared by VRPA Technologies and Madera County Transportation Commission staff and approved by the Madera County Transportation Commission Policy Board in 2007. The Madera County Transportation Commission updated the RTP to reflect the transportation system through Fiscal Year (FY) 2035. The RTP ensures that the County's transportation system and implementation policies/programs through FY 2035 would safely and efficiently accommodate growth envisioned in the Land Use Elements of the cities of Chowchilla and Madera, and Madera County. The RTP includes programs and policies for congestion management, transit, bicycles and pedestrians, roadways, freight, and finances. The RTP is revised at least every 4 years, since the County is designated as nonattainment for Federal air quality standards.

The RTP's primary use is as a regional long-range plan for federally funded transportation projects, and it also serves as a comprehensive, coordinated transportation plan for all the governmental jurisdictions within the region. Different jurisdictions have different transportation implementation responsibilities under the RTP. These include Caltrans, Madera County, and the cities of Chowchilla and Madera.

22.3 Environmental Consequences and Mitigation Measures

22.3.1 Impact Assessment Methodology

This section describes the approach for evaluating transportation and traffic impacts. The Project would have two types of transportation and traffic impacts that have been evaluated for impacts, namely:

- Project construction impacts.
- Project operations and maintenance impacts.

The analysis of transportation and traffic-related effects of the Project is presented based on the construction and operational characteristics of the Project alternatives, including the type, location, trip generation, trip distribution and duration of restoration activities.

Project Construction (Short-Term)

During Project construction, there would be a short-term increase in Project related construction traffic and demand for roadway capacity and alternate routes associated with construction activities. Construction impacts have been evaluated for traffic and transportation impacts using the following methodology and assumption inputs.

- Data collection (traffic counts) and development of Project construction trip generation estimates (including worker, material and equipment delivery traffic to and from the Project site).
- Identification of borrow pit locations and estimation of soil material (truck trips) that may need to be transported on local roads.
- Calculation of roadway capacities and LOS under baseline conditions and with Project construction conditions. All roadway analysis scenarios were evaluated using *Highway Capacity Manual 2000* Analysis Procedures and Methodology (Transportation Research Board 2000).
- Assessment of potential Project related roadway closures resulting from Project construction activities. Alternate routes were identified and provided, as needed, and impacts to emergency response time were evaluated.

Project Operations and Maintenance (Long-Term)

After the conclusion of Project construction activities, there would be recurring Project operations and maintenance traffic associated with the maintenance and upkeep of the Project. Long-term operations and maintenance impacts were evaluated for traffic and transportation impacts using the following methodology and assumption inputs.

- Development of Project operations trip generation including worker and maintenance vehicle movements to and from the Project site.
- Identification of frequency of Project operations and maintenance activities.
- Identification of major Project operations and maintenance activities that may affect roadway system operations (e.g., work vehicles/activities adjacent to roadway right-of-ways, wide loads, heavy specialty equipment, etc.).
- Assessment of potential Project related roadway closures resulting from Project operations activities. Alternate routes were identified and provided, as needed, and impacts to emergency response time were evaluated.

Roadway Segment Analysis

Highway Capacity Manual 2000 (Transportation Research Board 2000) defines LOS as a quantitative measure describing operational characteristics within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. LOS characteristics for road segments are presented in Table 22-3.

Table 22-3.
Roadway Level of Service Descriptions

Level of Service	Description of Operation
A	Primarily free flow operations
B	Reasonably unimpeded operations, ability to maneuver only slightly restricted
C	Stable operations, ability to maneuver and select operating speed affected
D	Unstable flow, speeds and ability to maneuver restricted.
E	Significant delays, flow quite unstable.
F	Extremely slow speeds.

Table 22-4 provides the LOS and Peak Hour Directional Volume thresholds for highways and local roadways within Fresno County. Table 22-4 was based on the Florida Department of Transportation (2009), Table 9, Generalized Peak Hour Directional Volumes for Florida's Rural Undeveloped Areas and Cities or Developed Areas with less than 5,000 population. This is a modified Highway Capacity Manual-based LOS table (Florida Table), which is approved for use in Fresno County. The table considers the capacity of individual roadway segments based on numerous roadway variables (such as highway design speed, number of passing lanes, saturation flow, shoulder width, intersection spacing, etc.). Highways are generally considered uninterrupted flow roadways (two lane or multilane). Uninterrupted flow highways are roadways with a combination of roadway segments which have average signalized intersection spacing greater than 2.0 miles and are not freeways. Interrupted flow roadways are characterized by signals with average signalized intersection spacing less than or equal to 2.0 miles.

Table 22-4.
Fresno County Volume Thresholds for Roadway Level of Service for Uninterrupted Flow Highways

No of Lanes in Each Direction	Median Type	LOS and Volume Thresholds (Uninterrupted Flow Highways)					
		A	B	C	D	E	F
1	Undivided (U)	-	≤420	420-780	780-1100	1100-1400	>1400
1	Divided (D)	-	≤445	445-820	820-1155	1155-1470	>1470
2	Undivided (U)	-	≤1300	1300-2040	2040-2630	2630-3000	>3000
2	Divided (D)	-	≤1365	1365-2145	2145-2765	2765-3150	>3150
3	Divided (D)	-	≤1950	1950-3060	3060-3950	3950-4500	>4500

Source: Florida Department of Transportation 2009, Generalized Peak Hour Directional Volumes for Florida's Rural Undeveloped Areas and Cities or Developed Areas Less Than 5,000 population
Key:
LOS = Level of Service

Madera County uses evaluation criteria for roadway segments based on daily traffic volume. Table 22-5 shows the Madera County LOS criteria. For analysis purposes, all roadway segments were evaluated using Table 22-5 based on the estimated daily trip generation data for the Project alternatives.

Table 22-5.
Madera County Regional Transportation Plan Roadway Capacity/Level of Service

Roadway Classification	Number of Lanes	Maximum Two-Way Average Daily Traffic (ADT)[1,2]				
		LOS A	LOS B	LOS C	LOS D	LOS E
Collector	2	7,800	9,100	10,400	11,700	13,000
Secondary	4	15,500	18,100	20,700	23,300	25,900
Major	4	20,500	23,900	27,300	30,700	34,100
Arterial [3]	2	10,800	12,600	14,400	16,200	18,000
Arterial	4	21,500	25,100	28,700	32,300	35,900
Mountain Arterial [3]	2	9,700	11,300	12,900	14,500	16,100
Mountain Arterial	3	12,500	14,600	16,700	18,800	20,900
Mountain Arterial	4	22,300	26,000	29,800	33,500	37,200
Urban Arterial	4	21,500	25,100	28,700	32,300	35,900
Urban Arterial	6	32,300	37,700	43,100	48,500	53,900
Urban Arterial	8	43,100	50,300	57,400	64,600	71,800
Expressway [4]	4	24,500	28,600	32,700	36,800	40,900
Expressway [4]	6	36,800	42,900	49,000	55,200	61,300
Expressway [4]	8	49,000	57,200	65,400	73,500	81,700
Freeway	4	45,900	53,600	61,200	68,900	76,500
Freeway	6	70,500	82,200	94,000	105,800	117,500
Freeway	8	96,300	112,400	128,400	144,500	160,500
Freeway	10	120,400	140,400	160,500	180,500	200,600

Key:
ADT = average daily traffic
LOS = level of service

Notes:
[1] All Capacity figures are based on optimum conditions and are intended as guidelines for planning purposes only.
[2] Maximum two-way ADT values are based on the 1999 Modified Highway Capacity Manual Level of Service Tables.
[3] Level two-lane arterials are analyzed as arterials.
[4] There are currently no roadways in Madera County that match this category, but capacity values are included for future conditions analysis.

22.3.2 Significance Criteria

Potential impacts to transportation and traffic systems and facilities could occur if Project actions were to result in any of the following:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the roadway system.
- Exceed, either individually or cumulatively, a LOS standard established by the county congestion management agency for designated roads or highways.
- Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access (e.g., affecting emergency response time).

22.3.3 Impacts and Mitigation Measures

This section provides a Project-level evaluation of direct and indirect effects of the Project alternatives on transportation and traffic. It includes analyses of potential effects relative to No-Action conditions in accordance with National Environmental Policy Act and potential impacts compared to existing conditions to meet CEQA requirements. The analysis is organized by Project alternative with specific impact topics numbered sequentially under each alternative. With respect to transportation and traffic, the environmental impact issues and concerns are:

1. Potential to Cause an Increase in Traffic which is Substantial in Relation to the Existing Traffic Load and Capacity of the Roadway System.
2. Potential to Exceed, Either Individually or Cumulatively, a LOS Standard Established By the County Congestion Management Agency for Designated Roads or Highways.
3. Potential to Substantially Increase Hazards to a Design Feature (e.g., sharp curves or dangerous intersections) or Increase Incompatible Uses (e.g., farm equipment).
4. Potential to Result in Inadequate Emergency Access.

No-Action Alternative

Under the No-Action Alternative, the Project would not be implemented and none of the Project features would be developed in Reach 2B of the San Joaquin River. However, other proposed actions under the San Joaquin River Restoration Program (SJRRP) would be implemented, including habitat restoration in other reaches, augmentation of river flows, and reintroduction of salmon. Without the Project in Reach 2B, however, these Program-level activities would not achieve the Settlement goals. This section describes the impacts of the No-Action Alternative. The analysis is a comparison to existing conditions, and since the No-Action Alternative would not involve Project construction or operations, no mitigation is required for No-Action alternative.

In consultation with Fresno Council of Governments (Fresno COG) (Bitner, pers. comm. 2013) and coordination with County of Madera Planning staff (Winning, pers. comm. 2013), the latest approved version of the Fresno COG transportation model was used to develop 2035 baseline conditions, which were subsequently used to develop the No-Action Alternative. An ambient traffic growth of 1 percent per year is derived from the Fresno COG transportation model. Table 22-6 shows the ADT and LOS associated with existing and No-Action conditions; there would be no change in ADT or LOS directly attributable to the Project under the No-Action Alternative.

Impact TRA-1 (No-Action Alternative): ***Potential to Cause an Increase in Traffic which is Substantial in Relation to the Existing Traffic Load and Capacity of the Roadway System.*** Under the No-Action Alternative, the Project would not be implemented and there would be no associated construction activities in the Project area. In addition, there would be no Project operations and maintenance. As a result, there would be **no impact** on the roadway circulation system.

Table 22-6.
Roadway Segments LOS – Existing and No-Action Construction Conditions

Road	Description	Existing ADTs	Existing LOS	No-Action 2035 ADTs	No-Action LOS
Firebaugh Blvd	East of Ripperdan Avenue	3,036	A	3,765	A
Firebaugh Blvd	West if Ripperdan Avenue	5,460	A	6,770	A
Ripperdan Ave	South of Firebaugh Blvd	3,037	A	3,766	A
Bass Avenue	Bass Avenue east of SR 33	510	A	632	A
San Mateo Ave	San Mateo Avenue north of SR 180	547	A	678	A
S. SR 33	SR 33 south of SR 180/33 Junction	11,800	A	14,632	A
N. SR 33	SR 33 north of SR 180/33 Junction	5,600	A	6,944	A
W. SR 180	SR 180 west of San Mateo Avenue	8,200	A	10,168	A
E. SR 180	SR 180 east of San Mateo Avenue	8,200	A	10,168	A

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Impact TRA-2 (No-Action Alternative): ***Potential to Exceed, Either Individually or Cumulatively, a LOS Standard Established By the County Congestion Management Agency for Designated Roads or Highways.*** Under the No-Action Alternative, none of the proposed facilities that are part of the Project would be developed. Therefore, there would be no Project construction or operations that would result in additional traffic that may cause exceedance of existing LOS standards at designated congestion management program roads or highways in the Project area. As a result, there would be **no impact** on the existing roadway circulation system.

Impact TRA-3 (No-Action Alternative): ***Potential to Substantially Increase Hazards to a Design Feature or Increase Incompatible Uses.*** Under the No-Action Alternative, the Project would not be implemented and there would be no associated construction activities or long-term operational activities that would cause an increase in hazards due to a Project design feature or introduce incompatible use in the Project area. In addition, the Project would not have hazardous design features or incompatible use, as proposed. As a result, there would be **no impact** on the existing roadway circulation system.

Impact TRA-4 (No-Action Alternative): ***Potential to Result in Inadequate Emergency Access.*** Under the No-Action Alternative, none of the proposed facilities that are part of the Project would be developed. Therefore, there would be no Project construction or operations and maintenance that would result in additional traffic that may cause inadequate emergency access in the Project area. In addition, the Project would not block roadways or create roadway discontinuities that would affect existing emergency access.

However, Restoration Flows would limit emergency access at the San Mateo Avenue crossing more frequently and for longer durations during the year than existing conditions. This would cause emergency service providers to use alternative access

routes, such as Drive 10 ½, when flows exceed the capacity of the San Mateo Avenue crossing (150 cubic feet per second). Flows would typically be greater than the existing culvert capacity during November to April. This could impact emergency response times to the northeastern portion of the Project area for half of the year. Because high flows would affect access at the San Mateo Avenue crossing more frequently and for longer durations, impacts to emergency access would be **potentially significant and unavoidable**. No mitigation is required for No-Action.

Alternative A (Compact Bypass with Narrow Floodplain and South Canal)

Alternative A would entail construction of Project facilities, including a levee system to establish a bypass channel to the northeast of the existing river channel. Other key features include construction of a fish barrier below Mendota Dam, the Mendota Pool dike (separating the San Joaquin River and Mendota Pool), and the South Canal and South Canal bifurcation structure. No construction activities are proposed at or near Mendota Dam, which falls outside the Project boundary under Alternative A. Construction activity is expected to occur intermittently over an approximate 132-month timeframe.

Tables 22-7 and 22-8 summarize the results of the roadway segment analyses comparing Alternative A roadway LOS construction conditions with 2035 No-Action and existing conditions respectively. Project operations under Alternative A are anticipated to have low trip generation potential. Therefore, no LOS analyses were conducted beyond the aforementioned Alternative A construction conditions.

Table 22-7.
Roadway Segments LOS – 2035 No-Action and Alt. A Construction Conditions

Road	Description	No-Action 2035 ADTs	No-Action LOS	Alt A 2035 ADTs	Alt A 2035 LOS
Firebaugh Blvd	East of Ripperdan Avenue	3,765	A	3,765	A
Firebaugh Blvd	West if Ripperdan Avenue	6,770	A	6,770	A
Ripperdan Ave	South of Firebaugh Blvd	3,766	A	3,766	A
Bass Avenue	Bass Avenue east of SR 33	632	A	832	A
San Mateo Ave	San Mateo Avenue north of SR 180	678	A	6,714	A
S. SR 33	SR 33 south of SR 180/33 Junction	14,632	A	15,879	A
N. SR 33	SR 33 north of SR 180/33 Junction	6,944	A	7,686	A
W. SR 180	SR 180 west of San Mateo Avenue	10,168	A	12,171	B
E. SR 180	SR 180 east of San Mateo Avenue	10,168	A	12,462	B

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Table 22-8.
Roadway Segments LOS – Existing and Alt. A Project Construction Conditions

Road	Description	Existing ADTs	Existing LOS	Alt A ADTs	Alt A LOS
Firebaugh Blvd	East of Ripperdan Avenue	3,036	A	3,036	A
Firebaugh Blvd	West if Ripperdan Avenue	5,460	A	5,460	A
Ripperdan Ave	South of Firebaugh Blvd	3,037	A	3,037	A
Bass Avenue	Bass Avenue east of SR 33	510	A	710	A
San Mateo Ave	San Mateo Ave north of SR 180	547	A	6,583	A
S. SR 33	SR 33 south of SR 180/33 Junction	11,800	A	13,047	A
N. SR 33	SR 33 north of SR 180/33 Junction	5,600	A	6,342	A
W. SR 180	SR 180 west of San Mateo Avenue	8,200	A	10,203	A
E. SR 180	SR 180 east of San Mateo Avenue	8,200	A	10,494	A

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Impact TRA-1 (Alternative A): ***Potential to Cause an Increase in Traffic which is Substantial in Relation to the Existing Traffic Load and Capacity of the Roadway System.*** Under Alternative A, the Project would be implemented and construction activities would be anticipated in the Project area. In addition, facilities would need to be maintained and operated. Although there would be an anticipated increase in Project added traffic during construction (as compared to the No-Action Alternative), the traffic levels are still within acceptable limits in context to the roadway capacities (see Table 22-5 for roadway capacities).

When comparing Alternative A to existing conditions, impacts from construction generated trips would be similar to those described in the preceding paragraph (i.e., comparison of Alternative A to No-Action). Based on the results of the comparison of roadway segment volumes to existing conditions, there would be a **less than significant** impact to the roadway circulation system traffic loads and capacities.

Impact TRA-2 (Alternative A): ***Potential to Exceed, Either Individually or Cumulatively, a LOS Standard Established By the County Congestion Management Agency for Designated Roads or Highways.*** Compared to the No-Action Alternative, construction of Alternative A has the potential to generate additional traffic that may cause an exceedance of existing LOS standards at designated congestion management program roads or highways in the Project area. As shown in Table 22-7, none of the study roadway segment in the immediate vicinity of the Project site would experience a change to an unacceptable LOS due to Alternative A construction.

When comparing Alternative A to existing conditions, impacts from construction generated trips would be similar to those described in the preceding paragraph (i.e., comparison of Alternative A to No-Action). Based on the results of the comparison of Alternative A LOS to the existing conditions LOS, there would be a **less than significant** impact to the roadway circulation system LOS.

Impact TRA-3 (Alternative A): ***Potential to Substantially Increase Hazards to a Design Feature or Increase Incompatible Uses.*** Compared to the No-Action Alternative, Alternative A would not cause a substantial increase in hazards due to a Project design feature or introduce incompatible use in the Project area. The Project design features would primarily be implemented in areas other than the roadway circulation system and are not intended to be used as public traveled way. In addition, Alternative A, as proposed, would not introduce hazardous design features or incompatible uses.

When comparing Alternative A to existing conditions, impacts from design features and incompatible uses would be similar to those described in the preceding paragraph (i.e., comparison of Alternative A to No-Action). As a result, there would be a **less than significant** impact to the roadway circulation system.

Impact TRA-4 (Alternative A): ***Potential to Result in Inadequate Emergency Access.*** Compared to the No-Action Alternative, Alternative A would result in a permanent road closure at Drive 10 ½ that may affect emergency access. The Compact Bypass would cross the existing Drive 10 ½, which provides access to the east side of Mendota Dam. With this alternative, the road would end at the east side of the bypass channel and would not continue to Mendota Dam. Construction of Alternative A would also result in a temporary road closure at the San Mateo Avenue crossing that may affect emergency access and/or emergency response times to areas north of the river for several months.

Fresno County and Madera County fire units and emergency responders provide each other with mutual assistance. The Mendota Fire Station 96 is located within 3 miles of the Mendota Pool and is likely to provide emergency services and act as first responders in the Project area. Current estimates by the Fresno County Fire Protection District (FCFPD) provide for a 10 minute response time to Project areas south of the river (FCFPD 2007). With the closure of Drive 10 ½ or the San Mateo Avenue crossing, emergency response times could increase by 15 minutes or more to areas immediately north of the crossing (Keenan, pers. comm. 2013). This would likely increase response times beyond the County's 20 minutes goal for rural areas.

Alternative A construction activities also would result in added trips to the roadway circulation system that could potentially affect the speed and response times of emergency vehicles and first responders in other areas, however the results of the roadway segment analysis indicate that roadway capacity and LOS are within acceptable levels, which also correlate to acceptable travel speeds.

When comparing Alternative A to existing conditions, impacts to emergency access and response times would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative A to No-Action). As a result, there would be a **potentially significant** impact to the roadway circulation system.

Mitigation Measure TRA-4A (Alternative A): ***Provide Temporary Roadway and Crossing at San Mateo Avenue.*** Construction activities in the Project area will be modified to provide a temporary roadway and crossing at San Mateo Avenue during construction to allow for thru-traffic and access, including levee, canal, and river crossing

construction areas (as applicable). Local emergency dispatchers will also be notified of temporary road closures associated with this crossing. Implementation of Mitigation Measure TRA-4A (Alternative A) will reduce short-term impacts to emergency access near San Mateo Avenue during construction.

Implementation Action: Provide temporary roadway and crossing at San Mateo Avenue to allow for thru-traffic and access around areas of active construction. Access will be provided over or around construction areas at levee, canal, or river crossings (as applicable). This temporary road would likely have a single lane for construction access and a single public access lane that would be barricaded from the construction side. Flagmen would likely be used to control traffic during daylight construction hours and a temporary traffic control stoplight would likely be used to control traffic during evenings and weekend hours.

Location: Active construction areas along San Mateo Avenue.

Effectiveness Criteria: Effectiveness will be based on access availability.

Responsible Agency: Reclamation and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and California State Lands Commission (CSLC) monitors.

Timing: Ongoing over the construction timeframe.

No feasible mitigation exists for long-term impacts to emergency response times to areas north of the river near the Drive 10 ½. Use of the closest river crossing (at San Mateo Avenue) would still increase emergency response times beyond the County's 20 minutes goal for rural areas. As a result, there would be a **significant and unavoidable** impact to the roadway circulation system.

Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the Preferred Alternative

Key features of Alternative B include construction of a levee system to establish a bypass channel to the northeast of the existing river channel, fish barrier below Mendota Dam, Compact Bypass Control Structure, Mendota Pool Control Structure, and re-route of Drive 10 ½. No construction activities are proposed at or near Mendota Dam, which falls outside the project boundary under Alternative B. Construction activity is expected to occur intermittently over an approximate 157-month timeframe.

Tables 22-9 and 22-10 summarize the results of the roadway segment analyses comparing Alternative B roadway LOS construction conditions with 2035 No-Action and existing conditions respectively. Project operations under Alternative B are anticipated to have low trip generation potential. Therefore, no LOS analyses were conducted beyond the aforementioned Alternative B construction conditions.

Table 22-9.
Roadway Segments LOS – 2035 No-Action and Alt. B Construction Conditions

Road	Description	No-Action 2035 ADTs	No-Action LOS	Alt B 2035 ADTs	Alt B LOS
Firebaugh Blvd	East of Ripperdan Avenue	3,765	A	3,765	A
Firebaugh Blvd	West if Ripperdan Avenue	6,770	A	6,770	A
Ripperdan Ave	South of Firebaugh Blvd	3,766	A	3,766	A
Bass Avenue	Bass Avenue east of SR 33	632	A	832	A
San Mateo Ave	San Mateo Avenue north of SR 180	678	A	6,366	A
S. SR 33	SR 33 south of SR 180/33 Junction	14,632	A	15,789	A
N. SR 33	SR 33 north of SR 180/33 Junction	6,944	A	7,689	A
W. SR 180	SR 180 west of San Mateo Avenue	10,168	A	11,994	B
E. SR 180	SR 180 east of San Mateo Avenue	10,168	A	12,378	B

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Table 22-10.
Roadway Segments LOS – Existing and Alt. B Project Construction Conditions

Road	Description	Existing ADTs	Existing LOS	Alt B ADTs	Alt B LOS
Firebaugh Blvd	East of Ripperdan Avenue	3036	A	3,036	A
Firebaugh Blvd	West if Ripperdan Avenue	5460	A	5,460	A
Ripperdan Ave	South of Firebaugh Blvd	3037	A	3,037	A
Bass Avenue	Bass Avenue east of SR 33	510	A	710	A
San Mateo Ave	San Mateo Avenue north of SR 180	547	A	6,235	A
S. SR 33	SR 33 south of SR 180/33 Junction	11,800	A	12,957	A
N. SR 33	SR 33 north of SR 180/33 Junction	5,600	A	6,345	A
W. SR 180	SR 180 west of San Mateo Avenue	8,200	A	10,026	A
E. SR 180	SR 180 east of San Mateo Avenue	8,200	A	10,410	A

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Impact TRA-1 (Alternative B): ***Potential to Cause an Increase in Traffic which is Substantial in Relation to the Existing Traffic Load and Capacity of the Roadway System.*** Under Alternative B, the Project would be implemented and construction activities are anticipated in the Project area. In addition, facilities would need to be maintained and operated. Although there would be an anticipated increase in Project added traffic during construction, the traffic levels are still within acceptable limits in context to the roadway capacities (see Table 22-5 for roadway capacities).

When comparing Alternative B to existing conditions, impacts from construction generated trips would be similar to those described in the preceding paragraph (i.e.,

comparison of Alternative B to No-Action). Based on the results of the comparison of roadway segment volumes to existing conditions, there would be a **less than significant** impact to the roadway circulation system traffic loads and capacities.

Impact TRA-2 (Alternative B): ***Potential to Exceed, Either Individually or Cumulatively, a LOS Standard Established By the County Congestion Management Agency for Designated Roads or Highways.*** Compared to the No-Action Alternative, construction under Alternative B has the potential to generate additional traffic that may cause an exceedance of existing LOS standards at designated congestion management program roads or highways in the Project area. As shown in Table 22-9, none of the study roadway segments in the immediate vicinity of the Project site would experience a change to an unacceptable LOS due to construction under Alternative B.

When comparing Alternative B to existing conditions, impacts from construction generated trips would be similar to those described in the preceding paragraph (i.e., comparison of Alternative B to No-Action). Based on the results of the comparison of Alternative B LOS to the existing condition LOS, there would be a **less than significant** impact to the roadway circulation system LOS.

Impact TRA-3 (Alternative B): ***Potential to Substantially Increase Hazards to a Design Feature or Increase Incompatible Uses.*** Compared to the No-Action Alternative, Alternative B would not cause a substantial increase in hazards due to a Project design feature or introduce incompatible use in the Project area. The project design features would primarily be implemented in areas other than the roadway circulation system and most of these area are not intended to be used as public traveled way. The proposed reroute of Drive 10 ½ would not introduce sharp curves or dangerous intersections. In addition, Alternative B, as proposed, would not introduce incompatible uses.

When comparing Alternative B to existing conditions, impacts from design features and incompatible uses would be similar to those described in the preceding paragraph (i.e., comparison of Alternative B to No-Action). As a result, there would be a **less than significant** impact to the roadway circulation system.

Impact TRA-4 (Alternative B): ***Potential to Result in Inadequate Emergency Access.*** Compared to the No-Action Alternative, Alternative B would create a permanent road closure that may affect emergency access/emergency response times to areas immediately north of the San Mateo Avenue crossing. As part of this alternative, the culvert and road embankments at the San Mateo Avenue crossing would be demolished, and no river crossing would be provided at this location.

Fresno County and Madera County fire units and emergency responders provide each other with mutual assistance. The Mendota Fire Station 96 is located within 3 miles of the Mendota Pool and is likely to provide emergency services and act as first responders in the Project area. Current estimates by the FCFPD (2007) provide for a 10 minute response time to Project areas south of the river. With the closure of Drive 10 ½ or the San Mateo Avenue crossing, emergency response times could increase by 15 minutes or

more to areas immediately north of the crossing (Keenan, pers. comm. 2013). This would likely increase response times beyond the County's 20 minutes goal for rural areas.

Alternative B would also change the current alignment of Drive 10 ½. The Compact Bypass would cross the existing Drive 10 ½, which provides access for the operations and maintenance of Mendota Dam. To continue the current long-term level of access, the road would be rerouted along the bypass channel levees and cross the head of the bypass channel at the proposed Compact Bypass Control Structure. This proposed reroute is not anticipated to substantially increase travel time nor severely affect the access needs of local commuters.

Alternative B construction activities would also block roadways that may affect emergency access. Construction of Alternative B would result in a temporary road closure at Drive 10 ½ and/or the San Mateo Avenue crossing that may affect emergency access and emergency response times to areas north of the river for several months. Alternative B construction activities would also result in added trips to the roadway circulation system in other areas that could potentially affect the speed and response times of emergency vehicles and first responders, however the results of the Alternative B roadway segment analysis indicate that roadway capacity and LOS are within acceptable levels which also correlate to acceptable travel speeds.

When comparing Alternative B to existing conditions, impacts to emergency access and response times would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative B to No-Action). As a result, there would be a **potentially significant** impact to the roadway circulation system.

Mitigation Measure TRA-4B (Alternative B): ***Use Construction Sequencing to Provide Continuous Emergency Access at Drive 10 ½.*** Construction activities in the Project area will be modified to provide continuous emergency access at Drive 10 ½ through construction sequencing and local emergency dispatchers will be notified of temporary road closures associated with this crossing. Implementation of this measure will reduce short-term impacts to emergency access near Drive 10 ½ during construction.

> **Implementation Action:** Provide continuous emergency access at Drive 10 ½ through construction sequencing. To continue the current level of emergency access, Drive 10 ½ will be rerouted along the bypass channel levees and cross the head of the bypass channel at the proposed Compact Bypass Control Structure prior to channel excavation at Drive 10 ½'s current alignment.
>
> **Location:** Active construction areas at Drive 10 ½.
>
> **Effectiveness Criteria:** Effectiveness will be based on access availability.
>
> **Responsible Agency:** Reclamation and the construction contractor.

Monitoring/Reporting Action: Adequacy of the proposed construction practices will be confirmed with Reclamation construction managers and CSLC monitors.

Timing: Ongoing over the construction timeframe.

No feasible mitigation exists for long-term impacts to emergency response times to areas north of the river near the San Mateo Avenue crossing. Use of alternative access routes (at Drive 10 ½) would still increase emergency response times beyond the County's 20 minutes goal for rural areas. As a result, there would be a **significant and unavoidable** impact to the roadway circulation system.

Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)

Key features of Alternative C include construction of a levee system, fish passage facilities at Mendota Dam, grade control structures downstream of Mendota Dam, a new Fresno Slough Dam, and Main Canal and Helm Ditch relocations. Construction activity is expected to occur intermittently over an approximate 133-month timeframe.

Tables 22-11 and 22-12 summarize the results of the roadway segment analyses comparing Alternative C roadway LOS construction conditions with 2035 No-Action and existing conditions respectively. Project operations under Alternative C are anticipated to have low trip generation potential. Therefore, no LOS analyses were conducted beyond the aforementioned Alternative C construction conditions.

Table 22-11.
Roadway Segments LOS – 2035 No-Action and Alt. C Construction Conditions

Road	Description	No-Action 2035 ADTs	No-Action LOS	Alt C 2035 ADTs	Alt C 2035 LOS
Firebaugh Blvd	East of Ripperdan Avenue	3,765	A	3,765	A
Firebaugh Blvd	West if Ripperdan Avenue	6,770	A	6,770	A
Ripperdan Ave	South of Firebaugh Blvd	3,766	A	3,766	A
Bass Avenue	Bass Avenue east of SR 33	632	A	832	A
San Mateo Ave	San Mateo Avenue north of SR 180	678	A	5,061	A
S. SR 33	SR 33 south of SR 180/33 Junction	14,632	A	15,621	A
N. SR 33	SR 33 north of SR 180/33 Junction	6,944	A	7,458	A
W. SR 180	SR 180 west of San Mateo Avenue	10,168	A	11,622	B
E. SR 180	SR 180 east of San Mateo Avenue	10,168	A	11,844	B

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Table 22-12.
Roadway Segments LOS – Existing and Alt. C Project Construction Conditions

Road	Description	Existing ADTs	Existing LOS	Alt C ADTs	Alt C LOS
Firebaugh Blvd	East of Ripperdan Avenue	3,036	A	3,036	A
Firebaugh Blvd	West if Ripperdan Avenue	5,460	A	5,460	A
Ripperdan Ave	South of Firebaugh Blvd	3,037	A	3,037	A
Bass Avenue	Bass Avenue east of SR 33	510	A	710	A
San Mateo Ave	San Mateo Avenue north of SR 180	547	A	4,930	A
S. SR 33	SR 33 south of SR 180/33 Junction	11,800	A	12,789	A
N. SR 33	SR 33 north of SR 180/33 Junction	5,600	A	6,114	A
W. SR 180	SR 180 west of San Mateo Avenue	8,200	A	9,654	A
E. SR 180	SR 180 east of San Mateo Avenue	8,200	A	9,876	A

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Impact TRA-1 (Alternative C): ***Potential to Cause an Increase in Traffic which is Substantial in Relation to the Existing Traffic Load and Capacity of the Roadway System.*** Under Alternative C, the Project would be implemented and construction activities would be anticipated in the Project area. In addition, Project facilities would need to be maintained and operated. Although there would be an increase in Project-related traffic during construction, the traffic levels are still within acceptable limits in context to the roadway capacities (see Table 22-5 for roadway capacities).

When comparing Alternative C to existing conditions, impacts from construction generated trips would be similar to those described in the preceding paragraph (i.e., comparison of Alternative C to No-Action). Based on the results of the comparison of roadway segment volumes to existing conditions, there would be a **less than significant** impact to the roadway circulation system traffic loads and capacities.

Impact TRA-2 (Alternative C): ***Potential to Exceed, Either Individually or Cumulatively, a LOS Standard Established By the County Congestion Management Agency for Designated Roads or Highways.*** Compared to the No-Action Alternative, construction under Alternative C has the potential to generate additional traffic that may cause an exceedance of existing LOS standards at designated congestion management program roads or highways in the Project area. As shown in Table 22-11, none of the study roadway segment in the immediate vicinity of the Project site would experience a change to an unacceptable LOS due to construction under Alternative C.

When comparing Alternative C to existing conditions, impacts from construction generated trips would be similar to those described in the preceding paragraph (i.e., comparison of Alternative C to No-Action). Based on the results of the comparison of Alternative C LOS to existing conditions LOS, there would be a **less than significant** impact to the roadway circulation system LOS.

Impact TRA-3 (Alternative C): ***Potential to Substantially Increase Hazards to a Design Feature or Increase Incompatible Uses.*** Compared to the No-Action Alternative,

Alternative C would not cause a substantial increase in hazards due to a Project design feature or introduce incompatible use in the Project area. The Project design features would primarily be implemented in areas other than the roadway circulation system and are not intended to be used as public traveled way. In addition, Alternative C, as proposed, would not introduce hazardous design features or incompatible uses.

When comparing Alternative C to existing conditions, impacts from design features and incompatible uses would be similar to those described in the preceding paragraph (i.e., comparison of Alternative C to No-Action). As a result, there would be a **less than significant** impact to the roadway circulation system.

Impact TRA-4 (Alternative C): ***Potential to Result in Inadequate Emergency Access.*** Compared to the No-Action Alternative, Alternative C construction activities would block roadways that may affect emergency access. Construction of Alternative C would result in a temporary road closure at Drive 10 ½ and the San Mateo Avenue crossing that may affect emergency access and/or emergency response times to areas north of the river for several months.

Fresno County and Madera County fire units and emergency responders provide each other with mutual assistance. The Mendota Fire Station 96 is located within 3 miles of the Mendota Pool and is likely to provide emergency services and act as first responders in the Project area. Current estimates by the FCFPD (2007) provide for a 10 minute response time to Project areas south of the river. With the closure of Drive 10 ½ or the San Mateo Avenue crossing, emergency response times could increase by 15 minutes or more to areas immediately north of the crossing (Keenan, pers. comm. 2013). This would likely increase response times beyond the County's 20 minutes goal for rural areas.

Construction activities under Alternative C would also result in added trips to the roadway circulation system in other areas that could potentially affect the speed and response times of emergency vehicles and first responders. However, the results of the roadway segment analysis indicate that roadway capacity and LOS are within acceptable levels, which also correlate to acceptable travel speeds.

When comparing Alternative C to existing conditions, impacts to emergency access and response times would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative C to No-Action). As a result, there would be a **potentially significant** short-term impact to the roadway circulation system.

Mitigation Measure TRA-4A (Alternative C): ***Provide Temporary Roadway and Crossing at San Mateo Avenue.*** Refer to Mitigation Measure TRA-4A (Alternative A). The same measure would be used here. Implementation of Mitigation Measure TRA-4A (Alternative C) will reduce short-term impacts to emergency access near San Mateo Avenue. However, no feasible mitigation exists for short-term impacts to emergency response times in areas immediately north of the river near Drive 10 ½. Use of the closest river crossing (at San Mateo Avenue) would still increase emergency response times beyond the County's 20 minutes goal for rural areas. Construction impacts associated with Drive 10 ½ would remain **significant and unavoidable**.

Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)
Key features of Alternative D include construction of a levee system, fish passage facilities at Mendota Dam, grade control structures downstream of Mendota Dam, Fresno Slough Dam, Main Canal and Helm Ditch relocations, and the North Canal. Construction activity is expected to occur intermittently over an approximate 158-month timeframe.

Tables 22-13 and 22-14 summarize the results of the roadway segment analyses comparing Alternative D roadway LOS construction conditions with 2035 No-Action and existing conditions respectively. Project operations under Alternative D are anticipated to have low trip generation potential. Therefore, no LOS analyses were conducted beyond the aforementioned Alternative D construction conditions.

Impact TRA-1 (Alternative D): ***Potential to Cause an Increase in Traffic which is Substantial in Relation to the Existing Traffic Load and Capacity of the Roadway System.*** Under Alternative D, the Project would be implemented and construction activities would be anticipated in the Project area. In addition, Project facilities would need to be maintained and operated. Although there would be an increase in traffic during Project construction, the traffic levels would still be within acceptable limits in context to the roadway capacities (see Table 22-5 for roadway capacities).

When comparing Alternative D to existing conditions, impacts from construction generated trips would be similar to those described in the preceding paragraph (i.e., comparison of Alternative D to No-Action). Based on the results of the comparison of roadway segment volumes to existing conditions, there would be a **less than significant** impact to the roadway circulation system traffic loads and capacities.

Impact TRA-2 (Alternative D): ***Potential to Exceed, Either Individually or Cumulatively, a LOS Standard Established By the County Congestion Management Agency for Designated Roads or Highways.*** Compared to the No-Action Alternative, construction under Alternative D has the potential to generate additional traffic that may cause an exceedance of existing LOS standards at designated congestion management program roads or highways in the Project area. As shown in Table 22-7, none of the study roadway segment in the immediate vicinity of the Project site would experience a change to an unacceptable LOS due to Project construction under Alternative D.

When comparing Alternative D to existing conditions, impacts from construction generated trips would be similar to those described in the preceding paragraph (i.e., comparison of Alternative D to No-Action). Based on the results of the comparison of Alternative D LOS to existing conditions LOS, there would be a **less than significant** impact to the roadway circulation system LOS.

Table 22-13.
Roadway Segments LOS – 2035 No-Action and Alt. D Construction Conditions

Road	Description	No-Action 2035 ADTs	No-Action LOS	Alt D 2035 ADTs	Alt D 2035 LOS
Firebaugh Blvd	East of Ripperdan Avenue	3,765	A	3,765	A
Firebaugh Blvd	West if Ripperdan Avenue	6,770	A	6,770	A
Ripperdan Ave	South of Firebaugh Blvd	3,766	A	3,766	A
Bass Avenue	Bass Avenue east of SR 33	632	A	832	A
San Mateo Ave	San Mateo Avenue north of SR 180	678	A	5,055	A
S. SR 33	SR 33 south of SR 180/33 Junction	14,632	A	15,618	A
N. SR 33	SR 33 north of SR 180/33 Junction	6,944	A	7,467	A
W. SR 180	SR 180 west of San Mateo Avenue	10,168	A	11,595	B
E. SR 180	SR 180 east of San Mateo Avenue	10,168	A	11,859	B

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Table 22-14.
Roadway Segments LOS – Existing and Alt. D Project Construction Conditions

Road	Description	Existing ADTs	Existing LOS	Alt D ADTs	Alt D LOS
Firebaugh Blvd	East of Ripperdan Avenue	3,036	A	3,036	A
Firebaugh Blvd	West if Ripperdan Avenue	5,460	A	5,460	A
Ripperdan Ave	South of Firebaugh Blvd	3,037	A	3,037	A
Bass Avenue	Bass Avenue east of SR 33	510	A	710	A
San Mateo Ave	San Mateo Avenue north of SR 180	547	A	4,924	A
S. SR 33	SR 33 south of SR 180/33 Junction	11,800	B	12,786	C
N. SR 33	SR 33 north of SR 180/33 Junction	5,600	A	6,123	A
W. SR 180	SR 180 west of San Mateo Avenue	8,200	A	9,627	A
E. SR 180	SR 180 east of San Mateo Avenue	8,200	A	9,891	A

Key:
ADT = average daily traffic
LOS = level of service
SR = State route

Impact TRA-3 (Alternative D): ***Potential to Substantially Increase Hazards to a Design Feature or Increase Incompatible Uses.*** Compared to the No-Action Alternative, Alternative D would not cause a substantial increase in hazards due to a Project design feature or introduce incompatible uses in the Project area. The Project design features would primarily be implemented in areas other than the roadway circulation system and are not intended to be used as public traveled way. In addition, Alternative D, as proposed, would not introduce hazardous design features or incompatible uses.

When comparing Alternative D to existing conditions, impacts from design features and incompatible uses would be similar to those described in the preceding paragraph (i.e., comparison of Alternative D to No-Action). As a result, there would be a **less than significant** impact to the roadway circulation system.

Impact TRA-4 (Alternative D): ***Potential to Result in Inadequate Emergency Access.*** Compared to the No-Action Alternative, Alternative D could potentially result in inadequate emergency access to portions of the Project area. Alternative D would create a permanent road closure that may affect emergency access/emergency response times to areas immediately north of the San Mateo Avenue crossing. As part of this alternative, the culvert and road embankments at the San Mateo Avenue crossing would be demolished, and no river crossing would be provided at this location. Construction of Alternative D would result in a temporary road closure at Drive 10 ½ during construction of fish passage facilities at Mendota Dam.

Fresno County and Madera County fire units and emergency responders provide each other with mutual assistance. The Mendota Fire Station 96 is located within 3 miles of the Mendota Pool and is likely to provide emergency services and act as first responders in the Project area. Current estimates by the FCFPD (2007) provide for a 10 minute response time to Project areas south of the river. With the closure of Drive 10 ½ or the San Mateo Avenue crossing, emergency response times could increase by 15 minutes or more to areas immediately north of the crossing (Keenan, pers. comm. 2013). This would likely increase response times beyond the County's 20 minutes goal for rural areas.

Construction activities under Alternative D would also result in added trips to the roadway circulation system that could potentially affect the speed and response times of emergency vehicles and first responders during the construction period. However, the results of the roadway segment analysis indicate that roadway capacity and LOS are within acceptable levels, which also correlate to acceptable travel speeds.

When comparing Alternative D to existing conditions, impacts to emergency access and response times would be similar to those described in the preceding paragraphs (i.e., comparison of Alternative D to No-Action). As a result, there would be a **potentially significant and unavoidable** impact to the roadway circulation system. No feasible mitigation exists for long-term impacts to emergency response times to areas north of the river near the San Mateo Avenue crossing or for short-term impacts to emergency response times in areas near Drive 10 ½. Use of alternative access routes would increase emergency response times beyond the County's 20 minutes goal for rural areas.

23.0 Utilities and Service Systems

This chapter provides an overview of existing utilities and service systems and describes the regulatory setting, environmental consequences, and mitigation measures, where applicable, as they pertain to the Project. Many utilities and service systems are evaluated to some degree in previous chapters. A discussion of surface water resources, water distribution facilities, and operations is provided in Chapter 12.0, "Hydrology – Flood Management" and Chapter 14.0, "Hydrology–Surface Water Resources and Water Quality." Information on regional planning for systems and service growth is discussed in Chapter 16.0, "Land Use Planning and Agriculture Resources." Wildland fire hazards are discussed in Chapter 19.0, "Public Health and Hazardous Materials." Information on recreation facilities is provided in Chapter 21.0, "Recreation." Impacts of the Project on emergency response time are addressed in Chapter 22.0, "Transportation and Traffic." School services and facilities are not analyzed in this section because there would be no need for new or physically altered facilities with implementation of Project alternatives.

23.1 Environmental Setting

This section describes the environmental setting associated with utilities and service systems and public services potentially affected by Project alternatives. The utilities and public services covered in this section include wastewater collection, fire protection services, law enforcement services, emergency services, solid waste management, utility crossings (i.e., electricity and natural gas), energy, and water supply features.

23.1.1 Wastewater Collection

Sanitary sewer systems in Fresno and Madera counties are typically provided by cities and special districts, such as community service districts, public utility districts, sanitary districts, and sewer maintenance districts. Some of these entities provide sewer collection service only and contract with surrounding agencies or districts for wastewater treatment and disposal. Some unincorporated areas in Fresno and Madera counties lack sanitary sewer infrastructure and are serviced by individual or community septic systems. As noted in the Program Environmental Impact Statement/Report (PEIS/R) (San Joaquin River Restoration Program [SJRRP] 2011, page 24-2), the Reach 2B area is not served by a municipal wastewater collection system, but may be served by individual or community septic systems, inclusive of pipelines and leach fields.

23.1.2 Fire Protection Services

Fire protection services for Reach 2B are provided by the Fresno County Fire Protection District (FCFPD), the Madera County Fire Department and the California Department of Forestry and Fire Protection (CAL FIRE). A general overview of fire protection facilities and services in the Project area is provided below.

The FCFPD is the largest of five Special Districts serving unincorporated areas of Fresno County, covering 2,655 square miles and serving over 50 percent of the county, including the Project area and the cities of Parlier, Mendota, Huron, San Joaquin and the rural communities of Tranquillity, Del Rey, Caruthers, Easton, Malaga, Friant, Cantua Creek, Calwa, Prather, Sand Creek and Wonder Valley. The FCFPD has 13 fire stations and 48 personnel (FCFPD 2009).

The FCFPD, in cooperation with the CAL FIRE, provides emergency services from 18 fire stations to provide wildland fire suppression, emergency medical service, response to hazardous materials incidents, urban search and rescue, water rescue, vehicle extrication, technical rescue, basic life support medical services, and fire prevention and education to approximately 182,000 people (Fresno County 2011). Table 23-1 identifies the FCFPD and CAL FIRE stations that are within 45 miles of the Project area. Two fire stations are within 20 miles of the Project area; the remaining stations are 40 or more miles away from the Project area.

Table 23-1.
Fresno County Fire Protection District and CAL FIRE Stations Nearest to the Project Area

Fire Station	Location	Driving Distance[1]
Mendota Station 96	101 McCabe Avenue, Mendota, CA 93640	2.8 miles
Tranquillity Station 95	25101 Morton Street / P.O. Box 645, Tranquillity, CA 93668	17 miles
Harris Ranch Station	24125 West Dorris Street, Coalinga, CA 93210	42 miles
South Fresno Station 87	4706 East Drummond Avenue, Fresno, CA 93727	42 miles
Caruthers Station 90	2701 W. Tahoe Avenue, Caruthers, CA 93609	42 miles
Easton Station 89	5810 South Cherry Avenue, Fresno, CA 93706	43 miles

Source: Fresno County 2011

Notes:

[1] Distances are approximate and have been calculated from Mendota Pool to provide a reference point. Actual distance will vary from other locations within the Project area.

The Madera County Fire Department provides fire protection services to unincorporated areas of Madera County through a network of 17 fire stations, a fleet of 56 apparatus and support vehicles, and a personnel staff that includes 32 career fire suppression personnel, 175 paid on-call firefighters and 7 support personnel. The Madera County Fire Department is administered, and fire suppression personnel are provided, through a contract with the CAL FIRE Madera-Mariposa-Merced Unit. Clerical and automotive support personnel are county employees.

Table 23-2 lists the Madera County Fire Department and CAL FIRE Madera-Mariposa-Merced Unit stations that are within 40 miles of the Project area. The nearest fire station is more than 30 driving miles from the Project area.

Table 23-2.
Madera County Fire and CAL FIRE Stations Nearest to the Project Area

Fire Station	Address	Driving Distance[1]
CAL FIRE Station 4 (Dairyland volunteer station)	13802 Ave. 21 Chowchilla, CA 93610	31 miles
CAL FIRE Station 2	112 Trinity St. Chowchilla, CA 93610	36 miles
Madera Valley /CAL FIRE Madera-Mariposa-Merced Unit Station 1	14225 Road 28 Madera, CA	37 miles
CAL FIRE Station 6	317 N Lake Madera, CA 93637	37 miles

Source: Madera County 2008a

Notes:

[1] Distances are approximate and have been calculated from Mendota Pool to provide a reference point. However, distance may vary from other locations of Reach 2B.

The Madera County Fire Station that serves the Project area is the CAL FIRE Madera-Mariposa-Merced Unit (Dairyland) Station No. 4, which is located 31 driving miles northeast from the farthest point within the Project area. This is a volunteer fire station and is not staffed by paid, on-duty personnel.

The Insurance Service Organization is a private insurance research group that periodically assesses the degree to which fire threatens geographic areas. Insurance Service Organization collects information on municipal fire-protection efforts in communities throughout the United States. In each of those communities, Insurance Service Organization analyzes the relevant data using a Fire Suppression Rating Schedule and then assigns a Public Protection Classification from 1 (best protection or lowest threat) to 10 (least protection or higher threat). This rating is based on the type of vegetation or structures present, climate, and the availability of fire protection services. The Madera County General Plan Background Report (Madera County 1995, at Figure 7-4, Fire Insurance Classifications) indicates that the Project area is located in a Class 9 fire insurance area.

23.1.3 Law Enforcement Services

Law enforcement services for portions of the Project area are provided by the Fresno County Sheriff's Office, the Madera County Sheriff's Department and the California Highway Patrol (CHP). A general overview of law enforcement facilities, assets and services serving the Project area is provided below.

The Fresno County Sheriff's Office provides metropolitan and rural law enforcement services in Fresno County. This office is responsible for law enforcement services and police patrols for more than 6,000 square miles, ranging from valley farmlands to mountain peaks and including portions of the Project area within Fresno County. The

Fresno County Sheriff's Office provides the following: Vehicle Patrol, Air Support Unit (helicopters), Mounted Horse Unit, Canine Unit, Bike Unit, Boating Enforcement Unit, and numerous community programs for Crime Prevention and Youth Services.

Over 1000 employees conduct field services from four rural substations. The Fresno County Sheriff Office services are divided into four geographic areas. The Project area is in Area 1, a region of over 2,400 square miles in western Fresno County. The Area 1 substation is located 22 miles southeast of Mendota in the city of San Joaquin. Area 1 is primarily comprised of agricultural farm land with some livestock ranching. The Fresno County Sheriff's Office headquarters is located in the city of Fresno, more than 35 miles east of Mendota and 25 miles east of the near point within the Project area.

Law enforcement services for portions of the Project area in Madera County are provided by the Madera County Sheriff's Department. The Department headquarters is located in the city of Madera. The Department has 116 total personnel, with 82 sworn officers, and substations at Chowchilla, Oakhurst, Native American ranchos, and Bass Lake. The Department is divided into the Valley Division, Mountain Division, and Administrative Division. The Administrative Division oversees the offices of records, dispatch, civil process and court security.

23.1.4 Emergency Services

Emergency services for portions of the Project area are provided by the Fresno County Sheriff's Office, Madera County Sheriff's Department, and CHP.

The Fresno County Sheriff's Office coordinates emergency evacuation routes and programs for residents and businesses throughout the County. Large-scale emergency services are handled by the department in cooperation with the Federal Emergency Management Agency (FEMA); the U.S. Forest Service (USFS); the State emergency response network run by the California Governor's Office of Emergency Services (OES); CAL FIRE; CHP; and local fire departments, hospitals, and ambulance services.

The Madera County Sheriff's Department is responsible for coordinating emergency services in Madera County. Large-scale emergency services are handled by the department in cooperation with FEMA; USFS; the State emergency response network run by the OES; CAL FIRE; CHP; and local fire departments, hospitals, and ambulance services.

Madera Community Hospital is located approximately 36 miles northeast of the Project area, in Madera. In addition, Community Regional Medical Center is located approximately 39 miles east of the Project area in Fresno. Ambulance dispatch services are provided by the Emergency Medical Services Communications Center for all ambulance requests in Fresno, Kings, and Madera counties.

The CHP's Central Division provides ground and air support for emergencies along the Interstate 5 corridor, State Route 99, and other State highways throughout Fresno and Madera counties. The CHP Central Division has 15 area offices, six resident posts, two

commercial inspection facilities, 667 uniformed officers, and 226 non-uniformed personnel (CHP 2013).

23.1.5 Solid Waste Management

Solid waste services and facilities for portions of the Project area located in Fresno County are provided by the Fresno County Resources Division. Solid waste services and facilities for the Madera County portion of the Project area are provided by the Madera County Resource Management Agency.

The Fresno County Resources Division operates the County-owned American Avenue Landfill and a small transfer station at Shaver Lake. The American Avenue Landfill is a Class II and Class III landfill[1] that accepts nonhazardous and inert solid wastes and asbestos. It is permitted to accept a maximum of 2,200 tons per day of solid waste. The site has a permitted capacity of approximately 3.3 million cubic yards and a remaining capacity of 2.9 million cubic yards. The closure date of the American Avenue Landfill is anticipated to be approximately 2031 (California Department of Resources, Recycling, and Reuse [CalRecycle] 2011a). The American Avenue Landfill is located in Kerman, approximately 16 miles southeast of the Project area.

In an effort to meet the requirements of Assembly Bill (AB) 939, Fresno County banned the disposal of construction and demolition debris at the American Avenue Landfill. Contractors are required to dispose of construction-related debris at recycling/transfer station facilities located in the cities of Fresno, Cutler, and Kerman. These facilities are identified in Table 23-3.

Solid waste disposal for portions of the Project area located in Madera County is managed by the Madera County Resource Management Agency. The county owns and operates the Fairmead Sanitary Landfill (Madera County 2013). Permitted waste types at the Fairmead Sanitary Landfill are Class III nonhazardous solid waste and inert wastes and nonfriable asbestos. The Fairmead Sanitary Landfill is permitted to accept a maximum of 1,100 tons per day of solid waste. The site has a permitted maximum capacity of approximately 9.4 million cubic yards and a remaining capacity of 5.5 million cubic yards. The closure date of the Fairmead Sanitary Landfill is anticipated to be approximately 2033 (CalRecycle 2011b). The Fairmead Sanitary Landfill is located in Chowchilla, approximately 22 miles northeast of the Project area. The county does not have a post-construction or residential recycling program but does remove some post-construction wastes out of the waste stream in the Mammoth Material Recovery Facility.

[1] Class II landfill refers to a waste management units for designated waste (hazardous waste that has been granted a variance from hazardous waste management requirements or nonhazardous waste that contains pollutants that could be released in concentrations exceeding applicable water quality objectives). Class III landfill refers to landfills for nonhazardous solid waste.

Table 23-3.
Fresno County Recycling/Transfer Station Facilities

Recycling / Transfer Station	Location	Driving Distance[1]
Mid-Valley Disposal Incorporated	15300 W. Jensen Avenue, Kerman, CA 93630	24 miles
Sunset Waste Systems	2721 South Elm Avenue, Fresno, CA93706	39 miles southeast
West Coast Waste in the City of Fresno	3077 S Golden State Frontage Road, Fresno, CA 93725-2312	41 miles
Cedar Avenue Recycling/Transfer Station	3457 South Cedar Avenue, Fresno, CA 93725	41 miles southeast
Kroeker Incorporated	4627 S. Chestnut Avenue, Fresno, CA 93725	43 miles southeast
Rice Road Transfer Station (Allied Waste)	10463 N Rice Road, Fresno, CA 93730	48 miles

Source: Fresno County 2007

Notes:

[1] Distances are approximate and have been calculated from Mendota Pool to provide a reference point. However, distance would vary from other locations of Reach 2B.

23.1.6 Utility Crossings

Electricity

The production of electricity requires the consumption or conversion of energy resources, including water, wind, oil, gas, coal, solar, geothermal, and nuclear sources. Approximately 71 percent of the State's electricity supply comes from in-State sources; the rest of the State's electricity is imported and includes electricity from the Pacific Northwest and the Southwest (California Energy Commission [CEC] 2013a). Of the electricity generated in-State, 53.4 percent is generated by natural gas-fired power plants, 1.7 percent is generated by coal-fired power plants, 14.6 percent comes from large hydroelectric dams, and 15.7 percent from nuclear power plants. The remaining 14.6 percent of the in-State total electricity production is supplied by renewable sources including small hydroelectric generation (2.4 percent), biomass (2.8 percent), geothermal (6.2 percent), solar (0.4 percent) and wind (3 percent) (CEC 2013a).

California's massive electricity generation system produces more than 296,000 gigawatt hours each year that is transported over the State's 32,000 miles of transmission lines. The State's main challenge is to ensure adequate electricity supplies while reducing greenhouse gas emissions as directed by AB 32 (33 percent reduction by 2020). Since 2003, California's energy policy has recognized an electricity "loading order" as the preferred sequence for meeting electricity demands. The loading order lists energy efficiency and demand response first; renewable resources second, and clean and efficient natural gas-fired power plants third. In addition, under the Renewables Portfolio Standard, California's goal was to increase the amount of electricity generated from renewable energy resources to 20 percent by 2010 and in 2011 legislation passed that

pushes that goal to 33 percent by 2020. Currently California receives almost 14 percent of its electricity from biomass, geothermal, small hydro, wind and solar energy generators (CEC 2011a).

Pacific Gas and Electric Company (PG&E) produces and purchases electricity from both renewable and non-renewable resources, with power derived from fossil fuels, nuclear, and hydroelectric sources. PG&E has an electricity generation portfolio that totals 6,800 megawatts and consists of 44 percent hydroelectric, 54 percent nuclear from the Diablo Canyon plant, and 2 percent from fossil fuels, and this portfolio supplies about 43 percent of PG&E's demand (PG&E 2009). To meet the electricity demands of its customers, PG&E supplements its generation portfolio by procuring about 57 percent of its electricity demand from other independent power producers or co-generators, as well as from other utilities outside of the State (PG&E 2009).

PG&E-owned electrical distribution lines cross the San Joaquin River in Reach 2B and all of them are overhead. PG&E also owns underground gas transmission lines that may be located within the Project area. Potentially affected power poles and overhead lines are shown in Figure 23-1.

Natural Gas

Most of the natural gas consumed in California during 2010 was extracted from on- and off-shore sites from the Southwest (42 percent), the Rocky Mountains (23 percent), and Canada (22 percent), while the remainder is produced in California (12 percent) (CEC 2011b). Natural gas from out-of-state production basins is delivered into California via the interstate natural gas pipeline system. Although California can contractually receive natural gas from any producing region in North America, it can only import physical supplies from the three producing regions above due to current pipeline configuration.

PG&E's gas is delivered via high-pressure pipelines to its load centers with compressors used to maintain transmission pressure. The gas is then received at either an underground storage facility or redistributed through another series of pipelines. In 2006, California consumed 6,032 million cubic feet of natural gas per day. Of this, the majority (43 percent) was used for California's electricity market. Other end users of natural gas include the residential (22 percent), industrial (23 percent), and commercial (10 percent) sectors. Transportation, storage and transmission losses account for the remaining natural gas consumption (CEC 2011c).

The Gill Ranch Gas Storage Project is a joint venture between Gill Ranch Storage, LLC and PG&E for an underground natural gas storage facility and related gas pipeline and electric power line alignments. A portion of the 30-inch diameter gas pipeline is beneath the San Joaquin River within Reach 2B at a minimum depth of 5 feet from the top of the pipe (California Public Utilities Commission [CPUC] 2009).

Natural gas transmission lines in the Project area are shown on Figure 23-1.

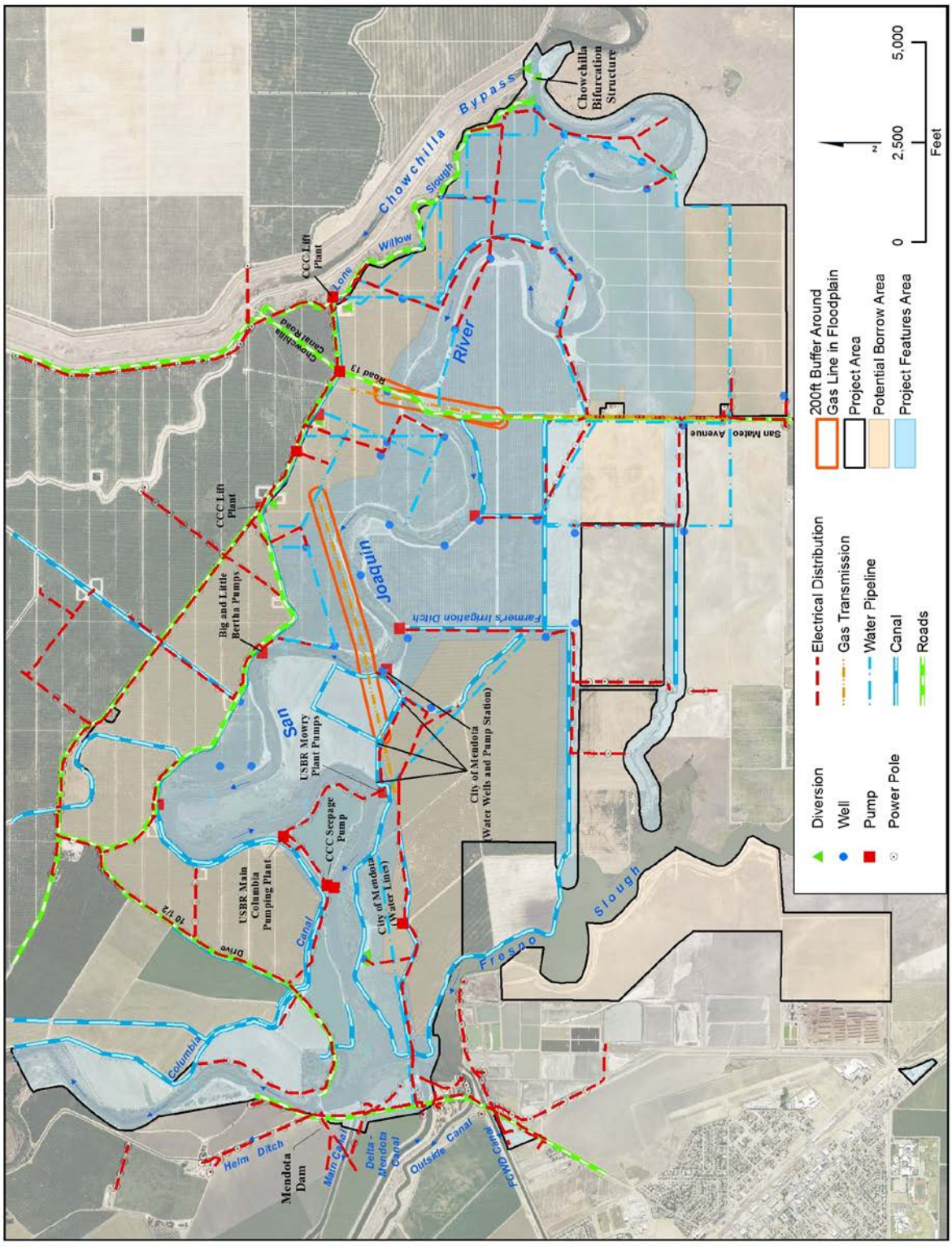

Figure 23-1.
Utilities in the Project Area

23.1.7 Energy

California's energy system includes electricity, natural gas, hydroelectric, nuclear, petroleum resources, and renewable energy. California's energy system provides 71 percent of the electricity, 12 percent of the natural gas, and 38 percent of the petroleum consumed or used for the State. The rest of the State's energy is imported and includes: natural gas purchases from Canada (22 percent) and from the Rocky Mountain States (23 percent) and the Southwest (42 percent); electricity from the Pacific Northwest (8 percent) and the Southwest – primarily coal and nuclear (21 percent); and crude oil imported from Alaska (14 percent) and foreign sources (48 percent) (CEC 2013b).

23.1.8 Water Supply Features

Flows conveyed into or diverted from Reach 2B and Mendota Pool could include:

- Interim and Restoration flows.
- Exchange Contractor deliveries to Mendota Pool from the San Joaquin River.
- Exchange Contractor deliveries to Mendota Pool from the Delta-Mendota Canal (DMC).
- Millerton Lake flood releases.
- Pine Flat Reservoir flood releases.
- Deliveries to Mendota Pool via groundwater pump-ins.
- Diversions from Mendota Pool.
- Diversions from the San Joaquin River via Lone Willow Slough and other pumps.

Mendota Pool delivers water to the San Joaquin River Exchange Contractors (Exchange Contractors) via the Main Canal, Helm Ditch, Columbia Canal, Main Lift Canal, and Outside Canal. The DMC typically conveys 2,500 to 3,000 cubic feet per second (cfs) to Mendota Pool during the irrigation season. Water deliveries from Mendota Pool are based on water surface elevation, not storage capacity.

Several water diversions, canals, lift stations, and groundwater wells exist within the Project area. Twenty-nine water diversions are located along this reach. Diversions occur from Mendota Pool via the Columbia Canal, Mendota Dam (for Arroyo Canal in Reach 3), Helm Ditch, Main Canal, Outside Canal, Fresno County Waterworks District Canal, Fresno Slough, and Mowry pumps. Diversions occur from the river via Lone Willow Slough and other pumps. Water pipelines also lie within the Project area.

The city of Mendota relies on three wells located southeast of the Mendota Pool for 100 percent of their municipal water supply. These wells produce on average approximately 2,000 acre-feet per year.

Water conveyance infrastructure, including wells, pipelines, canals and irrigation lines within the Project area is shown in Figure 23-1.

23.2 Regulatory Setting

This section describes the regulatory setting pertaining to utilities and service systems, and public services, within the Project area.

23.2.1 Federal

The following Federal laws related to utilities and service systems are applicable to Project alternatives.

Resource Conservation and Recovery Act (42 United States Code [USC] Section 6901 et seq.)

The Federal Resource Conservation and Recovery Act (RCRA) enacted in 1976 to ensure that solid and hazardous wastes are properly managed, from their generation, to ultimate disposal or destruction. Implementation of the RCRA has largely been delegated to federally approved State waste management programs and under Subtitle D, further promulgated to local governments for management of planning, regulation, and implementation of nonhazardous solid waste disposal. The U.S. Environmental Protection Agency (EPA) retains oversight of State actions under 40 Code of Federal Regulations [CFR] 239-259. Where facilities are found to be inadequate, Section 256.42 requires that necessary facilities and practices be developed by the responsible state and local agencies, or by the private sector. In California, that responsibility was created under the California Integrated Waste Management Act of 1989 and AB 939.

Energy Policy Act of 2005

The Energy Policy Act of 2005 seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the Act, consumers and businesses can attain Federal tax credits for purchasing fuel-efficient appliances and products, including buying hybrid vehicles, building energy efficient buildings, and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

23.2.2 State of California

The following State laws that pertain to utilities and service systems as discussed in this section.

California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of by transformation and land disposal, the California Legislature passed the California Integrated Waste Management Act of 1989 (AB 939), effective January 1990. According to the California Integrated Waste Management Act, all cities and counties were required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000. Each city and county is required to develop solid waste plans demonstrating integration of the California Integrated Waste Management Act plan with the county plan. The plans must promote (in order of priority) source reduction, recycling and composting, and environmentally safe transformation and land disposal.

State of California Integrated Energy Policy

In 2002, the California Legislature passed Senate Bill 1389 which required the CEC to develop an integrated energy plan for electricity, natural gas, and transportation fuels, for the California Energy Report biannually. The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for Zero Emission Vehicles and their infrastructure needs, and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

The most recent update – the 2014 Integrated Energy Policy Report (IEPR) - was adopted by the CEC on February 25, 2015 (CEC 2015). The 2014 IEPR Update focuses on the role of transportation in meeting State climate, air quality, and energy goals; the Alternative and Renewable Fuel and Vehicle Technology Program; plug-in electric vehicle infrastructure; the state of hydrogen, zero-emission vehicle, biofuels, and natural gas technologies over the next 10 years; an update to the electricity demand forecast; and other energy issues.

Utility Notification Requirements

California law (Gov. Code, § 4216 et seq.) requires owners and operators of underground utilities to become members of and participate in a regional notification center. "Operators of subsurface installations who are members of, participate in, and share in the costs of a regional notification center, including but not limited to … Underground Service Alert --Northern California … are in compliance with this section" (Gov. Code, § 4216.1). According to Underground Service Alert North, its "purpose is to receive planned excavation reports from public and private excavators and to transmit those planned excavation reports to all participating members of Underground Service Alert North who may have underground facilities at the location of excavation. The Underground Service Alert North Members will mark or stake their facility, provide information or give clearance to dig" (Underground Service Alert North 2013).

23.2.3 Regional and Local

Fresno County General Plan

The Fresno County General Plan establishes the following goals and policies associated with public services and utilities that are relevant to the Project:

Water Supply and Delivery

- Goal PF-C: To ensure the availability of an adequate and safe water supply for domestic and agriculture consumption.
- Policy PF-C.1: Retain Existing Water Supplies. The County shall actively engage in efforts and support the efforts of others to retain existing water supplies within Fresno County.
- Policy PF-C.11: Ongoing Water Supply. The County shall assure an on-going water supply to help sustain agriculture and accommodate future growth by

allocation of resources necessary to carry out the water resource management programs.

- Policy PF-C.29: Integrated Regional Water Management Planning. The County shall participate in integrated Regional Water Management Planning efforts with other local and regional water stakeholders to plan for the efficient use, enhancement, and management of surface and ground water supplies.

Storm Drainage and Flood Control

- Goal PF-E: To provide efficient, cost effective, and environmentally-sound storm drainage and flood control facilities that protect life and property and to divert and retain stormwater runoff for groundwater replenishment.
- Policy PF-E.21: Best Management Practices (BMPs). The County shall require the use of feasible and practical BMPs to protect streams from the adverse effects of construction activities, and shall encourage the urban storm drainage systems and agricultural activities to use BMPs.

Landfills, Transfer Stations, and Solid Waste Processing Facilities

- Goal PF-F: To ensure the safe and efficient disposal or recycling of solid waste generated in the county in an effort to protect the public health and safety.
- Policy PF-F.7: Existing Public Landfills. The County has designated the American Avenue Landfill as the regional landfill to serve the incorporated and unincorporated areas of the county. The publicly-operated Coalinga and Clovis landfills may continue to operate provided the sites are operated economically and in compliance with all environmental laws and regulations. Existing publicly-operated landfills may be expanded.

Law Enforcement

- Goal PF-G: To protect life and property by deterring crime and ensuring the prompt and efficient provision of law enforcement service and facility needs to meet the growing provision of law enforcement service and facility needs to meet the growing demand for police services associated with an increasing population.
- Policy PF-G.1: Effective Law Enforcement. The County shall ensure the provision of effective law enforcement services to unincorporated areas in the county.

Fire Protection and Emergency Medical Services

- Goal PF-H: To ensure the prompt and efficient provision of fire and emergency medical facility and service needs, to protect residents of and visitors to Fresno County from injury and loss of life, and to protect property from fire.
- Policy PF-H.1: Provision of Fire/Emergency Medical Service. The County shall work cooperatively with local fire protection districts to ensure the provision of

effective fire and emergency medical services to unincorporated areas within the county.

- Policy PF-H.8: The County shall encourage local fire protection agencies in the county to maintain the following as minimum standards for average first alarm response times to emergency calls: (a) 5 minutes in urban areas; (b) 15 minutes in suburban areas; and (c) 20 minutes in rural areas.

Utilities

- Goal PF-J: To provide efficient and cost-effective utilities that serve the existing and future needs of people in the unincorporated areas of the county.
- Policy PF-J.1: The County shall encourage the provision of adequate gas and electric, communications, and telecommunications service and facilities to serve existing and future needs.
- Policy PF-J.2: The County shall work with local gas and electric utility companies to design and locate appropriate expansion of gas and electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual, and other impacts on existing and future residents.

Madera County General Plan

The Madera County General Plan establishes the following goals and policies associated with public services and utilities that are relevant to the Project:

Law Enforcement, Fire, and Emergency Medical Services

- Goal 3.G: To ensure the prompt and efficient provision of law enforcement, fire, and emergency medical facility and service needs. County.
- Policy 3.G.1: The County would ensure the provision of effective law enforcement, fire, and emergency medical services to unincorporated areas.

Fire Protection Services

- Goal 3.H: To protect residents of and visitors to Madera County from injury and loss of life and to protect property and watershed resources from fires.
- Policy 3.H.2: The County would encourage local fire protection agencies in the county to maintain the following as minimum standards (expressed as average first alarm response times to emergency calls): (a) 5 minutes in urban areas; (b) 15 minutes in suburban areas; and (c) 20 minutes in rural areas.

Wastewater Collection, Treatment, and Disposal Goal 3D and Policy 3D2 promote the efficient use of water and a reduced wastewater system.

Landfills, Transfer Stations, and Solid Waste Recycling Goal 3F and Policy 3F2 promote the maximum use of solid waste source reduction, recycling, composting, and environmentally safe transformation of wastes.

Utilities Policy 3.J.1 encourages the provision of adequate gas and electric, communications, and telecommunications service and facilities to serve existing and future needs, while minimizing noise, electromagnetic, and visual impacts on existing and future residents. Policy 3.J.2 indicates that the County would work with local gas and electric utility companies to design and locate appropriate expansion of gas and electric systems.

Fresno County Groundwater Management Plan

The Fresno Area Regional Groundwater Management Plan (Fresno Irrigation District et al. 2006) presents a comprehensive strategy to enhance and maintain the quantity and quality of local groundwater resources. The plan document states that the County's groundwater-related issues can be addressed through currently available means without intrusive regulation and/or restrictions on groundwater pumping. If implemented, efforts related to conservation, water recycling, groundwater banking, management of groundwater contamination, and development of additional surface water storage can provide means to meet future increases in demand while reducing or eliminating overdraft within the County.

Madera County Groundwater Management Plan

The Madera County Integrated Regional Water Management Plan (Madera County 2008b) describes the collective approach to water management that the County and its stakeholders would use to deal with water supply, water quality, and flood management through 2030. The main objectives of the Integrated Regional Water Management Plan are water resource management optimization, evaluating and increasing water supplies, water quality protection and improvement, and flood control planning.

Specific goals for the Valley Floor region include:

- Substantial reduction or elimination of groundwater overdraft through improved management of existing water supplies and development of additional water supplies.
- Development of processes to better manage groundwater pumping.
- Incorporation of flood protection into the water management strategy.
- Maintaining and/or improving groundwater quality.
- Development of a groundwater monitoring program.

23.3 Environmental Consequences and Mitigation Measures

23.3.1 Impact Assessment Methodology

This section discusses the impact assessment methods that were applied to existing utilities and public service systems, which include wastewater collection, fire protection services, law enforcement services, emergency services, solid waste management, utility crossings, energy, and water supply diversions and systems.

The evaluation of potential impacts on utilities and public services systems was based on document reviews and available literature from the following resources:

- Documents and web-based information published by Federal, State, county, and municipal agencies.
- Consultation with appropriate agencies and utility providers.
- Aerial and ground photography of the study area and local environs.

Wastewater Collection

Existing wastewater facilities were identified within the potentially affected areas and direct (physical displacement of wastewater infrastructure) or indirect effects were evaluated using current resource data and maps.

Fire Protection, Law Enforcement, and Emergency Services

The capacity of existing fire protection services and law enforcement services to support the needs of Project construction and implementation was evaluated based on the type and quality of resources available to the Project area. The need for new or physically altered governmental facilities (e.g., the creation of new service facilities) was evaluated, including the ability to meet Project-related fire protection, law enforcement, and emergency service needs.

Solid Waste Management

Potential disruption of solid waste services or solid waste infrastructure due to the Project was evaluated. The need for solid waste disposal services during Project construction and implementation was identified. The potential for the Project to impact the ability of Fresno or Madera County to meet AB 939, the Integrated Waste Management Act, and Fresno County's ban on the disposal of construction and demolition debris at two county-operated landfills, was also evaluated.

Utility Crossings

Effects at utility crossings were analyzed by identifying the primary ways that construction and operation of the Project alternatives could affect existing utility crossings and analyzing the potential for short- or long-term disruption of these utilities. The environmental effects of the utility relocations themselves (e.g., effects on biology, cultural resources, wetlands, etc.) were discussed in the relevant resource sections.

Energy

Energy use due to changes in Project operations was evaluated. Construction and operations/maintenance activities would cause irreversible and irretrievable commitments of nonrenewable energy resources such as gasoline and diesel fuel. The extent to which the Project alternatives would increase energy consumption would be limited, as the work requires a relatively small area.

Water Supply Features and Diversions

Effects to surface water diversion and infrastructure were evaluated for the water diversions located along Reach 2B. Qualitative descriptions and assessments were the primary analysis tool for water supply diversions. Considerations in the engineering

design of infrastructure were discussed. Effects due to delivery of trucked water to transportation and traffic and to air quality are discussed in their respective sections. Changes in groundwater supply were evaluated in Chapter 13.0 "Hydrology – Groundwater."

23.3.2 Significance Criteria

The National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) significance criteria for the Public Services and Utilities section are defined below for wastewater collection, fire protection services, law enforcement services, emergency services, solid waste management, water services, utility crossings, water resources, energy resources and water supply diversions.

Pursuant to NEPA regulations (40 CFR 1500–1508), Project effects are evaluated based on the criteria of context and intensity. Context means the affected environment in which a proposed project occurs. The severity of the impact is examined in terms of the type, quality, and sensitivity of the resource involved; the location and extent of the impact; the duration of the effect (short- or long-term); and other consideration of context. Intensity means the degree or magnitude of a potential adverse effect.

An energy impact with *negligible* intensity would result in a slight, measurable increased use of energy but is very close to the existing conditions. An energy impact of *moderate* intensity is defined as measurable changes in energy consumption that can be met through existing generating facilities or new power plant facilities already approved by State and Federal regulatory agencies and scheduled to be built and operational by 2035. An energy impact of substantial intensity would deplete existing energy resource to such a degree that it would require construction and operation of new electrical generating facilities.

According to Appendix G of the State CEQA Guidelines, a significant impact on utilities and service systems, including public services, would occur if the Project would:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Conflict with a fixed facility such as a wastewater treatment plant.
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Have insufficient water supplies available to serve the Project from existing entitlements and resources, or need new or expanded entitlements.
- Result in a determination by the wastewater treatment provider that serves or may serve the Project that it does not have adequate capacity to serve the projected Project demand in addition to its existing commitments.

- Be served by a landfill with insufficient permitted capacity to accommodate solid waste disposal needs.
- Not comply with Federal, State, and local statutes and regulations related to solid waste.
- Result in substantial adverse physical impacts associated with either the provision of or need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection, police protection, schools, and other public facilities.

23.3.3 Impacts and Mitigation Measures

This section describes the effects that the Project alternatives would have on utilities and service systems and public services including wastewater collection, fire protection services, law enforcement services, emergency services, solid waste management, water services, utility crossings, and energy resources. These Project alternatives are described in detail in Chapter 2.0, "Description of Alternatives." This analysis of potential direct and indirect effects of the Project alternatives on utilities and public services resources is conducted relative to No-Action conditions in accordance with NEPA. In accordance with the State CEQA Guidelines, potential Project impacts under CEQA are compared to existing conditions. The analysis is organized by Project alternative with specific environmental impact topics numbered sequentially under each alternative.

With respect to utilities and public services, the environmental impact topics considered are:

1. Increased Need for New or Physically Altered Governmental Facilities due to Reduced Emergency Access and Increased Emergency Response Times.
2. Potential for Generation of Solid Waste in the Project Area in Excess of Permitted Landfill Capacity.
3. Potential for Noncompliance with Federal, State, and Local Statutes and Regulations Related to Solid Waste.
4. Potential for Insufficient Water Supply Resources in the Project area.
5. Potential for New or Physically Altered Utility Infrastructure to Conflict with an Applicable Land Use Plan, Policy, or Regulation.
6. Effects on Energy Resources.
7. Reduced Capacity of Existing Operational Diversion Facilities.

Other utilities and service system related issues covered in the PEIS/R are not covered here because they are programmatic in nature and/or are not relevant to the Project area. This includes recapturing, reuse, and recirculation of Restoration Flows.

Issues Eliminated from Further Analysis

Increased Demand for Wastewater Treatment

Because no housing or other occupied facilities would be constructed by the Project and the Project would not cause indirect population growth, there would be no increased demand for wastewater collection systems. Restroom facilities (i.e., a structural outhouse) may be included at water control structures; however, these restrooms would be pump-out facilities with no running water. Construction activities would also require outhouse facilities. Waste generated at these facilities would be removed and disposed of at permitted disposal facilities. Therefore, construction or expansion of wastewater treatment facilities would not be necessary nor would the Project cause a reduction in the ability of existing facilities to meet wastewater treatment requirements. Furthermore, the Project would not conflict with a fixed facility such as a wastewater treatment plant. No direct or indirect effects to existing wastewater collection services would result. For these reasons, these issues are not further evaluated.

Increased Demand for Emergency Services

Because the Project alternatives would not result in direct or indirect population growth, the need for fire protection, law enforcement, and emergency medical and disaster response services would be unchanged. The increased flows and related recreation opportunities at Mendota Dam and Mendota Pool and at other river access points (such as the San Mateo Avenue crossing) could attract some additional recreationists to these areas but not enough to expand the need for emergency services because service facilities and river access points would not change. Hence, no additional emergency service capacity would be required and there would be no need for new or altered emergency service facilities because of the Project. Therefore, issues resulting from increased demand for emergency services are not further evaluated in this section.

Increased Demand for Water Treatment

Because no housing or other occupied facilities would be constructed by the Project and the Project would not cause indirect population growth, there would be no increased demand for water treatment facilities. Restroom facilities (i.e., a structural outhouse) may be included at water control structures; however, these restrooms would be pump-out facilities with no running water. Therefore, construction of new water treatment facilities or expansion of existing facilities would not be necessary. For this reason, increased demand for water treatment facilities are not further evaluated in this section.

New Stormwater Drainage Facilities

The relocation or retrofitting of existing infrastructure affected by the Project is discussed below. The Project would not require or result in the construction of new stormwater drainage facilities or expansion of existing facilities by county agencies or others. For this reason, this issue not further evaluated in this section.

School Services

School services and facilities would not be affected by any of the Project alternatives, and new or physically altered facilities would not be needed. The Project would not generate or redistribute populations or housing; hence, school services and facilities would not be

directly or indirectly affected. For this reason, school services and facilities are not further evaluated in this section.

No-Action Alternative

Under the No-Action Alternative, the Project would not be implemented and none of the Project features would be developed in Reach 2B of the San Joaquin River. However, other proposed actions under the SJRRP would be implemented, including habitat restoration in other reaches, augmentation of river flows, and reintroduction of salmon. Without the Project in Reach 2B, however, these activities would not achieve the Settlement goals. The potential effects of the No-Action Alternative are described below. Unless otherwise stated, conditions existing as of July 2009 were assumed to persist and the effect on those conditions associated with utility service infrastructure was analyzed. The analysis is a comparison to existing conditions, and no mitigation is required for No-Action.

Emergency Services

Impact UTL-1 (No-Action Alternative): *Increased Need for New or Physically Altered Governmental Facilities due to Reduced Emergency Access and Increased Emergency Response Times.* Emergency services are generally provided by the CHP Central Division, Madera County Sheriff's Department and the Fresno County Sheriff's Department. Large-scale emergency services are the responsibility of the Sheriff's department and FEMA, USFS, the State emergency response network overseen by the California OES, CAL FIRE, CHP, and local fire departments, hospitals and ambulance services. Fresno County and Madera County fire units and emergency responders provide each other with mutual assistance; hence, river crossings provide access and egress for emergency responders to private property and agricultural areas along the river.

Compared to existing conditions, emergency responders may need to use alternative access routes during certain times of the year. Restoration Flows limit access at the San Mateo Avenue crossing more frequently and for longer durations during the year than existing conditions. This would cause mutual assistance emergency service providers to use alternative access routes to reach areas north of the river, such as Drive 10 ½, when flows exceed the capacity of the San Mateo Avenue crossing. Flows would typically be greater than the existing culvert capacity (150 cfs) during November to April.

Although emergency response times to areas north of the river would be increased for a portion of the year, the creation of new fire stations or the expansion of existing stations would be unlikely to be influenced by this access limitation. The expansion of existing facilities and the siting of new firefighting stations occur in response to new growth areas (Madera County 2008a). The release of Restoration Flows would not increase population growth in the Project area or vicinity, and therefore effects would be negligible. This impact would be **less than significant**.

Solid Waste Management

Impact UTL-2 (No-Action Alternative): *Potential for Generation of Solid Waste in the Project Area in Excess of Permitted Landfill Capacity.* None of the Project facilities would be built under the No-Action Alternative and there would be no change in the

long-term or short-term generation of solid waste within the Project area. Therefore, compared to existing conditions, no additional use or disruption of solid waste services or infrastructure would occur. There would be **no impact**.

Impact UTL-3 (No-Action Alternative): ***Potential for Noncompliance with Federal, State, and Local Statutes and Regulations Related to Solid Waste.*** None of the Project facilities would be built under the No-Action Alternative and there would be no change in generation of solid waste within the Project area. Compared to existing conditions, no additional use or disruption of solid waste services or infrastructure would occur. Consequently, no change would occur in the ability of the Fresno County Resources Division and the Madera County Resource Management Agency to abide by the mandates of AB 939 to reduce waste being disposed and plans for solid waste facility and landfill compliance. This includes Fresno County General Plan policies for safe and efficient disposal or recycling of solid waste, and the Fresno County Code, Title 8, banning the disposal of construction and demolition debris at the American Avenue and Coalinga Landfills.

As described above, no additional solid waste would be generated under the No-Action Alternative and no Project-related impact to Federal, State and local statutes and regulations pertaining to waste disposal would result. There would be **no impact**.

Water Services

Impact UTL-4 (No-Action Alternative): ***Potential for Insufficient Water Supply Resources in the Project Area.*** This discussion identifies the potential effects on water services for the Project area under the No-Action Alternative (Water Supply Diversions are discussed separately below). The No-Action Alternative includes Restoration Flows in Reach 2B, limited by the than-existing conveyance capacity of the reach. These flows would occur within the existing levee alignment.

The city of Mendota water wells east of Mendota Pool, and various irrigation canals, pump stations and individual groundwater wells, pipelines and monitoring wells would be unaffected by Project actions under the No-Action Alternative. Restoration Flows would not adversely affect the ability to operate existing wells, pipelines, canals, and pump stations in the Project area. Efforts to meet goals and policies found in the Madera County AB3030 Groundwater Management Plan (Madera County 2002), the Fresno County Groundwater Management Plan (Fresno Irrigation District et al. 2006) and the Fresno County General Plan (Fresno County 2000) that are associated with public water supply and management would not be altered. No new or expanded entitlements would be required.

No change in public water supply or water supply resources would occur under the No-Action Alternative beyond those previously analyzed in the PEIS/R (e.g., the release of Interim and Restoration flows and the recapture, reuse, and recirculation of those flows in the Restoration Area). There would be no change in the ability to operate existing wells, pipelines, and pump stations in the Project area. No impact to Federal, State and local statutes and regulations pertaining public water supply would result. There would be **no impact**.

Utility Crossings

Impact UTL-5 (No-Action Alternative): ***Potential for New or Physically Altered Utility Infrastructure to Conflict With An Applicable Land Use Plan, Policy, or Regulation.*** Under the No-Action Alternative, there would be no Project-related conflicts with existing infrastructure, such as gas and electrical service lines and telephone or cable communication infrastructure, and therefore policies and regulations regarding construction or modification of electric transmission, power, or distribution lines would not be applicable. Existing conditions would remain and any new construction would be required to abide by the current regulations. There would be **no impact**.

Energy Resources

Impact UTL-6 (No-Action Alternative): ***Effects on Energy Resources.*** The No-Action Alternative would include routine operations and maintenance of existing water control infrastructure. Energy use is primarily from the burning of fossil fuels such as diesel and standard gasoline to power construction equipment and vehicles. The amount and type of fuels required for periodic maintenance of the existing system would be minimal and would not impact energy resources including local and regional energy supplies, or need for added energy capacity; would not impact peak and base period energy demand for electricity, or other forms of energy; would not exceed existing energy standards; and would not impact transportation energy use. The extent to which the No-Action Alternative would increase energy consumption would be limited; hence, energy consumption under the No-Action Alternative would be similar to existing conditions. There would be **no impact**.

Water Supply Diversions

Impact UTL-7 (No-Action Alternative): ***Reduced Capacity of Existing Operational Diversion Facilities.*** The No-Action Alternative includes Restoration Flows in Reach 2B, limited by the than-existing conveyance capacity of the reach. These flows would occur within the existing levee alignment. The No-Action Alternative would not reduce the capacity of existing operational diversion facilities such as lift pumps and canals and Restoration Flows would not adversely affect the ability to operate existing wells, pipelines, canals, and pump stations in the Project area. No change to water supply diversions would result under the No-Action Alternative in comparison to existing conditions. There would be **no impact**.

Alternative A (Compact Bypass with Narrow Floodplain and South Canal)

Alternative A would include construction of Project facilities including a Compact Bypass channel, a levee system encompassing the existing river channel in a narrow floodplain, and the South Canal. Other key features include construction of the Mendota Pool dike (separating the San Joaquin River and Mendota Pool), a fish barrier below Mendota Dam, and the South Canal bifurcation structure with fish passage facility and fish screens, modification of the San Mateo Avenue crossing, and the removal of the San Joaquin River control structure at the Chowchilla Bifurcation Structure. Construction activity is expected to occur intermittently over an approximate 132-month timeframe.

Emergency Services

Impact UTL-1 (Alternative A): ***Increased Need for New or Physically Altered Governmental Facilities due to Reduced Emergency Access and Increased Emergency Response Times.*** Compared to the No-Action Alternative, Project activities under Alternative A would not change long-term emergency services provided by the CHP Central Division, Madera County Sheriff's Department, Fresno County Sheriff's Department, CAL FIRE and local fire departments and ambulance services or generally impair the long-term ability of local agencies to respond to an emergency. However, Fresno County and Madera County fire units and emergency responders provide each other with mutual assistance; hence, river crossings provide access and egress for emergency responders to private property and agricultural areas along the river.

Alternative A would result in a roadway discontinuity at Drive 10 ½ that may affect emergency access and/or emergency response times in areas north of the river near the existing crossing. The Compact Bypass would cross the existing Drive 10 ½, which provides access to the east side of Mendota Dam. With this alternative, the road would end at the east side of the bypass channel and would not continue to Mendota Dam. Alternative A would also result in a temporary road closure at the San Mateo Avenue crossing that may affect emergency access and/or emergency response times to areas north of the river for several months. The permanent roadway discontinuity at Drive 10 ½ and the temporary removal of the San Mateo Avenue crossing would limit access and egress and could affect the ability to provide rapid response from emergency responders to private property, agricultural areas and recreationists along the north side of the river. Reducing access to this area has the potential to adversely impact the ability of fire unit and emergency responders to provide timely medical assistance or response to a rapidly spreading vegetation fire.

Although emergency response times to areas north of the river would be increased, the creation of new fire stations or the expansion of existing stations would be unlikely to be influenced by this access limitation. The expansion of existing facilities and the siting of new firefighting stations occur in response to new growth areas (Madera County 2008a). Alternative A would not increase population growth in the Project area or vicinity, and therefore effects would be negligible.

When comparing Alternative A to existing conditions, impacts would be similar to those discussed in the preceding paragraphs (i.e., the comparison of Alternative A to No-Action). Impacts would be **less than significant**.

Solid Waste Management

Impact UTL-2 (Alternative A): ***Potential for Generation of Solid Waste in the Project Area in Excess of Permitted Landfill Capacity.*** Construction for Alternative A would result in earthmoving activities for levees, canals, and various structural additions and improvements within the Project area. Demolition and removal of the San Joaquin River control structure at the Chowchilla Bifurcation Structure and replacement of the San Mateo Avenue crossing at the San Joaquin River would result in small amounts of solid waste removal from the Project area. These wastes would be removed for recycling or disposal in municipal landfills that accept construction and demolition materials. Solid

waste landfills or transfer stations nearest to the Project area that accept construction and demolition waste include the Mid-Valley Disposal Transfer Station in Kerman, Fresno County located about 24 miles from the Mendota Pool, and the Fairmead Landfill located in Chowchilla, Madera County, which also approximately 24 miles northeast of the Mendota Pool.

During operation and maintenance activities for Alternative A, debris that collects on trash racks, screens, ladders, or other fish passage structures would be periodically removed. Annual maintenance cleaning would occur after the fish migration and when flows have receded.

Existing capacities of prospective solid waste landfills, transfer stations and service providers (provided in Section 23.1.5) are adequate to receive the small amounts of solid wastes removed from the Project area during construction, operation, and maintenance activities; no new solid waste facilities or infrastructure would be required. No change in the ability of Fresno or Madera County to meet AB 939, the Integrated Waste Management Act, including Fresno County's ban on the disposal of construction and demolition debris at two county-operated landfills would occur. Compared to the No-Action Alternative, no direct or indirect effects to existing solid waste services would result due to implementation of Alternative A.

When comparing Alternative A to existing conditions, impacts would be similar to those discussed in the preceding paragraphs (i.e., the comparison of Alternative A to No-Action). The potential volume of solid waste that would be generated under Alternative A is substantially below permitted landfill capacities at affected landfills and transfer stations. No Project-related impact to pertaining waste disposal in excess of landfill capacity would result. There would be **no impact**.

Impact UTL-3 (Alternative A): ***Potential for Noncompliance with Federal, State, and Local Statutes and Regulations Related to Solid Waste.*** Substantial amounts of non-recyclable solid waste would not be generated under Alternative A. Demolition would result in small amounts of solid waste removal from the Project area which would be disposed of in a permitted landfill. Annual maintenance cleaning would also remove small amounts of trash and sediments from the Project area. There would be no conflict with Fresno County General Plan policies for safe and efficient disposal or recycling of solid waste, nor a conflict with Fresno County Code, Title 8, banning the disposal of construction and demolition debris at the American Avenue and Coalinga Landfills. Consequently, no change in the ability of Fresno or Madera County to meet AB 939, the Integrated Waste Management Act, would occur.

No Project-related impact to Federal, State and local statutes and regulations pertaining waste disposal would result, in comparison to No-Action or existing conditions. There would be **no impact**.

Water Services

Water resource infrastructure within the Project area has been identified. Under Alternative A, various regional irrigation canals, pump stations and individual

groundwater wells, pipelines and monitoring wells could be affected. Water supply and water conveyance infrastructure that could potentially be affected by Alternative A and other Project alternatives are identified in Table 23-4.

Table 23-4.
Potentially Affected Water Resource Infrastructure

Utility	Alt A	Alt B	Alt C	Alt D	Action
Major Water Infrastructure					
Chowchilla Bifurcation Structure	1 EA	1 EA	1 EA	1 EA	Modify or Remove portion
San Mateo Avenue Culvert	1 EA	1 EA	1 EA	1 EA	Replace or Remove
Lone Willow Slough Diversion	1 EA	1 EA	1 EA	1 EA	Modify
CCC (Bend 10)	2,500 feet	2,500 feet	2,500 feet	2,500 feet	Relocate/Modify
CCID (Main Canal and Helm Ditch)	-	-	2,400 feet	2,400 feet	Relocate/Modify
Mendota Dam	-	-	1 EA	1 EA	Modify
CCC (Pump Station and Canal)	2,200 feet	2,200 feet	2,200 feet	2,200 feet	Relocate/Modify
City of Mendota Wells	3	3	3	3	Avoid or flood-proof and protect~~, Modify, or Relocate~~
Minor Water Infrastructure					
Irrigation Canals	32,500 feet	31,500 feet	32,500 feet	56,000 feet	Relocate
Pump Stations	10 EA	10 EA	10 EA	10 EA	Relocate
Groundwater Wells	26 EA	32 EA	25 EA	32 EA	Modify
Water Pipelines	31,000 feet	41,000 feet	33,000 feet	50,000 feet	Abandon
Monitoring Wells	-	1 EA	-	-	Abandon

Key:
Alt = Alternative
CCC = Columbia canal
CCID = Central California Irrigation District

Impact UTL-4 (Alternative A): ***Potential for Insufficient Water Supply Resources in the Project Area.*** In comparison to the No-Action Alternative, various regional irrigation canals, pump stations and individual groundwater wells, pipelines and monitoring wells would be affected under Alternative A. As part of the Project, approximately 32,500 linear feet of irrigation canals and 10 water pump stations would be relocated. Twenty-six groundwater wells would be modified by flood proofing using berms or by raising pumps and approximately 31,000 linear feet of water pipelines would be abandoned (see Table 23-4). Flood-proofed wells would be provided with year-round vehicular access via a raised roadbed across the floodplain. The city of Mendota's three groundwater wells will remain in place. Two of them are outside of the levee alignments and will remain unaffected. The third well is immediately adjacent to the San Joaquin River and will be floodproofed, with the adjacent levee extending to protect the well. A new bridge may be

constructed immediately adjacent to the Mowry Bridge, which holds the city of Mendota's water pipeline, for construction access~~Three city of Mendota water wells east of the Mendota Pool would be avoided, flood-proofed, protected, or relocated~~. The proposed replacement, relocation, or protection of existing water supply infrastructure would not result in a substantial change in public water supply reliability or water supply resources, as new facilities would be operational prior to disconnecting existing facilities to help alleviate potential service interruptions.

Alternative A would remove a portion of the San Joaquin River arm of Mendota Pool upstream of the Compact Bypass. The transient storage capacity of Mendota Pool is estimated to be between 290 and 1,460 acre-feet, corresponding to the top 0.2 and 1.0 foot of the Pool, respectively. The reduction in transient storage capacity is estimated to be between 33 and 164 acre-feet, corresponding to the top 0.2 and 1.0 foot of the Pool, for Alternative A. This represents a reduction of approximately 11 percent of the transient storage capacity of the Pool. Fluctuations in transient storage depth are expected to be within historical fluctuations found during wet, normal-wet, and normal-dry water years. The historical overall annual range can vary from greater than 2.0 feet (wet water year), 0.7 foot (normal wet water year), and 0.5 foot (normal dry water year). In addition, six SCADA (supervisory control and data acquisition) gates were recently installed at Mendota Dam. Knowledge of Mendota Pool operations, in combination with the new SCADA system, would be used to operate the Pool in a manner similar to the way it has always been operated.

Water supplies needed by the Project to irrigate restoration plantings would be acquired from willing sellers. Therefore sufficient water supplies would be available to serve the Project from existing entitlements and resources (including water purchases from willing sellers); new or expanded entitlements are not required.

Efforts to meet goals and policies found in the Madera County AB3030 Groundwater Management Plan (Madera County 2002), the Fresno County Groundwater Management Plan (Fresno Irrigation District et al. 2006) and the Fresno County General Plan (Fresno County 2000) and are associated with public water supply and management would not be altered. Substantial direct or indirect effects to existing water services would not occur due to implementation of Alternative A. No conflicts with Federal, State and local statutes and regulations pertaining public water supply would result.

When comparing Alternative A to existing conditions, impacts would be similar to those discussed in the preceding paragraphs (i.e., the comparison of Alternative A to No-Action). This impact would be **less than significant**.

Utility Crossings

Electric and natural gas utility infrastructure within the Project area has been identified. Table 23-5 lists the length of the overhead electrical utilities, the number of electrical power support poles and the length of natural gas pipeline for potentially affected infrastructure for Alternative A and other Project alternatives.

Table 23-5.
Potentially Affected Electric and Gas Infrastructure

Utility	Alternative A	Alternative B	Alternative C	Alternative D
Electrical Overhead Utilities	43,500 feet	48,500 feet	48,000 feet	68,000 feet
Gas Pipelines	10,000 feet	11,000 feet	9,000 feet	11,500 feet
Power Poles (each)	144	162	166	239

Impact UTL-5 (Alternative A): ***Potential for New or Physically Altered Utility Infrastructure to Conflict With An Applicable Land Use Plan, Policy, or Regulation.*** In contrast to the No-Action Alternative, up to 43,500 linear feet of electrical overhead utility lines,144 utility poles, and 11,000 linear feet of gas pipeline within the Project area could be affected by Project construction activities (see Table 23-5). Electrical lines from nearby power poles would also be extended to water control structures to facilitate gate and fish screen operations.

To minimize and avoid disruption of subsurface utilities from ground disturbing activities, Project proponents would confirm the location of existing underground utilities; coordinate with the owners of transmission lines and pipelines; design restoration actions to avoid affecting underground facilities, if feasible; and coordinate with the utility owner to shut off and relocate the utilities, if necessary. This is consistent with the environmental commitments specified in the PEIS/R.

The location of public utilities would be confirmed and appropriate notifications would be made by contacting utility (power and communication utility service, and irrigation district service) providers who operate, maintain or own utilities in the Project area. Short-term effects to utility services may result from modifications or replacements; however, interruption of services would be minimal because replacement lines would typically be constructed prior to disconnecting services in existing lines.

Construction contractors will request an underground service alert from Underground Service Alert North in advance of earthmoving activities to locate and avoid underground utilities. Should previously unidentified underground utility facilities be present, the contractor would coordinate with the transmission line or pipeline owner to obtain design specifications of underground facilities, avoid affecting underground utility facilities, or if necessary, coordinate with the utility owner to shut off and relocate the utilities.

County policies regarding utilities are described in the Fresno County and Madera County General Plans. The extension of electrical utilities to Project facilities is consistent with these policies. The CPUC sets forth provisions for public electric utilities regulated under its General Order 131-D that the utility provider must adhere to when constructing or modifying public electric utilities. No conflicts with CPUC requirements are anticipated.

When comparing Alternative A to existing conditions, impacts would be similar to those discussed in the preceding paragraphs (i.e., the comparison of Alternative A to No-

Action). Utility relocations would not conflict with applicable land use plans, policies, or regulations. Impacts would be **less than significant**.

Energy Resources

Impact UTL-6 (Alternative A): ***Effects on Energy Resources.*** Energy use for the construction phase of the Project is primarily from the burning of fossil fuels such as diesel and standard gasoline to power construction equipment and vehicles. A majority of construction vehicle and equipment usage would be within Project ground disturbing areas. Trips outside of these areas would be limited to initial and final equipment mobilization to and from the Project area, haul vehicles, and trips by workers commuting to and from the Project area during work days.

Energy use during the operational and maintenance phase of the Project would primarily be from vehicles traveling to and from the Project area and from the electricity use at water control structures and fish passage facilities by gates and screens. The number of worker trips needed for operational and maintenance activities would be minor (e.g., estimated at a maximum of eight trips per day) and the amount of electrical usage by gates and screens is small and periodic as compared to other water infrastructure such as continuous pumps.

In comparison to the No-Action Alternative, sources of energy and infrastructure would primarily be required during the construction phase of the Project, for the use of construction vehicles and earthmoving equipment (e.g., during construction of the Compact Bypass, fish passage facilities, fish screens, and seasonal barriers; establishing low-flow channels; and constructing levees). These construction activities would result in irreversible and irretrievable commitments of nonrenewable energy resources such as gasoline and diesel fuel. However, the transportation energy effects would occur only for the duration of the construction and be intermittent. No substantial direct or indirect effects to existing energy resources would result due to implementation of Alternative A.

When comparing Alternative A to existing conditions, impacts would be similar to those discussed in the preceding paragraphs (i.e., the comparison of Alternative A to No-Action). The use of petroleum fuels to complete these trips and work on-site would represent a less than significant impact, as the work would occur only for the duration of the construction and would be conducted within a relatively small area. The extent to which Alternative A would increase energy consumption from other sources is minor. The amount and type of fuels expended during the construction period would not cause a significant impact to energy resources including local and regional energy supplies, or need for added energy capacity; would not cause a significant impact to peak and base period energy demand for electricity, or other forms of energy; would not exceed existing energy standards; and would not cause a significant impact to transportation energy use. The impact would be **less than significant**.

Water Supply Diversions

Impact UTL-7 (Alternative A): ***Reduced Capacity of Existing Operational Diversion Facilities.*** The Project is designed to convey water to Mendota Pool to accommodate contractual obligations for water deliveries to the Exchange Contractors on an as needed

basis. Because conveyance of water deliveries to Mendota Pool is incorporated as part of the Project design, Project infrastructure would not inhibit these water supply deliveries. (The normal delivery mechanism for water deliveries to the Exchange Contractors is the DMC.)

Compared to the No-Action Alternative, Alternative A would change water surface elevations in the San Joaquin River arm of Mendota Pool. However, implementation of Alternative A would not reduce the capacity of operational diversion facilities because existing lift pumps would be relocated or flood-proofed by the Project. No substantial short- or long-term effects under Alternative A would result.

When comparing Alternative A to existing conditions, impacts would be similar to those discussed in the preceding paragraphs (i.e., the comparison of Alternative A to No-Action). The impact would be **less than significant**.

Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the Preferred Alternative

Alternative B would include construction of Project features including a Compact Bypass channel, a new levee system with a wide, consensus-based floodplain encompassing the river channel, the Mendota Pool Control Structure, and the Compact Bypass ~~Bifurcation~~ Control Structure with fish passage facility. Other key features include construction of a fish passage facility at the Chowchilla Bifurcation Structure, the re-route of Drive 10 ½ (across the Compact Bypass ~~c~~Control ~~s~~Structure), and removal of San Mateo Avenue crossing. Construction activity is expected to occur intermittently over an approximate 157-month timeframe.

Emergency Services

Impact UTL-1 (Alternative B): ***Increased Need for New or Physically Altered Governmental Facilities due to Reduced Emergency Access and Increased Emergency Response Times.*** Refer to Impact UTL-1 (Alternative A). Potential impacts of Alternative B would be the same as potential impacts of Alternative A with the exception that the roadway discontinuity would occur at the San Mateo Avenue crossing. Under Alternative B, the removal of the San Mateo Avenue crossing and temporary construction effects associated with the re-route of Drive 10 ½ would limit access and egress and could limit the ability to provide rapid response from emergency responders to private property, agricultural areas and recreationists along the north side of the river near the crossing. Although emergency response times to areas north of the river would be increased, the creation of new fire stations or the expansion of existing stations would be unlikely to be influenced by this access limitation. The expansion of existing facilities and the siting of new firefighting stations occur in response to new growth areas (Madera County 2008a). Alternative B would not increase population growth in the Project area or vicinity, and therefore effects would be negligible. Impacts would be **less than significant**.

Solid Waste Management

Impact UTL-2 (Alternative B): ***Potential for Generation of Solid Waste in the Project Area in Excess of Permitted Landfill Capacity.*** Refer to Impact UTL-2 (Alternative A).

Potential impacts of Alternative B would be the same as potential impacts of Alternative A. Existing capacity of prospective solid waste landfills, transfer stations and service providers are adequate to receive wastes removed from the Project area during construction, operation and maintenance activities; no new solid waste facilities or infrastructure would be required. The potential volume of solid waste that would be generated under Alternative B is substantially below permitted landfill capacities at affected landfills and transfer stations. Therefore, no Project-related impact to pertaining waste disposal in excess of landfill capacity would result. There would be **no impact**.

Impact UTL-3 (Alternative B): *Potential for Noncompliance with Federal, State, and Local Statutes and Regulations Related to Solid Waste.* Refer to Impact UTL-3 (Alternative A). Potential impacts of Alternative B would be the same as potential impacts of Alternative A. Substantial amounts of non-recyclable solid waste would not be generated under Alternative B. The Project is not in conflict with Federal, State and local statutes and regulations pertaining waste disposal. There would be **no impact**.

Water Services

Under Alternative B, various regional irrigation canals, pump stations and individual groundwater wells, pipelines and monitoring wells would be affected. As part of the Project, approximately 31,500 linear feet of irrigation canals and 10 water pump stations would be relocated. Thirty-two groundwater wells would be modified by flood proofing using berms or by raising pumps and approximately 41,000 linear feet of water pipelines would be abandoned (see Table 23-4). Flood-proofed wells would be provided with year-round vehicular access via a raised roadbed across the floodplain. One monitoring well would be abandoned. Three city of Mendota water wells east of the Mendota Pool would be avoided or flood-proofed and protected~~, flood-proofed, protected, or relocated~~.

Impact UTL-4 (Alternative B): *Potential for Insufficient Water Supply Resources in the Project Area.* Refer to Impact UTL-4 (Alternative A). Potential impacts of Alternative B would be the same as potential impacts of Alternative A. Replacement, relocation, or protection of existing water supply infrastructure would not result in a substantial change in public water supply reliability or water supply resources. This impact would be **less than significant**.

Utility Crossings

Under Alternative B, approximately 48,500 linear feet of electrical overhead utility lines and 162 utility poles could be replaced. Approximately 11,000 linear feet of gas pipeline within the Project area could also be affected (see Table 23-5).

Impact UTL-5 (Alternative B): *Potential for New or Physically Altered Utility Infrastructure to Conflict With An Applicable Land Use Plan, Policy, or Regulation.* Refer to Impact UTL-5 (Alternative A). Potential impacts of Alternative B would be the same as potential impacts of Alternative A. Utility relocations would not conflict with applicable land use plans, policies, or regulations. No conflict with CPUC requirements or local jurisdiction policies would result under Alternative B. Impacts would be **less than significant**.

Energy Resources

Impact UTL-6 (Alternative B): ***Effects on Energy Resources.*** Refer to Impact UTL-6 (Alternative A). Potential impacts of Alternative B would be the same as potential impacts of Alternative A. The amount and type of fuels expended during the construction period would not cause a significant impact to energy resources including local and regional energy supplies, or need for added energy capacity; would not cause a significant impact to peak and base period energy demand for electricity, or other forms of energy; would not exceed existing energy standards; and would not cause a significant impact to transportation energy use. Impacts would be **less than significant**.

Water Supply Diversions

Impact UTL-7 (Alternative B): ***Reduced Capacity of Existing Operational Diversion Facilities.*** Refer to Impact UTL-7 (Alternative A). Potential impacts of Alternative B would be the same as potential impacts of Alternative A. The alternative would allow for water deliveries from the San Joaquin River to Mendota Pool and existing lift pumps would be relocated or flood-proofed. Impacts would be **less than significant**.

Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)

Alternative C would include construction of Project features including Fresno Slough Dam, a new levee system with a narrow floodplain encompassing the river channel, and the Short Canal. Other key features include construction of the Mendota Dam fish passage facility, the Fresno Slough fish barrier, the Short Canal control structure and fish screen, the Chowchilla Bifurcation Structure fish passage facility, modification of San Mateo Avenue crossing, and Main Canal and Helm Ditch relocations. Construction activity is expected to occur intermittently over an approximate 133-month timeframe.

Emergency Services

Impact UTL-1 (Alternative C): ***Increased Need for New or Physically Altered Governmental Facilities due to Reduced Emergency Access and Increased Emergency Response Times.*** Refer to Impact UTL-1 (Alternative A). Potential impacts of Alternative C would be the same as potential impacts of Alternative A with the exception of the discontinuity at Drive 10 ½. Under Alternative C, improvement or construction activities would not impair the long-term ability of local agencies to respond to an emergency. However, construction of fish passage facilities at Mendota Dam and the temporary removal of the San Mateo Avenue crossing would limit access and egress and could limit the ability of emergency responders to provide rapid response to private property, agricultural areas and recreationists along the north side of the river near the crossing. Although emergency response times to areas north of the river would be increased, the creation of new fire stations or the expansion of existing stations would be unlikely to be influenced by this access limitation. The expansion of existing facilities and the siting of new firefighting stations occur in response to new growth areas (Madera County 2008a). Alternative C would not increase population growth in the Project area or vicinity, and therefore effects would be negligible. Impacts would be **less than significant**.

Solid Waste Management

Impact UTL-2 (Alternative C): ***Potential for Generation of Solid Waste in the Project Area in Excess of Permitted Landfill Capacity.*** Refer to Impact UTL-2 (Alternative A). Potential impacts of Alternative C would be the same as potential impacts of Alternative A. The potential volume of solid waste that would be generated under this alternative is substantially below permitted landfill capacities at affected landfills and transfer stations; therefore, no Project-related impact to pertaining waste disposal in excess of landfill capacity would result. There would be **no impact**.

Impact UTL-3 (Alternative C): ***Potential for Noncompliance with Federal, State, and Local Statutes and Regulations Related to Solid Waste.*** Refer to Impact UTL-3 (Alternative A). Potential impacts of Alternative C would be the same as potential impacts of Alternative A. The Project is not in conflict with Federal, State and local statutes and regulations pertaining waste disposal. There would be **no impact**.

Water Services

Under Alternative C, various regional irrigation canals, pump stations and individual groundwater wells, pipelines and monitoring wells would be affected. As part of the Project, approximately 32,500 linear feet of irrigation canals and 10 water pump stations would be relocated. Twenty-five groundwater wells would be modified by flood proofing using berms or by raising pumps and approximately 33,000 linear feet of water pipelines would be abandoned (see Table 23-4). Flood-proofed wells would be provided with year-round vehicular access via a raised roadbed across the floodplain. Three city of Mendota water wells east of the Mendota Pool would be avoided or flood-proofed and protected~~, flood-proofed, protected, or relocated~~.

Impact UTL-4 (Alternative C): ***Potential for Insufficient Water Supply Resources in the Project Area.*** Refer to Impact UTL-4 (Alternative A). Replacement, relocation, or protection of existing water supply infrastructure would not result in a substantial change in public water supply reliability or water supply resources. Potential impacts of Alternative C would be ~~the same as~~similar to potential impacts of Alternative A with the following exception. Alternative C would remove a portion of the San Joaquin River arm of Mendota Pool upstream of the Fresno Slough Dam and reduce the transient storage capacity of the Pool by about 16 percent (or 46 to 230 acre-feet when transient storage corresponds to the top 0.2 to 1.0 foot of the Pool). Fluctuations in transient storage depth are expected to be within historical fluctuations found during wet, normal-wet, and normal-dry water years. The historical overall annual range can vary from greater than 2.0 feet (wet water year), 0.7 foot (normal wet water year), and 0.5 foot (normal dry water year). SCADA gates were recently installed at Mendota Dam. Knowledge of Mendota Pool operations, in combination with the new SCADA system, would be used to operate the Pool in a manner similar to the way it has always been operated. Because replacement, relocation, or protection of existing water supply infrastructure would not result in a substantial change in public water supply reliability or water supply resources, and because Mendota Pool operations are expected to be similar to historical operations, t~~T~~his impact would be **less than significant**.

Utility Crossings

Under Alternative C, approximately 48,000 linear feet of electrical overhead utility lines and 166 utility poles could be replaced. Approximately 9,000 linear feet of gas pipeline within the Project area could also be affected (see Table 23-5).

Impact UTL-5 (Alternative C): *Potential for New or Physically Altered Utility Infrastructure to Conflict With An Applicable Land Use Plan, Policy, or Regulation.* Refer to Impact UTL-5 (Alternative A). Potential impacts of Alternative C would be the same as potential impacts of Alternative A. Utility relocations would not conflict with applicable land use plans, policies, or regulations. Impacts would be **less than significant**.

Energy Resources

Impact UTL-6 (Alternative C): *Effects on Energy Resources.* Refer to Impact UTL-6 (Alternative A). Potential impacts of Alternative C would be the same as potential impacts of Alternative A. The amount and type of fuels expended during the construction period would not cause a significant impact to energy resources including local and regional energy supplies, or need for added energy capacity; would not cause a significant impact to peak and base period energy demand for electricity, or other forms of energy; would not exceed existing energy standards; and would not cause a significant impact to transportation energy use. Impacts would be **less than significant**.

Water Supply Diversions

Impact UTL-7 (Alternative C): *Reduced Capacity of Existing Operational Diversion Facilities.* Refer to Impact UTL-7 (Alternative A). Potential impacts of Alternative C would be the same as potential impacts of Alternative A with the exception that Mendota Pool would be restricted to the Fresno Slough arm. The alternative would allow for water deliveries from the San Joaquin River to Mendota Pool and existing lift pumps would be relocated or flood-proofed. Impacts would be **less than significant**.

Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)

Alternative D would include construction of Project features including Fresno Slough Dam, a new levee system with a wide floodplain encompassing the river channel, and the North Canal. Other key features include construction of the Mendota Dam fish passage facility, the Fresno Slough fish barrier, the North Canal bifurcation structure and North Canal fish passage facility, removal of the San Joaquin River control structure at the Chowchilla Bifurcation Structure, removal of San Mateo Avenue crossing, and Main Canal and Helm Ditch relocations. Construction activity is expected to occur intermittently over an approximate 158-month timeframe.

Emergency Services

Impact UTL-1 (Alternative D): *Increased Need for New or Physically Altered Governmental Facilities due to Reduced Emergency Access and Increased Emergency Response Times.* Refer to Impact UTL-1 (Alternative A). Potential impacts of Alternative D would be the same as potential impacts of Alternative A with the exception that the roadway discontinuity would occur at the San Mateo Avenue crossing. Under Alternative D, the removal of the San Mateo Avenue crossing and temporary

construction effects associated with Drive 10 ½ would limit access and egress and could limit the ability to provide rapid response from emergency responders to private property, agricultural areas and recreationists along the north side of the river near the crossing. Although emergency response times to areas north of the river would be increased, the creation of new fire stations or the expansion of existing stations would be unlikely to be influenced by this access limitation. The expansion of existing facilities and the siting of new firefighting stations occur in response to new growth areas (Madera County 2008a). Alternative D would not increase population growth in the Project area or vicinity, and therefore effects would be negligible. Impacts would be **less than significant**.

Solid Waste Management

Impact UTL-2 (Alternative D): *Potential for Generation of Solid Waste in the Project Area in Excess of Permitted Landfill Capacity.* Refer to Impact UTL-2 (Alternative A). Potential impacts of Alternative D would be the same as potential impacts of Alternative A. The potential volume of solid waste that would be generated under this alternative is substantially below permitted landfill capacities at affected landfills and transfer stations; therefore, no Project-related impact to pertaining waste disposal in excess of landfill capacity would result. There would be **no impact**.

Impact UTL-3 (Alternative D): *Potential for Noncompliance with Federal, State, and Local Statutes and Regulations Related to Solid Waste.* Refer to Impact UTL-3 (Alternative A). Potential impacts of Alternative D would be the same as potential impacts of Alternative A. The Project is not in conflict with Federal, State and local statutes and regulations pertaining waste disposal. There would be **no impact**.

Water Services

Under Alternative D, various regional irrigation canals, pump stations and individual groundwater wells, pipelines and monitoring wells would be affected. As part of the Project, approximately 56,000 linear feet of irrigation canals and 10 water pump stations would be relocated. Thirty-two groundwater wells would be modified by flood proofing using berms or by raising pumps and approximately 50,000 linear feet of water pipelines would be abandoned. Flood-proofed wells would be provided with year-round vehicular access via a raised roadbed across the floodplain. Three city of Mendota water wells east of the Mendota Pool would be avoided or flood-proofed and protected~~, flood-proofed, protected, or relocated~~.

Impact UTL-4 (Alternative D): *Potential for Insufficient Water Supply Resources in the Project Area.* Refer to Impact UTL-4 (Alternative ~~A~~C). Replacement, relocation, or protection of existing water supply infrastructure would not result in a substantial change in public water supply reliability or water supply resources. Potential impacts of Alternative D would be the same as potential impacts of Alternative ~~A~~C. This impact would be **less than significant**.

Utility Crossings

Under Alternative D, approximately 68,000 linear feet of electrical overhead utility lines and 239 utility poles could be replaced. Approximately 11,500 linear feet of gas pipeline within the Project area could also be affected (see Table 23-5).

Impact UTL-5 (Alternative D): ***Potential for New or Physically Altered Utility Infrastructure to Conflict With An Applicable Land Use Plan, Policy, or Regulation.*** Refer to Impact UTL-5 (Alternative A). Potential impacts of Alternative D would be the same as potential impacts of Alternative A. Utility relocations would not conflict with applicable land use plans, policies, or regulations. Impacts would be **less than significant**.

Energy Resources

Impact UTL-6 (Alternative D): ***Effects on Energy Resources.*** Refer to Impact UTL-6 (Alternative A). Potential impacts of Alternative D would be the same as potential impacts of Alternative A. The amount and type of fuels expended during the construction period would not cause a significant impact to energy resources including local and regional energy supplies, or need for added energy capacity; would not cause a significant impact to peak and base period energy demand for electricity, or other forms of energy; would not exceed existing energy standards; and would not cause a significant impact to transportation energy use. Impacts would be **less than significant**.

Water Supply Diversions

Impact UTL-7 (Alternative D): ***Reduced Capacity of Existing Operational Diversion Facilities.*** Refer to Impact UTL-7 (Alternative A). Potential impacts of Alternative D would be the same as potential impacts of Alternative A with the exception that Mendota Pool would be restricted to the Fresno Slough arm. The alternative would allow for water deliveries from the San Joaquin River to Mendota Pool and existing lift pumps would be relocated or flood-proofed. Impacts would be **less than significant**.