This section presents the evaluation of the various resource and community issues potentially affected by the alternatives. Each environmental or community resource area subsection describes the Affected Environment and Environmental Consequences, or impacts. The "project area" described in the Affected Environment sections typically refers to the area within or near the community of Folsom that would be affected by the Folsom Dam Road Access Restriction alternatives. Depending on the subject, this may focus on the general geographic area of Folsom and surrounding communities or on specific streets and roads. "Project area" also refers to areas that would be affected by a failure of Folsom Dam, which would affect downstream areas below the dam and the Sacramento metropolitan and surrounding area.

Cumulative impacts from past, present, and reasonably foreseeable future actions are included in the transportation analysis (Section 3.1) and are also described in Section 3.11.

Mitigation measures are identified for resource areas where adverse impacts are identified. Where no impacts are predicted, no mitigation was identified and no discussion of mitigation is presented.

Other required National Environmental Policy Act (NEPA) findings, such as the discussion of short-term uses of the environment and long-term productivity and irretrievable commitments of resources, are also addressed in Section 3.11.

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This section describes the past (pre-closure), existing (post-closure), and projected future traffic conditions within the area influenced by the Folsom Dam Road closure, and potential impacts and mitigation measures of each of the alternatives. To define the area affected by the Folsom Dam Road Access Restriction and the criteria by which each of the existing and future study years were evaluated, the following subsections describe the study scenarios, evaluation locations (study area), and level of service (LOS) categories that are applied to describe and compare traffic conditions. The description of the affected environment follows the LOS definitions.

Traffic Study Scenarios

The transportation analysis evaluated roadway operations under the following scenarios. Scenarios 1 and 2 are described in Section 3.1.1. Scenarios 3 and 4 are described and evaluated in Section 3.1.2.

1. Existing (Pre-Closure) Conditions based on traffic counts collected prior to the closure of Folsom Dam Road (before February 2003)
2. Existing (Post-Closure) Conditions based on traffic counts collected after the closure of the road in Fall 2003 and Spring 2004
3. Year 2005 (Near-Term) Conditions based on 2005 traffic forecasts
4. Year 2013 (10 Years from Closure) Conditions based on 2013 traffic forecasts

Traffic Analysis Locations

Traffic volumes obtained from counts and travel demand model forecasts are used to describe or define the traffic operations under existing conditions and future conditions, and with and without the alternatives. Evaluation of intersection operations was based on peak-hour traffic volumes and roadway segment operations analysis was based on daily volumes. The near-term analysis (Year 2005 scenario) includes the evaluation of intersection operations and roadway segment operations, using projected traffic volumes generated by applying growth rates to existing volumes. The long-term analysis (Year 2013 scenario) includes the evaluation of roadway segments with traffic projections developed using a modified version of the Sacramento Regional Travel Demand Model (SACMET), the selected traffic forecasting tool. The intersections and roadway segments addressed in the analysis are listed below and illustrated on Figure 3.1-1. Number and letter designations used below correspond with those shown on Figure 3.1-1.

Intersections

1. Folsom-Auburn Road/Folsom Dam Road
2. East Natoma Street/Folsom Dam Road
3. Folsom-Auburn Road/Oak Avenue Parkway
4. Folsom-Auburn Road/Greenback Lane
5. Riley Street/Scott Street
6. Riley Street/Leidesdorff Street

SCALE: N.T.S.	N	Folsom Dam Road Restriction EIS 18600807	TRAFFIC STUDY LOCATIONS	Figure 3.1-1

7. Riley Street/Sutter Street
8. Riley Street/~~East~~ Natoma Street
9. Folsom Boulevard/~~East~~ Natoma Street
10. ~~East~~ Natoma Street/Coloma Street

Roadway Segments

A. Folsom Dam Road
B. Riley Street crossing (Rainbow Bridge)
C. Folsom Boulevard crossing (Lake Natoma Crossing)
D. Folsom Boulevard
E. Folsom-Auburn Road
F. Natoma/East Natoma Street

Traffic Level of Service Descriptions

Transportation engineers and planners commonly use a grading system called Level of Service to measure and describe the operation of a roadway network. The LOS grading system qualitatively characterizes traffic conditions associated with varying levels of traffic. LOS varies from LOS A, indicating free-flow traffic conditions with little or no delay, to LOS F, representing oversaturated conditions where traffic flows exceed design capacity, resulting in long queues and delays. Table 3.1-1 describes each service level from the driver's perspective.

Table 3.1-1
Qualitative Description of Level of Service

Level of Service	Driver's Perception
A	LOS A is the highest quality of traffic flow. Motorists are able to drive at the desired speeds for two- and four-lane roads and can easily make lane changes to pass on four-lane roads. At a traffic signal, all motorists can be served by one green signal phase. Motorists on a stop-controlled approach experience little or no conflicting traffic.
B	LOS B is characterized by light congestion. Motorists are generally able to maintain desired speeds on two- and four-lane roads and make lane changes on four-lane roads. Motorists are still able to pass through traffic signal controlled intersections in one green phase. Stop-controlled approach motorists begin to notice absence of available gaps.
C	LOS C represents moderate traffic congestion. Average vehicle speeds continue to be near the motorist's desired speed for two- and four-lane roads. Lane change maneuvers on four-lane roads increase to maintain desired speed. Turning traffic and slow vehicles begin to have an adverse impact on traffic flows. Occasionally, motorists do not clear the intersection on the first green phase. Stop-controlled approach motorists begin to experience delay as they wait for available gaps.
D	LOS D is characterized by congestion with average vehicle speeds decreasing below the motorist's desired level for two- and four-lane roads. Lane change maneuvers on four-lane roads are difficult to make and turning traffic and slow vehicles adversely affect traffic flow. Multiple cars must wait through more than one green phase at a traffic signal. Stop-controlled approach motorists experience queuing due to a reduction in available gaps.

Table 3.1-1, concluded

Level of Service	Driver's Perception
E	LOS E is the lowest grade possible without reaching stop-and-go operations. Driving speeds are substantially reduced, brief periods of stop-and-go conditions can occur on two- and four-lane roads, and lane changes are minimal. At signalized intersections, long vehicle queues can form waiting to be served by the signal's green phase. Insufficient gaps on the major streets cause extensive queuing on the stop-controlled approaches.
F	LOS F represents stop-and-go conditions for two- and four-lane roads. Traffic flow is constrained and lane changes are minimal. Drivers at signalized intersections may wait through several green phases prior to being served. Motorists on stop-controlled approaches experience insufficient gaps of suitable size to cross safely through a major traffic stream.

Source: Fehr & Peers (interpreted from 2000 Highway Capacity Manual).

The City of Folsom's goal is to achieve or maintain LOS C operations throughout the city. In this analysis, levels of service that are worse than "C" (i.e., LOS D, E, and F) are noted as functioning at a level that is below this locally established criterion.

Roadway segments and intersections are evaluated under separate criteria and LOS thresholds; those technical criteria are described in Appendix B.

3.1.1 Affected Environment

The following subsections describe the roadway, transit, bicycle, and pedestrian components of the existing transportation system in the vicinity of Folsom Dam. Existing roadway operations are described for conditions prior to the Folsom Dam Road closure (pre-February 2003) and after the road closure (Fall 2003/Spring 2004). Changes in post-closure operations caused by the City of Folsom traffic management program are also discussed.

3.1.1.1 Transportation Facilities

Roadways

Figure 3.1-1 illustrates the roadway network within the study area. The following describes the regional and local roadway network.

U.S. Highway 50 (US-50) connects the Sacramento area with El Dorado County. Within the area of concern, US-50 runs east-west, and access is provided via the Folsom Boulevard interchange. According to California Department of Transportation (Caltrans; Caltrans 2003), US-50 has an existing (2003) annual average daily traffic volume of approximately 84,000 vehicles (both directions) at Folsom Boulevard.

Folsom Dam Road is a two-lane road that connects Folsom-Auburn Road to East Natoma Street. It was closed to traffic in February 2003. Bicycle and pedestrian traffic has always been restricted on this facility.

Folsom-Auburn Road/Folsom Boulevard provides north-south access between the City of Auburn (north of the study area) and the City of Folsom. North of Greenback Lane/Riley Street, this roadway is called Folsom-Auburn Road; south of Greenback Lane/Riley Street, it is called

Folsom Boulevard. Folsom-Auburn Road is a two-lane undivided north-south arterial north of Folsom Dam Road and a four-lane divided arterial south of Folsom Dam Road. Folsom Boulevard is a four-lane divided arterial in the City of Folsom. Folsom Boulevard crosses Lake Natoma between Greenback Lane and Leidesdorff Street; the Folsom Boulevard crossing is called the Lake Natoma Crossing. The speed limit varies from 40 to 50 miles per hour.

Natoma Street is an east-west roadway extending from Folsom-Auburn Road/Folsom Boulevard to east of Green Valley Road/Blue Ravine Road. This roadway is a two-lane undivided arterial from Folsom Boulevard to Stafford Street. East of Stafford Street to Fargo Way, it is a four-lane undivided arterial. From Fargo Way to Folsom Dam Road, the road is a two-lane undivided arterial. From Folsom Dam Road to Green Valley Road, Natoma Street has two lanes in the eastbound direction and one lane in the westbound direction. Natoma Street becomes East Natoma Street in the vicinity of Folsom Prison.

Riley Street extends from Folsom-Auburn Road to east of Blue Ravine Road. This roadway is a two-lane undivided arterial that goes through Folsom's historic downtown and business district. This roadway crosses Lake Natoma between Folsom-Auburn Road/Folsom Boulevard and Scott Street; the Riley Street crossing is called Rainbow Bridge.

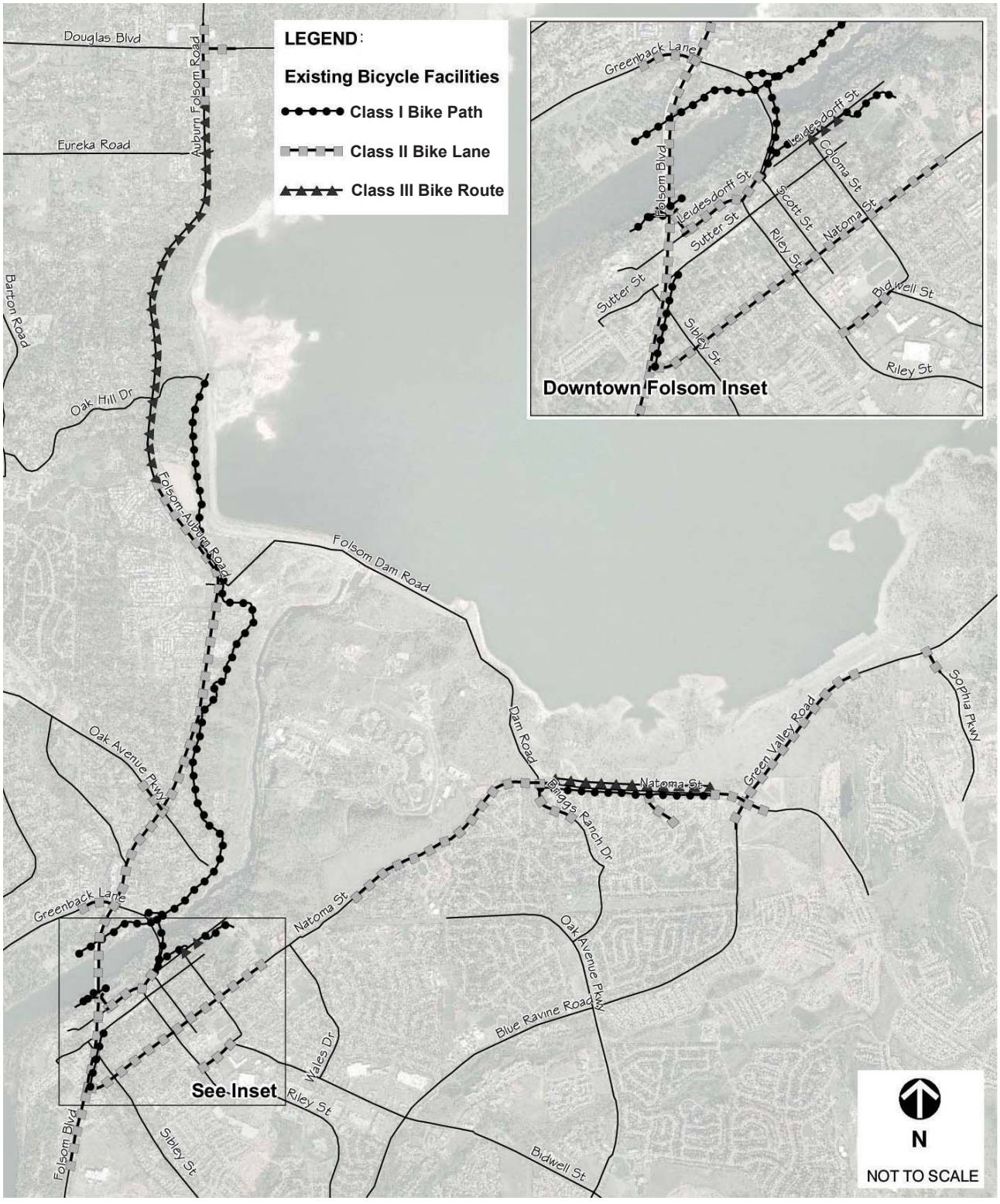
Bicycle and Pedestrian Facilities

Caltrans standards provide definitions for three distinct types of bikeway facilities, as generally described below:

- **Class I Bikeway (Bike Path)** provides a completely separate right-of-way and is designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized.
- **Class II Bikeway (Bike Lane)** provides a restricted right-of-way and is designated for the use of bicycles with a striped lane on a street or highway. Vehicle parking and vehicle/pedestrian cross-flow are permitted.
- **Class III Bikeway (Bike Route)** provides for a right-of-way designated by signs or pavement markings for shared use with pedestrians or motor vehicles.

American River Parkway Trail (Class I) begins in the City of Sacramento and runs along Lake Natoma throughout the City of Folsom. Bicycle lanes are provided on Folsom-Auburn Road/Folsom Boulevard north of Greenback Lane/Riley Street and south of Sutter Street. This roadway is a designated bicycle route between the Sacramento County line and Douglas Boulevard. Bicycle lanes exist on Natoma Street between Folsom Boulevard and east of Mill Street and between Prison Road and Briggs Ranch Drive. The City of Folsom Bikeway Master Plan (March 1994) proposes the connection of the two segments on Natoma Street to create a continuous bike lane from Folsom Boulevard to Green Valley Road. The locations of existing bicycle facilities are shown on Figure 3.1-2.

A city-wide Pedestrian Master Plan is currently being developed to identify benefits and disadvantages of the existing pedestrian system and to establish policies, objectives, and priorities for improving this system. Pedestrian facilities are provided throughout historic downtown Folsom and on developed portions of major roadways within the study area.



SCALE: N.T.S.	N	Folsom Dam Road Restriction EIS 18600807	EXISTING BICYCLE FACILITIES	Figure 3.1-2

Transit Service

Bus service in the Sacramento area is provided by the Folsom Stage Line, Roseville Transit, Sacramento Regional Transit, and Placer County Transit. Light rail service is provided by Sacramento Regional Transit. The primary bus service provider within the study area is the Folsom Stage Line, which has the following three lines:

- Route 10 provides service on Folsom-Auburn Road, East Bidwell Street, Riley Street, and Natoma Street. Weekday service is provided from approximately 7:00 AM to 10:00 PM with 30- to 60-minute headways[1]. There is no weekend or holiday service.
- Downtown Commuter runs between the City of Folsom and downtown Sacramento on weekdays. Service is provided during the morning commute from approximately 5:45 AM to 8:00 AM with 10- to 20-minute headways and during the evening commute from 3:30 PM to 6:30 PM with 15- to 30-minute headways.
- Light Rail Commuter provides service on Sibley Street, Glenn Drive, and Iron Point Road to the Butterfield Light Rail Station. Service is provided on weekdays from approximately 5:00 AM to 6:00 PM with 60-minute headways.

The Sacramento Regional Transit operates light rail service from downtown Sacramento to the Sunrise Station in Citrus Heights. The Sunrise Station opened in June 2004 and is part of the Amtrak/Folsom Light Rail Project, which will extend light rail 10.9 miles from downtown Sacramento to the City of Folsom. In Folsom, ~~a~~ stations ~~is~~ are planned at Glenn Drive/Folsom Boulevard and in the historic downtown district.

The existing bus routes and stop locations are shown on Figure 3.1-3.

3.1.1.2 Existing (Pre-Closure) Traffic Conditions

Roadway and intersection operations prior to the road closure were evaluated based on available information from published documents and other data collected before February 2003. A major change to the transportation network in the study area prior to 2003 was the completion of the Lake Natoma Crossing. Completed in 1999, this bridge provided substantial traffic congestion relief as a new crossing of the American River at Lake Natoma, which had been limited to the Riley Street/Rainbow Bridge crossing in the Historic District area and Folsom Dam Road. It created a direct connection of Folsom Boulevard with Folsom-Auburn Road, increasing capacity along this route, but it also attracted additional traffic along and connecting to this corridor. Levels of service along some segments of Folsom-Auburn Road and Natoma Street dropped below the City of Folsom's LOS C criterion. At the same time, population and housing in the City of Folsom and nearby communities also grew substantially over the past decade (see Section 3.4), also contributing to lower traffic service levels on primary arterials. The following describes the traffic conditions prior to the Folsom Dam Road closure in 2003.

[1] Headway refers to the time interval between transit revenue vehicles passing a specific location.

SCALE: N.T.S.	N	Folsom Dam Road Restriction EIS 18600807	EXISTING TRANSIT FACILITIES	Figure 3.1-3

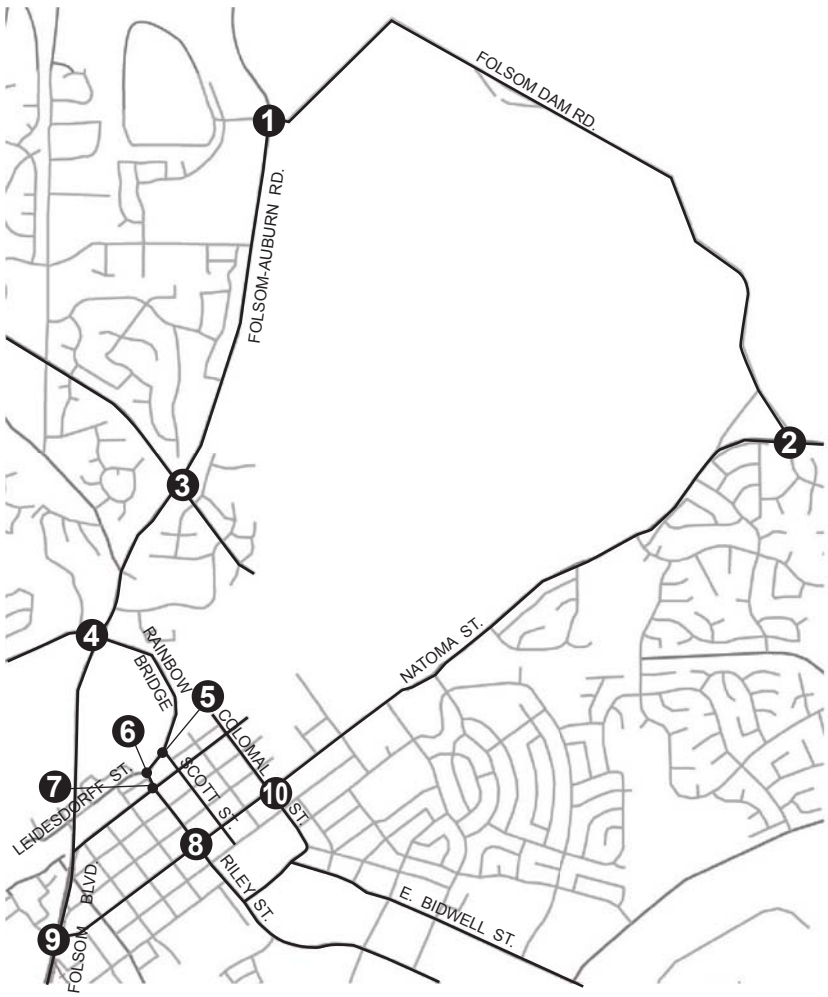
Roadway Segment Operations

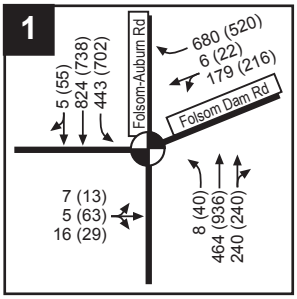
Roadway segment levels of service are presented in Table 3.1-2. Pre-closure daily traffic volumes were obtained for all of the roadway segments listed in this table. Only Folsom-Auburn Road between Folsom Dam Road and Inwood Road operated acceptably (i.e., LOS C or better) prior to the closure of Folsom Dam Road. All other study roadway segments operated at LOS D or worse. Rainbow Bridge operated at LOS F due to relatively high volumes throughout the day instead of typical roadway peaking characteristics (i.e., lower volumes during non-peak hours followed by higher traffic volumes during commute periods).

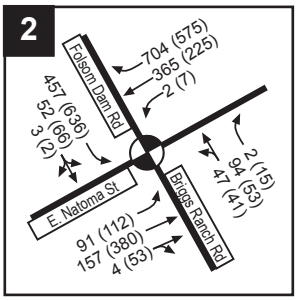
Intersection Operations

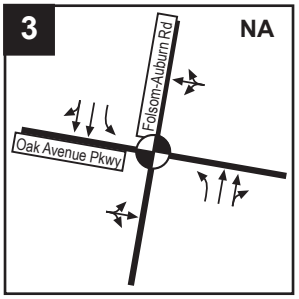
Morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak period turning movement counts for conditions prior to the road closure were available for the Folsom-Auburn Road/Folsom Dam Road, East Natoma Street/Folsom Dam Road, Riley Street/Scott Street, and Folsom Boulevard/~~East~~ Natoma Street intersections. PM peak-hour turning movements were available for the Riley Street/Leidesdorff Street intersection. Peak-hour intersection turning movement volumes, lane configurations, and traffic control devices (traffic signals) for pre-closure conditions are presented on Figure 3.1-4. Some of the peak-hour volumes are "metered" volumes (i.e., counted volumes are less than the actual demand) due to an upstream/downstream bottleneck and are identified on Figure 3.1-4.

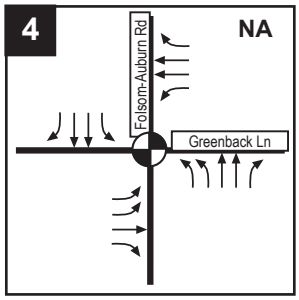
The results of the intersection LOS calculations are presented in Table 3.1-3. Prior to February 2003, some congestion was observed by Fehr & Peers staff at the Folsom-Auburn Road/Folsom Dam Road intersection largely due to commuter traffic using Folsom Dam Road. In addition, congestion was observed at the Folsom Boulevard/Greenback Lane intersection due to commuter traffic using the Rainbow Bridge and Lake Natoma Crossing. However, no count information was available for this intersection so a level of service calculation could not be conducted.

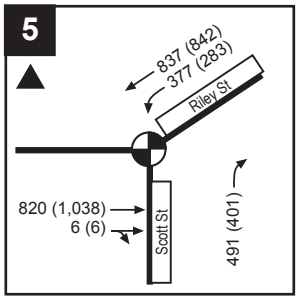


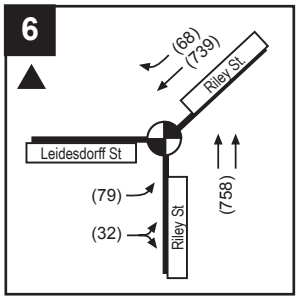


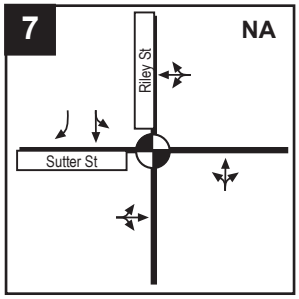


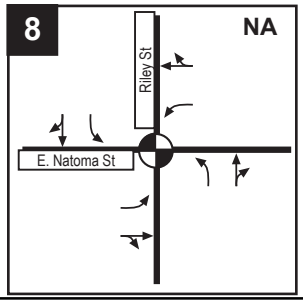


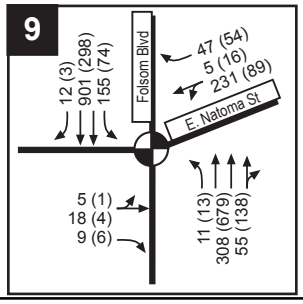


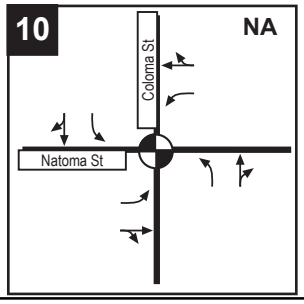












LEGEND:

XX (YY) = AM (PM) Peak Hour Traffic Volumes

NA = Traffic Counts Not Available

= Traffic Signal

= Volumes "metered" due to bottlenecks

SCALE: N.T.S.	N	Folsom Dam Road Restriction EIS 18600807	PRE-CLOSURE PEAK HOUR INTERSECTION TRAFFIC VOLUMES AND LANE CONFIGURATIONS	Figure 3.1-4

Table 3.1-2
Existing Roadway Segment Levels of Service

Roadway	Facility Type	Pre-Closure			Post-Closure (Pre-City TC Program)[1]			Post-Closure (Post-City TC Program)[2]		
		Count Date	Daily Traffic Volumes (vpd)	LOS	Count Date	Daily Traffic Volumes (vpd)	LOS	Count Date	Daily Traffic Volumes (vpd)	LOS
Folsom Dam Road	2-Lane Arterial	2000	17,500	D	-	-	-	-	-	-
Riley Street Crossing (Rainbow Bridge)	2-Lane Arterial	2002	36,700	F	2003	44,700	F	2004[3]	46,500	F
Folsom Boulevard Crossing (Lake Natoma Crossing)	4-Lane Arterial, Divided	2002	32,600	D	2003	33,600	D	2004[3]	34,900	D
Folsom Boulevard (between Blue Ravine Drive and Iron Point Road)	4-Lane Arterial, Divided	1994	25,700	D	NA	NA	NA	2004	30,600	D
Folsom-Auburn Road (between Folsom Dam Road and Inwood Road)	4-Lane Arterial, Undivided	1996	15,300	B	NA	NA	NA	2004	27,500	E
Folsom-Auburn Road (between Oak Avenue Parkway and Greenback Lane)	4-Lane Arterial, Divided	2000	31,500	D	NA	NA	NA	2004	39,400	F
Natoma Street (between Folsom Boulevard and Sibley Street)	2-Lane Collector	1999	7,100	D	2003	12,100	F	NA	NA	NA
East Natoma Street (between Cimmaron Circle and Folsom Dam Road)	2-Lane Arterial	1998	10,500	D	2003	17,700	E	NA	NA	NA

Source: Fehr & Peers

[1] Prior to implementation of City of Folsom's traffic calming (TC) program.

[2] After implementation of City of Folsom's traffic calming program.

[3] Daily traffic volume for 2004 was developed using a growth factor of 4 percent per year.

NA = Traffic counts not available.

vpd = vehicles per day

Table 3.1-3
Existing Intersection Levels of Service

Intersection	Peak Hour	Pre-Closure			Post-Closure (Pre-City TC Program)[1]			Post-Closure (Post-City TC Program)[2]		
		Count Date	Delay	LOS	Count Date	Delay	LOS	Count Date	Delay	LOS
Folsom-Auburn Road/ Folsom Dam Road	AM PM	6/2002	42 >80	D F	-	NA	NA	5/2004	9 8	A A
East Natoma Street/ Folsom Dam Road	AM PM	2001	24 24	C C	-	NA	NA	6/2004	11 8	B A
Folsom-Auburn Road/ Oak Avenue Parkway	AM PM	-	NA	NA	-	NA	NA	5/2004	60* 58*	E E
Folsom-Auburn Road/ Greenback Lane	AM PM	-	NA	NA	2003	>80 >80	F F	6/2004	>80 >80	F F
Riley Street/Scott Street	AM PM	2001	40* 16*	D B	2003	51* 23*	D C	6/2004	4* 7*	A A
Riley Street/Leidesdorff Street	AM PM	2001	NA 5*	NA A	-	NA	NA	6/2004	3* 8*	A A
Riley Street/Sutter Street	AM PM	-	NA	NA	-	NA	NA	6/2004	10* 24*	A C
Riley Street/ ~~East~~ Natoma Street	AM PM	-	NA	NA	2003	57* >80	E F	5/2004	74* >80	E F
Folsom Boulevard/~~East~~ Natoma Street	AM PM	4/1998	23 15	C B	2003	>80 56*	F E	5/2004	30* 37*	C C
Natoma Street/ Coloma Street	AM PM	-	NA	NA	2003	>80 69*	F E	6/2004	16* 26*	B C

Source: Fehr & Peers

Notes:
[1] Prior to implementation of City of Folsom's traffic calming (TC) program.
[2] After implementation of City of Folsom's traffic calming program.

* = Delay is higher than indicated and LOS may be worse due to queue spillback from upstream intersection.

NA = Traffic counts not available.

Along congested corridors, queues from upstream intersections spill back into adjacent intersections, causing high intersection delays. The resulting counted volumes are low because only a few vehicles can travel through the intersection. The intersection operations analysis is based on the measured volume and therefore produces a low delay estimate. These intersections are identified with an asterisk (*) in Table 3.1-3, in the "Delay" column.

Riley Street and Folsom Boulevard were congested corridors prior to the Folsom Dam Road closure. Therefore, intersection delays would be higher than indicated along these corridors. Two of the study intersections with available counts operated at LOS levels below C. The Folsom-Auburn Road/Folsom Dam Road and Riley Street/Scott Street intersections operated at LOS D during the AM peak hour, which is considered unacceptable by the City of Folsom threshold criteria. During the PM peak hour, only the Folsom-Auburn Road/Folsom Dam Road

intersection operated below the local LOS C criterion. Detailed calculations are presented in Appendix B.

3.1.1.3 Existing (Post-Closure) Traffic Conditions

Traffic patterns and traffic conditions in the study area changed following the closure of Folsom Dam Road. Much of the traffic that had been using Folsom Dam Road diverted to Rainbow Bridge (Riley Street crossing) and Lake Natoma Crossing (Folsom Boulevard crossing), causing increased congestion at the Folsom Boulevard/Folsom-Auburn Road/Riley Street/Greenback Lane intersection and on several streets in the City of Folsom, most notably Riley Street and ~~East~~ Natoma Street. The City of Folsom developed a "traffic calming" program for the historic district in response to the traffic pattern changes. Available data were used to evaluate roadway segment and intersection operations for conditions after the road closure and before implementation of the city's traffic calming program. New traffic volume counts were also conducted to evaluate traffic operations for conditions after implementation of the City's program.

Folsom Historic District Traffic Calming Program

The measures and devices implemented in the Folsom Historic District Traffic Calming Program included selected roadway closures (time-restricted and 24-hour), turn restrictions, and neighborhood signage. Traffic signal timing changes and turn-pocket modifications were also implemented to improve traffic flows. Prior to the program, vehicles would travel on neighborhood streets such as Scott Street and Sutter Street to avoid congestion on Riley Street. The traffic calming program placed a diverter at the Sutter Street/Scott Street intersection, which allows only right turns in the southbound direction. The implementation of this diverter virtually eliminated the left turns at the Riley Street/Scott Street intersection. Signs were posted at the ~~East~~ Natoma Street/Coloma Street intersection indicating no Riley Street crossing access via Coloma Street. These signs caused a dramatic decrease in peak-hour traffic on Coloma Street. In general, the program benefits and is receiving support from residents of streets with decreased traffic volumes. Others have commented that the program limits access to their business establishments.

Roadway Segment Operations

Traffic data used for this analysis consisted of roadway volumes for post-Folsom Dam Road closure, and pre- and post-closure implementation of the traffic calming program. Because different years were represented by the sets of traffic data, volumes were adjusted to matching years applying a 4 percent per year growth rate (applied to the Riley Street and Folsom Boulevard crossings).

The resulting roadway segment levels of service are presented in Table 3.1-2. With the Folsom Dam Road closure, the only options for crossing Lake Natoma in the study area are the Riley Street and Folsom Boulevard crossings, and all of the roadway segments operate at LOS D or worse both without and with the city's traffic calming program. Prior to the road closure, approximately 18,000 vehicles used Folsom Dam Road on a daily basis. Approximately 9,000 vehicles per day shifted to Rainbow Bridge and Lake Natoma Crossing, resulting in increased volumes on Folsom-Auburn Road and Riley Street through the center of the Folsom Historic District. The already poor existing operating conditions on these roads (LOS D or worse) were therefore further impacted by the closure action.

Intersection Operations

Peak-hour turning movement counts were available for conditions after the road closure and prior to the traffic calming program implementation for the following intersections.

- Folsom-Auburn Road/Greenback Lane
- Riley Street/Scott Street
- Riley Street/~~East~~ Natoma Street
- Folsom Boulevard/Natoma Street
- ~~East~~ Natoma Street/Coloma Street

Peak-hour intersection turning movement volumes, lane configurations, and traffic control devices for post-closure/pre-traffic calming program conditions are presented on Figure 3.1-5.

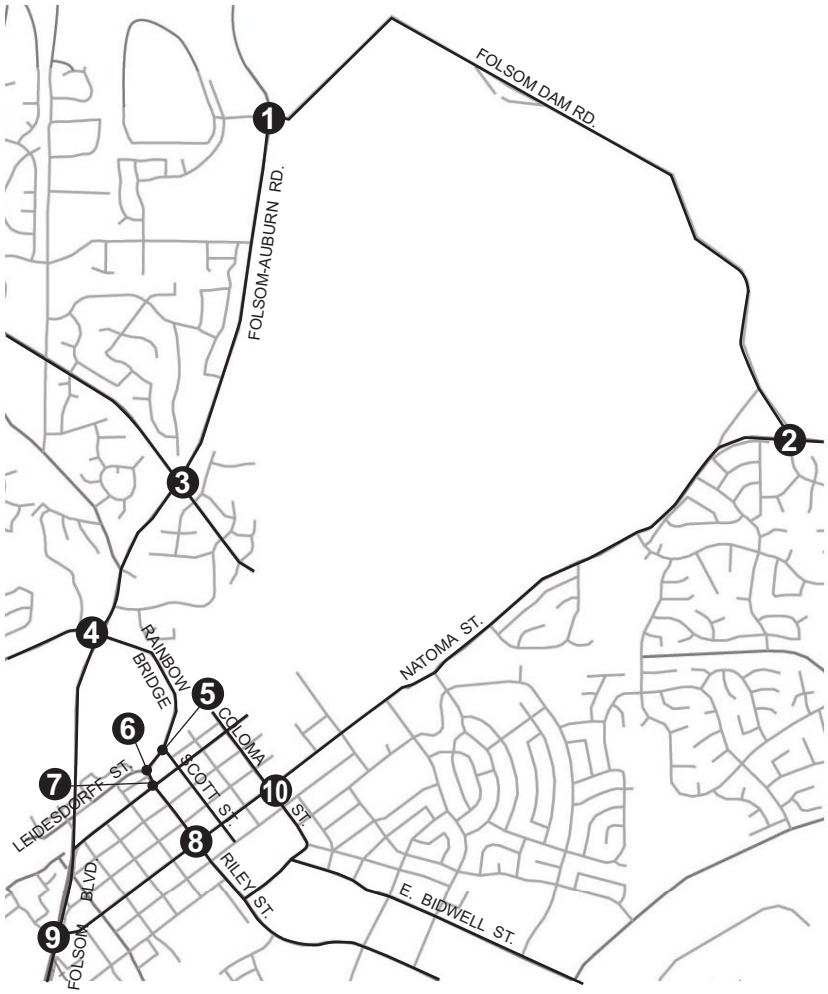
Peak-hour intersection turning movement counts were conducted in May and June 2004 at all study intersections to assess conditions after the Folsom Dam Road closure and after the implementation of the city's traffic calming program. Peak-hour intersection turning movement volumes, lane configurations, and traffic control devices for post-closure/post-traffic calming program conditions are presented on Figure 3.1-6.

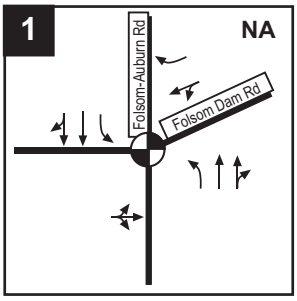
The Folsom Dam Road closure increased peak-period spreading and increased congestion along Riley Street, ~~East~~ Natoma Street, and Folsom-Auburn Road. Peak-period spreading is when congested traffic conditions occur for a longer period of time. Before the Folsom Dam Road closure, the evening peak period was approximately 4:00 PM to 6:00 PM. After the closure, the peak period extended or spread from approximately 3:30 PM to 6:30 PM. Increased congestion has also caused a "metering" effect such that the traffic volumes counted at the intersections along the congested corridors are not the actual peak hour demand (i.e., vehicles are unable to get through the intersection due to backup from upstream intersections).

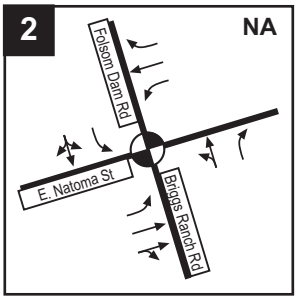
The intersection operations were analyzed to determine the change in delay and LOS, as compared in Table 3.1-3.

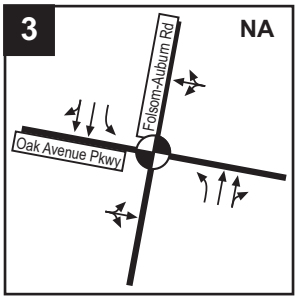
With the Folsom Dam Road closure, the two intersections at either end of Folsom Dam Road showed improved operations due to the reduction of traffic on one of the intersection legs. Traffic congestion was observed to increase substantially at the Folsom-Auburn Road/Greenback Lane intersection following the closure. Pre-closure counts are not available, so the magnitude of the increase cannot be quantified. LOS changes from LOS B/C to LOS E/F are reported at the intersections of Folsom Boulevard/~~East~~ Natoma Street following the Folsom Dam Road closure.

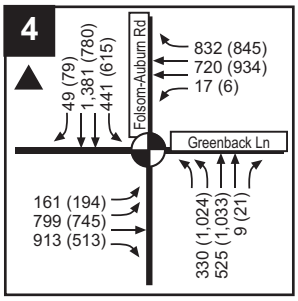
The operations of the Riley Street/Scott Street, Riley Street/Sutter Street, and ~~East~~ Natoma Street/Coloma Street intersections improved due to traffic diversion caused by the City of Folsom's traffic calming program. The intersections of Folsom-Auburn Road/Oak Avenue Parkway, Folsom-Auburn Road/Greenback Lane, and Riley Street/~~East~~ Natoma Street operated at levels below thresholds set forth by the City of Folsom during both peak periods with the Folsom Dam Road closure and the traffic calming program. Implementation of the traffic calming program compromised regional mobility to preserve the local quality of life and resulted

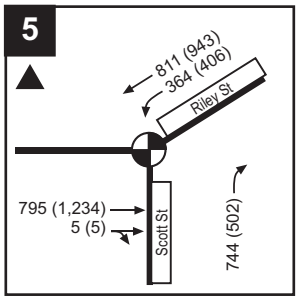


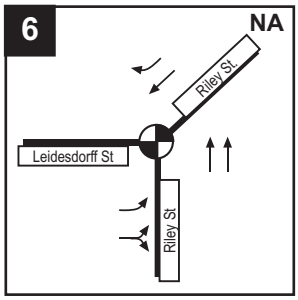


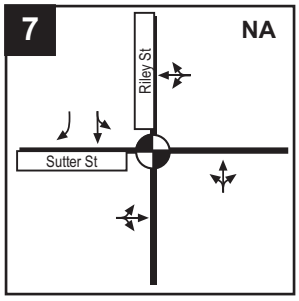


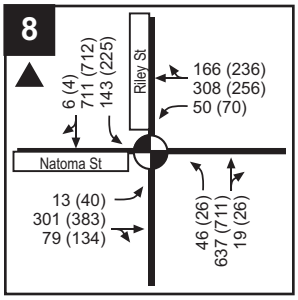


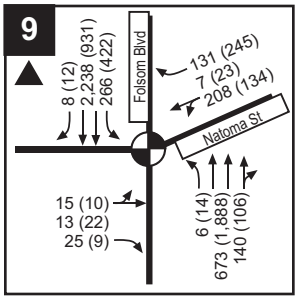


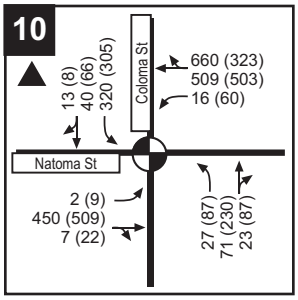












LEGEND:

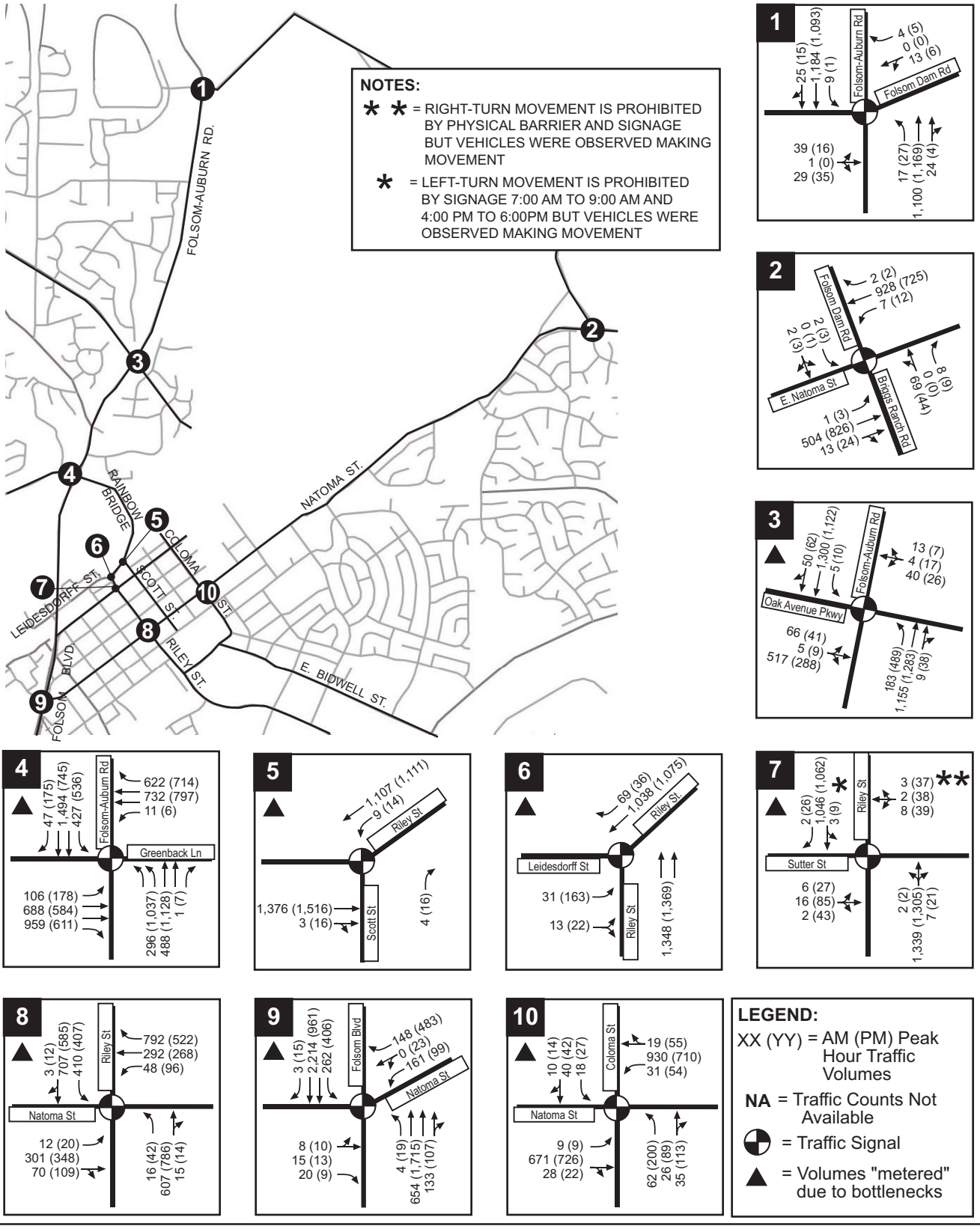
XX (YY) = AM (PM) Peak Hour Traffic Volumes

NA = Traffic Counts Not Available

= Traffic Signal

▲ = Volumes "metered" due to bottlenecks

SCALE: N.T.S.	N	Folsom Dam Road Restriction EIS 18600807	POST-CLOSURE (AND BEFORE TRAFFIC CALMING PROGRAM) PEAK HOUR INTERSECTION TRAFFIC VOLUMES AND LANE CONFIGURATIONS	Figure 3.1-5



SCALE: N.T.S.	N	Folsom Dam Road Restriction EIS 18600807	POST-CLOSURE (AND WITH TRAFFIC CALMING PROGRAM) PEAK HOUR INTERSECTION TRAFFIC VOLUMES AND LANE CONFIGURATIONS	Figure 3.1-6

in travel time increases for regional traffic due to implementation of measures to prevent neighborhood cut-through traffic.

Accident Data

The City of Folsom Police Department provided accident statistics for roadways citywide and those affected by the closure of Folsom Dam Road. The Department reported that the number of accidents during a 12-month period (March through February) increased by 16 percent citywide after Folsom Dam Road closed. In addition, during commute days (i.e., Monday through Friday) from March 2002 to February 2003, 310 accidents were reported on roadways affected by the closure. For the same days in 2003 through 2004, 461 accidents were reported. This represents a 49 percent increase in accidents on commute days for roadways impacted by the road closure, although it is based on only one year of post-road closure data. In most cases, an increase in traffic volumes can result in an increase in accidents, which could potentially be associated with the road closure and with traffic increases associated with local and regional growth.

3.1.2 Environmental Consequences

Evaluation Criteria

For traffic analysis, LOS criteria provide a means to compare impacts. The City of Folsom General Plan (1995) identifies LOS C as the city standard or goal for intersection operations. The Sacramento County General Plan (1993) establishes minimum LOS standards of LOS D for rural collectors and LOS E for urban roads. LOS C was used in this study to indicate locally "acceptable" operating conditions applicable in the City of Folsom.

Each of the alternatives is compared to No Action using the LOS scale of impact evaluation. Impacts of the Folsom Dam Road closure are identified if the alternatives result in any of the following:

- Deterioration of roadway segment operations from LOS C (or better) to LOS D (or worse), or addition of traffic to a segment operating at LOS D (or worse) that causes a change in the LOS category (e.g., an LOS of E changes to F)
- Deterioration of intersection operations from LOS C (or better) to LOS D (or worse), or addition of traffic to an intersection operating at LOS D (or worse) that causes a change in the LOS category
- Deterioration of overall travel time
- Interruption of existing or planned future bicycle, pedestrian, and transit operations
- Change in accident rates

As noted in the introduction, the evaluation of impacts is subdivided by two post-road closure study years: 2005 and 2013 (10 years after closure). The analytical methods for each of these study years are presented in the following pages, further broken down by roadway, intersection, travel time, and bike/transit impact categories. Traffic increases attributed to population growth in the City of Folsom were based on local land use planning assumptions, and have been taken into account in the analysis. Impacts for each alternative are discussed in Sections 3.1.2.1 through 3.1.2.4.

2005 Conditions

Year 2005 conditions (one year from the onset of the analysis) were evaluated to determine the near-term effects of each alternative. The No Action Alternative, the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative were evaluated on a peak-hour intersection and daily roadway segment basis.

Traffic and Roadway Operation Projections. Traffic volumes for 2005 were derived by applying annual growth rates to existing volumes. The annual growth rates were estimated by comparing 2001 and 2013 traffic projections from a modified version of the SACMET travel demand model. (The original SACMET model was developed by the Sacramento Area Council of Governments [SACOG].) The modified version used for this study was refined to include local roadway network and land use details to improve the model's forecasting accuracy in the study area. The model was run with two land use sets (2001 and 2013) and two roadway networks (with and without the Folsom Dam Road closure). The derived annual growth rates are 3.5 to 4.5 percent per year. A description of the SACMET model and forecasting methodology is presented in Appendix B.

Travel Times. Overall roadway operations were also evaluated by comparing travel times between the intersections of Folsom-Auburn Road/Folsom Boulevard and East Natoma Street/Folsom Dam Road via both the Rainbow Bridge and Lake Natoma Crossing in both directions during the AM and PM peak periods. The four routes are:

- Route 1: From Folsom-Auburn Road/Folsom Dam Road intersection to East Natoma Street/Folsom Dam Road intersection via the Rainbow Bridge
- Route 2: From East Natoma Street/Folsom Dam Road intersection to Folsom-Auburn Road/Folsom Dam Road intersection via the Rainbow Bridge
- Route 3: From Folsom-Auburn Road/Folsom Dam Road intersection to East Natoma Street/Folsom Dam Road intersection via the Lake Natoma Crossing
- Route 4: From East Natoma Street/Folsom Dam Road intersection to Folsom-Auburn Road/Folsom Dam Road intersection via the Lake Natoma Crossing

Surveys were performed to measure travel times for 2004 conditions. A modified version of the SACMET model was used to estimate travel times for 2005 No Action Alternative conditions. The percent increase in daily traffic volumes between No Action and the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3 were applied to the travel times for the No Action Alternative to determine travel times for these alternatives. Travel times are presented in Table 3.1-4.

Roadway Segment Analysis and Impacts. Roadway segment operations were evaluated for the No Action Alternative, Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and Long-Term Closure Alternative. Daily traffic volumes and levels of service for roadway segments are presented in Table 3.1-5. The following discusses the conditions predicted in 2005 for the No Action Alternative (no Folsom Dam Road access restriction) and compares the changes in level of service for the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative. The levels of service that are shown in bold in Table 3.1-5 indicate a change in LOS

Table 3.1-4
2005 Peak Hour Travel Times

Route	From	To	Peak Hour	No Action Alternative (minutes)	Preferred Alternative—Restricted Access Alternative 2 (minutes)	Restricted Access Alternative 3 (minutes)	Long-Term Closure Alternative (minutes)
1. Rainbow Bridge	Folsom-Auburn Road/ Folsom Dam Road	East Natoma Street/ Folsom Dam Road	AM PM	14.0 11.0	14.0 11.0	14.0 11.0	14.0 11.0
2. Rainbow Bridge	East Natoma Street/ Folsom Dam Road	Folsom-Auburn Road/ Folsom Dam Road	AM PM	10.0 10.0	11.0 11.0	11.5 11.5	11.0 13.0
3. Lake Natoma Crossing	Folsom-Auburn Road/ Folsom Dam Road	East Natoma Street/ Folsom Dam Road	AM PM	13.0 10.0	13.0 10.0	13.0 10.0	18.0 13.5
4. Lake Natoma Crossing	East Natoma Street/ Folsom Dam Road	Folsom-Auburn Road/ Folsom Dam Road	AM PM	10.0 13.5	10.0 14.0	10.0 14.0	14.0 17.5

Source: Fehr & Peers

Table 3.1-5
2005 Roadway Segment Levels of Service

Roadway	Facility Type	No Action Alternative		Preferred Alternative—Alternative 2 (5,800 vpd)		Alternative 3 (3,800 vpd)		Long-Term Closure Alternative	
		Daily Traffic Volumes (vpd)	LOS	Daily Traffic Volumes (vpd)	LOS	Daily Traffic Volumes (vpd)	LOS	Daily Traffic Volumes (vpd)	LOS
Folsom Dam Road	2-Lane Arterial	19,800	F	5,800	**C[1]**	3,800	**C[1]**	-	**-**
Riley Street Crossing (Rainbow Bridge)	2-Lane Arterial	36,500	F	40,300	**F**	41,800	**F**	45,300	**F**
Folsom Boulevard Crossing (Lake Natoma Crossing)	4-Lane Arterial, Divided	35,900	E	36,100	E	36,400	E	36,700	E
Folsom Boulevard (between Blue Ravine and Iron Point Road)	4-Lane Arterial, Divided	30,200	D	30,800	D	30,800	D	30,800	D
Folsom-Auburn Road (between Folsom Dam Road and Inwood Road)	4-Lane Arterial, Undivided	26,000	D	26,500	D	27,700	**E**	29,600	**F**
Folsom-Auburn Road (between Oak Avenue Parkway and Greenback Lane)	4-Lane Arterial, Divided	34,900	D	38,300	**F**	39,300	**F**	41,200	**F**
Natoma Street (between Folsom Boulevard and Sibley Street)	2-Lane Collector	8,500	D	10,900	**F**	11,700	**F**	13,600	**F**
East Natoma Street (between Cimmaron Circle and Folsom Dam Road)	2-Lane Arterial	15,700	D	19,800	**F**	19,800	**F**	19,800	**F**

Source: Fehr & Peers

Boldface text indicates a change in level of service with respect to No Action Alternative. Traffic added to roadways already operating at LOS F also shown in bold as these roads would be further affected.

vpd = vehicles per day

[1] The LOS is based on service rate of 960 vehicles per hour. LOS assumes the level of service thresholds for daily traffic volumes are 10% of the peak hour traffic (i.e., LOS C for 2-Lane Arterial is 970 vehicles per hour).

between the No Action Alternative and the three action alternatives. Levels of service that are not in bold do not change as a result of the alternatives. Although the volume of vehicles on the roadway may change as a result of the alternative, it is not substantial enough to cause a noticeable change in the level of service. Where a level of service degrades (e.g., from D to E or F), the impact is adverse. Where it improves (e.g., from C to B or A), the impact is beneficial. Traffic added to a roadway that is already at LOS F would be further adversely impacted; those roadways are also shown in bold.

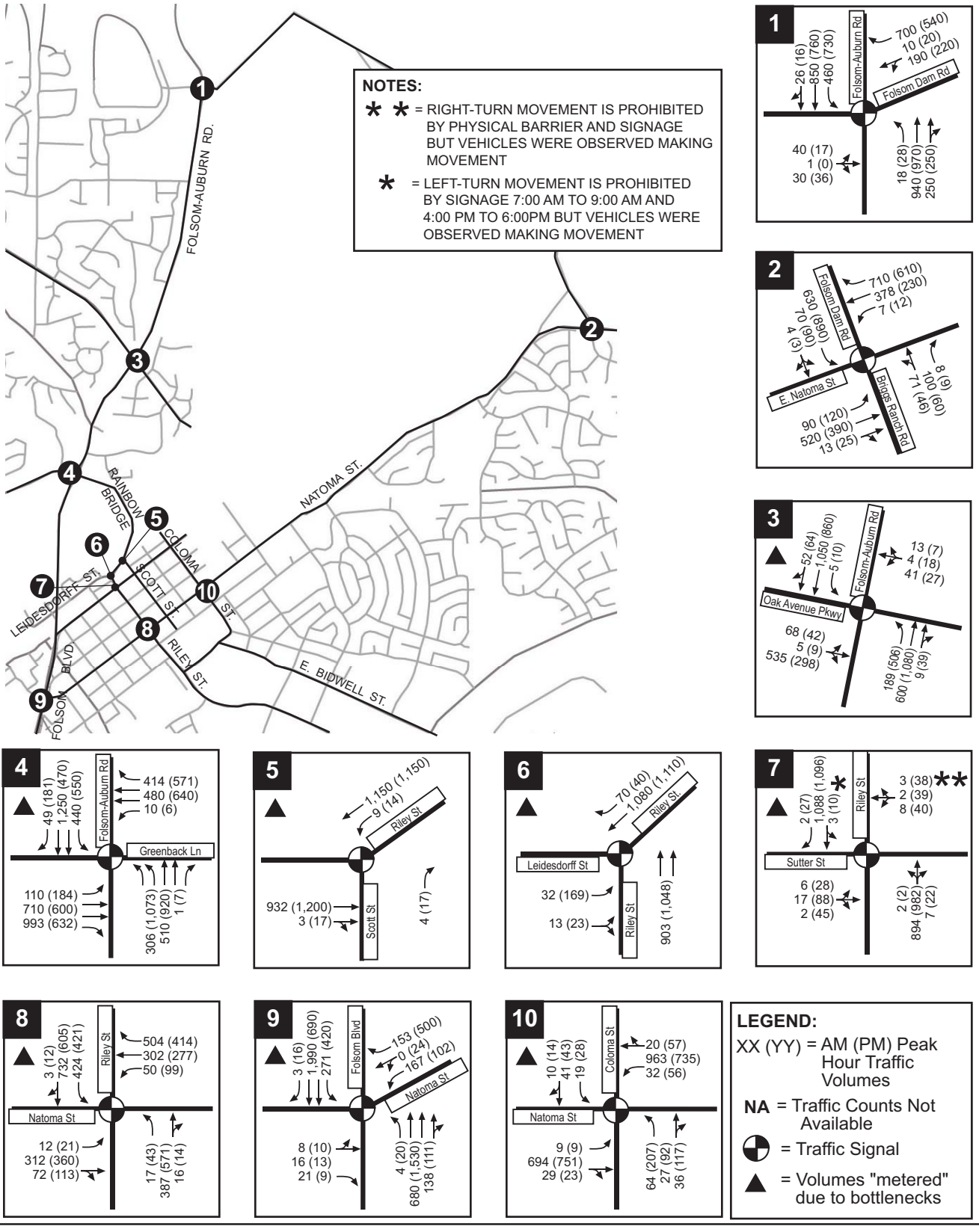
Intersection Operations and Impacts. Peak-hour intersection turning movement projections for 2005 for the No Action ~~and the Long-Term Closure~~ Alternative ~~are~~ is shown on Figure~~s~~ 3.1-7 ~~and 3.1-8, respectively~~. The percent increase in daily traffic volumes between No Action and the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3 were applied to the intersection delay for the No Action Alternative to determine the intersection operations for those alternatives, which are listed in Table 3.1-6. LOS calculations were conducted to evaluate intersection operations with the traffic projections. The lane configurations were assumed to be the same as the existing conditions as no planned improvements are to be competed within the year (M. Rackovan, pers. comm., 2004a). Similar to the analysis of roadways, the levels of service that are shown in bold in Table 3.1-6 indicate a change in traffic operations at the intersection that is substantial enough to change the estimated level of service (with respect to the No Action Alternative).

2013 Conditions

Year 2013 conditions, 10 years after the initial action of closing Folsom Dam Road, were evaluated to determine the long-term effects of each alternative.

Traffic Modeling Changes and Roadway Operations. To forecast conditions in future years, a modified version of the SACMET model (described in Appendix B) was used. The following describes the adjustments made to the model for this evaluation.

- Land Use Projections: Modifications were made to the model to reflect recently approved projects and other land uses anticipated for completion by 2013. A detailed discussion is provided in Appendix B.
- Transportation System Changes: The model network was modified to incorporate planned and funded improvements anticipated for completion by 2013. These improvements are described in Table 3.1-7. The ~~Folsom Dam Bypass~~Folsom Bridge Project ~~Project~~, which would provide a new ~~Lake Natoma~~ crossing of the American River, was included in the 2013 analysis although it has not been funded as of the date of this analysis. The project has a construction date of 2007/2008, and the City of Folsom and the U.S. Army Corps of Engineers (USACE) are committed to this delivery date.



SCALE: N.T.S.	N	Folsom Dam Road Restriction EIS 18600807	2005 NO ACTION PEAK HOUR INTERSECTION TRAFFIC VOLUMES AND LANE CONFIGURATIONS	Figure 3.1-7

Table 3.1-6
2005 Intersection Levels of Service

Intersection	Peak Hour	No Action Alternative		Preferred Alternative—Restricted Access Alternative 2 (5,800 vpd)		Restricted Access Alternative 3 (3,800 vpd)		Long-Term Closure Alternative	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Folsom-Auburn Road/ Folsom Dam Road	AM	>80	F	63	**E**	72	**E**	9	**A**
	PM	>80	F	>80	F	>80	F	8	**A**
East Natoma Street/ Folsom Dam Road	AM	42	D	30	**C**	34	**C**	11	**B**
	PM	33	C	23	C	27	C	9	**A**
Folsom-Auburn Road/ Oak Avenue Parkway	AM	60*	E	66*	E	68*	E	70*	E
	PM	51*	D	56*	**E**	58*	**E**	68*	**E**
Folsom-Auburn Road/ Greenback Lane	AM	>80	F	>80	**F**	>80	**F**	>80	**F**
	PM	>80	F	>80	**F**	>80	**F**	>80	**F**
Riley Street/Scott Street	AM	4*	A	5*	A	5*	A	5*	A
	PM	7*	A	8*	A	8*	A	8*	A
Riley Street/ Leidesdorff Street	AM	4*	A	4*	A	4*	A	4*	A
	PM	9*	A	9*	A	9*	A	9*	A
Riley Street/Sutter Street	AM	4*	A	5*	A	5*	A	15*	**B**
	PM	16*	B	18*	B	18*	B	31*	**C**
Riley Street/ Natoma Street	AM	52*	D	57*	**E**	57*	**E**	>80	**F**
	PM	79*	E	>80	**F**	>80	**F**	>80	**F**
Folsom Boulevard/ Natoma Street	AM	25*	C	32*	C	36*	**D**	36*	**D**
	PM	38*	D	39*	D	39*	D	39*	D
Natoma Street/ Coloma Street	AM	17*	B	18*	B	18*	B	18*	B
	PM	27*	C	28*	C	28*	C	28*	C

Source: Fehr & Peers
Boldface text indicates a change in level of service with respect to the No Action Alternative. If traffic would be added to a roadway already operating at LOS F, the LOS is also shown in bold as this road would be further affected.
* = Delay is higher than indicated and LOS may be worse due to traffic backup from upstream intersection.
vpd = vehicles per day

Table 3.1-7
2013 Transportation Improvement Projects Within Regional Study Area

Location	Description
USACE	
~~Folsom Dam Bypass~~Folsom Bridge Project	Construct two-lane bridge adjacent to dam
City of Folsom Department of Public Works – Tier 1: Publicly Funded	
Blue Ravine Road	Widen westbound approach to Folsom Boulevard for dual left-turn lanes and exclusive through and right-turn lanes
East Bidwell Street	Widen to six lanes from Oak Avenue Parkway to Blue Ravine Road
East Natoma Street	Widen to four lanes from Fargo Way to Blue Ravine Road
Folsom-Auburn Road	Widen to four lanes from Folsom Dam Road to Beals Point Road
Oak Avenue Parkway	Widen to six lanes from Folsom-Auburn Road to Baldwin Dam Road

Table 3.1-7, concluded

Location	Description
Sibley Street	Widen from two to four lanes between Blue Ravine Road and Glenn Drive
Glenn Drive	Widen from two to four lanes between Sibley Street and Folsom Boulevard
City of Folsom Department of Public Works – Tier 1: Developer Funded or Partially Developer Funded	
Broadstone Parkway	Construct four-lane section from Golf Links Drive to Empire Ranch Road
Empire Ranch Road	Construct four-lane section from El Dorado County line to Iron Point Road
Iron Point Road	Extend with four-lane intersection from Grover Road east to East Bidwell Street to El Dorado
U.S. 50 at Empire Ranch Road	Construct four-lane interchange
Sacramento County Department of Transportation – Tier 1: Publicly Funded	
Folsom Boulevard	Widen to four or five lanes, from Sunrise Boulevard to Aerojet Road
Madison Avenue	Widen from four to six lanes, from Sunrise Boulevard to Hazel Avenue
Sacramento County Department of Transportation – Tier 1: Developer- or Partially Developer-Funded	
Greenback Lane	Widen from four to six lanes, from Sunrise to Hazel Avenue
Hazel Avenue	Widen from two to four lanes, from Oak Avenue to Old Auburn Road in Placer County
Sacramento Regional Transit District – Tier 1: Publicly Funded	
Folsom Light Rail Corridor	Downtown Sacramento to Folsom Light Rail Extension
El Dorado County Department of Transportation – Tier 1: Developer Funded or Partially ~~DeveloperFunded~~Developer Funded	
Green Valley Road	Widen from two to four lanes, from the Sacramento/El Dorado County line to San Francisco Drive (includes intersection improvements with signals at various intersections)
Silva Valley Parkway	Construct new two-lane road from Serrano to White Rock Road
Placer County Department of Public Works – Tier 1: Publicly or Developer Funded	
Auburn-Folsom Road	Widen from two to four lanes from Roseville City limits to Oak Hill Drive
Auburn-Folsom Road	Widen from two to four lanes from Douglas Boulevard to Fuller Drive
Auburn-Folsom Road	Widen from two to four lanes from Fuller Drive to Oak Hill Drive

Source: Metropolitan Transportation Plan (MTP) for 2025, SACOG.

- Traffic Projections: Traffic projections were developed for all alternatives by incorporating changes to the model network to account for Folsom Dam Road being fully open, being closed, and being open on a limited basis (for the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3). Daily growth projected by the model was added to existing daily traffic. A growth rate of 8 percent per year was used for Folsom-Auburn Road, and 9 percent per year was used for East Natoma Street. With the ~~Folsom Dam Bypass~~Folsom Bridge Project ~~Project~~, some of the vehicles using the Riley Street and Folsom Boulevard crossings would reroute to the new bridge. Therefore, in some cases, volumes in 2013 are lower than existing conditions.

Travel Times. Roadway operations were evaluated by comparing AM and PM peak hour travel times between Folsom-Auburn Road/Folsom Dam Road and East Natoma Street/Folsom Dam Road via the Rainbow Bridge and Lake Natoma Crossing. Table 3.1-8 presents 2013 travel times.

Roadway Segment Analysis. The daily traffic projections and resulting levels of service are presented in Table 3.1-9.

Table 3.1-8
2013 Peak Hour Travel Times

Route	From	To	Peak Hour	No Action Alternative (minutes)	Preferred Alternative—Restricted Access Alternative 2 (minutes)	Restricted Access Alternative 3 (minutes)	Long-Term Closure Alternative (minutes)
Rainbow Bridge	Folsom-Auburn Road/ Folsom Dam Road	East Natoma Street/ Folsom Dam Road	AM PM	15.0 11.5	17.0 13.0	17.0 13.0	17.0 13.0
Rainbow Bridge	East Natoma Street/ Folsom Dam Road	Folsom-Auburn Road/ Folsom Dam Road	AM PM	12.0 14.5	13.0 16.5	13.0 16.5	13.0 16.5
Lake Natoma Crossing	Folsom-Auburn Road/ Folsom Dam Road	East Natoma Street/ Folsom Dam Road	AM PM	15.0 14.0	15.5 14.5	15.5 14.5	17.0 16.0
Lake Natoma Crossing	East Natoma Street/ Folsom Dam Road	Folsom-Auburn Road/ Folsom Dam Road	AM PM	13.5 15.0	14.0 15.5	14.0 15.5	16.5 16.5

Source: Fehr & Peers

Table 3.1-9
2013 Roadway Segment Levels of Service

Roadway	Facility Type	No Action Alternative		Preferred Alternative—Alternative 2 (5,800 vpd)		Alternative 3 (3,800 vpd)		Long-Term Closure Alternative	
		Daily Traffic Volumes (vpd)	LOS	Daily Traffic Volumes (vpd)	LOS	Daily Traffic Volumes (vpd)	LOS	Daily Traffic Volumes (vpd)	LOS
Folsom Dam Road	2-Lane Arterial	15,100	D	5,800	**C[1]**	3,800	**C[1]**	-	-
Riley Street Crossing (Rainbow Bridge)	2-Lane Arterial	34,600	F	41,500	**F**	42,500	**F**	44,600	**F**
Folsom Boulevard Crossing (Lake Natoma Crossing)	4-Lane Arterial, Divided	41,800	F	42,800	**F**	42,900	**F**	43,200	**F**
Folsom Boulevard (between Blue Ravine and Iron Point Road)	4-Lane Arterial, Divided	32,500	D	34,200	D	34,200	D	34,200	D
Folsom-Auburn Road (between Folsom Dam Road and Inwood Road)	4-Lane Arterial, Undivided	29,400	F	31,700	**F**	32,700	**F**	34,600	**F**
Folsom-Auburn Road (between Oak Avenue Parkway and Greenback Lane)	4-Lane Arterial, Divided	39,000	F	44,900	**F**	45,900	**F**	47,800	**F**
Natoma Street (between Folsom Boulevard and Sibley Street)	2-Lane Collector	8,500	D	14,300	**F**	14,300	**F**	14,300	**F**
East Natoma Street (between Cimmaron Circle and Folsom Dam Road)	4-Lane Arterial, Undivided	17,800	D	22,800	D	22,800	D	22,800	D
~~Folsom Dam Bypass~~Folsom Bridge Project (USACE)	2-Lane Arterial	19,600	F	24,500	**F**	25,200	**F**	26,700	**F**

Source: Fehr & Peers

vpd = vehicles per day

Boldface text indicates a change in level of service with respect to the No Action Alternative. If traffic would be added to a roadway already operating at LOS F, the LOS is also shown in bold as this road would be further affected.

[1]The LOS is based on service rate of 960 vehicles per hour. LOS assumes the level of service thresholds for daily traffic volumes are 10% of the peak hour traffic (i.e., LOS C for 2-Lane Arterial is 970 vehicles per hour).

3.1.2.1 No Action Alternative

2005 Conditions

Roadway Operations. All of the roadway segments would operate at a level of service below LOS C under 2005 No Action conditions (i.e., LOS D, E, or F). Under existing conditions prior to the closure of Folsom Dam Road, only one roadway segment on Folsom-Auburn Road operated at an acceptable level (Folsom Auburn Road between Folsom Dam Road and Inwood Road [Table 3.1-2]). By 2005, it is projected to operate at LOS D. Folsom Dam Road is projected to degrade from LOS D to LOS F. All level of service declines from existing conditions to study year 2005 are due to projected growth in the area. There are no impacts from the No Action Alternative since it is the basis of comparison to the other alternatives.

Intersection Operations. With projected growth in traffic to 2005 No Action conditions (i.e., changes projected to occur due to growth in traffic with Folsom Dam Road open), the Folsom-Auburn Road/Folsom Dam Road, Folsom-Auburn Road/Greenback Lane, and Riley Street/~~East~~ Natoma Street intersections would operate below acceptable levels during both the AM and PM peak periods. The East Natoma Street/Folsom Dam Road intersection operated at LOS C under existing conditions during the AM peak hour; it would degrade to LOS D in 2005. The Folsom-Auburn Road/Folsom Dam Road intersection operated at LOS D during the existing AM peak hour but would degrade to LOS F in 2005. The Folsom Boulevard/~~East~~ Natoma Street intersection operated at LOS B under existing conditions during the PM peak hour; it would operate at LOS D in 2005. In addition, traffic backup from upstream intersections would continue to cause operations to fall below acceptable standards at the Riley Street/Scott Street, Riley Street/Leidesdorff Street, Riley Street/Sutter Street, and ~~East~~ Natoma Street/Coloma Street intersections.

Bicycle and Pedestrian Impacts. Under the No Action Alternative, existing motor vehicle traffic would increase on Natoma Street, Folsom-Auburn Road, and Folsom Boulevard, which provide pedestrian and bicycle facilities. This is noted as an impact with respect to potential pedestrian/bicycle facilities, but no ~~planned~~ existing or planned future facilities will be physically affected.

Transit Impacts. The Sacramento Regional Transit light rail service is expected to be operational in downtown Folsom by 2005. The 2005 bus transit service was assumed to be the same as existing as there are no planned improvements (M. Rackovan, pers. comm., 2004b). Currently, bus service is provided along Riley Street and Folsom-Auburn Road.

Peak hour travel times are expected to increase on Riley Street and Folsom-Auburn Road. In addition, daily traffic levels would increase on the study roadways. Transit providers may need to increase the number of vehicles in their fleets to maintain existing headways.

2013 Conditions

Roadway Operations. Growth within and near the City of Folsom would continue to increase traffic and congestion on the area's roadways through the year 2013. However, the planned transportation improvements will increase capacity and help offset some of the adverse impacts of this growth. Conditions on Folsom Dam Road and the Riley Street crossing will operate better, and Natoma Street between Folsom Boulevard and Sibley Street will maintain the same volume in 2013 compared to 2005 primarily due to the proposed ~~Folsom Dam Bypass~~Folsom

Bridge Project ~~Project~~, which will carry approximately 20,000 vehicles per day. Volumes are predicted to increase between 2,000 to 6,000 vehicles per day on the other study roads, with largest increase predicted on the Lake Natoma Crossing. All of the roadway segments would continue to operate at a level of service that is below the standard determined by the City of Folsom as acceptable under 2013 No Action conditions. Five of the six study segments are projected to operate at LOS F. All of these changes are due to growth in the area even with the implementation of other transportation improvements (such as the aforementioned ~~Folsom Dam Bypass~~Folsom Bridge Project ~~Project~~).

Bicycle, Pedestrian, and Transit Impacts. Potential effects to these modes of transportation for all remaining alternatives and all study years would be the same as those described for 2005 conditions.

For any of the study years described above, near-complete access to Folsom Dam Road poses a risk of dam failure under the No Action Alternative. If dam failure occurs, local and regional transportation networks would be impacted. Folsom Dam Road would be closed indefinitely. Other roadways would also be closed.

3.1.2.2 Preferred Alternative—Restricted Access Alternative 2

2005 Conditions

Roadway Operations. As described in Section 2.2.2, this alternative allows restricted access for inspected vehicles across Folsom Dam Road. With this alternative, Folsom Dam Road would have restricted hours of use, and vehicles would be subject to inspection. As a result, Folsom Dam Road under this scenario is estimated to carry 5,800 vehicles per day, assuming that the proposed level of inspection service can be achieved and maintained. Based on vehicle counts, the capacity of the two-lane unrestricted Folsom Dam Road is estimated at 950 vehicles per hour per lane or a total of 1,900 vehicles per hour for two lanes. As discussed in Section 2.2.2, with an average 30-second delay per vehicle for inspections or to allow for vehicles to slow down through the inspection area, 120 cars per hour per lane can be achieved in one direction. To m~~M~~eet or approach~~ing~~ the pre-closure capacity would therefore require either ~~eight inspection~~additional lanes or ~~an increased~~a faster inspection rate ~~by another method that achieves the same traffic flow rate~~. The following impacts are identified:

- Compared with the No Action Alternative, levels of service on one segment of Folsom-Auburn Road and two segments of Natoma Street would degrade from D to F. All other levels of service would be approximately the same in comparison to the No Action Alternative.
- Compared to No Action, the Preferred Alternative—Restricted Access Alternative 2 would increase traffic on Rainbow Bridge by approximately 4,000 vehicles per day. The bridge is already at LOS F.

Intersection Operations. The forecasts indicate that intersection levels of service for the Preferred Alternative—Restricted Access Alternative 2 would continue to operate at acceptable levels and would be the same as under the No Action Alternative (i.e., no adverse impact) at the Riley Street/Scott Street, Riley Street/Leidesdorff Street, Riley Street/Sutter Street, and ~~East~~ Natoma Street/Coloma Street intersections. The Preferred Alternative—Restricted Access Alternative 2 would also allow sufficient traffic to cross Folsom Dam Road that the level of

service at the intersection of Folsom Boulevard/Natoma Street would not degrade below LOS C (same as under No Action). Operations at the Folsom-Auburn Road/Folsom Dam Road and East Natoma Street/Folsom Dam Road intersections would improve slightly with the Preferred Alternative—Restricted Access Alternative 2 due to the limited flow of traffic on Folsom Dam Road but would still operate at poor levels of service (LOS E and F) (a beneficial impact with respect to the No Action Alternative). The following adverse impacts would occur with respect to the No Action Alternative:

- The Folsom-Auburn Road/Oak Avenue Parkway and Riley Street/~~East~~ Natoma intersection level of service operations would worsen.
- Traffic would increase at the Folsom-Auburn Road/Greenback Lane intersection, which is already functioning at LOS F.

Vehicle Miles Traveled and Travel Times. Based on the SACMET model output, total daily vehicle miles traveled (VMT), vehicle hours traveled, and vehicle hours of delay were estimated for the study area for the 2005 study year[2] (Table 3.1-10). The following table shows slight differences in VMT between the Preferred Alternative—Restricted Access Alternative 2 and the No Action Alternative (total miles traveled is improved or lowered by 500 VMT per day with the Preferred Alternative—Restricted Access Alternative 2). The travel performance measures are the same for total hours traveled and delay.

Table 3.1-10
2005 Travel Model Results

Metric	No Action	Preferred Alternative—Restricted Access Alternative 2	Restricted Access Alternative 3	Long-Term Closure Alternative
Vehicle Miles Traveled	2,338,000	2,338,500	2,339,000	2,340,000
Vehicle Hours Traveled	70,700	70,700	71,200	71,500
Vehicle Hours of Delay	12,200	12,200	12,700	13,100

Table 3.1-4 showed 2005 peak hour travel times for the No Action Alternative and the Preferred Alternative—Restricted Access Alternative 2. As shown in that table, travel times on study Routes 1 and 3 would be the same as for the No Action Alternative. However, peak hour travel times would increase on Route 2 (1 minute in both the AM and PM peaks) and Route 4 (30 seconds in the PM peak only).

2013 Conditions

Roadway Operations. Under the Preferred Alternative—Restricted Access Alternative 2, traffic would increase on all study roadways in 2013 except for Folsom Dam Road but would only degrade level of service operations in one segment. As compared to No Action, traffic on Rainbow Bridge, the Lake Natoma Crossing, and the ~~Folsom Dam Bypass~~Folsom Bridge Project

[2] The results for some of these travel measures were rounded to fewer digits in the Draft EIS. For the Final EIS, the results are reported with less rounding to highlight the difference among the model outputs.

(assumed to be completed in~~by~~ December 2007~~/2008~~) would increase by a total of approximately 13,000 vehicles per day. The following adverse impacts would occur:

- Almost all roadway segments would already operate at LOS F. Volumes would increase on all roadway segments. The level of service on Natoma Street between Folsom Boulevard and Sibley Street would decline from LOS D to F.
- Five roadways already operating at LOS F would be adversely affected by additional traffic diverted to them, in comparison to the No Action Alternative.

Vehicle Miles Traveled and Travel Times. For the study year 2013, the travel model shows a decrease in total VMT between the No Action Alternative and the Preferred Alternative—Restricted Access Alternative 2. The Preferred Alternative—Restricted Access Alternative 2 shows a decrease in miles traveled (in comparison to No Action, due to the continued restrictions on use of Folsom Dam Road) and an increase in hours traveled and delay. The model results are summarized in Table 3.1-11.

Table 3.1-11
2013 Travel Model Results

	No Action	Preferred Alternative – Restricted Access Alternative 2*	Restricted Access Alternative 3*	Long-Term Closure Alternative
Vehicle Miles Traveled	3,268,000	3,258,000	3,257,000	3,249,000
Vehicle Hours Traveled	100,100	101,000	100,300	100,500
Vehicle Hours of Delay	17,600	17,800	18,200	18,500

* Note that in 2013, after the Folsom Bridge Project (new bridge) is open for use (as currently scheduled), the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3 would not be relevant because Folsom Dam Road is planned to be closed completely. Under those circumstances, the travel conditions would reflect the values listed for the Long-Term Closure Alternative column. For purposes of analysis, this table shows VMT, vehicle hours traveled, and vehicle hours of delay with Folsom Dam Road open under restricted use continuing into 2013.

Table 3.1-8 shows 2013 peak hour travel times for the No Action Alternative and the Preferred Alternative—Restricted Access Alternative 2. As shown in the table, peak hour travel times for the Preferred Alternative—Restricted Access Alternative 2 would increase on all four routes by approximately 30 seconds to 2 minutes.

Accidents. As noted at the end of Section 3.1.1.3 ("Accident Data"), the City of Folsom's traffic accident data showed an increase in incidents for the year following the complete closure of Folsom Dam Road, in comparison to the year prior to the closure. The City of Folsom Police Department has cited congestion related to the closure as the primary contributor to the increase in recorded accidents. Subsequent periods of data collection and comparison over longer time periods would be needed to verify a sustained trend, but, in general, increases in traffic and congestion can lead to increases in accidents. As the risk of accidents increases for motor vehicles, it could also increase for pedestrians and bicyclists. In reopening Folsom Dam Road during peak periods, the Preferred Alternative—Restricted Access Alternative 2 has the potential to result in a decrease in accident rates compared to the year following the closure, assuming the recorded increase in accidents after February 2003 was caused by the increase in congestion and

that the Preferred Alternative—Restricted Access Alternative 2 can noticeably decrease congested conditions.

3.1.2.3 Restricted Access Alternative 3

2005 Conditions

Roadway Operations. Similar to the Preferred Alternative—Restricted Access Alternative 2, this alternative would allow restricted access across Folsom Dam Road, but at a lower service rate than the Preferred Alternative, as it assumes that less inspection capacity is available at each end of Folsom Dam Road and vehicle flow would be allowed in one direction only (changing between AM and PM peak periods). Folsom Dam Road would carry an estimated 3,800 vehicles per day (500 vehicles per hour), again assuming the proposed inspection rate or flow of traffic can be achieved and maintained (as described in Section 2.2.3). This alternative would allow for 2,000 fewer vehicles per day than the Preferred Alternative—Restricted Access Alternative 2 (i.e., 5,800 minus 3,800). Five hundred vehicles per hour is about half of the pre-closure one-way capacity of each lane. At an average inspection rate of 30 seconds per vehicle, achieving this volume would require either four inspection lanes or an equivalent method that provides the same rate of traffic flow. Vehicles using Folsom Dam Road would be diverted from other roadways in the area, improving their operations, but the diversion is less effective in general than the Preferred Alternative—Restricted Access Alternative 2. Under Restricted Access Alternative 3, all roadway segments in the study area except Folsom Dam Road would have service levels below LOS C and higher daily traffic volumes than the No Action Alternative. The following adverse impacts are identified:

- Traffic on one segment of Folsom-Auburn Road and two segments of Natoma Street would degrade from LOS D to F. One roadway segment, Folsom-Auburn Road between Folsom Dam Road and Inwood Road, would operate at LOS E in comparison to LOS D with the No Action Alternative.
- Restricted Access Alternative 3 would add more than 5,000 vehicles per day to the Rainbow Bridge as compared to the No Action Alternative.

Intersection Operations. A lower number of cars would be inspected under Restricted Access Alternative 3 than under the Preferred Alternative—Restricted Access Alternative 2, but the resulting level of service changes are the same except for one intersection (Folsom Boulevard/Natoma Street in the AM peak period). Compared with the No Action Alternative, the following adverse impacts would occur:

- The Folsom-Auburn Road/Oak Avenue Parkway and Riley Street/~~East~~ Natoma Street intersection level of service operations would worsen because traffic would increase along Folsom-Auburn Road and Folsom Boulevard.
- Traffic would increase at the Folsom-Auburn Road/Greenback Lane intersection, which is already functioning at LOS F (same as the No Action Alternative, but traffic volumes using the intersection would be slightly higher).
- The Folsom Boulevard/Natoma Street intersection would decline from LOS C to D in the AM peak hour.

Vehicle Miles Traveled and Travel Times. Restricted Access Alternative 3 would result in a slight increase in total VMT, hours traveled, and delay in comparison to the Preferred Alternative—Restricted Access Alternative 2 and the No Action Alternative (Table 3.1-10). Table 3.1-4 shows 2005 peak hour travel times for the No Action Alternative and Restricted Access Alternative 3. As shown in the table, travel times on Routes 1 and 3 would be the same as under the No Action Alternative. However, peak hour travel times would increase on Route 2 (1.5 minutes in both the AM and PM peaks) and Route 4 (30 seconds in the PM peak only).

2013 Conditions

Roadway Operations. Under Restricted Access Alternative 3, all of the roadway segments except Folsom Dam Road would operate at service levels below the acceptable standard, according to the City of Folsom General Plan. As compared to No Action, traffic on Rainbow Bridge, the Lake Natoma Crossing, and the ~~Folsom Dam Bypass~~Folsom Bridge Project would increase by approximately 15,000 vehicles per day. The following adverse impacts are identified:

- Compared to No Action, the level of service on Natoma Street between Folsom Boulevard and Sibley Street would decline from LOS D to F.
- Volumes on all study roadways except Folsom Dam Road would be higher than with the No Action Alternative, but not enough to degrade the level of service.

Vehicle Miles Traveled and Travel Times. Travel measures are listed in Table 3.1-11 for the 2013 study year. Table 3.1-8 shows 2013 peak hour travel times for the No Action Alternative and Restricted Access Alternative 3. As shown in the table, peak hour travel times for Alternative 3 would increase on all four routes by approximately 30 seconds to 2 minutes.

Accidents. As discussed for the Preferred Alternative—Restricted Access Alternative 2, assuming that Folsom's recorded increase in accident rates following the complete road closure is directly associated with congestion, some decrease in accidents might also occur with Restricted Access Alternative 3. As the risk of accidents decreases for motor vehicles, it could also decrease for pedestrians and bicyclists.

3.1.2.4 Long-Term Closure Alternative

2005 Conditions

Roadway Operations. All of the study roadway segments are projected to operate at levels below LOS C in 2005 with the Long-Term Closure Alternative, as is predicted for the other alternatives. The Long-Term Closure Alternative would result in an increase in traffic on all roadway segments, with the obvious exception of Folsom Dam Road as it would remain closed. Traffic on three study area roadways (Rainbow Bridge, Lake Natoma Crossing, and Folsom Boulevard between Blue Ravine and Iron Point Roads) would increase but would not result in a change in level of service in comparison to the No Action Alternative. In comparison to the No Action Alternative, the following adverse impacts would occur based on a predicted change in the level of service:

- Traffic on four other segments of Folsom-Auburn Road and Natoma Street would increase enough to change levels of service from D to F, which is a noticeable, adverse impact (see Table 3.1-5).

- Compared to the No Action Alternative, the Long-Term Closure Alternative is predicted to increase traffic on the Rainbow Bridge by approximately 10,000 vehicles per day. The bridge is already at LOS F. This impact would further increase delay time at this congested roadway segment.

Intersection Operations. With the Long-Term Closure Alternative (in comparison to the No Action Alternative), the two intersections at either end of Folsom Dam Road show improved operations due to the reduction of traffic on one of the intersection legs (i.e., due to Folsom Dam Road being closed). The levels of service change in the AM and PM peak period at the Riley Street/Sutter Street intersection, but even with the change it continues to operate better than the city's LOS C criteria. The analysis indicates that the Riley Street/Scott Street, Riley Street/Leidesdorff Street, Riley Street/Sutter Street, and ~~East~~ Natoma Street/Coloma Street intersections would operate acceptably; however, traffic backup from adjacent intersections could cause higher delays. The following adverse impacts are identified:

- The Folsom-Auburn Road/Oak Avenue Parkway would degrade from LOS D to E in the PM peak period.
- Folsom-Auburn Road/Greenback Lane operations (already at LOS F) worsen with the Long-Term Closure Alternative because the Folsom Dam Road closure increases traffic along Folsom-Auburn Road and Folsom Boulevard.
- The Riley Street/~~East~~ Natoma Street intersection would degrade from LOS D/E to LOS F.
- The Folsom Boulevard/Natoma Street intersection would degrade from LOS C to D during the AM peak hour.

Vehicle Miles Traveled and Travel Times. Modeling results for these traffic measures are listed in Table 3.1-10. ~~Accounting for T~~the SACMET model~~'s accuracy and rounding the results accordingly, the model~~ estimated that the total daily vehicle miles traveled within the study area would ~~generally~~ be slightly higher with ~~the same with and without the Folsom Dam Road closure with~~ the Long-Term Closure Alternative than with the other alternatives[3]. ~~However, the Long-Term Closure Alternative would increase the vehicle hours traveled by approximately 1 percent and the vehicle hours of delay by approximately 7 percent.~~

~~In Section 3.1.2, three representative routes were defined that were modeled to forecast the total travel time for the different routes between the Folsom-Auburn Road/Folsom Boulevard and East Natoma Street/Folsom Dam Road intersections.~~ Table 3.1-4 shows 2005 peak hour travel times for the No Action Alternative and Long-Term Closure Alternative for each of the study routes. As shown in the table, travel times on Route 1 are the same as for the No Action Alternative. However, peak hour travel times would increase on Route 2 (1 minute in the AM peak and 3 minutes in the PM peak), Route 3 (5 minutes in the AM peak and 3.5 minutes in the PM peak), and Route 4 (4 minutes in both the AM and PM peaks).

[3] ~~The model showed a difference in vehicle miles traveled of less than 200 miles daily total for the entire study area (the Long-Term Closure Alternative miles traveled were greater than the No Action Alternative). Accounting for assumptions in the study, the model accuracy, and rounding of predicted results, the difference is negligible and is considered the same for alternatives in the 2005 study year.~~

2013 Conditions

Roadway Operations. Relative to the No Action Alternative, traffic volumes on roadways within the study area would further increase with the Long-Term Closure Alternative. Although the ~~Folsom Dam Bypass~~Folsom Bridge Project is assumed to be completed ~~by 200~~in December 2007~~7/2008~~, projected growth to 2013 continues to increase on all roadway segments. As noted above, a total of five roadway segments are already projected to operate at LOS F with the No Action Alternative. One more roadway, East Natoma Street between Cimmaron Circle and Folsom Dam Road, would drop from LOS D to F with Folsom Dam Road closed. The Folsom Dam Road closure would increase traffic on the Rainbow Bridge, Lake Natoma Crossing, and ~~Folsom Dam Bypass~~Folsom Bridge Project by approximately 18,000 vehicles per day. In addition, traffic volumes on East Natoma Street and on Folsom-Auburn Road between Folsom Dam Road and Inwood Road would increase by approximately 5,000 vehicles per day. The following adverse impacts would occur:

- The level of service on East Natoma Street between Cimmaron Circle and Folsom Dam Road would decline from LOS D to F.
- Five roadways already operating at LOS F would be adversely affected by additional traffic diverted to them, compared to the No Action Alternative.

Vehicle Miles Traveled and Travel Times. Table 3.1-11 provides estimated miles traveled and hours of travel and delay.~~The SACMET model estimated that the daily vehicle miles traveled within the study area would be 6 percent higher under the No Action Alternative than under the Long-Term Closure Alternative. Vehicle hours traveled for the study area would be nearly equal without and with the Folsom Dam Road closure. This is partly due to the addition of the Folsom Dam Bypass~~Folsom Bridge Project~~. However, the Long-Term Closure Alternative would increase the vehicle hours of travel by approximately 5 percent.~~

Table 3.1-8 shows 2013 peak hour travel times for the No Action Alternative and Long-Term Closure Alternative. As shown in the table, peak hour travel times for the Long-Term Closure Alternative would increase on all four routes by approximately 1 to 3 minutes.

Accidents. Growth in the City of Folsom and nearby communities is planned for and expected to continue. Together with the road closure, this will also contribute to future trends in accident rates, assuming an association between traffic volume increases and accident incidents. Under the Long-Term Closure Alternative, accident rates would remain similar to those following the February 2003 road closure, since no improvement in traffic conditions is predicted.

3.1.3 Mitigation

The transportation impact analysis identifies impacts to the roadway, transit, travel time, pedestrian, and bicycle components of the transportation system within the study area. Mitigation measures for each horizon year (2005 and 2013) are discussed in this section. Where potential adverse impacts may occur under the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative, possible mitigation is identified for ways to reduce the degradation to service levels.

3.1.3.1 No Action Alternative

With respect to LOS reductions in study area roadway and intersection operations in 2005 and 2013, no mitigation applies. The No Action Alternative exposes the dam to unacceptable risks of potential failure, which would have substantial short- and long-term transportation impacts. These potential impacts are discussed in Appendix D. At this time, no mitigation for impacts associated with potential dam failure is identified, other than further avoidance or reduction of the risk.

3.1.3.2 Preferred Alternative—Restricted Access Alternative 2

Roadway Capacity Improvements. Under No Action, all of the study roadways would operate below (worse than) LOS C in 2005 and 2013. The Preferred Alternative—Restricted Access Alternative 2 would result in three roadway segments declining in LOS from D to F and would add traffic to roadway segments that already operate at LOS D, E, or F under No Action. These segments are as follows:

- Riley Street crossing (Rainbow Bridge)
- Folsom Boulevard crossing (Lake Natoma Crossing)
- Folsom Boulevard between Blue Ravine Road and Iron Point Road
- Folsom-Auburn Road, between Folsom Dam Road and Inwood Road
- Folsom-Auburn Road, between Oak Avenue Parkway and Greenback Lane
- Natoma Street, between Folsom Boulevard and Sibley Street
- East Natoma Street, between Cimmaron Circle and Folsom Dam Road

Mitigation Measures Beyond Authority of Reclamation. These local roadways approach or exceed capacity under the No Action Alternative. One method to improve roadway segment operations is to add capacity by adding lanes. Adding lanes can require right-of-way acquisition and modification/relocation of adjacent buildings. Future planned improvements on East Natoma Street between Cimmaron Circle and Folsom Dam Road include the construction of an additional lane in each direction. With this improvement, this roadway segment would operate at LOS D. However, the widening would not add sufficient capacity to improve operations to acceptable levels. All of the other roadway segments cannot be widened without disruption to adjacent businesses. In addition, right-of-way is not available along the east side of Folsom-Auburn Road and Folsom Boulevard due to the construction of the Sacramento Regional Transit Light Rail Extension.

Roadway operations can also be improved by reducing traffic volumes by changing people's travel modes (e.g., transit or bicycle) or promoting ridesharing (using carpools or vanpools). Increasing existing and future transit service both in frequency and coverage and giving preferential treatment to transit service, such as signal priority or exclusive lanes, would improve transit performance and reduce transit travel times. Substantial improvements to transit performance have been found to entice people from automobiles, thus reducing traffic volumes.

Mitigation Measures Within Authority of Reclamation. Another option is to open Folsom Dam Road to transit and carpools only (only during the times that the road is not proposed to be

open under the restricted access alternatives). The improved travel times could entice people to shift modes from single-occupant automobiles to buses or carpools, which would provide more than a one-to-one vehicle reduction (each vehicle on Folsom Dam Road would result in more than one vehicle being diverted from other roadways). However, security and inspection requirements would still apply to any vehicle using Folsom Dam Road.

Intersection Capacity Improvements. Under the Preferred Alternative—Restricted Access Alternative 2, compared with 2005 No Action conditions (see Table 3.1-6), the intersections discussed below would either have decreased levels of service or increased delay at an intersection already operating at LOS F.

Mitigation Measures Beyond Authority of Reclamation. The following capacity improvements could be made at these intersections:

- Folsom-Auburn Road/Oak Avenue Parkway – During the peak PM hour, this intersection would operate at LOS D under No Action conditions and LOS E with the Preferred Alternative—Restricted Access Alternative 2. The addition of an eastbound right-turn lane would improve the operations at this intersection; however, this would require the installation of a retaining wall and other earthwork due to the steep slope on Oak Avenue Parkway. With this improvement, this intersection would operate at LOS D during the AM peak hour and LOS E during the PM peak hour.
- Folsom-Auburn Road/Greenback Lane – This intersection would operate at LOS F during the AM and PM peak hours under both the No Action Alternative and the Preferred Alternative—Restricted Access Alternative 2. The intersection is essentially "built out." Other than grade separation or other major physical changes would be needed to improve operations to acceptable levels, there is no feasible mitigation to improve operations at this intersection.
- Riley Street/~~East~~ Natoma Street – Under No Action conditions, this intersection would operate at LOS D and E in the AM and PM peak hours, respectively. With the Preferred Alternative—Restricted Access Alternative 2, it would operate at LOS E and F in the AM and PM peak hours, respectively. Poor operations at this intersection are due to congestion throughout the Riley Street corridor. Systemwide improvements along Riley Street~~, such as added through lanes that are not feasible,~~ would be needed to improve operations to acceptable levels. Added through lanes are one such improvement but are not feasible without major right-of-way acquisition and its associated adverse impacts to local properties.

In addition, intersection operations can be improved through signal coordination and timing optimization. The City of Folsom is in the process of designing and implementing an Intelligent Transportation System Plan in the downtown area. When in place, the system would reduce traffic congestion through signal coordination and other means. An Automated Vehicle Locator system, a tracking and response recommendation system that works in conjunction with dispatch software, would further improve the movement of traffic and emergency response vehicles when implemented jointly with an Intelligent Transportation System Plan.~~To support this effort, Reclamation could conduct traffic counts to measure turning movement volumes at the intersections on the affected roadways and develop optimized signal timing plans for implementation by the appropriate agencies.~~

3.1.3.3 Restricted Access Alternative 3

Roadway Capacity Improvements. Compared to No Action, roadway LOS operations would be the same in 2005 and 2013 as for the Preferred Alternative—Restricted Access Alternative 2 except for one roadway segment. In 2005, Folsom-Auburn Road between Folsom Dam Road and Inwood Road is predicted to operate at LOS E under Restricted Access Alternative 3, compared to LOS D under No Action and the Preferred Alternative—Restricted Access Alternative 2. The same mitigation described for the Preferred Alternative—Restricted Access Alternative 2 would apply.

Intersection Capacity Improvements. Intersection operations would be the same as those under the Preferred Alternative—Restricted Access Alternative 2, in addition to the location discussed below.

Mitigation Measures Beyond Authority of Reclamation. The following capacity improvements could be made at this intersection:

- Folsom Boulevard/Natoma Street – Under No Action conditions, this intersection would operate at LOS C and D in the AM and PM peak hours, respectively. With Restricted Access Alternative 3, it would operate at LOS D in both the AM and PM peak hours. The addition of a third southbound through lane would improve the operations at this intersection; however, right-of-way acquisition would most likely be required. With this improvement, this intersection would operate at LOS C during the AM peak hour and LOS D during the PM peak hour.

The signal coordination, timing optimization, and other related mitigation measures described for the Preferred Alternative—Restricted Access Alternative 2 would also apply.

3.1.3.4 Long-Term Closure Alternative

Roadway Capacity Improvements. The Long-Term Closure Alternative would also add traffic to roadway segments that operate at LOS D, E, or F under the No Action Alternative. The segments are the same as those listed for the Preferred Alternative—Restricted Access Alternative 2 (Section 3.1.3.2). The mitigation discussed for the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3 would also apply to this alternative. Intersection capacity improvements listed under those alternatives that also apply to the Long-Term Closure Alternative are at Folsom-Auburn Road/Oak Avenue Parkway, Folsom-Auburn Road/Greenback Lane, Riley Street/ Natoma Street, and Folsom Boulevard/Natoma Street.

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3.2.1 Affected Environment

This section describes the affected environment of Eastern Sacramento County with respect to air quality. It also includes descriptions of Federal, State, and regional regulations that apply to air quality in the Folsom area and regional compliance with established air quality standards.

3.2.1.1 Air Quality Study Area

The project area consists of the portion of Folsom Dam Road that has been closed for security purposes, and local and regional roads affected by traffic changes since the closure. Motor vehicles are a source of air pollutant emissions in the project area and are the focus of this evaluation. The project area is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD), which covers Sacramento County only.

3.2.1.2 Environmental Setting

Folsom lies in the eastern portion of the Sacramento Valley air basin at the base of the Sierra Nevada foothills. This section describes the regional climate and meteorological conditions that influence the transport and dispersion of air pollutants and air quality in the project area.

Meteorology and Climatology

Prevailing winds in Sacramento County come from the south, primarily because of marine breezes that originate from the west and are driven northward by local topography. During the winter, these sea breezes usually diminish and winds from the north occur with greater frequency. Nevertheless, winds from the south predominate.

In addition to wind flow, atmospheric stability and mixing heights are important parameters in the determination of pollutant dispersion. Atmospheric stability reflects the amount of atmospheric turbulence and mixing. In general, the less stable an atmosphere, the greater the turbulence, resulting in more mixing and better dispersion. The mixing height, measured from the ground upward, is the height of the atmospheric layer in which convection and mechanical turbulence promote mixing. Good "ventilation" results from a high mixing height and at least moderate wind speeds within the mixing layer.

Between late spring and early fall, a layer of warm air often overlays a layer of cool air, resulting in frequent temperature inversions. Winter inversions are usually formed when the sun heats upper air layers, trapping the lower layers that are cooled by contact with the surface of the earth during the night. Although inversion types predominate during certain times of the year, either type could occur at any time. Temperature inversions limit mixing heights and thus are associated with poor dispersion. Local topography produces a number of variations that can affect the inversion base and influence local air quality.

Normal maximum and minimum temperatures (in degrees Fahrenheit) during the summer vary generally from the low 90s to the high 50s, respectively (Table 3.2-1). During the winter, maximum temperatures vary from the high 30s to the low 60s.

Table 3.2-1
Average Climatological Data at Folsom Dam

Month	Temperature (°F)			Precipitation (inches)	
	Normal Max	Normal Min	Normal	Normal	Median
January	53.4	37.7	45.6	4.33	3.85
February	60.0	41.6	50.9	3.45	2.35
March	63.7	43.9	53.8	3.82	3.48
April	70.2	46.6	58.5	1.89	1.23
May	79.3	51.1	65.2	0.49	0.25
June	87.6	56.7	72.1	0.2	0.11
July	94.2	60.2	77.2	0.11	0.00
August	93.2	59.8	76.5	0.12	0.00
September	87.6	57.4	72.5	0.48	0.10
October	77.8	52.6	65.3	1.55	0.94
November	63.3	44.9	54.2	3.95	2.83
December	54	38.5	46.3	3.47	3.10
Year	73.7	49.2	61.5	23.91	22.10

Source: NOAA 1992

The average annual precipitation at Folsom Dam is 23.91 inches. January is the wettest month with an average of 4.33 inches of precipitation, and July and August are the driest months, with no measurable rainfall. Monthly temperature and precipitation data collected at Folsom Dam are summarized in Table 3.2-1.

Existing Pollution Sources

The California Air Resources Board (CARB) maintains an inventory of point, areawide, and mobile sources within the Sacramento area. Point sources include industrial plants and refineries. Area sources include small sources such as dry cleaners, gas stations, and paint and solvent use. Mobile sources include on-road and off-road vehicles and marine sources. The 2003 emission inventory for the Sacramento Valley Air Basin is summarized in Table 3.2-2.

Table 3.2-2
2003 Estimated Annual Average Emissions, Sacramento Valley Air Basin (Tons)

Source Type	Total Organic Gases	Reactive Organic Gases	Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	Particulate Matter	PM_{10}	$PM_{2.5}$
Stationary Sources								
Fuel Combustion	11.6	2.7	35.5	33.4	1.1	3.7	3.5	3.4
Waste Disposal	34.7	0.5	0.2	0.1	0	0.1	0	0
Cleaning and Surface Coatings	18.4	15.5	0.6	0.1	0	0	0	0
Petroleum Production and Marketing	71	14	0.5	2.3	0	0	0	0
Industrial Process	6.4	5.1	11.5	3	0.4	25	13.5	7.7
Total	142.1	37.8	48.4	38.8	1.5	28.8	17.1	10.6
Areawide Sources								
Solvent Evaporation	41.7	38	NA	NA	NA	NA	NA	NA
Miscellaneous Processes	139.8	29.3	332.8	8.2	0.8	362.7	201	70.8
Total	181.5	67.2	332.8	8.2	0.8	362.8	201	70.9
Mobile Sources								
On-Road Motor Vehicles	75.9	70.4	661.6	127	1	3.7	3.6	2.6
Other Mobile Sources	49.1	45.3	276.7	92.2	2.7	6.2	6.1	5.4
Total	125.1	115.7	938.3	219.3	3.6	9.9	9.7	7.9

Source: CARB Web site (www.arb.ca.gov)
NA = Not applicable

3.2.1.3 Regulatory Setting

The project area is subject to major air quality planning programs required by both the Federal Clean Air Act, which was last amended in 1990 (42 U.S. Code [USC] 7401 et seq.), and the California Clean Air Act of 1988 (California Health and Safety Code Section 39600 et seq.). Both the Federal and State statutes provide for ambient air quality standards to protect public health, timetables for achieving and maintaining ambient standards, and the development of Federal- and State-mandated plans to guide the air quality improvement efforts of State and local agencies. The Federal plan, which is referred to as the State Implementation Plan (SIP), must contain control strategies that demonstrate attainment with national ambient air quality standards by deadlines established in the Federal Clean Air Act. The State plan is called the Clean Air Plan (CAP). The CAP must show satisfactory progress in attaining State ambient air quality standards. Deadlines for attaining State standards are not fixed. The SIP and the CAP overlap and generally contain the same emissions control measures.

Both the SIP and the CAP rely on the combined emission control programs of the U.S. Environmental Protection Agency (USEPA), the CARB, and the SMAQMD. The role of each agency in controlling emissions in the project area is described below.

Federal

The USEPA oversees State and local implementation of Federal Clean Air Act requirements. It sets emission standards for many mobile sources such as new on-road motor vehicles, including transport trucks that are sold outside of California. The USEPA also sets emission standards for

various classes of new off-road mobile sources, including locomotives that are sold throughout the country.

State and Local

Although the Folsom Dam Road access restrictions being considered are a Federal action, State and local laws and regulations are important to understand as they regulate regional air quality. Under California law, the responsibility for carrying out air pollution control programs is split between the CARB and local or regional air pollution control agencies. In the project area, the SMAQMD regulates stationary sources. The SMAQMD can impose emission standards, set fuel or material specifications, establish operational limits to reduce air emissions, and require stationary sources to obtain permits.

The CARB shares the regulation of mobile sources with the USEPA. The CARB has the authority to set emission standards for on-road motor vehicles and for some classes of off-road mobile sources that are sold in California. The emission standards with the largest effect in the project area are those set for automobile, light- and medium-duty truck, California heavy-duty truck, and other diesel engines. The CARB also regulates vehicle fuels with the intent to reduce emissions. The CARB has set emission reduction performance requirements for gasoline (California reformulated gasoline) and has limited the sulfur and aromatic content of diesel fuel to make it burn cleaner. The CARB also sets the standards used to pass or fail vehicles in the smog check and heavy-duty truck inspection programs.

The Federal, State, and regional control programs described above are directed primarily toward criteria pollutants. Criteria pollutants are those for which ambient air quality standards exist. Programs are also in place to reduce public exposure to other pollutants, such as those that present a potential hazard to public health. These pollutants are called "hazardous air pollutants" in Federal law and "toxic air contaminants" under California law. Toxic air contaminants are pollutants for which specific air quality standards have not been established but that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health effects. The Federal and State programs are currently directed toward reducing toxic air contaminant emissions. Although hazardous air pollutants have no ambient standards, SMAQMD regulates new or expanding stationary sources of these pollutants.

National and State Ambient Air Quality Standards

National and State ambient air quality standards have been established for carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter less than 10 and 2.5 micrometers in diameter (PM_{10} and $PM_{2.5}$, respectively).[1] Ambient standards specify the concentration of these "criteria pollutants" that the public can be exposed to without experiencing adverse health effects. Since individuals vary widely in their sensitivity to air pollutants, standards are set to protect more sensitive populations (i.e., children and the elderly). National and State standards are reviewed and updated periodically based on new health studies. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent. National and State ambient air quality standards are listed in Table 3.2-3.

[1] Other pollutants (e.g., lead) also have ambient standards, but they are not discussed in this document because emissions of these pollutants from cars and vessels are expected to be minimal.

Table 3.2-3
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	National Standards[2,3]	Sacramento State Status/Classification	Sacramento National Status/Classification
Ozone	8 hour	--	0.08 ppm	--	Nonattainment
	1 hour	0.09 ppm	0.12 ppm	Nonattainment	Nonattainment
Carbon Monoxide	8 hour	9.0 ppm	9 ppm	Attainment	Attainment
	1 hour	20 ppm	35 ppm	Attainment	Attainment
Nitrogen Dioxide	Annual Mean	--	0.053 ppm	--	Attainment
	1 hour	0.25 ppm	--	Attainment	--
Sulfur Dioxide	Annual Mean	--	0.03 ppm	--	Attainment
	24 hour	0.04 ppm	0.14 ppm	Attainment	Attainment
	1 hour	0.25 ppm	--	Attainment	--
Fine Particulate Matter (PM_{10})	Annual Arithmetic Mean	--	50 $\mu g/m^3$	--	Attainment
	Annual Geometric Mean	30 $\mu g/m^3$	--	Nonattainment	--
	24 hour	50 $\mu g/m^3$	150 $\mu g/m^3$	Nonattainment	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	--	15 $\mu g/m^3$	--	Unclassified/Not Designated
	24 hour	--	65 $\mu g/m^3$	--	Unclassified/Not Designated

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter – PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average.

2. National standards other than for ozone, particulates, and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one.
The 8-hour ozone standard is attained when the 3-year average of the 4th highest a daily concentration is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of each year's annual 99th percentile of monitored concentrations is less than 150 $\mu g/m^3$. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of each year's annual 98th percentile is less than 65 $\mu g/m^3$. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially averaged across officially designed clusters of sites falls below the standard.

3. National air quality standards are set at levels determined to be protective of public health with an adequate margin of safety. Each state must attain these standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency.

ppm = part(s) per million

$\mu g/m^3$ = microgram(s) per cubic meter

For planning purposes, regions such as the area under SMAQMD jurisdiction are given an air quality status label by the Federal and State regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated as "attainment areas" on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards, areas are designated as "nonattainment areas." An area that recently exceeded ambient standards but is now in attainment is an attainment area that is referred to as a "maintenance area." Nonattainment areas are further classified based on the severity and persistence of the air quality problem as "moderate," "severe," or "serious." Classifications determine the applicability and minimum stringency of pollution control requirements. In general, the more serious the air quality classification, the more stringent are the control requirements that must be contained in the regional air quality plans (see discussion of the SIP and CAP, above). The air district is a nonattainment area for O_3 and particulate matter (PM_{10} only; the area is unclassified for $PM_{2.5}$) (Table 3.2-3).

3.2.2 Environmental Consequences

This section evaluates the potential impacts to air quality from the proposed action.

Evaluation Criteria

The Folsom Dam Road Access Restriction alternatives will affect traffic patterns in the local and regional area of Folsom, and changes in traffic can affect local and regional air quality. The objective of the air quality assessment for the Folsom Dam Road Access Restriction was first to estimate the potential type of change in air quality emissions for each of the alternatives (that is, to determine whether an alternative might have an overall benefit or adverse impact on air quality based on the anticipated change in traffic conditions). As explained below, overall emissions from traffic volumes were addressed using total daily vehicle miles traveled and average speed. "Tailpipe emissions" of pollutants vary with each of these measures. For example, vehicles are less efficient at very slow speeds, especially stop-and-go conditions. More importantly, higher volumes of cars, miles traveled, and increases in time of delays due to congestion can also result in greater emissions of vehicular-associated pollutant emissions. Traffic growth in each of the study years evaluated was accounted for in the traffic model based on local land use planning projections (General Plans).

The second step evaluated the net effect of each alternative and compared the effect to applicable standards. As described in previous sections, a region's air quality is measured and assessed already by the regional air quality district (SMAQMD) and Federal and State agencies in terms of whether it is in attainment of established Federal and State criteria. The evaluation for regional impacts focused on whether the predicted changes in traffic patterns could adversely and/or substantially impair the region's ability to maintain or achieve conformance with established air quality standards for the different criteria pollutants. "Emission budgets" have been developed as part of federally required implementation plans for each region and pollutants of concern (see "Transportation Planning and Regional Air Quality Conformity," below). An alternative could cause an increase in overall pollutants emitted because of the estimated change in traffic patterns, and the net or total emissions were compared to the regional implementation plan budget surplus for a given pollutant. In addition, SCAQMD has developed criteria for ozone precursors (i.e., reactive organic gases [ROG] and nitrogen oxides [NO_x]). These are criteria that the air district has established to measure whether a project will emit sufficient levels of pollutants to be of

concern on a regional basis. Typically, these criteria might be applied against a proposed "point source" such as a new industrial facility, or a land use development proposal, to determine whether the project could generate quantities of pollutants of concern that should be further evaluated, regulated, or mitigated. The SCAQMD criteria for ROG and NO_x are 65 and 85 pounds per day, respectively. The net emission changes for the alternatives were compared against the SCAQMD criteria.

The evaluation described above is appropriate at a regional level of assessment, within or across a regional air basin. Certain pollutants are of greatest concern on a regional basis because they affect the formation of conditions such as smog, which is formed by a photochemical reaction in the atmosphere when these pollutants are mixed together and exposed to sunlight. These pollutants include NO_x and ROG emissions, which can react and form O_3. Because the formation of O_3 takes place over time and includes sources throughout a regional area, the amount of emissions and their differences among alternatives provide a reasonable means of comparing pollutant emission impacts. In contrast, CO is a pollutant that is of most concern nearest to its primary source of emission (traffic). It tends to disperse rapidly with distance from its source, and therefore CO impacts are more localized, typically nearest areas of greatest traffic or congestion. Because of this difference, potential CO impacts were modeled to predict concentrations at some representative worst-case intersection areas. The modeled concentration levels were added to CO background levels and compared to National and State air quality standards, which are expressed in units of concentration over time (i.e., there are both 1-hour and 8-hour exposure standards for CO, both of which are addressed in this study).

Transportation Planning and Regional Air Quality Conformity

Planning for new or proposed transportation projects includes a process where a regional or local Metropolitan Planning Organization, in this case the SACOG, reviews and prioritizes freeway, highway, roadway, bicycle, and mass transit improvements based on local agency input. Included in this process is a required Air Quality Conformity Analysis that evaluates future traffic and air quality impacts potentially associated with implementing the transportation improvements. The process is repeated every two years with changes and updates in transportation funding and priorities. Although the proposed alternatives for restricted access at Folsom Dam Road are not considered transportation improvements under the Federal transportation funding process and are therefore not evaluated by SACOG, the air quality conformity evaluation process does provide a context for assessing the effects of the road closure options.

SAGOG performed its most recent air quality conformity analysis on its Metropolitan Transportation Plan (MTP) for the future year 2025, and Amendment 03-01 to the 2003/2005 Metropolitan Transportation Improvement Program (MTIP) (SACOG 2002b). Analyses were performed for what are termed the Sacramento O_3 Nonattainment Area, CO Attainment Area, and PM_{10} Planning Areas and the Yuba/Sutter O_3 Nonattainment Area. Except for CO, the designations indicate these areas do not conform to or meet Federal standards established for those pollutants (described in Section 3.2.1.3). In the case of CO, it is in attainment of current standards but is considered a maintenance area. Until the maintenance status is lifted, CO will be included in the MTIP. Attainment status of $PM_{2.5}$ has not been finalized. However, draft information shows California as nonattainment for that pollutant. Because of the status of these pollutants, emission budgets have been developed as part of a required SIP for the Sacramento O_3 Nonattainment Area, the CO Attainment Area, and for PM_{10} to help reduce the levels of these

pollutants in future years within the regional area.[2] For purposes of evaluation of the Folsom Dam Road Access Restriction alternatives, a comparison was made of the total estimated emissions from each alternative against the emission "budget" identified in the SIP (see Table 3.2-4) for each of the pollutants discussed above. Emission estimates for an alternative that would impact a budget surplus for a pollutant that does not or may not meet attainment status was also used in the following sections to compare regional air quality impacts.

Table 3.2-4
MTP and MTIP Emission Budget Tests

Pollutant	Emissions (tons/day)	Budget (tons/day)	Surplus/Deficit (tons/day)
2002			
ROG	32.29	39.67	7.38
NO_x	67.44	70.25	2.81
CO	NA[1]	NA[1]	NA[1]
2005			
ROG	24.65	31.32	6.67
NO_x	54.26	61.35	7.09
CO	222.1	780	557.9
2015			
ROG	15.59	31.32	15.73
NO_x	38.89	61.35	22.46
CO	168.81	780	611.19

Notes: Data for PM_{10} are not available.

[1] SACOG 2002b

Impact Assessment Methodology

Regional Emission Analysis for Criteria Pollutants. The air quality study addresses impacts from vehicle emissions sources for the No Action Alternative, the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative. The No Action Alternative assumes that Folsom Dam Road will be reopened with any restrictions that were in place before February 2003, and the Long-Term Closure Alternative assumes that Folsom Dam Road will remain closed. The Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3 assume that there would be controlled use of the road and limited hours of operation (two 3-hour periods per day under the Preferred

[2] In regard to O_3 and regional air quality planning, O_3 control measures in addition to those defined in the 1994 SIP may be required within the air district to reduce emission sources associated with this pollutant. The region's compliance for the emission of O_3 precursors may also be affected by updates in the regional emissions inventory. Noncompliance can result in postponement or delays in federally funded transportation projects within the region. The Folsom Dam Road Access Restriction does not fall under the transportation conformity process, since it is not a road improvement project and would not be affected by this process. The alternatives that increase the emission of O_3 precursors due to delays or vehicle miles traveled would cumulatively contribute to background O_3 levels. How updates in the regional inventory or in federally funded transportation planning could affect or be affected by any of the alternatives is unknown, but effects would be minor given the relatively low total amount of emissions on a regional level described in this section.

Alternative—Restricted Access Alternative 2 and two 2-hour periods per day under Restricted Access Alternative 3), which would limit the amount of traffic flow.

The analysis is based on a comparison of emissions between the alternatives for two study years (2005 and 2013). Emissions of criteria pollutants common to vehicle operations for were estimated and include ROG, NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_2. Emissions are based on total vehicle miles traveled for each scenario, for both study years. Vehicle emissions (passenger cars, trucks and motorcycles) were calculated using forecasts of total vehicle miles traveled for both study years. Impacts are discussed in Section 3.2.2, below.

Vehicle emission factors were calculated using the most recent version of the CARB-developed vehicle emissions model, EMFAC2002, which incorporates anticipated emissions rates for future years. CARB's EMFAC2002 model shows that emission rates per individual vehicle, on average, decrease due to improvements in engine and fuel technology and the retirement of older vehicles from the fleet. Older vehicles are the highest-polluting vehicles, and the model takes into account that these cars are being replaced over time with more efficient vehicles. PM_{10} emissions are not expected to change significantly in the future. Emission factors from EMFAC2002 were used in conjunction with average daily vehicle miles traveled (VMT) and vehicle mix data from the Transportation Project-Level Carbon Monoxide Protocol (UC Davis 1997) to calculate daily emissions. Subsequently, emissions from each alternative were compared to the No Action Alternative to assist in determining potential impacts.

The City of Folsom, in their request that Reclamation prepare an EIS on the Folsom Dam Road Access Restriction, noted that the EIS prepared for the American River Crossing project identified an alternative for that action consisting of a new bridge parallel to Folsom Dam Road. The city wrote that the American River Crossing EIS predicted increases in criteria pollutants under that alternative of 104 pounds per day of NO_x, 75 pounds per day of ROG, and potentially over 32,000 pounds per day of ozone precursors. The bridge, now known as the ~~Folsom Dam Bypass~~Folsom Bridge Project ~~Project~~, is not evaluated as an alternative for the Folsom Dam Road Access Restriction but is discussed in Section 3.11.2. However, the bridge analysis assumed six travel lanes in each direction, compared to the Folsom Dam Road Access Restriction alternatives, which consist of two lanes (No Action), two lanes with restricted access (the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3), and no access/closed (Long-Term Closure Alternative). Thus, the analysis for the American River Crossing project assumed traffic volumes that were comparatively many times higher than those used in this analysis for the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3.

Carbon Monoxide Modeling. Although six pollutants may be emitted as a result of partial or complete road closure (CO, NO_x, PM_{10}, $PM_{2.5}$, ROG, and SO_2), CO was modeled as a representative indicator of environmental impacts associated with the action alternatives. Local CO concentrations associated with the predicted traffic conditions for each alternative were estimated by means of an air dispersion modeling analysis using the CALINE4 model. The CALINE4 model is applied on Federal and State transportation projects and is recommended by SMAQMD for analyzing local CO concentrations at roadway intersections (SMAQMD 2004). Project and site-specific conditions are input to the model, including roadway geometry, emission sources and modeling receptor locations, meteorology assumptions, CO background concentrations, vehicle emission factors, and traffic volumes. Ambient CO levels are typically most affected nearest to congested intersections. Based on a review of the traffic study, the data

available (representative or worst-case traffic intersections were evaluated in the traffic study) and the intersections most affected or congested, two intersections were selected for CO modeling: Riley Street/~~East~~ Natoma Street and Folsom-Auburn Road/Greenback Lane. These two intersections had high levels of traffic and/or potential sensitive receptors (e.g., homes) are located nearby. The modeled CO concentrations were added to 1-hour and 8-hour CO levels that were determined from existing monitoring data and derived from SMAQMD's guidelines for air quality assessment in Sacramento County (SMAQMD 2004). The modeled CO levels added to the background CO levels were then compared to Federal and State standards.

3.2.2.1 No Action Alternative

This alternative would restore traffic access across Folsom Dam Road, similar to pre-closure conditions. Under those conditions, at a regional level, criteria pollutant levels for O_3 and PM_{10} do not meet Federal or State ambient air quality standards. The No Action Alternative would not change this status and was used as a basis of comparison for the other alternatives.

Total emissions resulting from traffic under the No Action Alternative and the three action alternatives were estimated and are shown in Table 3.2-5. This calculation was derived from the estimated daily vehicle miles traveled within the modeled regional area for the study years 2005 and 2013 using emission rates based on CARB criteria. Total emissions for each pollutant shown in the table decrease between study years (for example, total CO declines from 10.93 tons per day emitted in 2005 to 7.47 tons per day in 2013). This is attributed to CARB's prediction that average vehicle emission rates gradually decrease over time with the continued replacement of older, less efficient vehicles that emit higher rates of pollutants with newer vehicles. This benefit to air quality has no relationship to any of the alternatives under consideration.

As noted previously, the regional air basin is in attainment for CO. To evaluate representative, potentially worst-case CO levels at a local or project-specific level, the intersections of Riley Street/~~East~~ Natoma Street and Folsom-Auburn Road/Greenback Lane were analyzed. Table 3.2-6~~5~~ lists the results for the highest predicted level of CO, showing the maximum modeled concentration generated from the model, the background CO concentrations estimated at the project location, and the total of the modeled level added to the existing CO concentration. Results are listed to compare against the Federal and State standards. Neither location exceeds the applicable standards for the No Action Alternative.

Table 3.2-5
Estimated Vehicle Emissions, 2005 and 2013

Pollutant	No Action Alternative		Preferred Alternative– Restricted Access Alternative 2		Restricted Access Alternative 3		Long-Term Closure Alternative	
	Total Emissions of all Regional Traffic (tons/day)	Total Emissions of all Regional Traffic (lbs/day)	Total Emissions (lbs/day)	Change from No Action (lbs/day)[1]	Total Emissions (lbs/day)	Change from No Action (lbs/day)[1]	Total Emissions (lbs/day)	Change from No Action (lbs/day)[1]
Year 2005								
ROG	0.43	858	858.48	0.18	858.66	0.37	859.03	0.73
CO	10.93	21,858	21,862.92	4.67	21,867.60	9.35	21,876.94	18.70
NO_x	1.91	3,825	3825.80	0.82	3826.62	1.64	3,828.25	3.27
SO_2	0.02	37	36.81	0.01	36.82	0.02	36.83	0.03
PM_{10}	0.10	198	198.14	0.04	198.18	0.08	198.26	0.17
$PM_{2.5}$	0.06	128	128.26	0.03	128.29	0.05	128.35	0.11
Year 2013								
ROG	0.25	498	494.95	-2.89	494.95	-2.89	494.95	-2.89
CO	7.47	14,935	14,848.18	-86.83	14,848.18	-86.83	14,848.18	-86.83
NO_x	1.29	2,576	2,561.52	-14.98	2,561.52	-14.98	2,561.52	-14.98
SO_2	0.01	27	26.45	-0.15	26.45	-0.15	26.45	-0.15
PM_{10}	0.13	256	254.20	-1.49	254.20	-1.49	254.20	-1.49
$PM_{2.5}$	0.07	147	146.62	-0.86	146.62	-0.86	146.62	-0.86

[1] Calculated as the subject alternative total emissions less the No Action Alternative total emissions. The calculated change shows the increase or decrease in emissions with implementation of the subject alternative in comparison to the No Action Alternative. Total emissions for the three action alternatives for 2013 are equivalent with the Folsom Bridge Project open and the roadway closed.

Table 3.2-6~~5~~
No Action Alternative Estimated Maximum Carbon Monoxide Concentrations

Location	Maximum Model-Predicted Concentrations (ppm)		Background Concentrations (ppm)		Maximum Total Concentrations (ppm) (Modeled + Background)	
	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour
Riley Street/ ~~East~~ Natoma Street	3.9	2.73	3.48	1.74	7.38	4.47
Folsom-Auburn Road/ Greenback Lane	5.5	3.85	3.48	1.74	8.98	5.59
California Ambient Air Quality Standards (ppm)					20	9.0
National Ambient Air Quality Standards (ppm)					35	9
Exceeds Standards?					No	No

In the event of a failure of Folsom Dam, transportation systems, industrial processes, and other generators of air emissions would be affected, at least temporarily. The potential effects could

range from actual emissions reductions due to the lack of mobility from road closures (motor vehicles account of a large portion of daily pollutant emissions) and temporary disruptions of industry, to increases in emissions from new inefficiencies, as travel may be longer and more congested. The magnitude and intensity of the impacts may vary from location to location.

3.2.2.2 Preferred Alternative—Restricted Access Alternative 2

The Preferred Alternative—Restricted Access Alternative 2 would allow limited public access to Folsom Dam Road with prescreening and security measures, as described in Section 2.2.2. ~~These~~ This alternative would have the benefit of diverting a portion of existing traffic demand across the dam, similar to but not at the same capacity as the No Action Alternative. ~~The total vehicle miles traveled were not available from the travel model because it was designed to produce daily (24-hour) rather than peak-hour projections.~~ Estimates of air quality impacts for the Preferred Alternative—Restricted Access Alternative 2 account for the fact that it would open Folsom Dam Road for 3-hour periods in the morning and afternoon/evening peak commute times, as compared to a 24-hour period (under No Action), 2-hour periods twice a day (under Restricted Access Alternative 3), or full-time closure (under the Long-Term Closure Alternative).

~~Based on the extrapolation of data from the No Action Alternative and the Long-Term Closure Alternative to the Preferred Alternative—Restricted Access Alternative 2,~~ Total vehicle miles traveled with the Preferred Alternative—Restricted Access Alternative 2 ~~but~~ would be slightly higher than under the No Action Alternative, and ~~would show a slight increase~~this results in a predicted increase in total traffic emissions for 2005 (Table 3.2-5). This change is based on the difference between the total vehicle miles traveled generated by the regional traffic model for the Preferred Alternative—Restricted Access Alternative 2 and the total miles traveled with Folsom Dam Road open (the No Action Alternative). The difference in emissions is less than 1 pound per day across the Folsom regional area for most pollutants (NO_x, ROG, SO_2, and particulate matter). Carbon monoxide shows the greatest difference at 4.7 pounds per day, and was modeled to determine predicted concentrations to compare against air quality standards (discussed below in this subsection). This increase in emissions is negligible in comparison to the total vehicle emissions calculated for the study area (listed under the No Action Alternative). This alternative is not expected to cause an exceedance or add to an exceedance of the ambient air quality standards for NO_x, PM_{10}, and O_3 because (1) the emissions fall within the SIP budget surplus for all three pollutants, and (2) the emission estimates for O_3 precursors for all study years are below those used by SMAQMD for determining whether further analysis should be performed. ~~(in overall emissions) over the No Action 2003 and 2005 results and a slight decrease compared to the 2013 results. The Preferred Alternative—Restricted Access Alternative 2 would have total emissions less than the Long-Term Closure Alternative and would not affect the current status of any of the criteria pollutants with respect to attainment or maintenance of nonattainment classification.~~ For example, the total amount of increased emissions for each pollutant fall well within the emissions budget/surplus shown in Table 3.2-4 (listed in tons per day). Total emissions would have to approach or exceed the surplus, and the change resulting from the Preferred Alternative—Restricted Access Alternative 2 would have no effect on those budgets. Total emissions for 2013 show a decrease due to the completion of the Folsom Bridge Project, which would further improve traffic conditions when the bridge is operational. ~~Traffic congestion would be slightly improved with respect to the key intersections evaluated, and the Preferred~~

~~Alternative—Restricted Access Alternative 2 would have CO concentrations below the Federal and State standards.~~

Based on CO modeling of the key intersections performed for the project and discussed in Section 3.2.2.1, maximum 1-hour CO concentrations for the Preferred Alternative—Restricted Alternative 2 would be between 7 to 10 ppm for the 1-hour measurement period, and between 4 to 6 ppm for the 8-hour period. The change in concentration would be approximately 1 ppm or less. These concentrations were modeled worst-case levels and are well under State and Federal standards (listed in Table 3.2-3).

3.2.2.3 Restricted Access Alternative 3

Restricted Access Alternative 3 would have higher total emissions than the Preferred Alternative—Restricted Access Alternative 2 because it would reopen Folsom Dam Road for 2-hour periods in the morning and afternoon/evening peak commute times, as compared to 3-hour periods under the Preferred Alternative—Restricted Access Alternative 2. Total estimated emissions are listed in Table 3.2-5. However, even though the total estimated emissions are higher, the change from No Action conditions is still relatively low with respect to the No Action Alternative and is within regional air quality planning budgets. Carbon monoxide levels would increase, but the change would be less than 1 ppm, and as with the No Action Alternative and the Preferred Alternative—Restricted Access Alternative 2, would not exceed an air quality standard. Overall, effects of Restricted Access Alternative 3 would be generally the same as those for the Preferred Alternative—Restricted Access Alternative 2.

3.2.2.4 Long-Term Closure Alternative

The Long-Term Closure Alternative, which would close Folsom Dam Road entirely, results in the highest vehicle miles traveled and highest total amount of criteria pollutant emissions for the study year 2005 (Table 3.2-5). As with the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3, however, the predicted increase in total emissions is within regional pollutant budgets, and the total increase by itself would not change the current status of the region with respect to attainment of air quality standards in 2005 or 2013.

Predicted maximum CO concentrations (existing CO monitored levels plus the predicted worst-case increase with Long-Term Closure Alternative traffic changes) were calculated at 8.6 to 9.9 ppm for the 1-hour measurement period. (The California standard is 20 ppm for CO, and the Federal standard is 35 ppm.) For the 8-hour measurement period, the predicted maximum CO levels range from 5.3 to 6.2 ppm (the California and Federal standard for CO is 9 ppm). These levels are well below the applicable standards.

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3.3.1 Affected Environment

This section describes the affected environment of the portion of Sacramento County and the City of Folsom in the Folsom Dam vicinity with respect to noise.

3.3.1.1 Noise Study Area

The proposed project area covers the portion of Folsom Dam Road that crosses Folsom Dam along with local and regional roads affected by traffic changes since the closure of this road. Traffic on local roadways is the dominant source of noise in this area. Therefore, traffic noise is the focus of this assessment.

3.3.1.2 Environmental Setting

The portion of Sacramento County and the City of Folsom that is included in the study area is removed from State highways and freeways. There are no active railroad lines in the area, although an extension of the Sacramento Regional Transit light rail system is currently under construction. Although some light industrial land uses and associated noise sources are located in the City of Folsom, no substantial industrial noise sources are located adjacent to the roadways that are primarily affected by road closure–related changes in traffic. Two water treatment plants are located near Folsom-Auburn Road and near Natoma Street, but these facilities do not generate much noise. The project area is not subject to regular airport-related aircraft over-flights. Noise due to traffic on local roadways is the dominant noise source in the area.

3.3.1.3 Regulatory Setting

The project area includes noise-sensitive land uses in Sacramento County and the City of Folsom. Because the effects of the proposed access restrictions are evaluated under Federal environmental assessment guidelines, it is appropriate to apply Federal traffic noise impact assessment criteria. Since both Sacramento County and the City of Folsom have adopted noise standards for new land developments and other noise-producing projects, it is also appropriate to review the potential noise effects in the context of the Noise Element of each jurisdiction's General Plan.

Federal Traffic Noise Assessment Criteria

The most applicable criteria for traffic noise assessment are those established by the Federal Highway Administration (FHWA), which have been interpreted and implemented for projects in California by the California Department of Transportation (Caltrans). These criteria are contained in the October 1998 *Caltrans Traffic Noise Analysis Protocol* (the Protocol) (Caltrans 1998) and are referred to and used in this analysis to provide an established framework for the analysis of impacts. According to the Protocol, under the National Environmental Policy Act (NEPA), adverse impacts are identified, including impacts for which no or only partial mitigation is possible. Mitigation measures can be proposed to limit the adverse impacts. The FHWA regulations (23 Code of Federal Regulations [CFR] 772) constitute the Federal Noise Standard.

The unit of noise (sound) level measurement employed in this report is the A-weighted sound pressure level, denoted in decibels (dBA). The noise impact criteria are expressed in terms of the equivalent, or energy-average, hourly noise level, $L_{eq}(h)$, in dBA. In applying the FHWA criteria, the L_{eq} is determined for the design hour traffic flow, which is the highest traffic volume that will allow free flow of traffic on the roadway of concern. This is generally considered to be the traffic volume associated with Level of Service (LOS) C. Note that this is not the peak-hour traffic volume; during the peak hour, traffic may move very slowly, and the traffic noise level will be lower than during free-flow conditions.

Based on the Protocol criteria, a traffic noise impact is identified if a noise increase is substantial, which occurs when the predicted noise levels with the project exceed existing noise levels by 12 dBA, $L_{eq}(h)$. A noise impact resulting from a substantial noise increase may additionally be an adverse environmental effect. To determine the magnitude of the environmental effect, consideration is given to the context and intensity of the noise increase. Context refers to the project setting and uniqueness, or sensitive nature of the noise receivers. Intensity refers to the increase in noise levels over the No Action condition, to the number of residential units affected, and to the absolute noise levels.

The Protocol also identified Noise Abatement Criteria (NAC) that indicated acceptable noise levels. Noise impacts are considered when levels approach within 1 dBA, or exceed, the NAC. The NAC for various land uses are categorized on the basis of their sensitivity to noise (Table 3.3-1).

Table 3.3-1
FHWA Noise Abatement Criteria

Activity Category	NAC, Hourly A-Weighted Noise Level, dBA $L_{eq}(h)$	Description of Activities
A	57 Exterior	Lands on which serenity and quiet serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Exterior	Developed lands, properties or activities not included in Categories A or B above.
D	–	Undeveloped lands.
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

The Category B noise abatement criterion applies to residences, hotels, motels, churches, schools, recreation areas, active sport areas and parks, and is an hourly exterior sound level of 67 dBA, $L_{eq}(h)$. The Category E criterion also applies to residences, motels, hotels, schools, hospitals, and similar uses, and is an hourly interior sound level of 52 dBA $L_{eq}(h)$. The interior sound level criterion only applies in situations where there are no exterior activities that are affected by traffic noise.

For this analysis, it was assumed that a predicted traffic noise level of 65 dBA L_{eq} or more would approach or exceed the NAC at a residential receiver. Under the Protocol, if a traffic noise impact is predicted, noise abatement measures may be evaluated and considered as mitigation. Noise abatement measures may include avoiding the project impact, constructing noise barriers, acquiring property or interest, using traffic management measures, and insulating and/or air-conditioning public use or non-profit institutional structures. Preliminary noise abatement design includes acoustical considerations such as noise barrier heights, lengths, location, material, etc.

Noise abatement feasibility includes other considerations, including achieving a noise reduction of 5 dBA or greater at the impacted land uses, topography, access requirements, presence of local cross streets, other noise sources in the area, and safety considerations. If noise abatement measures are advanced for consideration, they may also be evaluated for "reasonableness," which considers more subjective factors including the benefits, cost, absolute noise levels, changes, environmental impacts of the measures, input from those impacted, and other factors.

Sacramento County Noise Element

The Noise Element of the Sacramento County General Plan (County of Sacramento 1993) establishes an exterior noise level standard of 60 dB L_{dn} for noise generated by transportation-related noise sources. An exterior noise level of 65 dB L_{dn} may be allowed in outdoor activity areas provided that all practical exterior noise reduction measures are applied. For multifamily developments, the exterior noise level standards are commonly applied at the project's outdoor activity area.

The L_{dn} descriptor is based on a 24-hour distribution of traffic noise and applies a 10 decibel (dB) weighting to noise measured during nighttime hours (10 PM to 7 AM). For the roadways within the project area, the L_{dn} due to traffic noise is within about 1 dB of the highest hourly L_{eq} value.

City of Folsom Noise Element

Policy 30.4 of the Noise Element of the City of Folsom General Plan (City of Folsom 1993) states that areas within the City of Folsom shall be designated as noise-impacted if exposed to existing or projected exterior noise levels exceeding 60 dB L_{dn}/Community Noise Equivalent Level (CNEL). In Policy 30.5, which relates to new development of noise-sensitive land uses, the Noise Element states that, where it is not possible to reduce exterior traffic noise to 60 dB L_{dn}/CNEL by incorporating a practical application of the best available noise reduction technology, an exterior noise level of up to 65 dB L_{dn}/CNEL will be allowed.

Other Federal Noise Assessment Criteria

Some guidance is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn}. The changes in noise exposure that are shown in Table 3.3-2 are expected to result in equal changes in annoyance due to noise. Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis for traffic noise described in terms of L_{dn}.

Table 3.3-2
Substantial Increases for Transportation Noise Exposure

Ambient Noise Level Without Project (L_{dn})	Adverse Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5 dB or more
60–65 dB	+3 dB or more
>65 dB	+2 dB or more

Source: FICON as applied by Brown-Buntin Associates, Inc.

3.3.2 Environmental Consequences

This section evaluates the potential effects of absolute traffic noise levels and changes in traffic noise levels resulting from the proposed Folsom Dam Road Access Restriction.

Evaluation Criteria

The alternatives would affect traffic volumes in the project area, which would consequently affect traffic noise levels. All of the growth in traffic through 2001 was accounted for in the analysis based on local land use planning assumptions (General Plans) that are the basis for the traffic model projections.

The noise assessment determined projected traffic noise levels for each of the alternatives considered. The results were compared to local, state, and federal criteria discussed in the previous section. The Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative were also compared to the baseline No Action Alternative to determine the net impact of implementing the respective alternative.

Impact Assessment Methodology

The noise study was prepared using a combination of noise measurements and traffic noise modeling. Traffic noise measurements were performed at nine sites to calibrate the FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108). In addition, noise measurements were performed over 24-hour periods at four locations to describe traffic noise levels at nearby residences in terms of the L_{dn} descriptor and to derive suitable day-night traffic noise distribution factors for noise modeling in terms of L_{dn}. Noise measurements were performed in terms of the L_{eq} and other statistical descriptors.

Noise measurement equipment consisted of Larson Davis Laboratories Model 820 precision integrating sound level meters, which were equipped with B&K Type 4176 0.5-inch microphones. The measurement equipment was calibrated immediately before and after use and meets the specifications of the American National Standards Institute for Type 1 sound measurement systems.

The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was employed for the prediction of traffic noise levels. The FHWA model is the analytical method currently favored for traffic noise prediction by most State and local agencies. It is applied to Federal transportation and roadway projects by Caltrans. The model is based upon the CALVENO noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to

vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

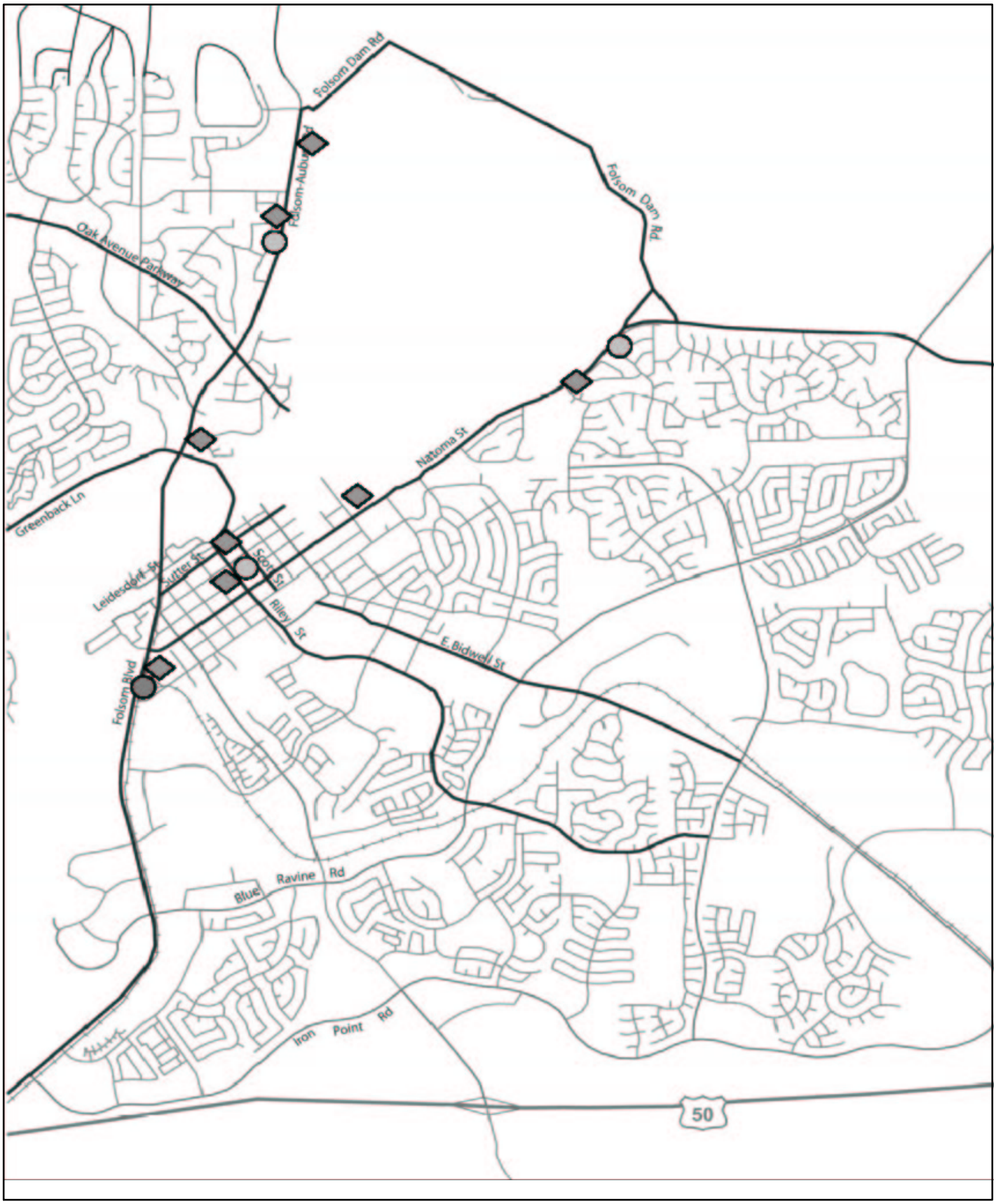
The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions and is considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the day/night distribution of traffic and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Sound level measurements and concurrent traffic counts were conducted over 15-minute periods at nine sites adjacent to the major roadways in the project area. These roadway segments are adjacent to the study intersections evaluated in the traffic analysis (see Section 3.1). The measurements were conducted at a height of 5 feet above the ground to represent ground-level receivers. In some instances, the ground was elevated above the roadway. The purpose of the noise measurements was to determine the accuracy of the FHWA traffic noise prediction model in describing traffic noise levels in the project area. Figure 3.3-1 shows the calibration noise measurement sites.

The noise measurements were conducted in terms of the average noise level (L_{eq}). The measured values were later compared to the values predicted by the FHWA model using observed traffic volumes, truck mix, speeds, roadway geometries, and distances to the microphone. Table 3.3-3 lists the calibration measurement sites, and Table 3.3.4 compares the measured and modeled noise levels for the observed traffic conditions.

Table 3.3-3
Traffic Noise Measurement Sites for Traffic Noise Model Calibrations
Folsom Dam Road Closure Area

Site/Intersection Number	Description	Comments
1	Folsom-Auburn Road south of Dam Road (Lake Pointe Apartments)	Free-flowing traffic
2	Randall Drive and East Natoma Street	Free-flowing traffic
3	Folsom-Auburn Road north of Oak Avenue Parkway	Free-flowing traffic
4	Folsom-Auburn Road near Oak Avenue Parkway	Free-flowing traffic
5/6	Riley Street at Scott Street	Signal-controlled traffic
7/8	Riley Street at Figueroa Street	Signal-controlled traffic
9	Folsom Boulevard at Natoma Street	Free-flowing traffic
10	E-ast Natoma Street between Stafford Street and Wales Drive	Signal-controlled traffic



LEGEND

= Calibration Site

= 24-hour Site

Note: Not to Scale

N

	Folsom Dam Road Restriction EIS 18600807	Traffic Noise Level Measurement Sites	Figure 3.3-1

L:\Projects\Folsom_Dam_Road_Closure_18600807\MXD\Current Working Documents\Traffic_Noise_Level_Measurement_Sites.mxd

Table 3.3-4
Noise Measurement Summary and FHWA Model Calibration
Folsom Dam Road Closure Area

Segment	Distance, Feet	Mic Height, Feet re: roadway	Posted Speed, mph	Observed Vehicles/Hour			L_{eq}, dB	
				Autos	Medium Trucks	Heavy Trucks	Measured	Predicted by FHWA Model*
1	70	7	50	1,428	52	0	71	68
2	70	5	45	1,304	16	0	65	66
3	70	5	50	2,072	24	4	69	69
4	65	8	50	2,872	16	12	72	71
5/6	60	12	35	2,508	16	4	71	66
7/8	60	5	35	2,548	4	0	64	66
9	75	8	50	3,496	36	36	70	71
10	70	5	35	1,668	16	0	62	64

*Assumes acoustically "soft" site
mph = miles per hour

The FHWA model reasonably predicted traffic noise levels for most of the roadway segments. The two notable exceptions were along Folsom-Auburn Road near the Lake Pointe Apartments and along Riley Street near Scott Street. The difference between measured and predicted traffic noise levels at Site 1 was likely due to traffic traveling at speeds above the speed limit at the time of measurement and due to the closer proximity of traffic on that six-lane road segment. This difference did not appear on the other nearby segments of Folsom-Auburn Road. At Site 5/6, the difference between measured and predicted traffic noise levels was probably due to the elevated measurement location. To conservatively model traffic noise in the vicinity of Site 5/6, a +3 dB offset was applied to the FHWA model. Given the FHWA model's reasonable agreement with the measured noise levels at the other sites, no offset was applied to predict future exterior noise levels for the other roadways.

To describe the existing day/night distribution of traffic noise in the access restriction vicinity, 24-hour continuous noise measurements were conducted at four locations, as shown in Figure 3.3-1. The locations were selected to represent typical traffic noise conditions in the residential areas along the roadways potentially affected by the access restriction. Noise measurements were conducted in terms of the hourly L_{eq} and other statistical descriptors. Table 3.3-5 lists the measurement sites and a summary of the measured noise levels. Additional noise measurement information is presented in Appendix B.

Table 3.3-5
Measured 24-Hour Noise Levels
Folsom Dam Road Closure Area

Site	Date	L_{dn}, dB	L_{eq}, dB			Day/Night Traffic Distribution (%)
			Highest Hour	Daytime Average	Nighttime Average	
616 Figueroa Street	7/15-16/04	72.8	73.1	69.0	65.8	78 / 22
748 Hancock Drive	7/13-14/04	65.6	64.7	63.0	58.1	84 /16
7013 Folsom-Auburn Road.	7/13-14/04	74.7	73.5	71.7	67.3	82 /18
817 Oakdale Street	7/15-16/04	71.6	70.9	68.8	64.1	83 / 17

The continuous noise measurements showed that the highest observed hourly L_{eq} value was within approximately 1.5 dB of the L_{dn} value for the measurement periods. Thus, for this analysis, the calculated L_{dn} and design hour L_{eq} values for traffic noise exposures may be considered to be equal.

Inputs to the FHWA Highway Traffic Noise Prediction Model when calculating L_{dn} values include average daily traffic volume, daytime/nighttime traffic distribution, medium and heavy truck percentages, and vehicle speed. Annual average daily traffic levels were obtained from the EIS transportation analysis prepared by Fehr & Peers (see Section 3.1). Typical medium and heavy truck percentages were derived from traffic counts provided by the City of Folsom and the truck mix observed during noise model calibration. The calibration data were used to describe vehicle speeds and model offsets. The constant FHWA model inputs are shown in Table 3.3-6.

Table 3.3-6
FHWA Highway Traffic Noise Prediction Model Inputs
Folsom Dam Road Closure Area

Roadway	Day/Night %	% Medium Trucks	% Heavy Trucks	Distance to roadway centerline, feet *	Speed (mph)	Offset dB
Folsom Dam Road	82/18	1.5	1	50	35	0
Riley Street Crossing (Rainbow Bridge)	78/22	1.5	1	50	35	+3
Folsom Boulevard Crossing (Lake Natoma Crossing)	83/17	3	7	50	50	0
Folsom Boulevard (between Blue Ravine Drive and Iron Point Road)	83/17	3	7	50	50	0
Folsom-Auburn Road (between Folsom Dam Road and Inwood Road)	82/18	3	7	50	50	0

Table 3.3-6, concluded

Roadway	Day/Night %	% Medium Trucks	% Heavy Trucks	Distance to roadway centerline, feet *	Speed (mph)	Offset dB
Folsom-Auburn Road (between Oak Avenue Parkway and Greenback Lane)	82/18	3	7	50	50	0
Natoma Street (between Folsom Boulevard and Sibley Street)	83/17	1.5	1	50	35	0
East~~-~~ Natoma Street (between Cimarron Circle and Folsom Dam Road)	84/16	3	1	50	45	0
~~Folsom Dam Bypass~~Folsom Bridge Project (USACE)	82/18	1.5	1	50	35	0
American River Bridge	82/18	3	1	50	45	0

*Acoustically "soft" site assumed.

mph = miles per hour

To provide a single reference point for the analysis, the distance from roadway centerline to a receiver was assumed to be 50 feet. While this distance is generally representative of the distance from a roadway centerline to a house along the roadway, it is recognized that some noise-sensitive receivers will be located closer to or farther from the road. In addition, some receivers are elevated above the roadway, which tends to increase traffic noise levels, and other receivers are behind noise barriers, which reduce traffic noise levels. However, since this analysis primarily compares traffic noise levels with and without the access restriction, those differences between receivers remain constant. The most important variable in the traffic noise exposures for the access restriction and its alternatives is the projected traffic volume. The traffic volumes for this analysis were obtained from the traffic analysis (Section 3.1), and are listed in terms of average daily traffic volumes in Table 3.3-7.

The FHWA model was used to predict traffic noise levels for each of the alternatives listed in Table 3.3-7. The predicted exterior noise levels at the reference distance of 50 feet are shown in Table 3.3-8. In Table 3.3-8, the shaded cells indicate locations where the predicted traffic noise level does not exceed the applicable standards.

The predicted changes, or net effect, in L_{dn} or Design Hour L_{eq} values are shown in Table 3.3-9. In this table, the shaded cells indicate locations where the predicted change (between No Action and the other alternatives) in the traffic noise level would be greatest.

Table 3.3-7
Average Daily Traffic Volumes, Folsom Dam Road Closure Area

Roadway	Pre-Closure	Post-Closure		2005				2013			
		Pre-Traffic Calming	Post-Traffic Calming	No Action	Long-Term Closure Alternative	Preferred Alternative—Restricted Access Alternative 2	Restricted Access Alternative 3	No Action	Long-Term Closure Alternative	Preferred Alternative—Restricted Access Alternative 2	Restricted Access Alternative 3
Folsom Dam Road	17,500	-	-	19,800	-	5,800	3,800	15,100	-	5,800	3,800
Riley Street Crossing (Rainbow Bridge)	36,700	44,700	46,500	36,500	45,300	40,300	41,800	34,600	44,600	41,500	42,500
Folsom Boulevard Crossing (Lake Natoma Crossing)	32,600	33,600	34,900	35,900	36,700	36,100	36,400	41,800	43,200	42,800	42,900
Folsom Boulevard (between Blue Ravine Drive and Iron Point Road)	25,700	N/A	30,600	30,200	30,800	30,800	30,800	32,500	34,200	34,200	34,200
Folsom-Auburn Road (between Folsom Dam Road and Inwood Road)	15,300	N/A	27,500	26,000	29,600	26,500	27,700	29,400	34,600	31,700	32,700
Folsom-Auburn Road (between Oak Avenue Parkway and Greenback Lane)	31,500	N/A	39,400	34,900	41,200	38,300	39,300	39,000	47,800	44,900	45,900
Natoma Street (between Folsom Boulevard and Sibley Street)	7,100	12,100	N/A	8,500	13,600	10,900	11,700	8,500	14,300	14,300	14,300
East~~-~~ Natoma Street (between Cimarron Circle and Folsom Dam Road)	10,500	17,700	N/A	15,700	19,800	19,800	19,800	17,800	22,800	22,800	22,800
~~Folsom Dam Bypass~~Folsom Bridge Project (USACE)	-	-	-	-	-	-	-	19,600	26,700	24,500	25,200
American River Bridge	-	-	-	-	-	-	-	-	-	-	-

Table 3.3-8
Predicted Traffic Noise Levels in Terms of L_{dn} or Design Hour L_{eq}, dB, Folsom Dam Road Closure Area

Roadway	Pre-Closure	Post-Closure		2005				2013			
		Pre-Traffic Calming	Post-Traffic Calming	No Action	Long-Term Closure Alternative	Preferred Alternative—Restricted Access Alternative 2	Restricted Access Alternative 3	No Action	Long-Term Closure Alternative	Preferred Alternative—Restricted Access Alternative 2	Restricted Access Alternative 3
Folsom Dam Road	67.4	-	-	68.0	-	62.6	60.8	66.8	-	62.6	60.8
Riley Street Crossing (Rainbow Bridge)	74.2	75.1	75.2	74.2	75.1	74.6	74.8	73.9	75.0	74.7	74.8
Folsom Boulevard Crossing (Lake Natoma Crossing)	76.2	76.3	76.5	76.6	76.7	76.7	76.7	77.3	77.4	77.4	77.4
Folsom Boulevard (between Blue Ravine Drive and Iron Point Road)	75.2	N/A	75.9	75.9	76.0	76.0	76.0	76.2	76.4	76.4	76.4
Folsom-Auburn Road (between Folsom Dam Road and Inwood Road)	73.1	N/A	75.6	75.4	75.9	75.5	75.7	75.9	76.6	76.2	76.4
Folsom-Auburn Road (between Oak Avenue Parkway and Greenback Lane)	76.2	N/A	77.2	76.7	77.4	77.1	77.2	77.1	78.0	77.8	77.9
Natoma Street (between Folsom Boulevard and Sibley Street)	63.3	65.7	N/A	64.1	66.2	65.2	65.5	64.1	66.4	66.4	66.4
E.ast Natoma Street (between Cimarron Circle and Folsom Dam Road)	67.8	70.1	N/A	69.5	70.6	70.6	70.6	70.1	71.2	71.2	71.2
~~Folsom Dam Bypass~~Folsom Bridge Project (USACE)	-	-	-	-	-	-	-	71.7	73.0	72.7	72.8
American River Bridge	-	-	-	-	-	-	-	-	-	-	-

Note: Shaded areas indicate locations where predicted traffic noise levels ~~n~~do not exceed applicable standards.

Table 3.3-9
Predicted Changes in Traffic Noise Levels in Terms of
L_{dn} or Design Hour L_{eq}, dB, Folsom Dam Road Closure Area

Roadway	Pre-Closure	Post-Closure		2005				2013			
		Pre-Traffic Calming	Post-Traffic Calming	No Action	Long-Term Closure Alternative	Preferred Alternative—Restricted Access Alternative 2	Restricted Access Alternative 3	No Action	Long-Term Closure Alternative	Preferred Alternative—Restricted Access Alternative 2	Restricted Access Alternative 3
Folsom Dam Road	-	No traffic	No traffic	-	No traffic	-5.4	-7.2	-	No traffic	-4.2	-6.0
Riley Street Crossing (Rainbow Bridge)	-	+0.9	+1.0	-	+0.9	+0.4	+0.6	-	+1.1	+0.8	+0.9
Folsom Boulevard Crossing (Lake Natoma Crossing)	-	+0.1	+0.3	-	+0.1	+0.1	+0.1	-	+0.1	+0.1	+0.1
Folsom Boulevard (between Blue Ravine Drive and Iron Point Road)	-	N/A	+0.8	-	+0.1	+0.1	+0.1	-	+0.4	+0.4	+0.4
Folsom-Auburn Road (between Folsom Dam Road and Inwood Road)	-	N/A	+2.5	-	+0.5	+0.1	+0.3	-	+0.7	+0.3	+0.5
Folsom-Auburn Road (between Oak Avenue Parkway and Greenback Lane)	-	N/A	+1.0	-	+0.7	+0.4	+0.5	-	+0.9	+0.7	+0.8
Natoma Street (between Folsom Boulevard and Sibley Street)	-	+2.4	N/A	-	2.1	+1.1	+1.4	-	+2.3	+2.3	+2.3
East~~-~~ Natoma Street (between Cimarron Circle and Folsom Dam Road)	-	+2.3	N/A	-	+1.1	+1.1	+1.1	-	+1.1	+1.1	+1.1
~~Folsom Dam Bypass~~Folsom Bridge Project (USACE)	-	-	-	-	-	-	-	-	+1.3	+1.0	+1.1
American River Bridge	-	-	-	-	-	-	-	-	-	-	-

Note: Shaded areas indicate locations where the predicted change in traffic noise level between the No Action and all other alternatives is considered to constitute an adverse impact (greater than 2 dBA change).

3.3.2.1 No Action Alternative

Under the No Action Alternative, along all of the roadways analyzed except Natoma Street between Folsom Boulevard and Sibley Street, traffic noise levels at receivers within 50 feet of the roadway centerlines would continue to exceed the FHWA NAC of 65 dB L_{eq}. Given the anticipated growth and increased traffic in the study area, it is not anticipated that reopening Folsom Dam Road would reduce noise levels on the above-named streets to a level below 5 dBA. The predicted noise levels at the reference distance along these same roadways would also exceed the 65 dB L_{dn} land use compatibility criterion of Sacramento County and the City of Folsom.

Along Natoma Street between Folsom Boulevard and Sibley Street, the predicted traffic noise levels at a distance of 50 feet from the roadway centerline would be less than 65 dB L_{eq} or L_{dn} under the No Action Alternative. Therefore, noise-sensitive receivers along that roadway would not be considered subject to traffic noise impacts under the No Action Alternative.

At a regional level, the noise environment in the study area is influenced by highways and roadways. Other regional noise sources include factors such as airplane noise and industrial facilities. These noise sources are site-specific and do not have the same effects throughout the region. In the event of a failure of Folsom Dam, transportation systems and other uses that contribute to the noise environment could change. These impacts are likely to be temporary, would depend on site-specific circumstances, and may be both positive and negative in terms of noise generation. The magnitude and intensity of the impacts would have to be evaluated on a site-by-site basis.

3.3.2.2 Preferred Alternative—Restricted Access Alternative 2

Under the Preferred Alternative—Restricted Access Alternative 2, predicted traffic noise levels at receivers within 50 feet of all of the study roadway centerlines would exceed the FHWA NAC (65 dB L_{eq}) and the land use compatibility criterion of Sacramento County and the City of Folsom (65 dB L_{dn}), with the exception of locations along Folsom Dam Road (Table 3.3-8). As a result, noise-sensitive receivers along ~~all of~~ the roadways studied would be considered subject to traffic noise impacts under the Preferred Alternative—Restricted Access Alternative 2. This would also be the case for Restricted Access Alternative 3 and the Long-Term Closure Alternative. For study year 2005, the net change in noise levels with the Preferred Alternative—Restricted Access Alternative 2 is ~~under~~ 1.1 ~~2~~ dBA or less for all locations, except along Folsom Dam Road (Table 3.3-9) ~~and under 1 dBA for most locations~~. In 2013, traffic volumes are predicted to be greater and the net difference in noise level increases is slightly higher at one location: ~~.~~ Natoma Street between Folsom Boulevard and Sibley Street would see noise level increases ~~slightly over 2~~of up to 2.3 dBA. An increase of approximately 2 dBA is considered the threshold of an audible or perceptible change in ambient noise levels. The net increases for 2013 for the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3 and the Long-Term Closure Alternative are comparable at all study locations except along Folsom Dam Road.

3.3.2.3 Restricted Access Alternative 3

Predicted traffic noise levels for Restricted Access Alternative 3 would be almost identical to those for the Preferred Alternative—Restricted Access Alternative 2 (see Section 3.3.2.2). Differences between the two alternatives, as shown in Table 3.3-9, would be due to the amount of time that public vehicular traffic would be allowed on Folsom Dam Road under each alternative (two 2-hour periods daily from Monday to Friday for Restricted Access Alternative 3 compared to two 3-hour periods on the same days for the Preferred Alternative—Restricted Access Alternative 2).

3.3.2.4 Long-Term Closure Alternative

Under the Long-Term Closure Alternative, predicted traffic noise levels at receivers within 50 feet of all of the study roadway centerlines would also exceed the FHWA criteria~~, NAC of 65 dB L_{eq}. The predicted noise levels at the reference distance along these roadways would also exceed the 65 dB L_{dn} land use compatibility criterion of~~and Sacramento County and ~~the~~ City of Folsom criteria for the same reasons discussed for the Preferred Alternative—Restricted Alternative 2. As a result, noise-sensitive receivers along all of the roadways studied would be considered subject to traffic noise impacts under the Long-Term Closure Alternative.

Relative to the No Action Alternative, the net impact of the Long-Term Closure Alternative would be increases in predicted noise levels along all of the roadway study segments (see Table 3.3-9). Most of the locations modeled and listed in Table 3.3-9 were less than 2 dBA except along Natoma Street between Folsom Boulevard and Sibley Street. Traffic noise levels along this roadway may increase by up to 2.4 dBA. ~~Under the No Action Alternative, these roadways would experience lower noise levels.~~

3.3.3 Mitigation

In accordance with the Federal traffic noise assessment guidelines, if a traffic noise impact is predicted, noise abatement measures may be evaluated and considered. Although it is not a requirement under NEPA, if a traffic noise impact is found to be an adverse environmental effect, the project sponsor may implement reasonable and feasible noise abatement features to reduce the noise increase to below FHWA-established standards.

3.3.3.1 No Action Alternative

Under the No Action Alternative, noise levels would exceed Federal, county, and city standards on all roadways except Natoma Street between Folsom Boulevard and Sibley Street. As the baseline case, no mitigation is proposed for the No Action Alternative.

3.3.3.2 Preferred Alternative—Restricted Access Alternative 2

Consistent with the guidelines intended to reduce the severity of potential impacts, noise abatement measures were considered for noise-sensitive receivers along Natoma Street between Folsom Boulevard and Sibley Street. As a practical matter, the noise impact area was considered to extend along Natoma Street to the intersection of Riley Street, since most traffic would continue to that point.

The noise-sensitive land uses along this section of roadway are residences, two churches, and a convenience store. The homes face the roadway and are set back about 20 feet from the property line at the street. Most of the homes have driveways, and access to the front doors of the homes is from the street.

Potential noise abatement measures for the Preferred Alternative—Restricted Access Alternative 2 include: avoiding the impact, constructing noise barriers, acquiring property or interest, using traffic management measures, ~~and~~ insulating and/or air-conditioning public use or nonprofit institutional structures, and repaving roads.

The incremental impact associated with this alternative could be avoided by implementing the No Action Alternative. That is, if the No Action Alternative were selected, there would be no resulting increases in traffic on the affected roadway, and the noise impact would not occur. Noise barriers would not be practical for the homes along Natoma Street, as their effectiveness would be severely compromised by the necessary openings for driveways. Barriers would also impede access to the front doors from the on-street parking. Applying the Caltrans/FHWA Protocol, noise abatement measures are not considered if 50 percent or more of the affected residents do not want them. Since the affected area is historical in appearance, noise barriers would probably not be acceptable to the residents from an aesthetic standpoint. It is unlikely that it would be possible to obtain approval for noise barriers from at least half of the affected residents. Noise barriers are therefore not considered practical or effective.

Since the predicted access restriction-related noise exposures only approach, but do not exceed, the NAC, acquiring the property or interest would not typically be an option for this project. That is, the noise exposure would not be considered extreme, and there would be areas on the property with acceptable noise exposures. Interior noise levels would be expected to be within acceptable limits, assuming normal construction practices were used. Backyard noise exposures would also be acceptable due to shielding by the homes themselves.

Traffic management measures could be considered to reduce the traffic volume using Natoma Street. The City of Folsom currently closes Sibley Street between Natoma Street and Glenn Drive between the hours of 4 PM to 7 PM on weekdays. This measure reduces the demand for use of Natoma Street during rush hour, since many drivers would otherwise cross between Natoma Street and Glenn Drive on Sibley Street. The city could consider limiting access to the intersection with Riley Street from Natoma Street or some other appropriate traffic calming methods. However, such measures would likely contribute to the existing impediments to traffic flow in the vicinity of Riley Street during high traffic volume hours and would be unacceptable.

Insulation against traffic noise could be offered to the churches. However, since the predicted traffic noise levels do not exceed the NAC, and since normal construction practices would be expected to result in acceptable interior noise levels, providing additional traffic noise insulation to the churches could not be justified.

Roadway surface types and their condition affect traffic noise levels, and some pavement types can provide traffic noise reduction for cumulative future traffic noise levels, at least in the short-term. One such pavement type, open-graded pavement, is designed to be water permeable. Another type, rubberized pavement, includes a portion of recycled tires. Both open-graded and rubberized pavements can reduce noise generated from tires, often more than 2 dBA when first installed. For any roadway surface, however, tire-generated noise will be higher for older pavement (due to increased surface roughness), and any effective noise reduction achieved

would depend on the existing condition of each treated road. The noise-reduction effectiveness of open-graded and rubberized surfaces will decline within several years of application, depending upon the amount of traffic use. These surface types are not widely used due to their relatively higher installation cost and reduced longevity.

3.3.3.3 Restricted Access Alternative 3

There is no perceptible difference ~~in~~ between net impacts of the Preferred Alternative—Restricted Access Alternative 2 and Restricted Access Alternative 3. Therefore, the same noise abatement measures were considered, including: avoiding the impact, constructing noise barriers, acquiring property or interest, using traffic management measures, ~~and~~ insulating and/or air-conditioning public use or non-profit institutional structures, and repaving roads. These noise abatement measures were either found not to be feasible or did not substantially reduce the magnitude or intensity of the net impact. Therefore, application of these mitigation measures for the action alternatives, including Restricted Access Alternative 3, is not justified.

3.3.3.4 Long-Term Closure Alternative

There is no perceptible difference ~~in~~ between net impacts of the Long-Term Closure Alternative and the Preferred Alternative—Restricted Access Alternative 2. The same noise abatement measures were considered and found to not be justified, as discussed in Section 3.3.3.2.

Socioeconomics describes the social and economic characteristics of the study area for the Folsom Dam Road Access Restriction. Several demographic variables are analyzed to characterize the affected communities, including population size and distribution, the means and amount of employment, and income generation.

3.4.1 Affected Environment

Two separate study areas were used to characterize the socioeconomic resources for the Folsom Dam Road Access Restriction. The Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative limit access to Folsom Dam Road and would have direct socioeconomic effects within the City of Folsom and to adjoining communities. However, the impacts associated with the No Action Alternative are more likely to be felt across a broader geographic area covering much of Sacramento County. Thus, the City of Folsom and the County of Sacramento are the two study areas analyzed in this section.[1] The City of Folsom is within and consequently a subset of Sacramento County.

3.4.1.1 Sacramento County

Sacramento County covers a total area of 637,120 acres (995.5 square miles) (California Department of Finance 2003a). The majority of the land area is flat or rolling and is part of the Central Valley of California, which is one of the most productive agricultural regions worldwide (County of Sacramento 2004).

The southwestern-most portion of the county consists of delta lowlands between the Sacramento and San Joaquin Rivers. The county extends eastward to the foothills of the Sierra Nevada Mountains and northward about 10 miles past the City of Sacramento (County of Sacramento 2004). The City of Sacramento, which is the State Capital and the County Seat, is located on the western border of the county where the American and Sacramento Rivers meet. The Sacramento River separates Sacramento from Yolo and Solano Counties to the west.

Population and Housing

The Sacramento County population grew from 1,041,219 in 1990 to 1,223,499 in 2000, a compound growth rate of 1.6 percent per year (see Table 3.4-1). The incorporated areas of the county grew by 3.3 percent per year, and the unincorporated areas grew by 0.4 percent per year. As of January 1, 2004, the estimated Sacramento County population was 1,335,400, including 725,700 in incorporated areas and 609,700 in unincorporated areas.[2] The compound growth rate for the county from 2000 through 2004 was 2.2 percent per year. In 2000, there were 453,602 occupied housing units in Sacramento County, including 263,811 owner-occupied and 189,791 renter-occupied units (U.S. Census Bureau 2002).

Based on age breakdown, 28 percent of the population was under 18, 10 percent was from 18 to 24, 30 percent was from 25 to 44, 21 percent was from 45 to 64, and 11 percent was 65 or older. The median age was 34 years.

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[1] Although the area of the City of Folsom impacted by the alternatives may include only parts of the city, the data presented in this section are for the entire city, which coincides with zip code 95630.

[2] The data for the incorporated and unincorporated areas of the county between 1990 and 2004 are not comparable because of the incorporation of Citrus Heights on January 1, 1997, and Rancho Cordova on July 1, 2003.

Table 3.4-1
Population Statistics for Sacramento County and Folsom, 1990–2004 (Select Years)

	Population			Compound Annual Growth Rate	
Area	4/1/1990	4/1/2000	1/1/2004	1990–2000	2000–2004
County Total	1,041,219	1,223,499	1,335,400	1.6%	2.2%
Incorporated	408,889	564,273	725,700	3.3%*	6.5%*
Unincorporated	632,330	659,226	609,700	0.4%*	-1.9%*
Folsom	29,802	51,884	65,600	5.7%	6.0%

Source: California Department of Finance Demographic Research Unit 2002, 2004.

* The incorporation of Citrus Heights and Rancho Cordova during the study period makes 2000–2004 incomparable with 1990 data.

Minority and Low-Income Populations

The racial makeup of Sacramento County in 2000 was 64 percent white, 10 percent black or African American, 1 percent Native American, 11 percent Asian, 1 percent Pacific Islander, 7 percent of other races, and 7 percent from two or more races.

In 1999, median household income for Sacramento County was $43,816, and median family income was $50,717. Per capita income countywide was $21,142, with 14 percent of the population and 10 percent of families below the poverty level. In 1999, the poverty level for a family of four was $17,027 (DHHS 2000).

Key Industries

Total nonfarm employment in Sacramento County grew by 19.3 percent between 1990 and 2000 (see Table 3.4-2). Among aggregated industries, the largest absolute growth was in jobs in companies that provide services, while the largest absolute declines were in Federal government agencies. The largest percentage growth rates were in computer systems design, waste management and remediation, and administrative and support services. The largest percentage declines were in Federal government, accounting and tax preparation, and nondurables manufacturing. The table does not include all industries, and totals may differ slightly from the sums of the columns because of rounding.

Table 3.4-2
Industry Employment and Trends, Sacramento County, 1990–2000

Industry	Employment		Change 1990-2000	
	1990	2000	Absolute	Compound Annual Growth Rate
Goods Producing Total	55,800	63,700	7,900	1.3%
Natural resources	300	300	0	0
Nondurable manufacturing	14,300	11,000	-3,300	-2.6%
Durable manufacturing	12,100	20,300	8,200	5.3%
Service Providing Total	409,300	491,300	82,000	1.8%
Trade and Transportation	83,100	89,500	6,400	0.7%
Information	12,900	14,400	1,500	1.1%
Financial	32,500	40,300	7,800	2.2%
Professional	45,200	78,100	32,900	5.6%
Educational	41,000	51,300	10,300	2.3%
Leisure and Hospitality	34,700	43,900	9,200	2.4%
Other Private	16,500	19,000	2,500	1.4%
Federal Government	27,900	11,300	-16,600	-8.6%
State and Local Government	115,500	143,400	27,900	2.2%
Total, Private and Public	468,500	558,100	89,600	1.8%

Major employers in Sacramento County are shown in Table 3.4-3. The key sectors represented among the employers shown are computers and computer components, government and education, health, and finance.

Despite the number of large employers shown in Table 3.4-3, most businesses in Sacramento County are small. In 2000, 70 percent of the 25,722 business establishments in the county employed fewer than 10 people, and 84 percent employed fewer than 20 (U.S. Census Bureau 2004). Among businesses that provide professional, scientific, and technical services, fully 82 percent employed fewer than 10 people, and 94 percent employed fewer than 20.

Table 3.4-3
Major Employers in Sacramento County

Employer Name	Industry
Apple Computer	Computer and Office Equipment
California State University	Education
Campbell Soup Company	Food Processing
Catholic Healthcare West	Hospitals
City and County of Sacramento	Government
EDS Corporation	Computer and Data Processing Services
Intel Corporation	Electronic Components and Accessories

Table 3.4-3, concluded

Employer Name	Industry
Kaiser Foundation Hospitals	Hospitals
Los Rios Community College	Education
McClatchy Company	Newspapers
Sacramento and San Juan School Districts	Education
SMUD	Electric Services
State of California	Government
Sutter Health	Hospitals
Teichert, Inc.	Engineering and Architectural Services
U.C. Davis Medical Center	Hospitals
USAA	Insurance
Vision Service Plan	Insurance

Source: California Employment Development Department 2004.

In 2000, total economic output in Sacramento County was an estimated $72.2 billion, counting both private and public sectors (see Table 3.4-4).[3] Output was greatest in the following sectors: State and local government, semiconductors and related devices, real estate, wholesale trade, and communications (excluding radio and television). The lowest levels of output that year were in costume jewelry, pipes and pipe fittings, and miscellaneous meat animal products.

Table 3.4-4
Economic Output in Sacramento County, 2000

Sector	Output ($2000)
State and local government	$10,864,360,000
Semiconductors and related devices	$3,946,870,000
Real estate	$3,120,160,000
Wholesale Trade	$2,810,020,000
Communications (excluding radio/television)	$2,490,390,000
New housing construction	$2,258,870,000
Doctors and dentists	$2,196,680,000
Insurance carriers	$2,080,480,000
State and local electric utilities	$1,901,360,000
Banking	$1,767,520,000
Restaurants and bars	$1,483,120,000
Hospitals	$1,451,490,000
Industrial and commercial building construction	$1,101,100,000
Automotive dealers and service stations	$1,042,330,000

[3] Government output is estimated based on a model using input-output (I-O) software from Minnesota IMPLAN Group, Inc., for calendar year 2000. IMPLAN is discussed in greater detail in Section 3.4.2 (Environmental Consequences).

Table 3.4-4, concluded

Sector	Output ($2000)
Maintenance and repair of nonresidential buildings	$1,035,480,000
Computer and data processing services	$963,640,000
Engineering and architectural services	$927,147,000
State and local government – education	$852,317,000
Maintenance and repair of residential buildings	$840,487,000
Management and consulting services	$827,730,000
Credit agencies	$821,887,000
Miscellaneous retail	$810,927,000
Food stores	$806,365,000
Costume jewelry	$214,000
Pipes and pipe fittings	$198,000
Miscellaneous meat animal products	$ 23,000
Other	$25,834,425,000
Total	$72,235,590,000

Source: Input-output model for Sacramento County.

Agriculture

Over time, agriculture in Sacramento County has evolved to intensively farmed crops as well as dairy and other livestock operations. Generally, cropping patterns have shifted to greater acreages in vineyards and fruits and lesser acreages in field, seed, and hay crops. In the southern part of Sacramento County along the Sacramento River, which lies directly downstream of Folsom Dam, agricultural production still consists primarily of field crops, pasture, fruits and vineyards, truck crops, and hay and grain.

Changes in agriculture in Sacramento County have led to the development of an extensive support infrastructure for production farming. This support industry has grown both inside and outside of the county's geographic boundaries. Businesses engaged in related activities include suppliers of purchased inputs (e.g., feed, chemicals, irrigation equipment, and farm machinery); food processors; financial institutions; transportation and shipping companies; and storage businesses. Each of these sectors purchases from and sells to many other businesses.

Accordingly, the impacts of farming ripple through many sectors of the Sacramento County economy. In 2002, while farming value of agricultural production was $275.9 million (see Table 3.4-5), total regional output attributable to agriculture was $409.1 million.[4] The total economic impact attributable to production of fruit (including grapes) and nuts was $162.0 million, followed by dairy products at $55.9 million and vegetables at $35.6 million.

[4] Based on data from the input-output (I-O) model used to analyze the impacts of the alternatives.

Table 3.4-5
Production and Value of Output, 1998 and 2002

Product Type	1998		2002	
	Harvested Acreage	Value	Harvested Acreage	Value
Apiary	--	$159,000	--	$55,000
Field Crops	189,054	$37,135,000	183,653	$49,719,000
Fruit and Nut Crops	20,184	$110,297,000	34,050	$104,429,000
Livestock and Poultry	--	$27,852,000	--	$28,819,000
Livestock and Poultry Products	--	$51,103,000		$38,824,000
Nursery Products	533	$17,933,000	666	$26,378,000
Seed Crops	7,019	$5,290,000	5,242	$3,775,000
Vegetable Crops	11,787	$25,639,000	8,753	$23,938,000
Total	228,577	$275,408,000	232,364	$275,937,000

Source: Sacramento County Agricultural Commissioner, various years.

3.4.1.2 Folsom

The City of Folsom is one of only five incorporated cities in Sacramento County. Folsom is about 25 miles upstream from the City of Sacramento on the American River. The city occupies an area of about 15,170 acres (23.7 square miles).

Population and Housing

Population in Folsom has grown rapidly since 1990. Between 1990 and 2000, the city experienced a 74.1 percent growth, or an increase of 22,002 residents. This increase represents a compound growth rate of 5.7 percent per year over that period. The city's growth accelerated between 2000 and 2004. In 2000, the population of the city was 51,884 (California Department of Finance 2002). As of January 1, 2004, the estimated population was 65,600, 26 percent greater than in 2000. The compound rate of growth over the period 2000 to 2004 was 6.0 percent per year, as compared with the countywide compound growth rate of 2.2 percent during that time. These statistics indicate that the City's rate of growth is relatively high and has accelerated with respect to the overall county in recent years.

In 2000, there were 17,180 occupied housing units in Folsom, including 13,101 owner-occupied and 4,079 renter-occupied units. In 2000, 24 percent of the population was under 18, 7 percent from 18 to 24, 39 percent from 25 to 44, 21 percent from 45 to 64, and 9 percent 65 or older.

Minority and Low-Income Populations

The racial makeup of Folsom is predominantly white. The city's population is estimated to be 78 percent white, 6 percent black or African American, 1 percent Native American, 7 percent Asian, 5 percent from other races, and 3 percent from two or more races.

In 1999, median household income in Folsom was $73,175 (67 percent higher than the median household income for the county), and median family income was $82,448 (62.6 percent higher than the county). Per capita income was 42.9 percent higher than the county at $30,210, and only 7 percent of the population and 3 percent of families were below the poverty level, as compared

with 14 percent of people below the poverty line countywide. In 1999, the poverty level for a family of four was $17,027 (DHHS 2000).

Key Industries

Historically, much of the Folsom area economy was based on the State prison located south of Folsom Dam. In the last 20 years, however, the structure of the local economy has changed as several major corporations have located in the city. In addition, several major retail and commercial centers have been completed or are planned, and housing construction has grown rapidly. Despite the growing trends, however, most of the businesses in Folsom are relatively small. In 2000, 74 percent of business establishments in Folsom employed fewer than 10 people and 86 percent employed fewer than 20.

With new residential development to the east and southeast of the center of the city, the geographic distribution of businesses in Folsom has also widened. Many new businesses have located closer to growing residential development in areas along or near Blue Ravine Road, the eastern area of East Bidwell Street, Iron Point Road, and Prairie City Road. This accounts for much of the growth in business since the mid 1990s. As parallel residential and commercial growth have been concentrated in these areas, traffic and congestion at these locations have been increasing since the late 1990s.

Employment comparisons between Folsom and other cities between 1990 and 2000 are not possible using publicly available data. However, employment and business data for Folsom are available beginning in 1994, and the data sets demonstrate that between 1994 and 2000, the number of businesses have been growing by an average of 60 percent per year. From 1994 through 1997, the total number of business establishments in Folsom grew by 96 and from 1998 through 2000 by another 115 (U.S. Census Bureau 2004).[5] From 1994 through 1997, total employment in Folsom grew by 3,040 persons and from 1998 through 2000 it grew by 5,836. In 2000, total business employment in Folsom was 21,958 (U.S. Census Bureau 2004). Total payroll in 2000 was $1,229,836,000.

During the same year, 21 percent (219) of the 1,026 business establishments in Folsom were in the retailing sector (U.S. Census Bureau 2004). An additional 13 percent (138) were professional and research entities, 11 percent (114) were in health care, 11 percent (109) were in accommodation or food services, and 9 percent (97) were in construction. Total economic output in Folsom in 2000 was $2.1 billion, counting both private and public sectors (see Table 3.4-6). Output was greatest for the following sectors: State and local government, computer and data processing, insurance, and doctors and dentists.

Although later data are not available from the cited sources, the City of Folsom's Finance Department has indicated that the number of business licenses has increased over the last several years, indicating that the citywide growth rate is continuing.

[5] Comparisons from 1994 through 1997 are based on the Standard Industrial Classification system, and those from 1998 through 2000 are based on the North American Industry Classification System.

Table 3.4-6
Economic Output in Folsom, 2000

Sector	Output ($2000)
State and local government	$460,343,000
Computer and data processing	$187,852,000
Insurance carriers	$132,760,000
Doctors and dentists	$78,549,000
Hospitals	$70,946,000
New housing construction	$65,105,000
Restaurants and bars	$62,215,000
State and local electric utilities	$62,091,000
Automotive dealers and service stations	$58,544,000
Wholesale trade	$54,490,000
Real estate	$38,599,000
Food stores	$38,540,000
State and local government – education	$36,114,000
Federal government – nonmilitary	$33,141,000
Banking	$32,712,000
Industrial and commercial building construction	$31,736,000
Electric services	$28,022,000
Miscellaneous clay products	$70,000
Phonograph records and tapes	$63,000
Costume jewelry	$63,000
Other	*$653,795,000*
Total	**$2,125,750,000**

Source: Input-output (I-O) model for zip code 95630.

Recreation

Recreation activities in the Folsom Lake State Recreation Area (SRA) show that average annual total visitor attendance from 2000 through 2003 was 1.5 million, including boat use. Folsom Lake SRA is a popular area for local recreationists, who account for an estimated 90 percent of users; out-of-area visitors account for 10 percent of users (Reclamation 1997a). No alternative recreational lakes exist within the immediate Sacramento area. Camp Far West Reservoir is 27 miles from the city, Sly Park Reservoir is 35 miles away, and Comanche Reservoir is at a distance of 40 miles.

Based on the above visitation numbers and spending profiles developed from several sources, current spending for recreation in the Folsom Lake SRA is estimated to be $92,384,000 per year (see Table 3.4-7). Across types of recreation, the largest amounts are attributable to boating, fishing, and swimming and beach use. Within those categories, the largest expenditures are at service stations and automotive-related businesses, lodging, restaurants and bars, and food stores.

Table 3.4-7
Estimated Annual Recreation Spending, Folsom Lake SRA, by Type of Activity

Type of Recreation Activity	Average Annual Visitor Days, 2001-2003	Annual Spending ($Average of 2001 and 2002)
Power Boating	472,909	$38,306,000
Other Boating	81,536	$6,604,000
Fishing	325,144	$26,418,000
Swimming/Beach Use	440,294	$12,359,000
Camping	65,229	$1,831,000
Picnicking	146,765	$4,120,000
Other	97,843	$2,746,000
Total	**1,630,719**	**$92,384,000**

Sources: Annual visitor-days shown are a four-year average based on data from 2000 through 2003. Annual spending based on percentage distribution is taken from Reclamation 1997b, p. II-31, and average spending per visitor-day, by activity, is taken from National Recreation Lakes Study Commission 1999, p. 283 (1996 dollars were updated to 2004 dollars using the Consumer Price Index for all items, all western urban consumers, as published by U.S. Bureau of Labor Statistics 2004).

Traffic and Commuting

Traffic patterns have been shifting over the past several years in Folsom due to citywide residential and commercial growth, infrastructure development, the indefinite closure of Folsom Dam Road in 2003, and subsequent actions taken by the City of Folsom to manage traffic. As described in Section 3.1, traffic congestion has been increasing over time, and the closure of Folsom Dam Road coupled with the implementation of the city's Traffic Calming Program have further exacerbated delays, affecting both businesses and residents in Folsom. Based on a reconnaissance-level survey, it is estimated that 177 businesses are located in the areas most directly affected by changing traffic patterns.

3.4.2 Environmental Consequences

This section addresses the socioeconomic impacts associated with each of the alternatives analyzed for the Folsom Dam Road Access Restriction. It is important to note that in addition to patterns of commercial growth, industry-specific demand trends, broader countywide and statewide economic trends, the introduction of new competitors in the local market, cost controls, employee productivity, and business management have all contributed to changes that have affected and continue to affect individual businesses in the vicinity of the access restriction. As such, the data represented in this section reflects the combined effect of these microeconomic and macroeconomic factors and trends, as well as effects relating to changes in traffic patterns. Because data cannot easily be segregated to attribute effects to specific isolated actions such as the proposed long-term decision regarding access to Folsom Dam Road, this section includes a framework for analysis and describes the limitations of the data sources currently available.

Framework for Estimation of Economic Impacts

The evaluation of impacts presented in this section is based on the two study areas described in Section 3.4.1. Under the No Action Alternative, immediate local impacts associated with reopening Folsom Dam Road to pre-2003 conditions are assessed. However, there are additional potential (direct and indirect) effects associated with the No Action Alternative that would have both a local impact and a regional impact to downstream resources, as analyzed in detail in Appendix D.

Indirect impacts to regional resources resulting from the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative have not been calculated. Therefore, the impact analyses for the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative are not strictly comparable to that of the No Action Alternative. On a regional level, it is assumed that the risk of potential adverse local and regional effects associated with the No Action Alternative can be minimized to varying degrees under the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative. However, it is not known whether the estimated local revenue reductions due to the February 2003 closure of Folsom Dam Road are being offset by revenue increases for businesses elsewhere in Folsom or in other parts of Sacramento County or other counties.

Additionally, as noted previously, it is not known to what extent estimated revenue reductions under the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative discussed in this section can be directly attributed to limiting access on Folsom Dam Road. Other factors continue to affect local businesses. The increase in traffic congestion offers an important but perhaps incomplete explanation for the loss in business revenues in north and central Folsom. Therefore, the analysis is presented as a combined effect.

Data Sources. Several sources of data are used for the analysis presented in this section. Demographic data for Folsom and Sacramento County are tabulated from publications of the California Department of Finance. Employment data are taken from "County Business Patterns," published by the U.S. Census Bureau. Retail sales data are taken from reports of the California Board of Equalization. Other data for Folsom have been collected from City of Folsom departments and businesses. Within Folsom, the assessment of economic impacts focused on the changes in retail sales along the roadways most affected by traffic, using survey interviews and data.

An input-output (I-O) model for Sacramento County was used to analyze the impacts of the No Action Alternative. The model was developed using a variety of State and Federal data sources, including those discussed above, and algorithms to disaggregate the data. The database associated with the model provides more detailed estimates of many variables than those available from government sources.

Input-Output Analysis. I-O analysis is a technique used to describe and analyze the nature of relationships among industries. It is based on the concept that every industry in a geographic area both purchases from and sells to other industries and to final consumers and that other sectors and industries, in turn, sell to still other industries or other final consumers. I-O models are used frequently to estimate the effects on various industries of resource changes within a region.

For the No Action Alternative, the impact area analyzed includes both the City of Folsom study area and the Sacramento County study area. Immediate effects that would restore pre-2003 conditions are predominantly local. However, the No Action Alternative also has the potential to have widespread adverse effects, at both a local and regional level. The economic impacts analyzed or discussed include the following:

- Agriculture
- Recreation
- Water supplies
- Power production
- Business revenues and incomes
- Personal incomes
- Roads and other transportation infrastructure
- Buildings and contents
- Government expenditures

Based on the study areas reviewed, three types of impacts are considered: direct, indirect, and induced impacts, each measured relative to output, employment, and income.[6] Direct impacts include those most directly or explicitly related to an affected sector or group. In this study, the key direct impacts are on the businesses, residents, and other entities that would be affected by an increased risk of failure of Folsom Dam (under the No Action Alternative).

Indirect impacts are those closely related to the directly impacted businesses. These impacts may be either "forward" or "backward" interindustry linkages. The former occur in cases where the products are used in the production of other products (for example, electronic components used in the production of computers). The latter occur in those cases where the impacted sector purchases from other industries (for example, businesses that produce electronic components that purchase raw materials from suppliers).

Induced impacts occur because of changes in local incomes and population. Direct and indirect impacts influence the incomes of employees of the impacted businesses. As these income levels change, they induce changes in the consumption of goods and services. In addition, induced impacts occur because of changes in population. If employment declines, some local residents may leave the area because of reduced job opportunities.

The Sacramento County model used for the analysis of the No Action Alternative was developed using IMPLAN (Minnesota IMPLAN Group 2004). IMPLAN is a system of software and databases used to construct regional economic models. It is based on I-O methodology, which quantitatively measures the interdependence among economic sectors. Each sector not only produces goods and services, but also purchases goods and services for use in the production process.

[6] The sum of indirect and induced impacts is sometimes termed "secondary impacts."

Evaluation Criteria. The level and severity of economic changes are based on context and intensity (40 Code of Federal Regulations [CFR] 1508.27). Context refers to such measures as geography, e.g. national or the affected region; affected interests; or the locality. Intensity refers to the severity of the impact and may vary depending on such considerations as beneficial or adverse impacts; particular characteristics of the geographic area; and the degree to which the effects on the quality of the human environment are likely to be highly controversial.

For this study, rigorous statistical testing of impact estimates would have necessitated the use of detailed information on individual businesses for many years, and this information is not available because of confidentiality issues. Consequently, a change of 5 percent or more in output, employment, or income for the No Action Alternative was used to indicate that a marked change has either occurred or may occur.

Data Limitations. Limited data preclude a rigorous quantitative analysis of the impacts of the closure of Folsom Dam Road and a comparison between the No Action Alternative and action alternatives. The factors most responsible include the following:

- Traffic flows and congestion in Folsom have increased for many reasons, including population increases and residential and commercial growth. Much of this growth was underway prior to the closure of Folsom Dam Road.
- Activity, revenues, costs, and profits of any business are a cumulative reflection of many variables, including demand trends for the particular business and industry, intra- and inter-regional competition among businesses in the industry, costs for labor and raw materials, worker productivity, and macroeconomic trends. It was not possible in this study to distinguish between the impacts of these influences and of the closure of Folsom Dam Road. Doing so would have required obtaining and analyzing, among other data, several years of financial statements for businesses in the impact area, which was not feasible because of confidentiality.
- It is reasonable to assume that customers who patronize Folsom businesses in the impact area would purchase those goods and services elsewhere. Thus any decline in business revenues in the impact area would likely have been offset by increased revenues among businesses elsewhere in Folsom, Sacramento County, or other counties. It was not possible in this study to measure these impacts.

Evaluation of Economic Impacts

For reasons discussed above, the analysis of impacts from the No Action Alternative differs from that for the three action alternatives. For the No Action Alternative, impacts are presented in two parts. The first part includes a discussion of the direct impacts on individual sectors or measures (e.g., agriculture, recreation, or business revenues). The direct impacts are estimated using a variety of Federal, State, and local data, with assumptions and limitations discussed in the text. The second part includes a summary of the direct and total output, employment, and income impacts of the alternative on Sacramento County. Where appropriate, the total impacts are estimated by inputting the estimated direct impacts into the I-O model discussed above.

Socioeconomic Effects Since 2003

Following the indefinite closure of Folsom Dam Road in February 2003, the City of Folsom instituted a Traffic Calming Program. Together, these two actions had a marked effect on traffic

patterns through parts of Folsom including the Riley Street crossing (Rainbow Bridge), the Folsom Boulevard crossing (Lake Natoma Crossing), Folsom-Auburn Road between Folsom Dam Road and Greenback Lane, and Natoma/East Natoma Street between Folsom Boulevard and Folsom Dam Road. Traffic congestion has increased in several parts of Folsom as drivers have changed to alternate routes.

Discussions with city officials, emergency and law enforcement personnel, and individuals in public meetings indicate that congestion and commute times have increased dramatically at some roadway segments at peak periods. Residents in the area also voiced concerns over increased traffic in neighborhoods, higher risk of accidents, and the quality of air and noise in the vicinity. Some businesses report that their sales revenues have declined because their locations are less accessible than they were prior to closure of the road.

To assess potential economic changes resulting from the February 2003 road closure, a survey was conducted of business managers and operators in the areas of downtown Folsom most affected by the road closure. As a preliminary step, a list of businesses was developed from a reconnaissance of the affected streets conducted on July 2 and 3, 2004:

- Folsom-Auburn Road, between Greenback Road and Pinebrook Plaza, north of Folsom Dam Road
- Leidesdorff Street
- Natoma Street from Riley Street to Cimarron Circle and from Riley Street to Wool Street
- Riley Street from Leidesdorff Street to East Bidwell Avenue
- Sutter Street, entire length

Business names and addresses were noted.[7] Telephone numbers were then located in local phone books or Internet phone directories. Each business was contacted, and the manager was asked to comment briefly on the impacts of the closure on the firm.

Each respondent was asked the following questions, with some variations:

- Has your business changed since 2003, if at all?
- If your business has been impacted, can you approximate the gains or losses since the road closure?
- If your business has been impacted, have you hired new employees or laid off existing employees? Have you chosen not to hire or rehire employees you would normally keep on staff?
- Have you contemplated shutting down or moving your business?

A total of 177 businesses were identified from the survey: 47 on Folsom-Auburn Road, 10 on Leidesdorff, 52 on Natoma Street, nine on Riley Street, and 59 on Sutter Street. Phone numbers were found for 138 of these businesses, and all were contacted. Information was obtained from 93, and the remainder either did not return the two phone calls made or, on answering, refused to

[7] Some businesses may have been unintentionally excluded because signage was not visible from the street or parking lot.

participate. Table 3.4-8 displays the numbers of businesses identified and contacted, by street.[8] Note that this survey is not a complete or comprehensive survey of every business potentially affected, but does provide sufficient information to indicate trends and overall effects.

Table 3.4-8
Businesses Identified and Contacted, Folsom, by Street

Street	Identified	Contacted	Refused to Comment
Folsom-Auburn	47	28	0
Leidesdorff	10	7	0
Natoma	52	20	2
Riley	9	6	0
Sutter	59	32	2
Total	177	93	4

The businesses identified were in 10 general categories, including:

- Restaurants and bars
- Gifts, antiques, and collectibles
- Lodging
- Automotive
- Professional (e.g., doctors, dentists, and accountants)
- Financial (e.g., mortgages, insurance, and related)
- Beauty and spas
- Miscellaneous retail
- Miscellaneous nonretail and services
- Unknown

Discussions revealed a variety of reported changes in business. The results are reported herein as indicators of the range of potential changes that have occurred. The managers were asked to discuss these changes as distinctly associated in time with the closure of Folsom Dam Road.

Reported changes in business were wide ranging. Several businesses opened shortly before or after the closure, and the managers were unable to discern any impacts. Several others have been in business for more than 10 years and reported revenue losses and employee layoffs because of declines. Reported revenue impacts ranged from none to 60 percent. Among those businesses providing figures, the median reported revenue loss decline was 35 percent. In addition, managers that provided specific estimates said they have had to lay off 56 people and have delayed hiring another 47 (for all businesses contacted). Several managers stated that they have considered moving their businesses, some to elsewhere within Folsom and others to either El

[8] The statistical validity of the sample was not tested. However, because all businesses on the affected streets were included, it is believed that the sample was representative.

Dorado or Placer counties. Finally, six managers said that they have already begun to shut down or to relocate their businesses, and four said that they were considering doing so.

Adverse impacts occurred to individual businesses that report that they have been "hit the hardest," such as providers of discretionary services (gift and antique stores, for example) and retailers where individual street and small retail locations have experienced access impacts because of changes in traffic congestion. However, without citywide or areawide surveys, it is not possible to quantitatively measure the magnitude of relative impacts among different sectors of the Folsom economy. Furthermore, without information on the extent of offsetting impacts in other parts of Folsom, it is not possible to develop estimates of the overall impacts on the Folsom economy.

Table 3.4-9 provides information on the types of businesses interviewed and the sales impacts reported by each type. The impacts shown are believed to represent the maximum losses that could be experienced by firms in the area most affected by the closure of Folsom Dam Road. Although indirect and total impacts of these direct effects are not estimated in this analysis due to data limitations, they are expected to represent less than 1 percent of total citywide revenues. As noted, 21 of the 93 managers interviewed reported no revenue impacts, and two reported positive (though unquantified) impacts. An additional 20 managers said they did not know or would not comment on whether the closure had affected their businesses. The largest number of businesses reporting negative impacts indicated declines of 20 to 40 percent relative to pre-closure conditions. Sixteen businesses said their sales had declined by less than 20 percent, while 10 businesses reported declines of 41 to 60 percent and two reported declines of more than 60 percent. Among all categories of businesses, those providing miscellaneous services were the least impacted, and those selling gifts and antiques were the most impacted. Data provided by the City of Folsom were consistent with the range of data obtained from managers of the businesses contacted (R. Lorenz, pers. comm., 2004).

Table 3.4-9
Types of Businesses Contacted and Reported Percent Sales Declines

Type of Business	Number Interviewed	Reported Sales Impact Since Folsom Dam Road Closure						
		0%	Down 1-19%	Down 20-40%	Down 41-60%	Down >60%	Unknown	Positive Impact
Restaurants and Bars	18	2	2	6	1		6	1
Gifts and Antiques	21	3	3	6	5	1	3	
Misc. Retail[1]	16	2	6	3	2	1	1	1
Misc. Services[2]	11	7		1			3	
Auto Related	2			1			1	
Beauty and Spa	6	1	2	2			1	
Professional[3]	15	5	3	2	1		4	
Financial and Insurance	4	1		1	1		1	
Total	93	21	16	22	10	2	20	2

Note: The data presented in this table may overstate impacts in that all businesses are weighted equally. Thus, a thriving well-run business is assumed to have been impacted in the same manner as a smaller understaffed or poorly managed business. Furthermore, it is not possible to discern to what extent increased revenues of other Folsom businesses outside the most affected areas may have offset adverse impacts.

[1] Includes, e.g., health and fitness, art and design, clothing, and houseware businesses.

[2] Includes, e.g., consulting, printing and publishing, private education, and laundry businesses.

[3] Includes, e.g., medical, dental, accounting, and legal businesses.

Across all businesses that reported either no impacts or a decline in revenues, the weighted average decline was 21 percent. This figure and those that follow are not in dollar terms; rather, the weighting is in percentage terms only.[9] The largest reported weighted declines were for gift and antique stores and auto-related businesses (30 percent), financial and insurance firms (27 percent), restaurants and bars and miscellaneous retail establishments (23 percent), and beauty and spa businesses (16 percent). The smallest weighted declines were for miscellaneous services (4 percent) and professional businesses (13 percent). The actual decline, were data available, could be larger or smaller because 20 of the 93 businesses contacted stated that they did not know or were unwilling to state the impacts of the closure on their revenues.

Several caveats are appropriate in interpreting these data. First, managers were asked for their comments explicitly on the effects of closure of Folsom Dam Road. However, without actual sales revenue data before and after February 2003 for all businesses in the surveyed area, it cannot be stated with a high degree of certainty whether the impacts reported relate specifically to the latter period. Second, population and commercial growth in Folsom since the late 1990s

[9] Calculated by multiplying the midpoint of the ranges shown in Table 3.4-9 by the number of businesses for that range, adding the products, then dividing by the number of businesses.

has been concentrated in areas away from downtown Folsom. Several new housing tracts and retail and commercial malls have been developed in areas east and northeast of downtown, including those along or near Blue Ravine Road, East Bidwell Street, Prairie City Road, and Iron Point Road. It is possible that these newer businesses have contributed to some sales declines among other businesses closer to downtown, where impacts would have occurred regardless of the closure of Folsom Dam Road.

A third factor that is appropriate to consider is that traffic patterns and congestion are predominantly affected by long-term growth and the capacity of the roadway network to handle increasing traffic demands. Many of the roads and intersections studied are operating at relatively low levels of service, below the City's standard of level of service C. Under these conditions any additional impact, even minor, results in noticeable adverse impacts because of the lack of any remaining capacity to absorb the change. The major contributors to traffic conditions that have affected businesses (depending on location) include the cumulative effects of past and continued strong growth in the area, the road closure, and subsequent traffic controls implemented with the City's Traffic Calming Program.

A fourth factor that should be considered is that some managers reported sales revenue declines as a single percentage (e.g., 10 or 20 percent), while others reported ranges (e.g., 10 to 20 percent). Absent actual revenue data for all businesses, it was necessary to show results in ranges. Moreover, 20 of the 93 managers contacted stated that they were uncertain whether the closure of Folsom Dam Road had affected their businesses.

The net effect of these caveats is that the data reported by business managers and reported herein may reflect many influences, not just closure of Folsom Dam Road. For this reason, the figures shown should be considered with caution and as subject to error.

While 50 of the 93 businesses contacted stated that their sales had declined since closure of Folsom Dam Road, only five of the 93 are considering closing or moving their operations or are in the process of doing so. The majority, 56, indicated they have no plans to close or move, six said that they are unable to do so, and 26 said either that they were considering moving or closing or that they were uncertain (see Table 3.4-10).

Table 3.4-10
Plans of Surveyed Businesses to Move or Close

Type of Business	Plans to Move or Close				
	No Plans to Move	Considering Moving or Closing	Cannot Afford to Move or Close	Moving or Closing	Not Certain or Other
Restaurants and Bars	11	2	1	1	3
Gifts and Antiques	8	4	2	2	5
Misc. Retail	9			2	5
Misc. Services	10	1			
Auto Related	2				
Beauty and Spa	3	1	1		1
Professional	11	1	1		2
Financial and Insurance	2	1	1		
Total	56	10	6	5	16

The responses of Folsom business managers contacted within the area most impacted by the closure of Folsom Dam Road indicate that at least half of those firms have been adversely affected by that event. As discussed above, the weighted percentage decline in sales revenues among responding businesses was 21 percent.

As indicated previously, it is difficult to associate effects felt in the community to a single cause, such as the closure of Folsom Dam Road. Nevertheless, it is clear that segments of the community in the vicinity of the Folsom Dam Road closure have experienced socioeconomic effects since February 2003.

Under the Preferred Alternative—Restricted Access Alternative 2, the road would be reopened for two 3-hour periods daily from Monday to Friday, but it would remain closed during nonpeak weekday hours and all day Saturday and Sunday. The combined effects of changing traffic patterns would likely continue to some degree because use of Folsom Dam Road would be constrained by the hours of public access and the requirements for security review of traffic. Therefore, the results of the surveys along with publicly available data have been used as the basis for analysis of the likely impacts under the Preferred Alternative—Restricted Access Alternative 2. These effects would also apply, to varying degrees, to Restricted Access Alternative 3 (which would further limit the hours of public access and restrict volume and directional flow of traffic, as discussed in Section 2.2.3) and the Long-Term Closure Alternative (which would continue the road closure over the long term).

3.4.2.1 No Action Alternative

Under the No Action Alternative, access to Folsom Dam Road would be restored to pre-February 2003 conditions. The immediate impacts associated with that action would be somewhat different from the pre-2003 conditions. Traffic levels of service prior to road closure in 2003

were below the standards set forth in the City of Folsom's General Plan. With continued projected population growth, as demonstrated in Section 3.1.2, traffic would be greater than in early 2003 under the No Action Alternative. As a result, some changes in traffic patterns may occur despite the road being accessible.

The economic output for the City of Folsom was $2.1 billion in 2000. Assuming continued commercial growth, this number is also likely to increase under the No Action Alternative.

Under the No Action Alternative, however, the dam would be exposed to a greater level of security risk, which could result in widespread adverse environmental consequences both within Folsom and in the region. It is estimated that a combined economic loss of dam failure could be in the billions of dollars. A summary of the range of socioeconomic effects and their relative values is described below.

Agriculture

Sacramento County remains an important agricultural center. A failure of the dam could result in widespread agricultural losses and economic impacts to related industries in Sacramento County. Impacts would occur to the utilization of farm labor, at least in the short term.

Recreation

A failure of the dam facility would also result in losses to recreation-related businesses. Effects would be felt over the short term with problems of access and associated losses of lake-related activities, and would extend until water levels were restored. Over that time, both jobs and income would also be lost.

Water Supply and Power Production

Water supplied from Folsom Lake and power produced in the area play an important role in the supply available to the greater Sacramento region. Interruption of the water supply would directly and immediately affect the region at least on a temporary basis. The impacts would depend on many factors including available supplemental or replacement supplies, and system capacities of individual districts.

Losses in Business Revenue and Income

Under the scenario of a potential dam failure, it is likely that many businesses throughout the area (both local and beyond) would experience losses for at least six months (in addition to those already discussed for agriculture and recreation) for areas that can be cleared and reopened, and losses over a much more extended time period where reconstruction is necessary.

Damage to Buildings and Contents

The failure of Folsom Dam could cause substantial damage to residential and nonresidential buildings and contents in those buildings throughout the region. These losses could amount to millions of dollars or more.

In addition to property losses, it is anticipated that a dam failure would result in extensive losses in personal incomes and damage to roads and other transportation infrastructure. Furthermore, under this scenario, there is potential for loss of life.

3.4.2.2 Preferred Alternative—Restricted Access Alternative 2

The Preferred Alternative—Restricted Access Alternative 2 would provide limited traffic access across the dam with prescreening and security measures, as described in Section 2.2.2. This would~~,~~ restore some portion of the traffic circulation and pattern that existed before the closure of Folsom Dam Road. However, it would open the road only for 3 hours during the morning and afternoon/evening commute periods from Monday to Friday, so any effect on traffic circulation would be limited to periods when the road is open. Some intersections would have level of service improvements, but the improvements would be similar to those of the No Action Alternative or pre-closure conditions, as discussed in Section 3.1.2.2.

Business Revenue and Income

Compared to the post-closure economic effects discussed in Section 3.4.2 ("Socioeconomic Effects Since 2003"), the Preferred Alternative—Restricted Access Alternative 2 would provide some benefit to businesses that have employees that could commute across the dam, or the business have service routes that can use Folsom Dam Road to better reach their customers or service areas (although the limitations on vehicle size may prevent some business vehicles, such as trucks, from using this route). However, because Folsom Dam Road would remain closed during nonpeak weekday hours and weekends, congestion during those periods would not change from current conditions. Overall, the Preferred Alternative—Restricted Access Alternative 2 would have some beneficial effect for some businesses compared to post-closure (or Long-Term Closure Alternative) conditions, but the benefit would be less than that under the No Action Alternative. The Preferred Alternative—Restricted Access Alternative 2 reduces security risks compared to the No Action Alternative. If a dam failure occurs, the net impact (described in Section 3.4.2.1) would include and far surpass impacts associated with the Preferred Alternative—Restricted Access Alternative 2.

Effects to Other Resources

Providing restricted access to Folsom Dam Road would not affect the projected population growth in the City of Folsom. As indicated by the continued growth in the number of business licenses issued in Folsom, it is anticipated that robust commercial growth would also continue in the city, although less growth may occur in the areas directly impacted by the access restrictions on Folsom Dam Road. Since there are no agricultural resources within Folsom, there would be no effect on agriculture from the Preferred Alternative—Restricted Access Alternative 2. No regional effects to agriculture would result from the Preferred Alternative—Restricted Access Alternative 2.

Approximately 90 percent of all recreation resource users in Folsom are from the local region, and 10 percent come from other regions. No incremental adverse effect would occur to land-based recreation under the Preferred Alternative—Restricted Access Alternative 2 relative to the No Action Alternative. However, access to water-related recreation facilities would continue to be hampered by the Folsom Dam Road closure on weekends and nonpeak weekday hours. Weekday visitors could travel on Folsom Dam Road during the 3-hour periods of operation in the mornings and afternoon/evenings, but the added wait associated with inspections could deter some people from making this trip. Evening use of the SRA often coincides with afternoon/evening peak commute periods on weekdays, according to the Department of Parks and Recreation. Users who visit during this time could benefit from the Preferred Alternative—

Restricted Access Alternative 2, but the overall benefit would be less than under the No Action Alternative due to potential delays related to vehicle screening and inspections.

Within this larger region, approximately 10 percent of all recreation use (measured in visitor use days) occurs at Folsom Lake (Reclamation 1997e). Folsom Lake SRA personnel have noted that there appears to be no change in recreation use at the SRA during the 2004 season due to the road closure, even though user fees have also increased. This scenario is anticipated to continue under the Preferred Alternative—Restricted Access Alternative 2.

3.4.2.3 Restricted Access Alternative 3

Restricted Access Alternative 3 would have effects similar to the Preferred Alternative—Restricted Access Alternative 2. Any differences between the two would be due to the difference in the hours of public access to Folsom Dam Road (two 2-hour periods daily from Monday to Friday for Restricted Access Alternative 3 compared with two 3-hour periods for the Preferred Alternative—Restricted Access Alternative 2) and the difference in traffic capacity based on directional flow and hourly volume (see Section 2.2.3).

Business Revenue and Income

As discussed for the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3 could have some beneficial effect for some businesses compared to post-closure (or Long-Term Closure Alternative) conditions. In addition, Restricted Access Alternative 3 minimizes security risks compared to the No Action Alternative. If a dam failure occurs, the net impact (described in Section 3.4.2.1) would include and far surpass impacts associated with Restricted Access Alternative 3.

Effects to Other Resources

The implementation of Restricted Access Alternative 3 is not expected to have an impact on population or commercial growth in the city, although the pattern of geographic distribution of businesses may be affected. No local or regional agricultural impacts would occur.

Access to recreational resources would be approximately the same as under the Preferred Alternative—Restricted Access Alternative 2. Overall levels of recreational use are not expected to be impacted in comparison to the No Action Alternative.

3.4.2.4 Long-Term Closure Alternative

A decision to continue the closure of Folsom Dam Road over the long term would result in extending the effects to residents and businesses in parts of Folsom and communities surrounding the immediate area of effect. The predominant socioeconomic impact under the Long-Term Closure Alternative would be to local businesses.

Business Revenue and Income

The long-term closure of Folsom Dam Road would result in the continuation of the post-closure economic effects discussed in Section 3.4.2 (“Socioeconomic Effects Since 2003”). Compared with the No Action Alternative, some businesses located in areas most directly affected by the road closure are projected to experience losses. This would be considered an incremental effect, not present under the No Action Alternative except in the event that a dam failure occurs. If a

dam failure occurs, the net impact would include and far surpass impacts associated with the Long-Term Closure Alternative, as described in Section 3.4.2.1.

Effects to Other Resources

The long-term closure of Folsom Dam Road is not expected to have an impact on population or commercial growth in the city, although the pattern of geographic distribution of businesses may be affected. No local or regional agricultural impacts would occur.

As discussed in Section 3.8.2.4, local recreation users would be inconvenienced under the Long-Term Closure Alternative. However, statistical records indicate that, on a regionwide basis, there would be no change to the use of recreational facilities in the area.

3.4.3 Mitigation

3.4.3.1 No Action Alternative

No immediate measurable socioeconomic impacts would result from the No Action Alternative, though traffic may increase from the pre-2003 levels due to anticipated growth in the City of Folsom. The No Action Alternative exposes the dam to unacceptable risks of potential failure, which if occurred would have substantial short and long-term economic impacts. At this time, no mitigation for impacts associated with potential dam failure is foreseen, other than avoidance or reduction of the risk.

3.4.3.2 Preferred Alternative—Restricted Access Alternative 2

The Preferred Alternative—Restricted Access Alternative 2 would likely contribute to cumulative traffic congestion impacts and subsequent cumulative impacts to some businesses' revenues, particularly because Folsom Dam Road would remain closed on weekends and nonpeak daytime hours (as described in Table 2-1), and congestion during those periods would not change from current conditions.

Reclamation has no legal obligation to mitigate for potential impacts associated with the closure or partial closure of a Reclamation maintenance and facility-access road. However, potential mitigation options have been raised or requested. This EIS identifies economic changes or trends that have been reported along some of the roads where traffic impacts or changes have occurred after the closure of Folsom Dam Road and shows that these effects vary by location, business sector, and individual business. In cases where a business claims to have suffered direct losses associated with increased vehicular traffic and congestion from the Preferred Alternative—Restricted Access Alternative 2, that effect would have to be individually evaluated based on a review of specific sales revenue and other data, and the effect would have to be disassociated from other cumulative contributing factors such as those mentioned above. The Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3, and the Long-Term Closure Alternative are under consideration because of an overall security directive, and no compensatory mitigation review program exists or has been authorized by Reclamation for security actions or for the Folsom Dam Road Access Restriction. As a result, if mitigation were to be assigned to an individual impact, funding for such measures would also require additional approvals.

3.4.3.3 Restricted Access Alternative 3

As with the Preferred Alternative—Restricted Access Alternative 2, Restricted Access Alternative 3 would contribute to cumulative traffic congestion impacts and subsequent cumulative impacts to some businesses' revenues.

3.4.3.4 Long-Term Closure Alternative

The Long-Term Closure Alternative would result in the continued closure of Folsom Dam Road, which from an economic aspect is identified as contributing to cumulative traffic congestion impacts and subsequent cumulative impacts to some businesses' revenues. Mitigation concepts that would involve some form of alternative access across the dam to restore access to pre-closure conditions, even if restricted, would be equivalent or similar to selection of another alternative.

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