APPENDIX M

Transportation/Traffic Technical Report

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TRANSPORTATION/TRAFFIC TECHNICAL REPORT

NORTH HAIWEE DAM NO. 2 PROJECT

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1 Introduction

This report presents the methodology, findings, and conclusions of the Traffic Impact Analysis (TIA) prepared for the proposed North Haiwee Dam No. 2 (Proposed Project). Figure 1-1 shows the location of the Project. Borrow Site 10 refers to the LAA Excavation Area and Borrow Site 15 refers to the existing mine in Keeler in the Draft Environmental Impact Report/Environmental Assessment (EIR/EA).

The scope of this traffic analysis was based on discussion with Inyo County and California Department of Transportation (Caltrans) staff. Based on input received from Inyo County and Caltrans staff, the following roadway segments were identified for evaluation:

- State Route (SR) 136 immediately north of SR-190
- SR-190 between U.S. Route (US) 395 and SR-136;
- US-395 between SR-190 and North Haiwee Road; and
- US-395 south of North Haiwee Road.

Figure 1-2 shows the roadway segments included in the analysis.

US-395 south of North Haiwee Road is widened to its ultimate configuration of a four-lane highway, and therefore, the roadway capacity of US-395 south of North Haiwee Road is significantly higher than potential demand during construction of the Proposed Project. The Proposed Project is unlikely to add many construction related trips on SR-136 south of SR-190, or north of Borrow Site 15, and therefore, would not have any traffic impacts on those roadway segments. The Proposed Project would add minimal traffic to the circulation system during operations.

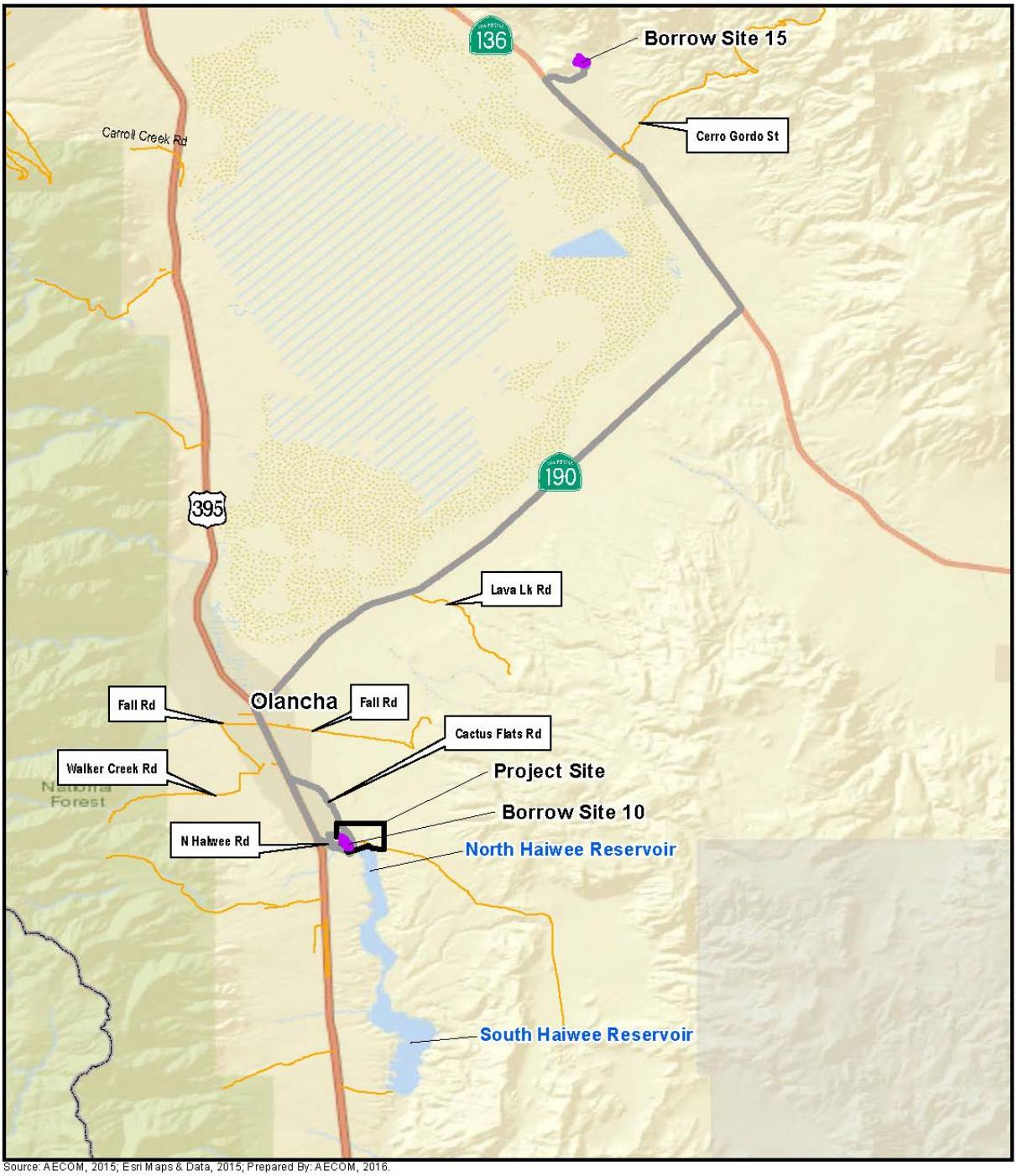


Figure 1-1
Project Location and Vicinity Map

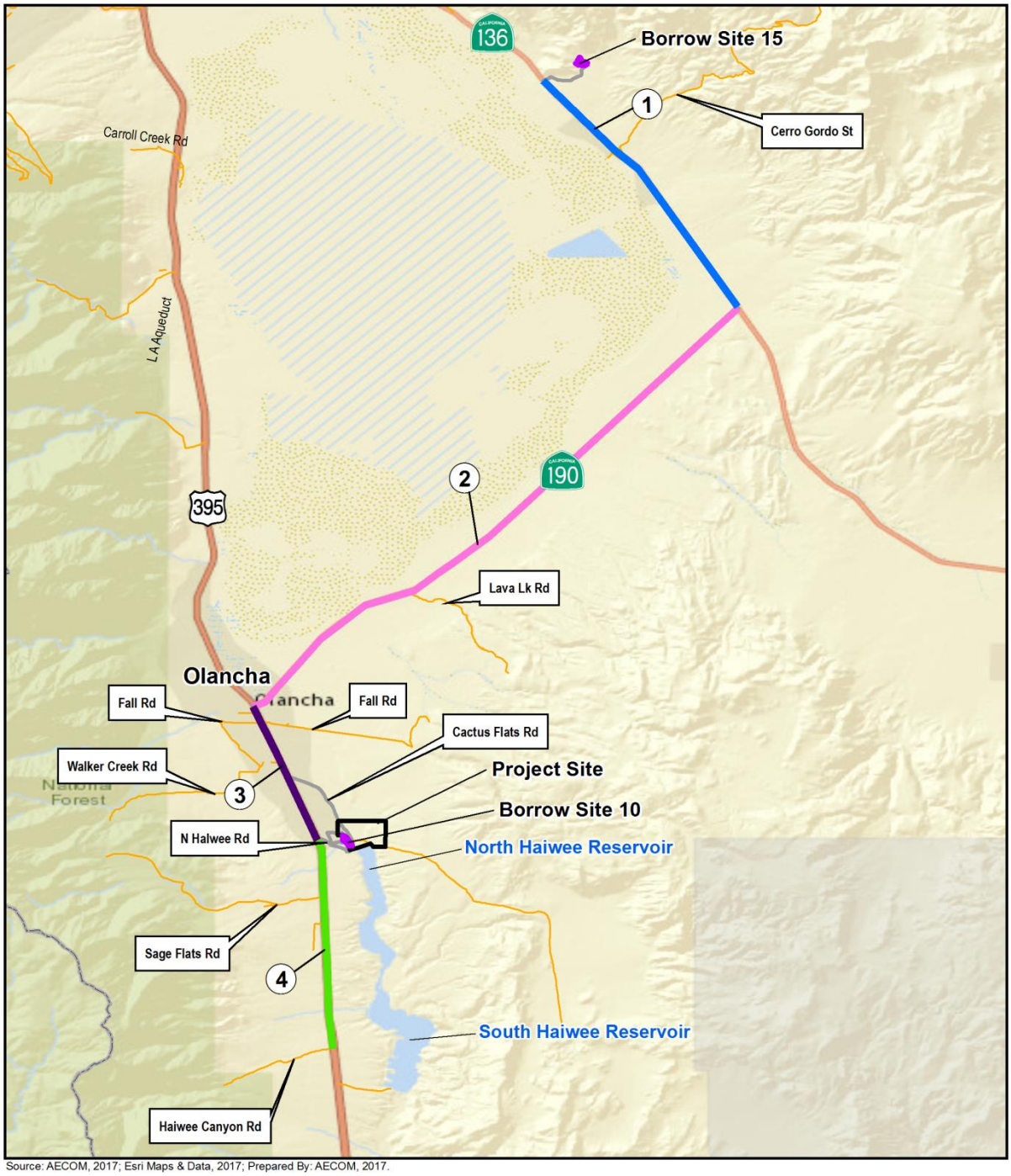


Figure 1-2
Study Area Roadway Segments

2 Project Description

The Los Angeles Department of Water and Power (LADWP) proposes to improve the seismic reliability of the North Haiwee Reservoir (NHR), which is located in the Owens Valley, California, approximately 150 miles north of Los Angeles. LADWP has prepared this draft joint EIR/EA in cooperation with the Bureau of Land Management (BLM). The purpose of the Proposed Project is to construct North Haiwee Dam No. 2 (NHD2 or new Dam) to the north of North Haiwee Dam (NHD or existing Dam), which impounds NHR. Seismic studies have found that NHD would have potential to fail during a Maximum Credible Earthquake event, the largest possible earthquake which could happen. NHD2 would serve to improve the seismic reliability of NHR in the event that the existing Dam is damaged or breached by an earthquake event, thereby ensuring public health and safety and securing the City's water source. The Proposed Project would provide sufficient seismic reliability for NHR, maintain the function of an essential water conveyance infrastructure component for the City of Los Angeles, and protect local populations from a hazardous flooding event. The Proposed Project would also create a basin between NHD2 and NHD, allowing LADWP to divert water from the Los Angeles Aqueduct (LAA), through the basin, and through a notch in NHD into NHR.

This technical report includes the evaluation of the No Project Alternative, as well as two Build Alternatives: the Cement Deep Soil Mixing (CDSM) Alternative and the Excavate and Recompact Alternative. The Proposed Project consists of the following components, which are common to both Build Alternatives:

- Construction of the NHD2 components: NHD2, the east and west berms, and grading of the basin area between NHD and NHD2;
- Realignment of Cactus Flats Road;
- Realignment of the LAA and construction of the diversion structure and temporary bridge;
- Construction of the diversion channel and NHD modifications;
- Excavation of materials from Borrow Site 10[1]; and
- Purchase and hauling of materials from Borrow Site 15.

The differentiating component between the two Build Alternatives is the method of construction of the foundation of NHD2, which affects the timeline and construction efforts of the NHD2 components and use of Borrow Sites 10 and 15. Construction of the remaining Proposed Project components is the same between the two Build Alternatives, except for the timeline of the diversion channel and NHD modifications.

Refer to Chapter 1.0 Introduction and Chapter 2.0 Project Description and Alternatives of the Draft EIR/EA for the full description of the Proposed Project, including purpose and need, objectives, regulatory requirements, alternatives, construction, and operations.

[1] Borrow Site 10 refers to the LAA Excavation Area and Borrow Site 15 refers to the existing mine in Keeler in the Draft EIR/EA.

3 Project Alternatives

As stated previously, both Build Alternatives would include the construction of NHD2, the Cactus Flats Road Realignment, the LAA Realignment, the Diversion Channel, Diversion Structure and temporary Bridge, West and East Berms, basin grading, and NHD modifications, including the proposed Notch.

Construction of the Proposed Project would source construction materials from a combination of Borrow Sites 10 and 15 (refer to Figure 1-2). The use of the Borrow Sites under each Build Alternative would be based on engineering constraints and material specifications.

Under both Build Alternatives, construction staging would occur on the Project Site (refer to Figure 3-1). Material from the Borrow Sites, construction equipment, and haul trucks would be stockpiled on-site within the Project Site. The Project Site would be accessed via North Haiwee Road or Cactus Flats Road from US-395. Off-site construction vehicle trips would be comprised of haul trucks hauling asphalt, concrete, and material from Borrow Site 15 to the Project Site. The proposed routes to bring material from the borrow sites are shown in Figure 3-2. Figure 3-3 shows the roadway improvements that would be incorporated with the Project Alternatives.

Borrow Site 10: Borrow Site 10 is within the Project Site. Trucks would access Borrow Site 10 via internal roadways and would not affect the off-site circulation network.

Borrow Site 15: Borrow Site 15 is an existing mine. Materials would be purchased from the existing mining operation. This Borrow Site is located approximately 21 miles north of the Project Site. The haul route for this Borrow Site would travel southwest on a private road to SR-136 and travel south. The route would continue southwest onto SR-190 and merge onto US-395. The trucks would exit Cactus Flats Road and continue south to the Project Site.

3.1 Excavate and Recompact Alternative

The Excavate and Recompact Alternative involves excavation of the foundation area of NHD2 down to 30 feet below ground surface, and subsequent refilling and mechanical compaction of the soil to treat liquefiable soils. This alternative would require dewatering for 18 months. The Excavate and Recompact Alternative would use Borrow Sites 10 and 15. The construction staging parameters and haul routes are discussed below.

3.1.1 Excavate and Recompact Alternative Construction Staging and Access

Construction staging would occur on the Project Site (refer to Figure 3-1). Material from the Borrow Sites, construction equipment, and haul trucks would be stockpiled on-site within the Project Site.

The Project Site would be accessed via North Haiwee Road or Cactus Flats Road from US-395. The construction staging areas adjacent to the new Dam construction area would be accessed via the existing Cactus Flats Road. This portion of Cactus Flats Road would be inaccessible to the general public during construction but would not be demolished, as it would provide access to the new and existing Dams.

Borrow Site 10 is located within the Project Site and would be accessed via North Haiwee Road. Borrow Site 15 would be accessed via a private road from SR-136.

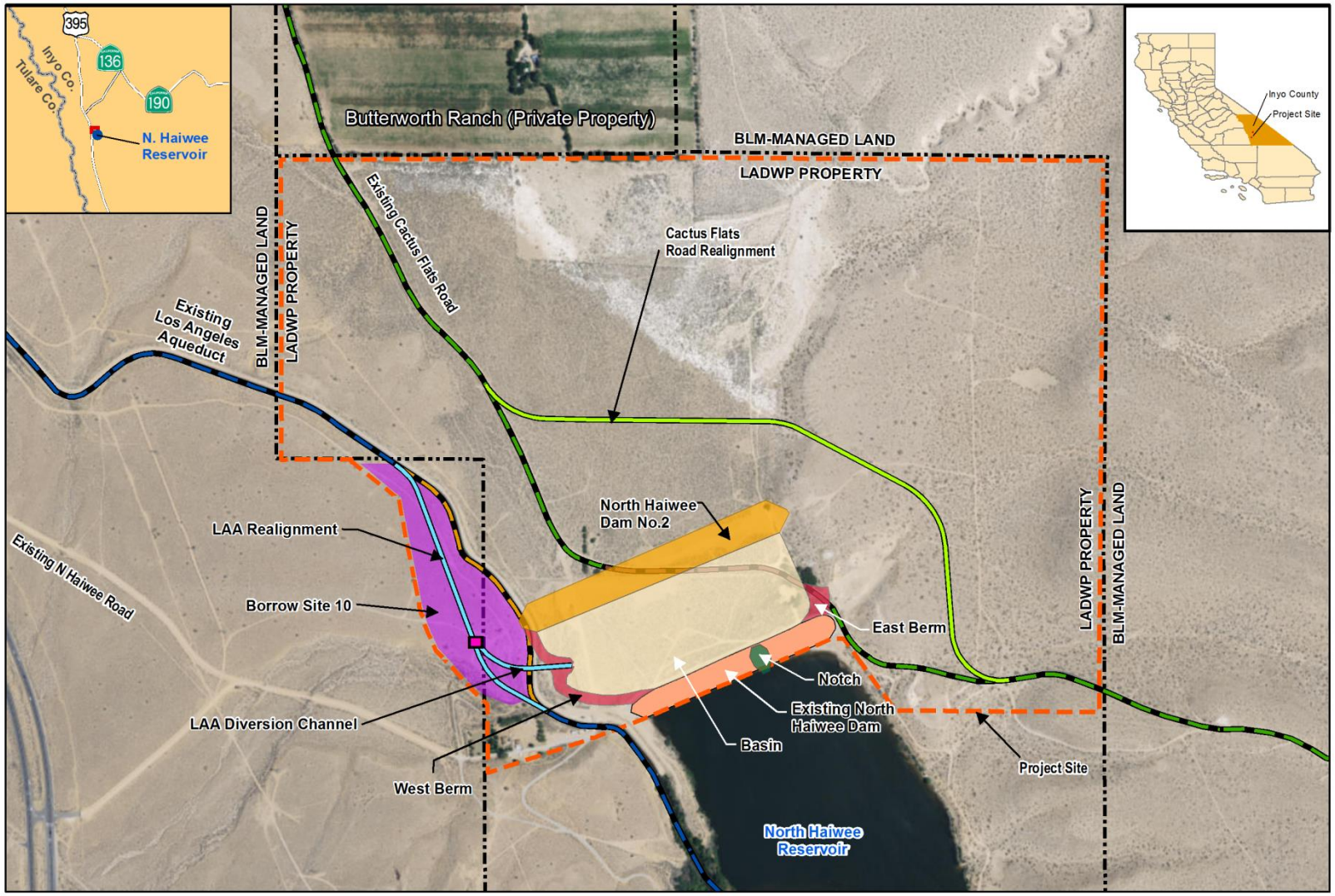
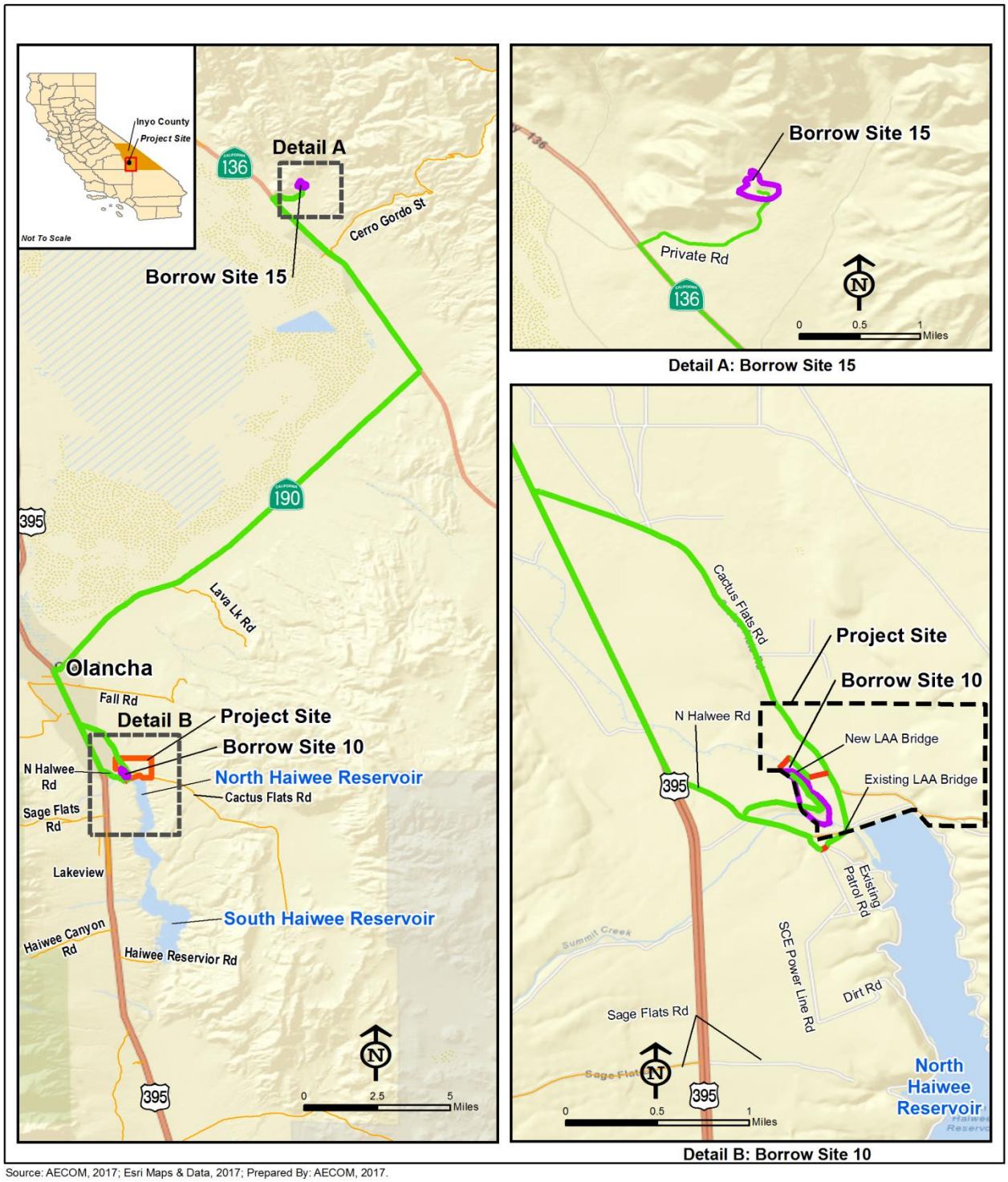


Figure 3-1

Proposed Project Components at Project Site



Source: AECOM, 2017; Esri Maps & Data, 2017; Prepared By: AECOM, 2017.

Haul Route-New Road Section
Haul Route-Roadway Widening
Haul Route

SCALE: AS SHOWN

Figure 3-2

Haul Routes for Proposed Project

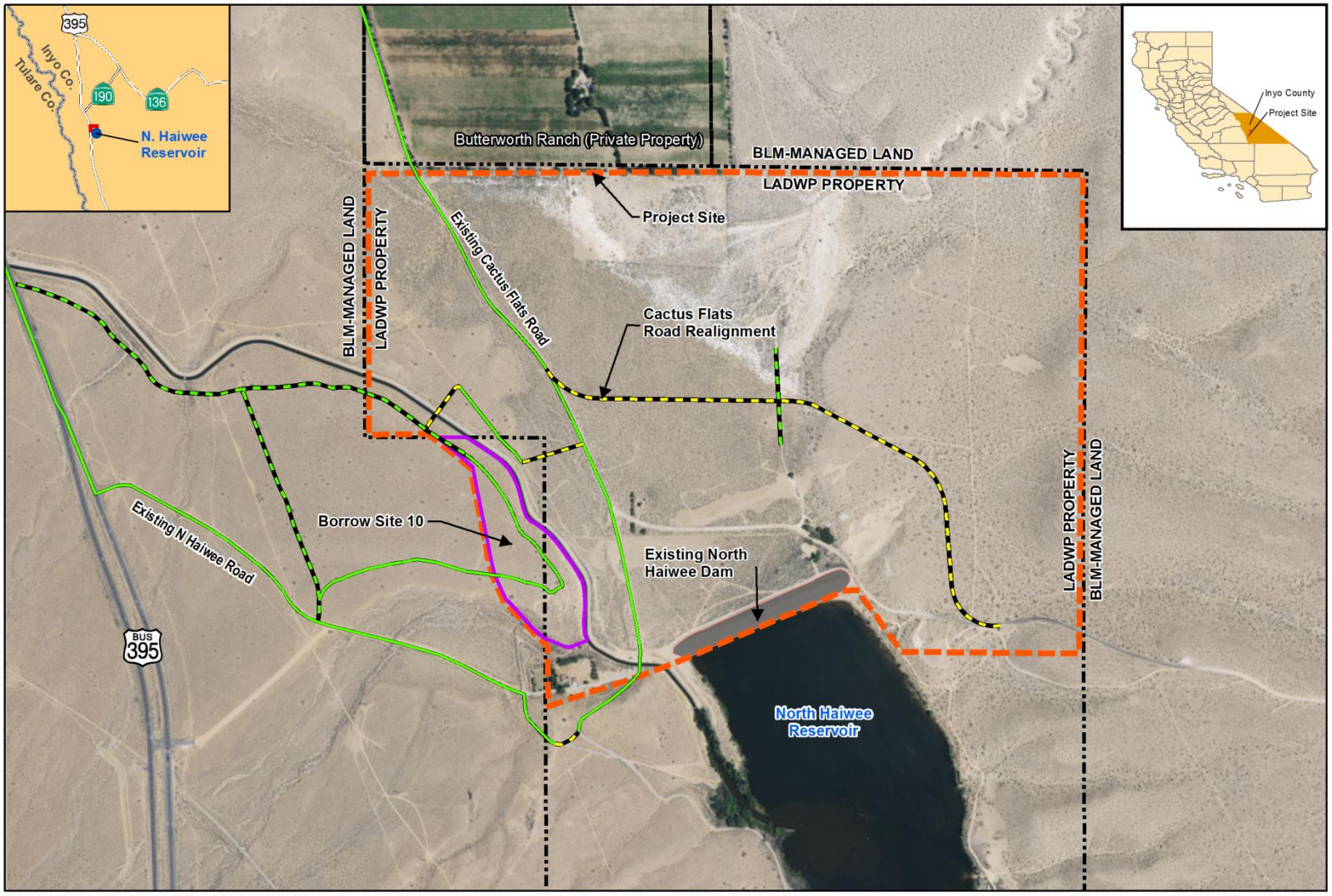


Figure 3-3
Roadway Improvements

3.1.2 Excavate and Recompact Alternative Haul Routes

Off-site construction vehicle trips would be comprised of haul trucks hauling asphalt, concrete, and material from Borrow Site 15 to the Project Site (refer to Figure 3-2). Asphalt would be hauled from Bishop, CA. Concrete would be hauled to the Project Site from the Keeler Batch Plant at 111 Sulfur Road, Keeler, CA, 93530.

3.2 CDSM Alternative

CDSM involves the creation of boreholes with a large auger. As the drill digs, it injects cement and/or other admixtures and mixes these with soil to create a strengthened column. The contractor would excavate the foundation of NHD2 to 15 feet below ground surface (bgs) (similar to the Excavate and Recompact Alternative), and then would install a grid of overlapping CDSM columns under the NHD2 footprint. Columns would be approximately six feet wide, and would be 55 to 80 feet below ground surface, depending on location. Once the columns are installed and the excavated area is refilled and recompacted, NHD2 would be constructed as it would under the Excavate and Recompact Alternative.

The CDSM Alternative would use Borrow Sites 10 and 15. The construction staging parameters and haul routes are discussed below.

3.2.1 CDSM Alternative Construction Staging and Access

The CDSM Alternative would require a portable cement grout batch plant onsite to batch cement grout for the mixing rigs. Raw materials for grout would be trucked in from Bishop, CA, Ridgecrest, CA, and/or Mojave, CA. Cement would temporarily be stored onsite in silos, which would be refilled during the duration of CDSM. Dewatering would be required, but would be substantially less than under the Excavate and Recompact Alternative. The CDSM Alternative would require approximately 671,817,600 gallons of water to be dewatered over 18 months. Construction of NHD2 under the CDSM Alternative would take approximately 37 months, 6 months shorter than under the Excavate and Recompact Alternative.

Similar to the Excavate and Recompact Alternative, construction staging would occur on the Project Site. Material from the Borrow Sites, construction equipment, and haul trucks would be stockpiled at the Project Site. Similar to the Excavate and Recompact Alternative, the Project Site would be accessed via North Haiwee Road or Cactus Flats Road from US-395. The construction staging areas adjacent to the new Dam construction area would be accessed via the existing Cactus Flats Road. This portion of Cactus Flats Road would be inaccessible to the general public during construction but would not be demolished, as it would provide access to the new and existing Dams.

Borrow Site 10 is located within the Project Site and would be accessed via internal roadways. Borrow Site 15 would be accessed via a private road from SR-136.

3.2.2 CDSM Alternative Haul Routes

Off-site construction vehicle trips would be comprised of haul trucks hauling asphalt, raw materials for grout, concrete for the notch and LAA Realignment, and material from Borrow Site 15 to the Project Site (refer to Figure 3-2). Raw materials for grout would be trucked in from Bishop, Ridgecrest, and/or Mojave. Asphalt would be hauled from Bishop, CA.

3.3 Vehicle Trips During Construction

Trip Generation. The Proposed Project trip generation during construction was based on the construction details provided by LADWP. The trip generation for haul trucks is ultimately based on the

amount of material hauled from each Borrow Site, and the amount of asphalt needed. Table 3-1 shows the number of truck trips for each Alternative by location.

The data from Table 3-1 was converted to daily truck traffic based on the Project schedule. This discussion is based on the average daily construction traffic of the peak month of each analysis year, and therefore presents a conservative analysis of average daily traffic. In any traffic analysis, traffic volumes containing a mix of vehicle types must be converted into an equivalent flow of passenger cars using passenger car equivalents (PCEs). Since the Project would generate a mix of automobile and truck traffic, truck traffic volumes are required to be normalized into PCEs. Truck volumes are converted to PCEs by applying a PCE factor, which ranges from 1.5 to 4.0, depending on facility type, terrain, and types of heavy vehicles. Project truck trips were converted to PCEs by applying a PCE factor of 2.5 to account for larger trucks on a relatively flat terrain. Personnel trips (passenger cars) were added to the truck PCE volumes to obtain daily PCE trips. Table 3-2 shows the daily trip generation (one-way trips) during each analysis year for the Build Alternatives.

TABLE 3-1
TRIP GENERATION DURING PROJECT CONSTRUCTION

	Location	Volume (CY[a])	Type of Vehicle	Total Number of Truck Trips
Excavate and Recompact Alternative Project Component				
NHD2	Borrow Site 10[b]	343,000	Scraper	14,913
NHD2	Borrow Site 15	107,000	Dump Truck	8,917
NHD2	Concrete Plant (Keeler)	68,800	Concrete Truck	5,733
Cactus Flats Road Realignment	Asphalt Plant (Bishop)	1,300	Asphalt Truck	112
LA Aqueduct Realignment	Concrete Plant (Keeler)	5,000	Concrete Truck	420
Diversion Channel, Notch, and Slope Protection	Concrete Plant (Keeler)	7,100	Concrete Truck	592
CDSM Alternative Project Component				
NHD2	Borrow Site 10 [b]	311,000	Dump Truck	13,522
NHD2	Borrow Site 15	107,000	Dump Truck	8,917
NHD2	Cement & Grout Additives (Ridgecrest/Bishop/ Mojave)	90,450	Pneumatic Tank Trailer	1,925
Cactus Flats Road Realignment	Asphalt Plant (Bishop)	1,300	Asphalt Truck	112
LA Aqueduct Realignment	Concrete Plant (Keeler)	5,000	Concrete Truck	420
Diversion Channel, Notch, and Slope Protection	Concrete Plant (Keeler)	7,100	Concrete Truck	592

Note: [a]CY = Cubic Yards
[b] Borrow Site 10 trips will not affect off-site roadways
Source: LADWP, 2016

TABLE 3-2
DAILY TRIP GENERATION DURING PROJECT CONSTRUCTION

Total Daily PCE Trips (Peak Month)							
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Excavate and Recompact Alternative	75	423	473	473	150	101	109
CDSM Alternative	75	428	1065	313	313	109	0*
Daily Truck Trips (Peak Month)							
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Excavate and Recompact Alternative	6	114	122	122	24	10	14
CDSM Alternative	6	116	350	90	90	35	0*
Daily Passenger Car Trips (Peak Month)							
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Excavate and Recompact Alternative	60	138	168	168	90	76	74
CDSM Alternative	60	138	190	88	88	109	0*

Note: PCE = Passenger Car Equivalents. Daily PCE Trips are the sum of passenger car trips and truck traffic converted to PCEs. Truck Trips are described here as one way trips, i.e. a truck traveling from Borrow Site 15 to the Project Site and back to Borrow Site 15 would be counted as two trips.
Trip Generation in this table includes all Proposed Project-related trips, whether on highways, local roads, or dirt roads.
* Construction under the CDSM Alternative will be completed in 2022.
Source: LADWP, 2016.

Trip Distribution. As stated earlier, based on input received from Inyo County and Caltrans staff, the following roadway segments were identified for evaluation:

- SR-136 immediately north of SR-190
- SR-190 between US-395 and SR-136;
- US-395 between SR-190 and North Haiwee Road; and
- US-395 south of North Haiwee Road.

The Proposed Project trip distribution for passenger cars was based on potential location of personnel. It is anticipated that personnel traffic would be equally split on US-395, with half traveling north and the other half traveling south, due to the presence of towns with similar populations to the north and south of the Project. Truck traffic was assigned to the network based on the proposed haul routes for each Alternative as discussed in Sections 3.1 and 3.2.

Trip Assignment. The Proposed Project trip distribution for personnel was applied to the Project trip generation to obtain Project trip assignment. Truck traffic was assigned to the network based on the proposed haul routes for each Alternative and Borrow Site. Table 3-3 shows the daily trip assignment on the study area roadway segments.

TABLE 3-3
CONSTRUCTION TRIP ASSIGNMENT (DAILY TRAFFIC VOLUMES)

Excavate and Recompact Alternative	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
SR-136 North of SR-190	0	286	226	226	0	0	0
SR-190 Between US-395 and SR-136	0	286	226	226	0	0	0
US-395 between SR-190 and North Haiwee Road	38	356	390	390	106	64	74
US-395 South of North Haiwee Road	46	70	124	124	76	54	58

TABLE 3-3
CONSTRUCTION TRIP ASSIGNMENT (DAILY TRAFFIC VOLUMES)

CDSM Alternative	2018	2019	2020	2021	2022	2023	2024
SR-136 North of SR-190	0	0	440	226	226	0	0
SR-190 Between US-395 and SR-136	0	0	440	226	226	0	0
US-395 Between SR-190 and North Haiwee Road	35	215	972	270	270	56	0
US-395 South of North Haiwee Road	40	70	316	44	44	56	0

Note: All volumes are in Passenger Car Equivalents
Source: Translutions, Inc., 2017

3.4 Vehicle Trips During Operation

The Proposed Project is anticipated to operate similarly to the existing Dam. The number of employees (resident reservoir keeper, maintenance personnel, etc.) is anticipated to be the same as under existing conditions. Therefore, the Project is not anticipated to generate new vehicle trips during operation. Therefore, an analysis of traffic conditions after construction is completed and new Dam operation begins is not required.

4 Regulatory Framework

4.1 Federal

Most federal regulations related to transportation issues are for the planning and construction of transportation facilities. Since the Proposed Project is not a transportation project, there are no federal regulations that apply to the transportation analysis and impact determination for the Proposed Project.

4.2 State

The California Vehicle Code applies to all vehicles during construction. In addition, the thresholds and parameters in the Caltrans Guide for the Preparation of Traffic Impact Studies (December 2002) has been used to determine thresholds for this analysis.

4.2.1 California Vehicle Code Section 35550

This regulation pertains to the gross weight on any one axle and is intended to restrict damage to roadway pavement by vehicles carrying overweight loads. Based on the regulation, the gross weight on any one axle shall not exceed 20,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle, shall not exceed 10,500 pounds. Caltrans has stated that any use of overweight loads will need to be permitted. Should the Proposed Project require vehicles carrying overweight loads, a permit with Caltrans would be obtained by LADWP.

4.2.2 Caltrans Guide for the Preparation of Traffic Impact Studies

According to the Caltrans Guide for the Preparation of Traffic Impact Studies, Caltrans endeavors to maintain a target Level of Service (LOS) at the transition between LOS "C" and LOS "D" on State highway facilities. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing measures of effectiveness should be maintained. Should the Proposed Project require vehicles carrying overweight loads, a permit with Caltrans would be obtained by LADWP.

4.3 Regional and Local

The Inyo County Regional Transportation Plan and the Inyo County General Plan are regional and local guidelines applicable to this Project.

4.3.1 Inyo County Regional Transportation Plan

On September 16, 2015, the Inyo County Local Transportation Commission approved the 2015 Inyo County Regional Transportation Plan (RTP). The RTP acknowledges that Caltrans has designated LOS "C" as the concept LOS for State highways in Inyo County.

US-395: The Inyo County RTP designates US-395 as a Rural Principal Arterial and is part of the National Highway System. US-395 is designated as a High Emphasis Focus Route (one of ten in California) in the Interregional Transportation Strategic Plan. The High-Emphasis category represents 34 routes in the State that have high interregional importance from a statewide perspective. This makes them a priority to be programmed and constructed to at least the minimum facility-concept standard (for most routes, this is freeway or expressway). The High Emphasis Focus Routes represent ten Interregional Road System corridors that are of the highest priority for completion to at least minimum facility concept standards

over the next 20 years. The Inyo County RTP identifies that the two-lane segments of this facility in the Olancha–Cartago area currently operates at less than the target LOS of LOS C, and that unless the Caltrans and Federal Highway Administration Olancha/Cartago Four-Lane Project is constructed (discussed in Section 7.3), it would continue to operate at unsatisfactory LOS.

SR-136: SR-136 is designated as a two-lane rural minor arterial. The Inyo County RTP identifies future potential need to make improvements to limit vehicular, bicycle, and pedestrian conflicts along SR-136.

SR-190: SR-190 is classified as a rural minor arterial. The Inyo County RTP identifies the need for paved shoulders to better accommodate cyclists, rock fall mitigation, and dip replacement.

4.3.2 Inyo County General Plan

The Inyo County General Plan forms the framework for land use decisions in the County. Policy RH-1.4 for roadways and highways requires maintaining a minimum of LOS C on all roadways in the County. For highways within the County, LOS C should be maintained except where roadways expansions or reconfigurations will adversely impact the small community character and economic viability of designated Central Business Districts.

5 LOS Definitions, Procedures, and Thresholds

LOS is a measure of the quality of operational conditions within a traffic stream, and is generally expressed in terms of such measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Levels range from A to F, with LOS A representing excellent (free-flow) conditions and LOS F representing extreme congestion. Detailed descriptions of LOS A through F are provided below.

5.1 LOS Definitions

The following LOS definitions are excerpted from the 2010 Highway Capacity Manual (HCM2010).

Level of Service A represents free-flow. Individual users are unaffected by the presence of others in the traffic stream. The freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent. The control delays at boundary intersections are minimal. The travel speed exceeds 85% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.

Level of Service B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A because the presence of others in the traffic stream begins to affect individual behavior. The control delays at the boundary intersections are not significant. The travel speed is between 67% and 85% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.

Level of Service C is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.

Level of Service D represents high-density, but stable flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. This indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the boundary intersections. The travel speed is between 40% and 50% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.

Level of Service E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns. The travel speed is between 30% and 40% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.

Level of Service F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the capacity of the facility at that location. Queues form behind such locations, and operations within the queue are extremely unstable. Vehicles may progress at reasonable speeds and then then be required to stop. It is likely that congestion is occurring at the

boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30 percent or less of the base free-flow speed, and the volume-to-capacity ratio is greater than 1.0.

5.2 Level of Service Capacities

This analysis is based on the Generalized Daily Service Volumes for Two-Lane Highways from the 2010HCM. Table 5-1 shows the generalized capacities of two-lane and four-lane highways.

TABLE 5-1
GENERALIZED DAILY SERVICE VOLUMES

	Maximum Roadway Capacity (Vehicles per Day)			
	LOS B	**LOS C**	**LOS D**	**LOS E**
Two-Lane Highway	2,600	5,100	8,200	16,400
Four-Lane Highway	17,200	24,900	32,700	38,200

Note: LOS = Level of Service
Source: HCM2010

6 Existing Conditions

This section discusses the existing transportation conditions in the study area.

6.1 Existing Roadway Conditions

The main regional roadways in the area are US-395, SR-190, and SR-136. Access to the Project Site is provided by Cactus Flats Road and North Haiwee Road. This section discusses the roadways in detail.

US-395: US-395 is one of the four major north-south corridors serving California. Within Caltrans District 9, the route is both an undivided, two-lane conventional highway; a divided, four-lane conventional highway; an undivided, two-lane expressway; and a divided, four-lane expressway. The route enters District 9 in eastern Kern County at the San Bernardino County Line, northeast of the community of Johannesburg and continues north through Kern County into Inyo County up the Owens Valley along the Eastern Sierra. It then goes through Mono County, where it exits into Nevada near Topaz Lake. In the vicinity of the Project Site, US-395 is a two-lane undivided highway north of North Haiwee Road, and a four-lane divided highway south of North Haiwee Road. The two-lane segments of US-395 are planned to be widened to four lanes in the future (Caltrans Olancha/Cartago Four-Lane Project). The preliminary engineering for the Caltrans project has been completed and construction is anticipated to start in 2018.

SR-190: SR-190 begins at its junction with SR-99 at Tipton in Tulare County (in Caltrans District 6). The route extends east to where the existing alignment terminates on the western slope of the Sierra Nevada mountains at the entrance to Quaking Aspen Campground. East of Quaking Aspen Campground and over the Sierra Crest to US-395 in Olancha, the California Transportation Commission adopted 43 miles of the legislatively designated but unconstructed alignment of SR-190. The entire length is functionally classified by the Federal Highway Administration as a Minor Arterial. This route is part of the Interregional Road System that connects US-395 at the eastern flank of the Sierra Nevada Range to SR-127 at Death Valley Junction near the California/Nevada border. In the vicinity of the Project Site, SR-190 is a two-lane undivided highway.

SR-136: SR-136 travels along the corridor formed between the northeastern shore of Owens Lake and the western base of the Inyo Mountains. This 18-mile stretch of highway connects US-395, from approximately one-mile south of the community of Lone Pine, with SR-190, approximately 18 miles west of Death Valley National Park. SR-136 is an undivided highway which connects Owens Valley with Death Valley. The highway accesses the Eastern Sierra Interagency Visitor Center at the US-395 junction, the community of Keeler, and the towns of Dolomite and Swansea. In the vicinity of the Project Site, SR-190 is a two-lane undivided highway.

Cactus Flats Road: Cactus Flats Road is an Inyo County designated road that provides access to the Project Site from US-395. It includes paved and unpaved segments. The Proposed Project would realign Cactus Flats Road within the Project Site.

North Haiwee Road: North Haiwee Road is a BLM designated road that provides access to the Project Site from US-395. It includes paved and unpaved segments.

6.2 Existing Traffic Volumes & LOS

The existing baseline of this analysis is year 2015. Traffic volumes were obtained from the Transportation Concept Reports (TCR) for SR-136, SR-190, and US-395. Since the traffic counts included in the TCRs are from different years, all traffic counts were normalized to year 2015 by applying a one percent per annum growth rate based on the recently approved Inyo County RTP. The TCR for SR-136 is based on traffic counts from 2012, so a three percent growth was applied to convert the year 2012 traffic volumes

to year 2015 traffic volumes. The TCR for SR-190 is based on traffic counts from 2010, so a five percent growth was applied to convert the year 2010 traffic volumes to year 2015 traffic volumes. The TCR for US-395 is based on traffic counts from 2013, and therefore, a two percent growth was applied to convert the year 2013 traffic volumes to year 2015 traffic volumes.

Truck traffic operates differently from automobile traffic. Trucks are usually slower to accelerate and decelerate. To convert the mix of automobile and truck traffic into a homogeneous mix of traffic, the concept of PCEs is used. A PCE factor is applied to truck traffic to convert them into "equivalent" passenger cars. For this analysis, background traffic volumes were converted to PCEs by using a PCE factor of 2.5.

Table 6-1 shows traffic volumes for the analysis roadways under existing (2015) conditions. As shown in Table 6-1, all roadways operate at satisfactory LOS based on Caltrans and Inyo County Guidelines with the exception of US-395, which operates at LOS D, south of SR-190.

TABLE 6-1
EXISTING (2015) TRAFFIC VOLUMES AND LOS

	Lanes	PCE Volume	LOS
SR-136 North of SR-190	2	528	B
SR-190 Between US-395 and SR-136	2	352	B
US-395 Between SR-190 and North Haiwee Road	2	7,418	**D**
US-395 South of North Haiwee Road	4	7,418	B

Notes:
LOS is based on HCM2010. Thresholds for LOS A are not available in the Service Volume Tables.
Bold = Unsatisfactory LOS
PCE = Passenger Car Equivalents
LOS = Level of Service
Source: Transportation Concept Reports for SR-136, SR-190, and US-395

7 Impact Analysis

7.1 Construction Impacts

Construction of the Proposed Project is anticipated to occur between 2018 and 2024, with the Excavate and Recompact Alternative occurring between 2018 and 2024 and the CDSM Alternative occurring between 2018 and 2023. An analysis was conducted for the highest daily traffic generation for each year of construction. Background (Without Project) traffic volumes for each year of construction were forecast by applying a one percent per annum growth rate to the existing baseline (2015) traffic volumes. Traffic volumes for each analysis year for "With Project" conditions were developed by adding the trip assignment to the corresponding "Without Project" traffic volumes.

The resulting levels of service were calculated using the Generalized Daily Service Volumes for Two-Lane Highways from the HCM2010 (Transportation Research Board, 2010).

Table 7-1 shows traffic volumes for the analysis roadways under each analysis year and each Alternative. As shown in Table 7-1, all roadways, with the exception of US-395, would operate at satisfactory LOS (LOS C) based on Caltrans and Inyo County Guidelines. US-395 operates at unsatisfactory LOS under existing conditions. Inyo County and Caltrans do not have thresholds of significance to identify project impacts when a facility is operating at unsatisfactory conditions under pre-project conditions. Caltrans requires that at locations where the operations are unsatisfactory under existing conditions, the measure of effectiveness (i.e. LOS) be maintained at existing levels. The Proposed Project under each Alternative does not cause the LOS to degrade below those under pre-Project levels, and therefore maintains the measures of effectiveness (MOEs). Therefore, the Proposed Project would not have a direct significant impact based on this threshold. In addition, it should be noted that Caltrans is working on the US-395 widening project (Olancha/Cartago Four-Lane Project) which will restore traffic operations to better than the target LOS in the area. Construction of US-395 is anticipated to begin in 2018. A discussion on the US-395 widening project is included under Cumulative Impacts (Section 7.3).

TABLE 7-1
FORECAST TRAFFIC VOLUMES AND LOS

	2018		2019		2020		2021		2022		2023		2024	
	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS
SR-136 North of SR-190														
No Proj.	545	B	550	B	556	B	561	B	566	B	571	B	576	B
E&R Alt.	545	B	835	B	781	B	786	B	566	B	571	B	576	B
CDSM Alt.	545	B	550	B	996	B	786	B	791	B	571	B	576	B
SR-190 Between US-395 and SR-136														
No Proj.	363	B	367	B	369	B	372	B	377	B	380	B	384	B
E&R Alt.	363	B	652	B	594	B	597	B	377	B	380	B	384	B
CDSM Alt.	363	B	367	B	809	B	597	B	602	B	380	B	384	B
US-395 Between SR-190 and North Haiwee Road														
No Proj.	7,640	**D**	7,713	**D**	7,789	**D**	7,863	**D**	7,963	**D**	8,011	**D**	8,085	**D**
E&R Alt.	7,678	**D**	8,068	**D**	8,178	**D**	8,252	**D**	8,042	**D**	8,074	**D**	8,158	**D**
CDSM Alt.	7,675	**D**	7,928	**D**	8,760	**D**	8,132	**D**	8,205	**D**	8,067	**D**	8,085	**D**

TABLE 7-1
FORECAST TRAFFIC VOLUMES AND LOS

	2018		2019		2020		2021		2022		2023		2024	
	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS	PCE Vol	LOS
US-395 South of North Haiwee Road														
No Proj.	7,640	B	7,713	B	7,789	B	7,863	B	7,963	B	8,011	B	8,085	B
E&R Alt.	7,685	B	7,783	B	7,913	B	7,987	B	8,012	B	8,064	B	8,143	B
CDSM Alt.	7,680	B	7,783	B	8,105	B	7,907	B	7,980	B	8,067	B	8,085	B

Notes:
LOS is based on HCM2010. Thresholds for LOS A are not available in the Service Volume Tables.
Bold: LOS below target LOS of LOS C
E&R = Excavate and Recompact

7.2 Operational Impact

As discussed in Section 3.4, an operational traffic analysis of the Proposed Project is not required.

7.3 Cumulative Impacts

Inyo County has identified eight cumulative projects in the area. Of the eight projects identified, only the US-395 Olancha/Cartago Four-Lane Project could have potential impacts to traffic flows in the area during the construction of the Proposed Project. The Olancha/Cartago Four-Lane Project is described in detail below.

Caltrans is planning to widen US-395 in the area, and construction of the Proposed Project could overlap with the construction of US-395. The preferred alternative for the US-395 widening project would construct a controlled-access, four-lane divided expressway for the entire length of the US-395 that is proposed to be widened. It would begin in the existing four-lane section of US-395 south of Olancha and travel west of Olancha and the LAA. After crossing Olancha Creek, the proposed US-395 alignment would cross the LAA and continue north through Cartago along the existing highway to join the four-lane section of US-395 to the north. The northbound and southbound lanes would be separated by a 100-foot-wide unpaved median. Posted traffic speeds on the divided highway would be set at 65 miles per hour. The existing highway south of the intersection with SR-190 East would be redesignated as SR-190. The existing highway north of the intersection with SR-190 East would be relinquished to Inyo County and would remain as a local route through Cartago. Construction of this project is anticipated to begin in 2018. Figure 7-1 shows the preferred alternative and limits of the US-395 widening project.

It is anticipated that traffic carrying construction material for the US-395 widening project will generally be limited to the sections of US-395 that currently have four lanes, and therefore, there could be some additional traffic added during construction of US-395. In addition, it is anticipated that there would not be major roadway closures during construction. Therefore, the cumulative impacts to traffic operations on study area roadway segments would not be significantly impacted due to the cumulative effects of the US-395 widening project and the construction of the Proposed Project.

7.4 Sight Distance

Sight distance is used to determine the safety of driveway ingress and egress movements at the proposed access locations for the Project. Typically, a driver should have an unobstructed view of an entire intersection when turning into and out of a driveway located on a major roadway. The American

Association of State Highway and Transportation Officials has conducted studies to determine the necessary sight distance for various maneuvers at unsignalized intersections. These findings are reported in "*A Policy on the Geometric Design of Highways and Streets*," most recently updated in 2010.

7.4.1 Intersection Sight Distance

The driver of a vehicle approaching or departing an intersection should have an unobstructed view of the intersection, including any traffic control devices, and sufficient lengths along the intersecting highway to permit the driver to anticipate and avoid potential collisions. These unobstructed views form triangular areas known as sight triangles. These sight triangles should be kept free of obstruction (such as shrubs, electrical boxes, parked vehicles, etc.) since such obstructions can lead to reduced visibility. If present, any object within the sight triangle that would obstruct the driver's view of an approaching vehicle should be removed or modified, or appropriate traffic control devices should be installed as per the *Manual on Uniform Traffic Control Devices* (MUTCD). For a roadway with a design speed of 70 miles per hour, the recommended minimum stopping sight distance is 775 feet.

Based on a site visit, the street frontages along the Project Site as well as along the Borrow Sites are generally flat and devoid of sharp curves on the roadway. Therefore, locations where trucks are likely to access the Project will have unrestricted view on both sides. The MUTCD recommends best management practices wherein the contract language specifies that debris, vehicles, or other objects that could obstruct line of sight are not placed adjacent to the Project access locations, and that shrubs and other vegetation are removed should they block lines of sight. Therefore, the Project would not create a significant impact under both the Excavate and Recompact Alternative and the CDSM Alternative.

7.4.2 Stopping Sight Distance

Sight distance is the length of the roadway ahead that is visible to the driver. The available sight distance on a roadway should be sufficiently long to enable a vehicle traveling at, or near the design speed to stop before reaching a stationary object in its path. Although greater lengths of visible roadway are desirable, the sight distance at every point along a roadway should be at least that needed for a below-average driver or vehicle to stop. For a roadway with a design speed of 70 miles per hour, the recommended minimum stopping sight distance is 730 feet.

Based on a site visit, the street frontages along the Project Site as well as along the Borrow Sites are generally flat and devoid of sharp curves on the roadway. Therefore, any access location where trucks are likely to access or depart the Project Site or Borrow Sites would have unrestricted view on both sides. Therefore, the Project would not create a significant impact under both the Excavate and Recompact Alternative and the CDSM Alternative.

Figure 7-1
US 395 Widening (Cumulative Project)

7.5 Availability of Paved Aprons

Access to the Borrow Sites and the Project Site are generally via unpaved roads. At locations where access will be provided to and from Caltrans facilities, the Project would construct driveways to the satisfaction of Caltrans. Impacts on safety due to the Project based on availability of paved aprons would be less than significant as the aprons would be constructed as part of the Project under both the Excavate and Recompact Alternative and the CDSM Alternative.

7.6 Safety Impacts due to Speed Differentials

Caltrans requested that an analysis of safety be conducted due to speed differentials.

Borrow Site 10: Borrow Site 10 is within the Project Site. Trucks would access Borrow Site 10 via internal roadways and would not utilize highways. Therefore, access to Borrow Site 10 would have no impact on speed differentials on highways.

Borrow Site 15: Borrow Site 15 is an existing mine. Materials would be purchased from the existing mining operation. This Borrow Site is located approximately 21 miles north of the Project Site. The haul route for this Borrow Site would travel southwest on a private road to SR-136 and travel south. The route would continue southwest onto SR-190 and merge onto US-395. Trucks would make a left turn from US-395 to Cactus Flats Road.

Truck traffic would make a northbound right turn from SR-136 to enter Borrow Site 15, and a left out onto SR-136 to exit Borrow Site 15. Based on the low traffic volumes on SR-136, these turning maneuvers are not anticipated to create a significant impact on safety due to speed differentials. Furthermore, the southern two-thirds of SR-136 between SR-190 and Borrow Site 15 allows passing, and therefore, should a truck be traveling at a slower speed, a vehicle could pass the truck safely.

The southbound left turn from US-395 to Cactus Flats Road does not have a left turn pocket. Based on the high traffic volume on US-395, the absence of a left turn pocket could lead to a tendency of vehicles trying to go around haul trucks. Therefore, the Project could have a potentially significant impact on safety. The southbound left turn from US-395 to North Haiwee Road has a dedicated left turn lane as well as storage space in the divided median. Therefore, it is recommended that a flagman be placed at the intersection of US-395 and Cactus Flats Road to direct and control the flow of existing trucks as well as control traffic to allow southbound trucks to make left turns onto Cactus Flats Road during hauling of materials from Borrow Site 15.

7.7 Turning Radii

At access locations to Borrow Sites constructed by the Project where haul trucks would make turning maneuvers that could potentially conflict with other traffic, the Project would ensure that sufficient turning radii are available to make the turns safely. Therefore, the Project would have less than significant impacts under both the Excavate and Recompact Alternative and the CDSM Alternative.

7.8 Focused Analysis of Cactus Flats Road

The Project would increase the number of trucks on Cactus Flats Road during Project construction. The Project could add up to 45 daily truck trips on Cactus Flats Road for a period of up to two years. If truck traffic from Borrow Site 15 is required to use North Haiwee Road instead of Cactus Flats Road (or use both Cactus Flats Road and North Haiwee Road), traffic volumes on Cactus Flats Road could be reduced. Since Cactus Flats Road is a dirt road with very low traffic volumes, the available capacity will be able to accommodate the additional 45 daily truck trips. Therefore, the impacts would be less than significant.

8 Mitigation Measures

This section discusses mitigation measures to offset potentially significant Project impacts.

8.1 Mitigation Measures Related to Construction Impacts

8.1.1 Traffic Operations

The Project, under both the Excavate and Recompact Alternative and the CDSM Alternative, would not create a significant impact on traffic operations. Therefore, no mitigation measures are required.

8.1.2 Sight Distance

Sufficient sight distance is available at all locations where Project traffic would access major roadways. Therefore, the impacts would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative.

8.1.3 Availability of Paved Aprons

The Project would comply with Caltrans requirements for the construction of driveways to the Borrow Sites. Therefore, the impacts of the Project would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative, and no mitigation measures would be required.

8.1.4 Safety Impacts due to Speed Differentials

The Project could have a potentially significant impact on safety due to speed differentials at the southbound left turn from US-395 to Cactus Flats Road under both the Excavate and Recompact Alternative and the CDSM Alternative. This can be mitigated by placing a flagman at the intersection of US-395/Cactus Flats Road to control the flow of exiting trucks as well as to control traffic to allow southbound trucks to make left turns onto Cactus Flats Road.

8.1.5 Turning Radii

The Project would ensure that all driveways constructed by the Project would provide safe turning radii. If single unit three-axle trucks are used during construction, a minimum design turning radius of 51.5 feet shall be provided. Therefore, the impacts of the Project under both the Excavate and Recompact Alternative and the CDSM Alternative would be less than significant, and no mitigation measures would be required.

8.1.6 Cactus Flats Road

The impacts of the Project would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative, and no mitigation measures would be required.

8.2 Mitigation Measures Related to Operational Impacts

The Project would have less than significant impacts on transportation/traffic during operations under both the Excavate and Recompact Alternative and the CDSM Alternative. No mitigation measures would be required.

8.3 Mitigation Measures Related to Cumulative Impacts

The Project would have less than significant cumulative impacts on transportation/traffic under both the Excavate and Recompact Alternative and the CDSM Alternative. No mitigation measures would be required.

9 CEQA Significance Conclusions

This section evaluates the CEQA checklist for impact evaluation.

1. **Will the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system?**

   Based on the results of the analysis, the Project would not degrade traffic operations below the target LOS established by Caltrans or Inyo County, but would add to an existing unsatisfactory condition on the two lane section of US-395. The addition of construction traffic will worsen traffic operations, but the Project would not degrade the existing MOE (LOS D), and therefore, the impact would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative. Further, since construction impacts are temporary, and Caltrans is working towards widening the two-lane section of US-395, no mitigation measures are required. The Project is consistent with adopted plans and policies related to non-motorized travel in the area. Therefore, the Project impact would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative.

2. **Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?**

   The Project would not conflict with the Inyo County General Plan Circulation Element or the Inyo County RTP, and does not propose changes to the Inyo County LOS standards. The County and Caltrans have acknowledged that US-395 operates at below the target LOS under existing conditions, and plans are underway to widen US-395. Based on Caltrans thresholds, for facilities that operate at less than the target LOS, the existing MOE should be maintained. The Project does not degrade the LOS from the existing MOE (LOS D) during construction. Therefore, the Project would have less than significant impacts during construction under both the Excavate and Recompact Alternative and the CDSM Alternative.

3. **Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?**

   The nearest airports to the Project Site are the Porter Ranch Airport located approximately 14 aerial miles from the Project Site, Sacatar Meadows Airport located approximately 12 miles from the Project Site, and the Lone Pine Airport located approximately 12 aerial miles from the Project Site. The Project does not propose any use that would affect or conflict with air traffic patterns. Therefore, the Project impact would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative.

4. **Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?**

   Design of driveways would be based on Caltrans' and Inyo County code, which sets the standard for such design. It is not anticipated that traffic hazards would increase. Therefore, the Project impact would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative.

5. **Result in inadequate emergency access?**

   The Project would not result in inadequate emergency access. The Project does not propose to close any roadways in the area, and therefore would have no impact on response times for emergency services. Therefore, the Project impact would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative.

6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

The Project would not change roadway designations from those in the Inyo County General Plan. The Project would also not result in the removal of any of the facilities listed above. Therefore, the Project impact would be less than significant under both the Excavate and Recompact Alternative and the CDSM Alternative.

10 NEPA Impacts Summary

1. Permanent Impacts

The Project would not have any permanent impacts on the transportation system as the Project is anticipated to generate very few additional trips beyond existing levels.

2. Temporary Impacts

The Project would add construction traffic to the adjacent circulation system. The Project would not have an adverse impact on traffic operations on SR-190 and SR-136. US-395 currently operates at less than the target LOS, and the Project would add traffic to this unsatisfactory condition. However, the Project would not degrade traffic operations to less than the existing LOS.

11 References

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12 List of Abbreviations and Acronyms

BLM	Bureau of Land Management
Caltrans	California Department of Transportation
CDSM	Cement Deep Soil Mixing
EIR/EA	Environmental Impact Report/Environmental Assessment
HCM2010	Highway Capacity Manual, 2010
LAA	Los Angeles Aqueduct
LADWP	Los Angeles Department of Water and Power
LOS	Level of Service
MOE	Measure of effectiveness
MUTCD	Manual on Uniform Traffic Control Devices
NHD	North Haiwee Dam or existing Dam
NHD2	North Haiwee Dam No. 2 or new Dam
NHR	North Haiwee Reservoir
Proposed Project	North Haiwee Dam No. 2 Project
PCE	Passenger Car Equivalents
RTP	Regional Transportation Plan
SR-	State Route
TCR	Transportation Concept Report
TIA	Traffic Impact Analysis
US-	United States Route

13 Preparer Qualifications

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