

Dermody

09-Inyo-127-KP 0.0/79.5

09-Inyo-127-PM 0.0/49.4

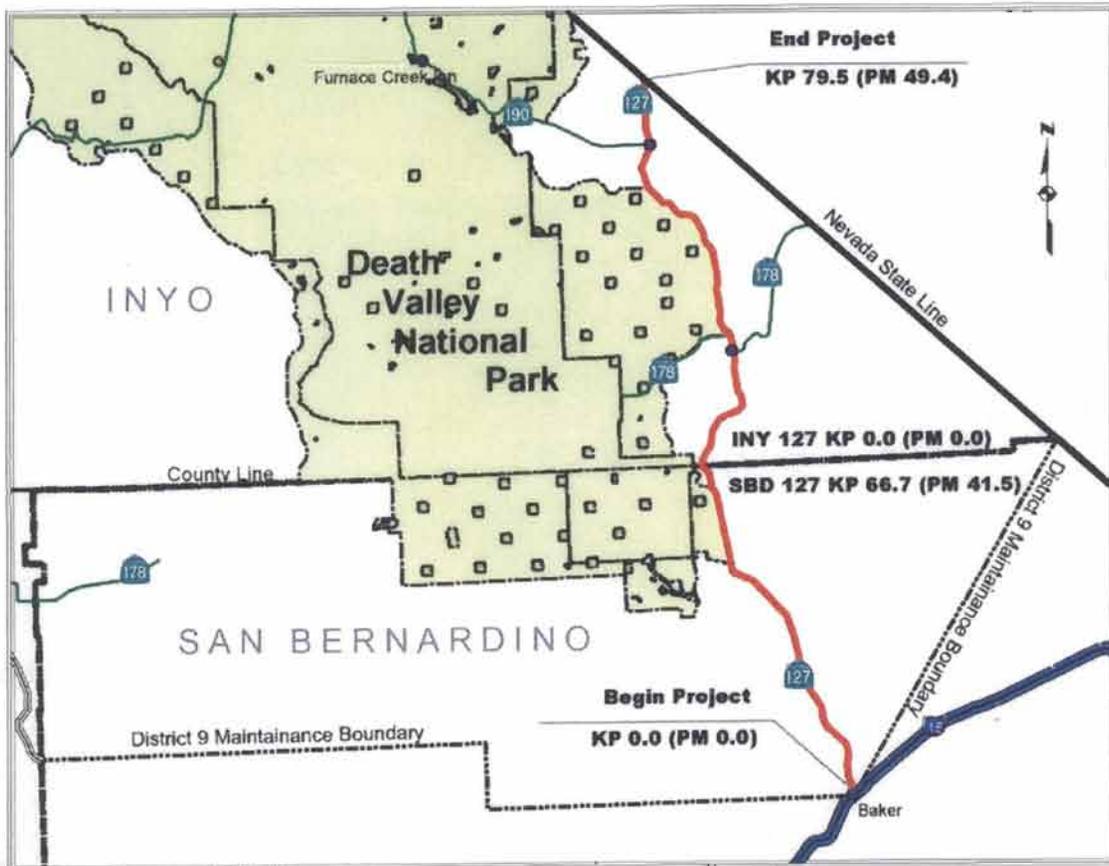
09-Sbd-127-KP 0.0/66.7

09-Inyo-127-PM 0.0/41.5

October 2002

HB4N

FEASIBILITY ANALYSIS REPORT



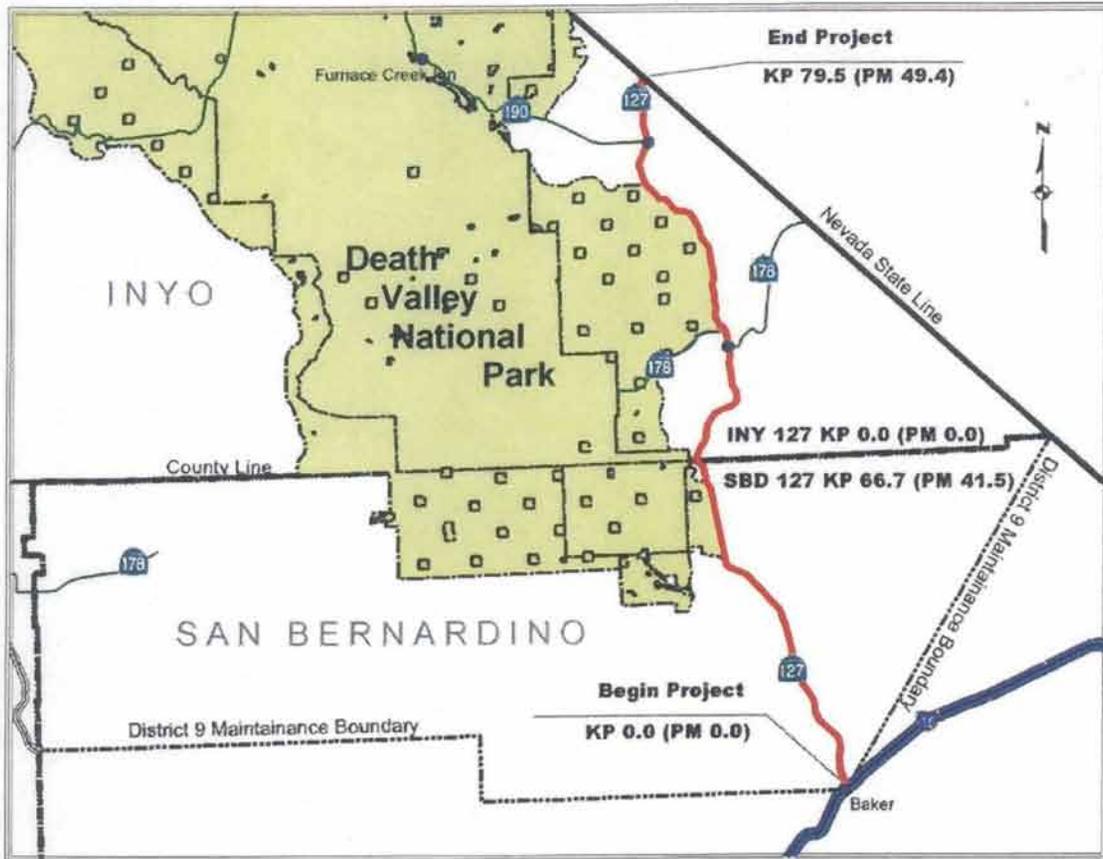
Project Name: SR-127 Improvements

On Route: SR 127

Between: Interstate 15, near Baker in San Bernardino County, for 66.7 km through Caltrans District 8 to the Inyo County line.

And: From the Inyo County line, for 79.5 km through Caltrans District 9, to the Nevada State boundary, where it is designated NSH-373.

FEASIBILITY ANALYSIS REPORT



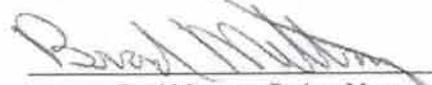
Project Name: SR-127 Improvements

On Route: SR 127

Between: Interstate 15, near Baker in San Bernardino County, for 66.7 km through Caltrans District 8 to the Inyo County line.

And: From the Inyo County line, for 79.5 km through Caltrans District 9, to the Nevada State boundary, where it is designated NSH-373.

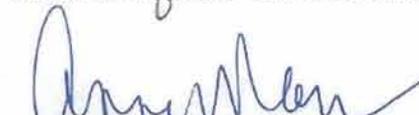
APPROVAL RECOMMENDED:


Brad Mettam - Project Manager

APPROVED:


Thomas P. Hallenbeck - District 9 District Director

1/14/03
Date


Anne Mayer - District 8 District Director

4/9/03
Date

wtz
4-1-03

09-Inyo-127-KP 0.0/79.5 (PM 0.0/49.4)
08-Sbd-127- KP 0.0/66.7 (PM 0.0/41.5)
September 2002
HB4N

This Feasibility Analysis Report has been prepared under the direction of the following Registered Engineer. The registered Civil Engineer attests to the technical information contained therein and has judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.


REGISTERED CIVIL ENGINEER

9-4-02
DATE



Feasibility Analysis Report

09-Inyo-127-KP 0.0/79.5 (PM 0.0/49.4)

08-Sbd-127-KP 0.0/66.7 (PM 0.0/41.5)

06247-EA 30520K

HB4N Program

1. INTRODUCTION

This Feasibility Analysis Report studies the need and cost to improve and upgrade safety and operations, in response to transportation of nuclear waste, on State Route 127 (SR-127) in the Counties of San Bernardino and Inyo. This 146-kilometer (91-mile) stretch of SR-127 has the potential to be considered by the United States Department of Energy (DOE) as a segment of a nationwide corridor for transporting high-level radioactive waste to Yucca Mountain, Nevada. While the DOE has not currently identified this route for the 25-year shipping period scheduled to begin in 2010, the potential for its use is based on the DOE's agreement to avoid transportation of either low-level radioactive waste or transuranic waste through the city of Las Vegas, Nevada.

It is proposed in this project to rehabilitate the existing lanes of SR-127, to construct new shoulders or widen existing shoulders to 3.0-meter and to correct horizontal and vertical alignments within the proposed project limits. This Report addresses transportation by heavy haul trucks on highways and does not consider the alternative of transportation by legal weight truck. Direct rail transportation impacts are also considered beyond the scope of this Report.

It is expected that DOE would fund the proposed improvements as mitigation for the impacts caused by the use of this facility. The total project cost estimate ranges from \$250,000,000 to \$300,000,000. This estimate includes \$500,000 (non-escalated) for right-of-way and utility relocation and \$249,500,000 to \$299,500,000 for construction of roadway and structural items. The above estimate does not include any support component costs, estimated to be about \$50,000,000 (about 17% of Capital Cost). The project category is Project Development Processing Category 4A with the proposal to modify an existing uncontrolled access route.

2. BACKGROUND

Following nearly two decades of studies, the Secretary of Energy has recommended that the Yucca Mountain, Nevada site be developed as the nation's first high-level radioactive waste repository. The plan is for deep geological disposal, approximately 305 meters (1,000 feet) underground, in robust metal containers for permanent burial. President George W. Bush has approved the site, allowing the DOE to apply for a license from the Nuclear Regulatory Commission (NRC) to build the facility (subject to potential legal challenges.)

Currently some shipments of low level nuclear waste to the Nevada Test Site are occurring. The

proposed shipments to Yucca Mountain are expected to begin in 2010, and to continue to be delivered 24 hours a day, 365 days a year, for over two and a half decades. High-level radioactive waste materials have accumulated throughout the United States since the mid-1940s. These materials are currently stored in temporary facilities at approximately 130 sites in 45 states. Shipments to Yucca Mountain will be coming from or traveling through 44 states, including California and Nevada. While the DOE is currently examining a rail route through Nevada, alternatives may include a highway route that avoids passing through heavily populated areas, such as Las Vegas, Nevada.

Because of the location of the disposal site, the DOE may consider using SR-127 as a segment for transporting radioactive wastes, in conjunction with its rail transportation. The route would be required to accommodate oversized trucks weighing approximately 140 metric tonnes (150 U.S. tons) with large 46 meter (150 feet) turning radii. Open road speeds for these trucks are anticipated to range from 30 to 80 km/h (20 to 50 mph). This Report analyzes and considers the impacts, costs, and mobility of the proposed truck type and increase of truck volumes on SR-127.

SR-127, located in the Counties of San Bernardino and Inyo, is an undivided two-lane conventional highway running in a north-south direction. It is functionally classified as a Rural Minor Arterial. This route begins at the interchange with Interstate 15 (I-15) in Baker and terminates 146.2 kilometers (90.9 miles) north at the Nevada State Line. The county line between San Bernardino and Inyo is 66.7 kilometers (41.5 miles) north of I-15. Most of the route is within flat desert and rolling terrain, passing through the communities of Baker, Shoshone, and Death Valley Junction. The route provides a link between California and Nevada and is primarily used for recreational and interregional traffic. Many tourists access Death Valley National Park by this route.

In Inyo County, SR-127 intersects eastbound SR-178 within the community of Shoshone, and westbound SR-178 is approximately 3 kilometers (1.7 miles) north of that. Near the community of Death Valley Junction, SR-127 intersects westbound SR-190 and eastbound State Line Road (County Road) to the Nevada State line. SR-127 continues north to the Nevada State Line and then becomes Nevada State Highway 373 (NSH-373). In Nevada, NSH-373 connects to an important inter-regional route, United States Highway Route 95 (US-95). Yucca Mountain is located on US 95 north of the intersection with NSH 373, approximately 17 miles north of the California State line.

SR-127 consists of 3.6-meter (12-foot) wide paved lanes, paved shoulders of varying widths from 0 to 0.6 meters (0 to 2 feet) and unpaved shoulders (i.e., loosely compacted dirt or gravel). Based on a 1995 pavement deflection study, the existing asphalt concrete (AC) thickness ranges from 101 mm (0.35 feet) to 192 mm (0.65 feet). Portions of the highway have been treated with Seal Coat. These portions of pavement surface have extensive continuous transverse, longitudinal, and alligator cracks. Along the entire project limits, there are no turnouts or passing lanes. Significant portions of the route have been overlaid with AC.

Segments of SR-127 are subject to temporary closure due to flash floods. Many of these flash flood locations are associated with extensive alluvial fans and the Amargosa River. At five locations, the depth of high water has been recorded to be 0.6 meters (2 feet) above the pavement surface. The highway has been closed several times due to flooding, typically no longer than three days. However, records indicate that in 1969, flooding required a two-week closure. Damages to the roadway from flooding have occurred in the past.

3. NEED AND PURPOSE

Based on information stated in the Introduction and Background section of this report, modifications must be made to SR-127 to bring the roadway up to current design standards in order to allow this route to carry 140-metric-tonne (150 tons) trucks carrying nuclear waste. To accommodate the proposed type of oversized and overweight vehicles carrying nuclear waste, the following four issues need to be addressed:

1. Safety
2. Improvement of highway geometrics (e.g. horizontal and vertical alignments)
3. Mitigation for flash flood impacts
4. Long-term maintenance

Realignment of several horizontal curves shown in the tables listed in Section 4, Alternatives, will increase the radius of curves on SR-127 and will enhance the roadway's operational and safety characteristics. Realignment through the communities of Baker and Death Valley Junction are needed to upgrade the horizontal and vertical alignments. A new bypass in San Bernardino County will avoid the community of Baker, including a school at KP 0.9 (PM 0.6) (See Attachment A, Baker Bypass). The realignment in Inyo County at Death Valley Junction would bring the alignment up to current design standards. The curve corrections maintain existing tangents and increase the radius to accommodate a design speed of 110 km/h (65 mph).

The preliminary drainage recommendations (see Attachment G) identify the locations where roadway improvements are necessary to convey storm water flows across the highway. A need to construct twenty two box culverts and six structures has been identified. These improvements are necessary to minimize flooding throughout the year.

Rehabilitation of the existing traffic lanes is necessary due to the following:

- The increase of existing truck volume and percentage of ADT, including shipments of high-level radioactive waste materials to Yucca Mountain
- Heavy haul trucks specifically designed to haul heavyweight, multi-purpose canisters of radioactive materials to Yucca Mountain, weighing upwards of 140 metric tones (150 tons) (see Attachment H, Heavy Haul Transporter)
- Extreme weather conditions, including high summer heat and flash flooding, which

- contribute to considerable damage to the pavement surface and base material
- Based on a 1995 pavement deflection study, the existing asphalt concrete (AC) thickness ranges from 101 mm (0.35 feet) to 192 mm (0.65 feet)
- The existing seal coated (chipsealed) pavement surface has extensive continuous transverse, longitudinal, and alligator cracks

Traffic Accidents

Project Limits

Based on the Traffic Accident Surveillance and Analysis System (TASAS) records for the project limits in the counties of San Bernardino and Inyo, the following table shows the Fatal, Fatal plus Injury, and Total Accident Rates. For comparison, the table also shows Statewide Average Accident Rates for a similar facility. Within the project limits, the Actual Accident Rates are lower than the Statewide Average Accident Rates in all three categories. The TASAS record data are shown in Attachment B.

**San Bernardino and Inyo Counties
 Accident Rates (01-01-97 to 12-31-01)**

Location	Actual			Average		
	Fatal	Fatal Plus Injury	Total	Fatal	Fatal Plus Injury	Total
San Bernardino County KP 0.0/66.74 (PM 0.0/41.473) & Inyo County ¹ KP 0.0/79.53 (PM 0.0/ 49.420)	0.018	0.62	0.98	0.055	0.73	1.47

Based on TASAS records between January 1, 1997 and December 31, 2001, the following number of reported accidents and types of collision information were gathered:

- There were 107 accidents reported within the project limits. Sixty-seven accidents resulted in 3 fatalities and 107 persons injured. The types of collisions were hit objects (48%), overturn (35%), broadside (5%), sideswipe (3%), head-on (2%), and others (7%).

¹ The accident rates for the project limits are provided in accidents per million vehicle miles.

Intersection and Spot Location Accidents

Based on the TASAS records, the following table shows the intersection and spot location accident rates in comparison to the statewide average accident rates for a similar facility. At the Baker Boulevard, Airfield Road, Junction East SR-178 (JCT E SR-178), and JCT SR-190 intersections, the Actual Total Accident Rate is higher than the Statewide Average Accident Rate for a similar facility (due to more than average “property damage only” accidents). In addition at the JCT SR-190 intersection, the Fatal plus Injury Accident Rate is higher than the Statewide Average for a similar facility.

At three spot locations in Inyo County, KP 3.30 to 3.62 (PM 2.05 to 2.25), KP 25.60 to 26.23 (PM 16.15 to 16.30), and KP 27.84 to 28.08 (PM 17.30 to 17.45), the actual fatal plus injury and total accident rates are higher than the statewide average for a similar facility.

The TASAS record data are shown in Attachment B.

Accident Rates² (01-01-97 to 12-31-01)

Location	Actual			Average		
	Fatal	Fatal Plus Injury	Total	Fatal	Fatal Plus Injury	Total
Baker Blvd SBD-KP 0.0 (PM 0.0)	0.000	0.13	1.70	0.006	0.32	0.76
Airfield Road SBD-KP 2.53 (PM 1.571)	0.000	0.00	0.69	0.003	0.06	0.14
Inyo KP 3.30/3.62 (PM 2.05/2.25)	0.000	3.13	4.70	0.047	0.64	1.27
Jct. E SR-178 Inyo-KP 23.74 (PM 14.749)	0.000	0.47	0.94	0.004	0.10	0.22
Inyo KP 25.60/26.23 (PM 16.15/16.3)	0.000	13.7	13.7	0.066	0.84	1.73
Inyo KP 27.84/28.08 (PM 17.3/17.45)	0.000	7.31	14.61	0.077	0.98	2.02
Jct. SR-190 Inyo-KP 67.83 (PM 42.149)	0.000	0.78	1.17	0.004	0.10	0.22

Based on TASAS records between January 1, 1997 and December 31, 2001, the following number of reported accidents and types of collision information were gathered:

- At the Baker Boulevard intersection, 13 accidents were reported. One accident resulted in three people being injured (no fatalities). The types of collisions were sideswipe (38%), rear end (31%), broadside (16%), and hit object (25%).
- At the Airfield Road intersection, 1 accident was reported. This accident resulted in no fatality and no persons were injured. The type of collision was a hit object (100%).
- At the JCT E SR-178 intersection, 2 accidents were reported. One accident resulted in no fatality and five persons injured. The types of collisions were head-on (50%) and broadside (50%).

² Accident rates are provided in accidents per million vehicles.

- At the JCT SR-190 intersection, 3 accidents were reported. Two accidents resulted in no fatality and three persons injured. The type of collisions was a hit object (100%).

The accident rates shown above are for reported and recorded accidents only. Caltrans Maintenance estimates that there have been many single-vehicle "run-off the road" accidents on SR-127, especially at the curves; however, these accidents were not officially reported or recorded; not all accidents are reported.

Traffic Volume and LOS

Present and future operating conditions on SR 127 are summarized in the following table:

State Route 127						
	San Bernardino County		Inyo County			
Segment	1	2	1	2	3	4
KP	0.00/1.03	1.03/66.79	0.00/23.80	23.80/26.44	26.44/67.83	67.83/79.53
PM	0.00/0.64	0.64/41.47	0.00/14.78	14.78/16.42	16.42/42.13	42.13/49.39
Length (km)	1.03	65.76	23.8	2.64	41.39	11.7
Length (m)	0.64	40.83	14.78	1.64	25.7	7.27
Design Hour 30th Highest	350	100	146	137	57	116
AADT 2001	1800	800	900	400	300	600
AADT 2011	2109	956	990	440	330	660
AADT 2021	2520	1120	1098	488	366	732
Truck Volume	10.20%	10.30%	10.60%	17.00%	22.00%	30.00%
Year 2002 LOS	C	A	A	A	A	A
V/C	0.15	0.06	0.06	0.03	0.02	0.03
Year 2012 LOS	C	A	A	A	A	A
V/C	0.17	0.07	0.07	0.03	0.02	0.04
Year 2022 LOS	C	A	B	A	A	A
V/C	0.21	0.08	0.08	0.03	0.02	0.04

In Inyo County, the above table shows that SR-127 currently provides a theoretical LOS A to 2005. LOS A and LOS B are reached in 2015 within Inyo County. District 9’s concept for this facility is LOS C.

In San Bernardino County, the above table shows SR-127 is currently operating at an LOS C and LOS A. LOS C and LOS A will be maintained through 2015.

4. Alternatives

“Build” Alternative

This alternative proposes to rehabilitate existing pavement, construct new shoulders, correct horizontal and vertical alignments, mitigate for flooding issues, and provide areas for trucks to turn around within the proposed project limits.

Summary of proposals include the following:

- Rehabilitation of the existing roadway. Recommendation of reconstruction of the entire route is pending results of further studies by staff of District Materials Lab and Materials Engineering And Testing Services (METS) in Headquarters.
- Widening or adding shoulders to 3.0-meter widths.
- Correcting curves to standard curve radii (i.e. 600 meters for a corresponding design speed of 110 km/h)
- Constructing new portions of highway to bypass the communities of Baker and Death Valley Junction. This would require a new route adoption. Further studies are required to consider avoiding the community of Shoshone and other areas.
- Realigning vertical and horizontal alignments due to flooding issues, specifically regarding the Amargosa River. This would require a new route adoption. The full impacts are not considered in this report and further studies would be required to see if this realignment would be viable or not.
- Constructing turnout areas to allow large trucks to make "U-turns" at approximately 16 kilometers (10 miles) spacing throughout the project limits.
- Constructing a weigh-in motion scan detector and Changeable Message Signs.

SR-127 Curve Improvements

Curve Number	County	Location KM (PM)	Existing Curve Radius m (feet)	Minimum Curve Radius m (feet)
1	San Bernardino	45.12 (28.0)	260 (853)	600 (1970)
2	San Bernardino	45.4 (28.2)	260 (853)	600 (1970)
3	San Bernardino	60.8 (37.8)	260 (853)	600 (1970)
4	San Bernardino	63.1 (39.2)	212 (696)	600 (1970)
5	San Bernardino	63.6 (39.6)	260 (853)	600 (1970)
1	Inyo	3.4 (2.1)	260 (853)	600 (1970)
2	Inyo	3.9 (2.4)	260 (853)	600 (1970)
3	Inyo	6.3 (3.9)	260 (853)	600 (1970)
4	Inyo	9.7 (6.0)	260 (853)	600 (1970)
5	Inyo	22.9 (14.2)	260 (853)	600 (1970)
6	Inyo	25.3 (15.7)	212 (696)	600 (1970)
7	Inyo	25.6 (15.9)	212 (696)	600 (1970)
8	Inyo	25.8 (16.0)	N/A N/A	600 (1970)
9	Inyo	26.1 (16.2)	N/A N/A	600 (1970)
10	Inyo	27.0 (16.8)	170 (558)	600 (1970)
11	Inyo	28.0 (17.4)	170 (558)	600 (1970)
12	Inyo	29.5 (18.3)	212 (696)	600 (1970)
13	Inyo	32.5 (20.2)	296 (971)	600 (1970)
14	Inyo	55.5 (34.5)	260 (853)	600 (1970)
15	Inyo	59.2 (36.8)	260 (853)	600 (1970)
16	Inyo	62.8 (39.0)	260 (853)	600 (1970)

Note: N/A - Not Applicable

SR-127 Realignments

Curve Number	County	Location KM (PM)	Existing curve Radius m (Feet)	Minimum Curve Radius M/(Feet)
1	Inyo	66.95 (41.6)	130 (427)	600 (1970)
2	Inyo	67.43 (41.9)	70 (230)	600 (1970)

This alternative proposes to maintain SR-127 as a two-lane conventional highway. The existing pavement would be rehabilitated and asphalt concrete shoulders would be added or widened to

3.0 meters (10 feet) throughout the project limits. Horizontal alignment would be improved to accommodate 110 km/h (65 mph) speeds, which requires the radius of curves to be increased to at least 600 meters. This alternative proposes truck turnouts at approximately 16 kilometers (10 miles) spacing throughout the project limits. These turnouts would allow large trucks to make U-turns.

Drainage

Realignment of sections of highway, which have occasionally flooded and caused considerable damage to the pavement surface and supporting roadbed, is necessary to bypass crossings of the Amargosa River. Realigning the highway, thus eliminating four existing crossings, would require acquisition of a portion of Death Valley National Park. Since identifying specific issues are expected to be lengthy, this Report does not identify the right of way impacts or costs associated regarding this realignment. At other locations, in this vast undeveloped area, many streams tend to meander. Improvements to existing channel crossings and channel bank improvements, both upstream and downstream, would be required to maintain the existing crossings and thus at least prevent or reduce overtopping of the existing roadbed. Other major drainage improvements (see Attachment G, Preliminary Drainage Recommendations) and a new overlay on existing lanes are necessary to improve the operational and safety characteristics of SR-127. Six structures and twenty two box culverts are proposed to minimize flash flooding throughout the year.

Structures

Inclusive with addressing structure issues, all structures require special design considerations due to the heavy loads these vehicles would be carrying. The estimate may not adequately reflect this issue due to the additional time to study these special considerations. Further studies will be needed.

Estimate

The current total project cost estimate is \$288,000,000 (see Attachment C, Draft Cost Estimate). This estimate includes \$500,000 (non-escalated) for right-of-way and utility relocation and \$277,500,000 for construction of roadway and structural items. The above estimate does not include any support component costs, estimated to be about \$50,000,000 (about 17% of Capital Cost). Based upon the year the construction begins the support component costs and right-of-way and utility costs will have to be suitably adjusted.

“No Build” Alternative

The “No Build” Alternative would not meet the need and purpose of the project. It would leave the existing roadway as it is. Impacts to the existing roadway if the “No Build” alternative is selected and the proposed heavy load truck hauling takes place on SR-127 include, but are not limited to, the following:

- Increased maintenance costs
- Increased pavement failure
- Inadequate shoulder width to accommodate any disabled oversized truck
- Increased potential for major accidents
- On-going flash flooding of roadway subject to closure during storms
- Extensive delays and out of direction travel caused by detour of heavy hauling truck traffic due to roadway closure

Due to these impacts, use of SR-127 for heavy load trucks should not occur under this alternative.

5. System and Regional Planning

SR-127 is part of the California Interregional Road System (IRRS) and is included in the Freeway and Expressway System (F&E). The Route Concept Reports from both Districts 8 and 9 expect SR-127 to remain a two-lane conventional highway to the year 2015 (for background information, see the Background section of this report).

SR-127 was adopted into the State Highway System in the year 1933. SR-127 crosses mainly unimproved vacant high desert land. Current land use is identified as mainly high desert open space, used primarily for recreation. Although adjacent land uses include some commercial and residential, most of the land use is recreational. No new land development projects on existing land are known at this time. Portions of SR 127 are adjacent to Death Valley National Park and several wilderness areas, or traverse or border lands held in trust for the Timbisha Shoshone Tribe.

Other than routine maintenance, at this time, no other state highway improvements, local improvements, and/or other development projects are being considered within the project limits or immediate vicinity.

6. Environmental Determination and Environmental Issues

The environmental issues on this project include significant impacts on visual, cultural, archeological, and biological resources. The significant environmental impacts are discussed in the Preliminary Environmental Analysis Report (see Section 7, Right-of-Way, below and Attachment D). The anticipated environmental document is an Environmental Impact

Report/Environmental Impact Study (EIR/EIS) for compliance with CEQA and NEPA. The Federal Highways Administration and the California Department of Transportation would act as the lead agencies in the preparation of a joint CEQA/NEPA environmental document. Mitigation costs are estimated to be \$6,300,000. The final environment determination is estimated to take nine years to complete. Assuming a start of January 2004, the final environmental document could be anticipated by the year 2013.

7. Right-of-Way

The "Build" Alternative proposes to realign existing SR-127 with horizontal curve radius corrections, add bypasses, and raise the vertical profiles. The estimated total right-of-way to be acquired is 100 hectares (247 acres). Since identifying specific issues require more time, this report does not identify the right of way impacts nor costs associated with realigning SR 127 in areas near a section of the Amargosa River and near the community of Shoshone. This will need to be addressed in future studies. The exact anticipated number of right-of-way parcels to be acquired cannot be determined at this time. A review of preliminary mapping within sections of land across Bureau of Land Management (BLM) in Inyo County indicates the following:

- No record of right-of-way exist (i.e., prescriptive rights only)
- Easements
- Title fees
- Right-of-way widths vary from 61 to 122 meters (200 to 400 feet)

Property to be acquired includes BLM, Death Valley National Park, and some privately owned land. Estimated costs for the public lands will be relatively low, however, value for privately owned land is estimated at \$2,470 per hectare (\$1,000 per acre). The total right-of-way cost for the "Build" Alternative is estimated at \$500,000 in current U.S. dollars (i.e., non-escalated). Based upon the year construction begins, the right-of-way cost should be suitably escalated. No utility relocations, railroad involvement, or relocation assistance is anticipated on this project.

The Preliminary Environmental Analysis Report is attached (see Attachment D) and it states, "This project is adjacent to designated Wilderness area in several locations... Wilderness areas typically don't include land within 30-300 feet of paved roads. If Right of Way is necessary within the designated Wilderness area, the designation must be changed. A Wilderness Area Designation can only be changed by the United States Congress."

8. Other Considerations As Appropriate

Emergency Response

The DOE would be responsible for emergency response. The DOE has published a document titled "Spent Nuclear Fuel Transportation" (see Attachment F). This document states the following:

The shipment of nuclear waste is highly regulated and subject to the utmost scrutiny. We follow the strict Department of Transportation (DOT) and NRC transportation rules, including the use of NRC-certified transportation cask, advance route approvals and notification, and shipment escorts. The Department also tracks its shipments by satellite on a 24-hour basis. DOE follows these precautions carefully now and will follow or exceed any others that may be required in the future, whether by the Congress or by DOT or NRC....

Finally, the Department is committed to ensuring safe practices in the transportation of nuclear materials. DOE has already trained emergency response teams in 34 states, under a variety of programs and in cooperation with other government agencies. Using funds and expertise provided by the department, local fire and police will continue to be trained in advance to respond appropriately to challenges unique to these shipments.

The DOE needs to also provide training for emergency responses by other local ambulance, medical staff (i.e., paramedics, doctors and nurses, etc.), Caltrans Maintenance, and Haz-Mat Crews.

Sustained Grades

The length of an uphill grade is important, because it could affect delays, capacity, and level of service when slow moving trucks are present. The addition of climbing lanes should be studied at the locations listed below, but are not considered in this report. Future considerations would include additional earthwork and property acquisition.

- From the Amargosa River Bridge to Ibex Pass KP 57.0/67.0 (PM 35.0/40.0) – There is an existing 4.0 % grade with a rise of 450 meters (1500 feet) (See Attachment A, Vertical Profile, P-1)
- From the Ibex Pass to Shoshone KP 0.0/8.0 (PM 0.0/5.0) – There is an existing 2.3 % grade with a rise of 150 meters (500 feet) (see Attachment A, Vertical Profile, P-2)

The Headquarters Traffic Operations Program and the Highway Capacity Manual should be consulted for a detailed analysis regarding the need and length of the climbing lanes.

Climbing lanes are normally not constructed on tangent sections where the length of the tangent exceeds the passing sight distance where passing would normally occur. The climbing lane analysis should be done in the future design phase.

Construction Impacts

Construction work would impact the traffic in this area. There will be traffic control with delays throughout the length of the project. This issue will be addressed by Traffic Management Plans.

Also, to prepare the repository at the Yucca Mountain site to receive the material, the construction work involved is expected to be a significant issue. Multiple trips of heavy machinery and heavy haul trucks are expected daily, both to and from the site, before SR 127 is improved. These construction activities could significantly impact the highway. This report does not identify construction costs or impacts, but they must be addressed in future studies.

Long-Term Maintenance

Estimating long-term maintenance issues are pending further studies. It is expected that the long-term maintenance efforts will be significant each year and at this time the level of federal (e.g. DOE) participation in these efforts is not known. The proposed shipments within the 25-year shipping period for routine maintenance are above and beyond current typical maintenance levels of service.

Traffic Management Plan (TMP)

It is anticipated that detours and lane closures would be required during construction. It is possible that traffic delays could ensue from the project and could be significant. Therefore, a Transportation Management Plan (TMP) for this project will be required. This TMP will follow the TMP Guidelines. The Traffic Operations Program's TMP Coordinator should be contacted for guidance. The TMP should be finalized during the early stage of the Plans, Specifications, and Estimate (PS&E) phase.

The media should be used to disseminate information to the public with regard to detours and lane closures and restrictions. To achieve maximum traffic safety and service, public awareness is necessary. District 8 and District 9 Transportation Management Centers should provide project information to Caltrans' Public Affairs Office, which would relay the information to the media. The media in turn would inform the public regarding lane closures and restrictions, delays and major changes in the traffic patterns and the construction progress. In addition, project bulletins should be given to the print media periodically. At least the Public Affairs Office and staff handling Traffic operations in both District 8 and District 9 should be kept informed by the Resident Engineer with regard to construction progress, delays, stage construction detours, lane closures, or any other information that may assist the centers in performing their duties.

Coordination with Native American Tribe (Timbisha-Shoshone)

Since this project passes directly through tribal land, coordination and agreement with the Native American Tribe (Timbisha-Shoshone) would be necessary. The attached Preliminary Environmental Analysis Report indicates that a Study Report is required for cultural impacts on Native American Coordination. These impacts would need to be addressed and mitigated.

Coordination with Military Operations

The U.S. Army has proposed an expansion of the Fort Irwin National Training Center. Coordination and agreement of military operations would be necessary with the Fort Irwin Military Reservation within San Bernardino County.

Coordination with BLM

Coordination and agreement with the BLM would be necessary within Inyo County.

Coordination with National Park Service

Coordination and agreement with the Death Valley National Park Service would be necessary.

Coordination with County of San Bernardino

Coordination and agreement with the local agencies and the County of San Bernardino would be necessary.

Coordination with County of Inyo

Coordination and agreement with the local agencies and the County of Inyo would be necessary.

Coordination with the Department of Transportation of Nevada

Coordination and agreement with the Department of Transportation of Nevada would be necessary.

Coordination with the U.S. Department of Energy, the U.S. Department of Transportation, and the Federal Highway Administration

Coordination would be necessary with federal departments and agencies.

Coordination with the California Energy Commission, the California Highway Patrol

Coordination would be necessary with state departments and agencies.

9. District Contact

For further information on this Feasibility Analysis Report, contact the following personnel:

Project Manager	Brad Mettam	(760-872-5214)
Design Manager	Rodrick Lee	(559-243-3573)
Project Engineer	Manuel Ramirez	(559-243-3596)
Environmental Planner	David Farris	(559-243-8170)
Right of Way Manager	Nancy Escallier	(760-872-0641)
Planning Manager	Katy Walton	(760-872-0691)

LIST OF ATTACHMENTS

- A. Feasibility Analysis Report Plans
 - Title Sheet
 - Typical Cross Section X-1
 - Typical Cross Section X-2
 - Vertical Profile P-1
 - Vertical Profile P-2
 - Typical Curve Correction C-1
 - Curve Location Map
 - Baker Bypass
- B. Traffic Data
 - TASAS Accident Rates (San Bernardino and Inyo Counties)
 - Traffic Volume Tables (D8 and D9 Route Concept Report and Operating Conditions)
- C. Draft Cost Estimates
- D. Preliminary Environmental Analysis Report
- E. Right of Way Scoping Checklist
- F. Spent Nuclear Fuel Transportation (Title Sheet and Introduction Only)
- G. Preliminary Drainage Recommendations
- H. Heavy Haul Transporter

ATTACHMENT A

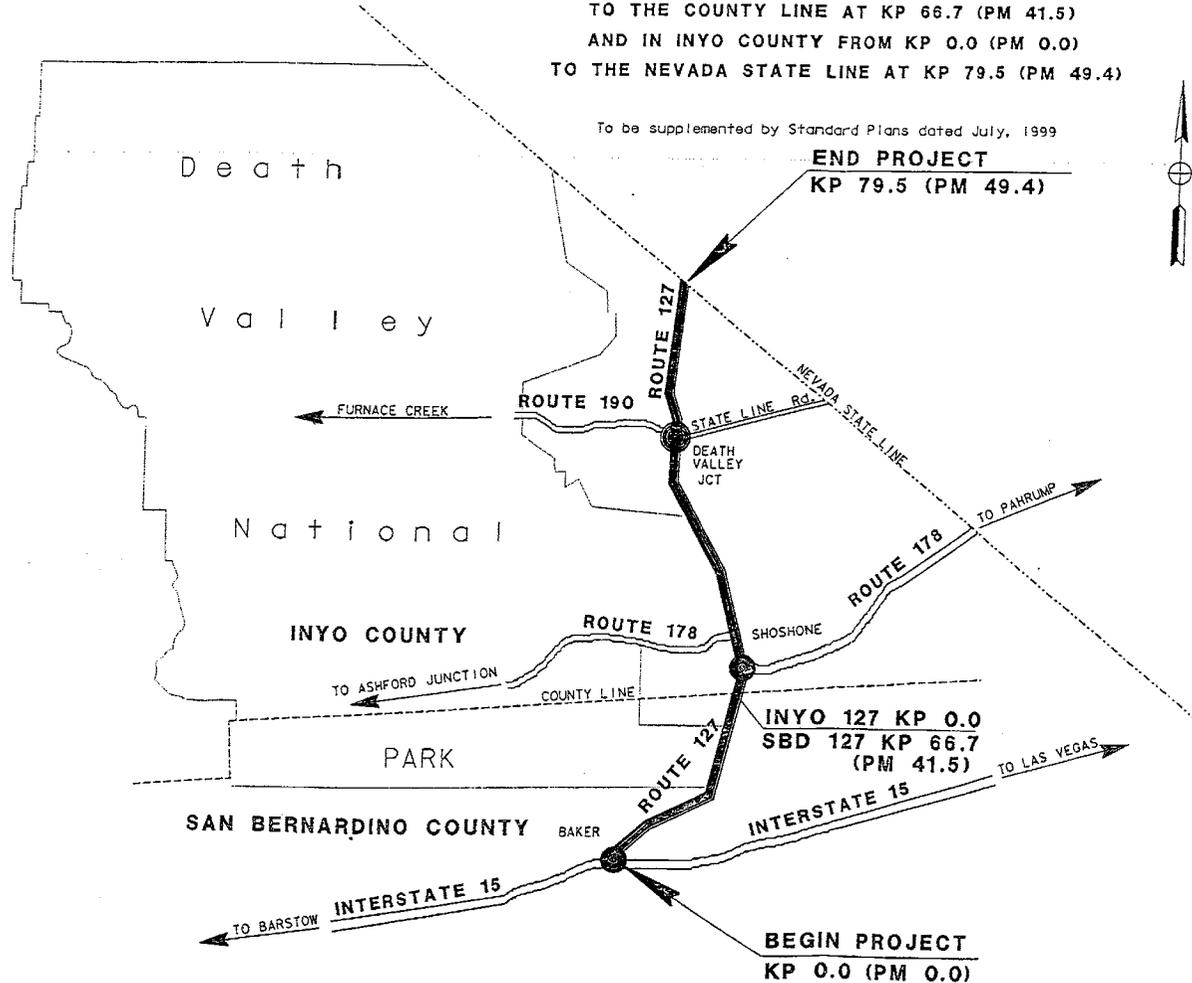
FEASIBILITY ANALYSIS REPORT PLANS

INDEX OF SHEETS

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 PROJECT PLANS FOR CONSTRUCTION ON
 STATE HIGHWAY

IN SAN BERNARDINO COUNTY FROM KP 0.0 (PM 0.0)
 TO THE COUNTY LINE AT KP 66.7 (PM 41.5)
 AND IN INYO COUNTY FROM KP 0.0 (PM 0.0)
 TO THE NEVADA STATE LINE AT KP 79.5 (PM 49.4)

To be supplemented by Standard Plans dated July, 1999



END PROJECT
 KP 79.5 (PM 49.4)

INYO 127 KP 0.0
 SBD 127 KP 66.7
 (PM 41.5)

BEGIN PROJECT
 KP 0.0 (PM 0.0)



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
09	INYO	127	0/79.5	1	
08	SBD		0/66.7		

Caltrans

LOCATION MAP

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.
 Caltrans now has a web site! To get to the web site, go to: <http://www.dot.ca.gov>



Project Engineer Date
 Registered Civil Engineer
 Plans Approval Date

Contract No.

PROJECT NUMBER: 2-B-2/S. BALASUBRAMANIAN 8-3-2
 DATE: 08-09-02
 ENGINEER: M. RAMIREZ

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT
 PROJECT ENGINEER
MANUEL RAMIREZ
 CALCULATED BY M.S.
 DESIGNED BY
 CHECKED BY
 REVISIONS
 DATE
 REVISOR
 DATE



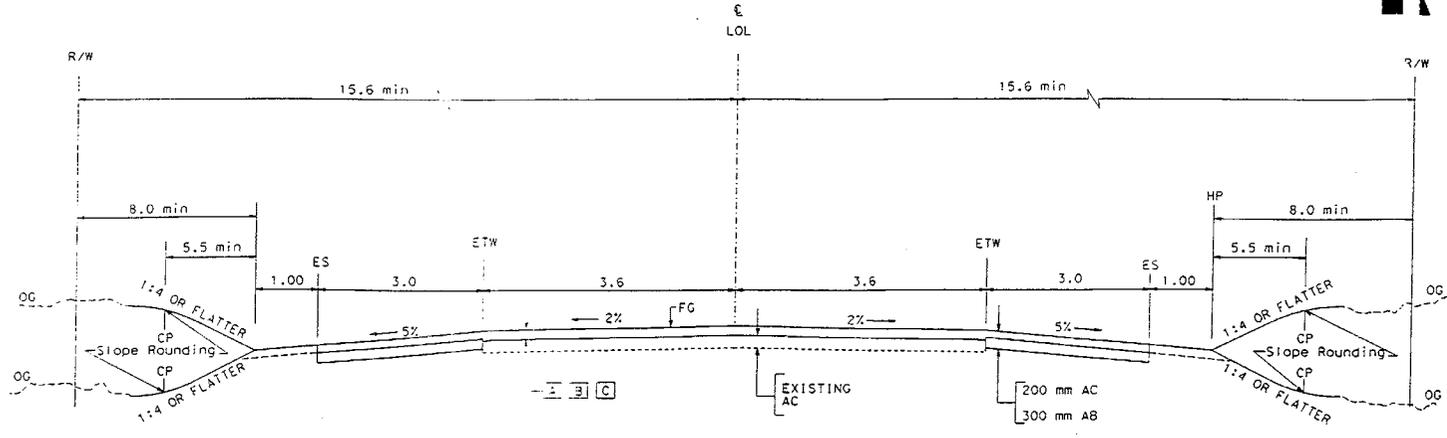
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
03	INYO	SBD	127	0/79	3
OR				0/66	

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness or electronic copies of this plan sheet.

Caltrans now has a web site! To go to the web site, go to: <http://www.dot.ca.gov>



ROUTE 127

SBD-127

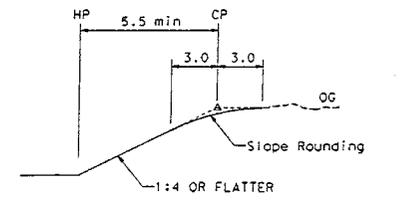
LOCATION	A-A 250mm AC	B-B 305mm AC
KP 0.00 TO KP 21.89 (PM 0.00 TO PM 13.6)		X
KP 21.88 TO KP 44.92 (PM 13.6 TO PM 27.913)	X	
KP 45.52 TO KP 55.82 (PM 28.287 TO PM 34.687)		X
KP 55.82 TO KP 60.69 (PM 34.687 TO PM 37.713)	X	
KP 60.97 TO KP 62.95 (PM 37.887 TO PM 39.113)	X	
KP 63.22 TO KP 63.43 (PM 39.287 TO PM 39.413)	X	
KP 63.70 TO KP 66.78 (PM 39.587 TO PM 41.5)	X	

INYO-127

LOCATION	A-A 250mm AC	C-C 610mm AC
KP 3.00 TO KP 3.24 (PM 3.00 TO PM 2.013)	X	
KP 3.52 TO KP 3.72 (PM 2.187 TO PM 2.313)	X	
KP 4.00 TO KP 6.14 (PM 2.487 TO PM 3.813)	X	
KP 6.41 TO KP 9.52 (PM 3.987 TO PM 5.913)		X
KP 9.79 TO KP 22.71 (PM 6.087 TO PM 14.113)		X
KP 22.99 TO KP 25.13 (PM 14.287 TO PM 15.613)	X	
KP 26.21 TO KP 26.90 (PM 16.287 TO PM 16.713)	X	
KP 27.18 TO KP 27.86 (PM 16.887 TO PM 17.313)	X	

INYO-127

LOCATION	A-A 250mm AC	C-C 610mm AC
KP 28.14 TO KP 29.31 (PM 17.487 TO PM 18.213)	X	
KP 29.59 TO KP 32.37 (PM 18.387 TO PM 20.113)	X	
KP 32.65 TO KP 35.08 (PM 20.287 TO PM 21.8)	X	
KP 49.24 TO KP 50.85 (PM 30.60 TO PM 31.60)		X
KP 50.85 TO KP 55.38 (PM 31.6 TO PM 34.413)	X	
KP 55.66 TO KP 59.08 (PM 34.587 TO PM 36.713)	X	
KP 59.36 TO KP 62.62 (PM 36.887 TO PM 38.913)	X	
KP 62.90 TO KP 65.98 (PM 39.087 TO PM 41.00)		X
KP 67.60 TO KP 70.63 (PM 42.00 TO PM 49.42)		X



SLOPE ROUNDING DETAIL

TYPICAL CROSS SECTIONS

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

NO SCALE

X-1

DATE PLOTTED: 05-28-02 10:20-DEC-2002 TIME PLOTTED: 22:18:31

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT ENGINEER
MANUEL RAMIREZ
 CALCULATED/DESIGNED BY M.S. CHECKED BY M.S.
 DATE REVISIONS DATE REVISIONS



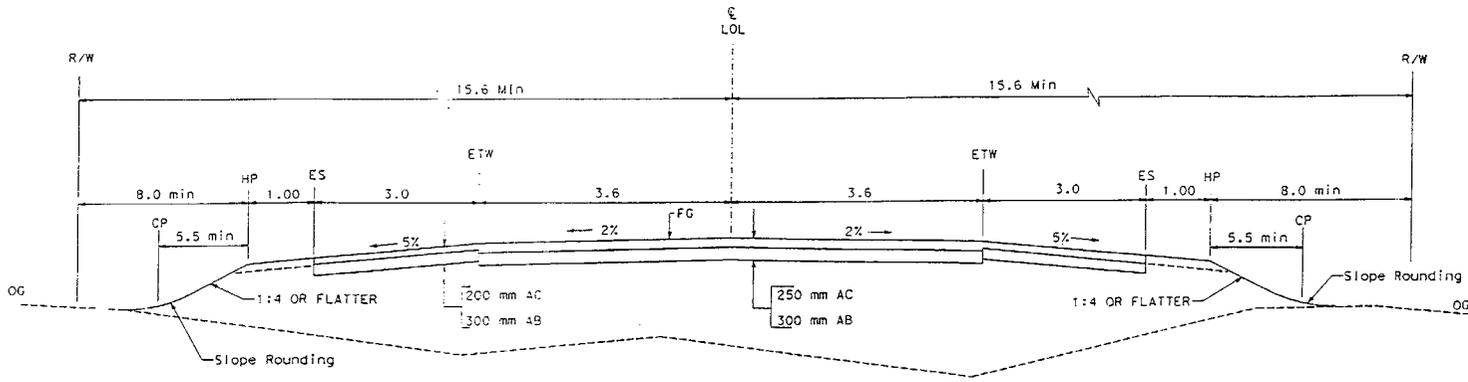
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
09	INYO	127	0/79.5		
08	SBD		0/66.7		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Caltrans now has a web site! To get to the web site, go to: <http://www.dtd.ca.gov>



ROUTE 127

SBD-127 CURVE CORRECTIONS

LOCATION
KP 44.92 TO KP 45.52 (PM 27.913 TO PM 28.287)
KP 60.69 TO KP 60.97 (PM 37.713 TO PM 37.887)
KP 62.94 TO KP 63.22 (PM 39.113 TO PM 39.287)
KP 63.43 TO KP 63.71 (PM 39.413 TO PM 39.587)

INYO-127 CURVE CORRECTIONS

LOCATION
KP 3.24 TO KP 3.52 (PM 2.013 TO PM 2.187)
KP 3.72 TO KP 4.0 (PM 2.313 TO PM 2.487)
KP 6.14 TO KP 6.42 (PM 3.813 TO PM 3.987)
KP 9.51 TO KP 9.79 (PM 5.913 TO PM 6.087)
KP 22.7 TO KP 22.99 (PM 14.113 TO PM 14.287)
KP 25.13 TO KP 26.21 (PM 15.613 TO PM 16.287)
KP 26.9 TO KP 27.18 (PM 16.713 TO PM 16.887)

INYO-127 CURVE CORRECTIONS

LOCATION
KP 27.86 TO KP 28.14 (PM 17.313 TO PM 17.487)
KP 29.31 TO KP 29.59 (PM 18.213 TO PM 18.387)
KP 32.37 TO KP 32.65 (PM 20.113 TO PM 20.287)
KP 55.311 TO KP 55.66 (PM 34.413 TO PM 34.587)
KP 59.08 TO KP 59.36 (PM 36.713 TO PM 36.887)
KP 62.62 TO KP 62.90 (PM 38.913 TO PM 39.087)

INYO-127 REALIGNMENT

LOCATION
KP 35.08 TO KP 49.24 (PM 21.80 TO PM 30.60)
KP 65.98 TO KP 67.59 (PM 41.00 TO PM 42.00)

SBD-127 BAKER BYPASS

LOCATION
KP 0.00 TO KP 1.83 (PM 0.00 TO PM 1.14)

TYPICAL CROSS SECTIONS

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

NO SCALE

X-2

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

USERNAME = 11330
 30X P.L.E. 2335222.CAD

CU 062470

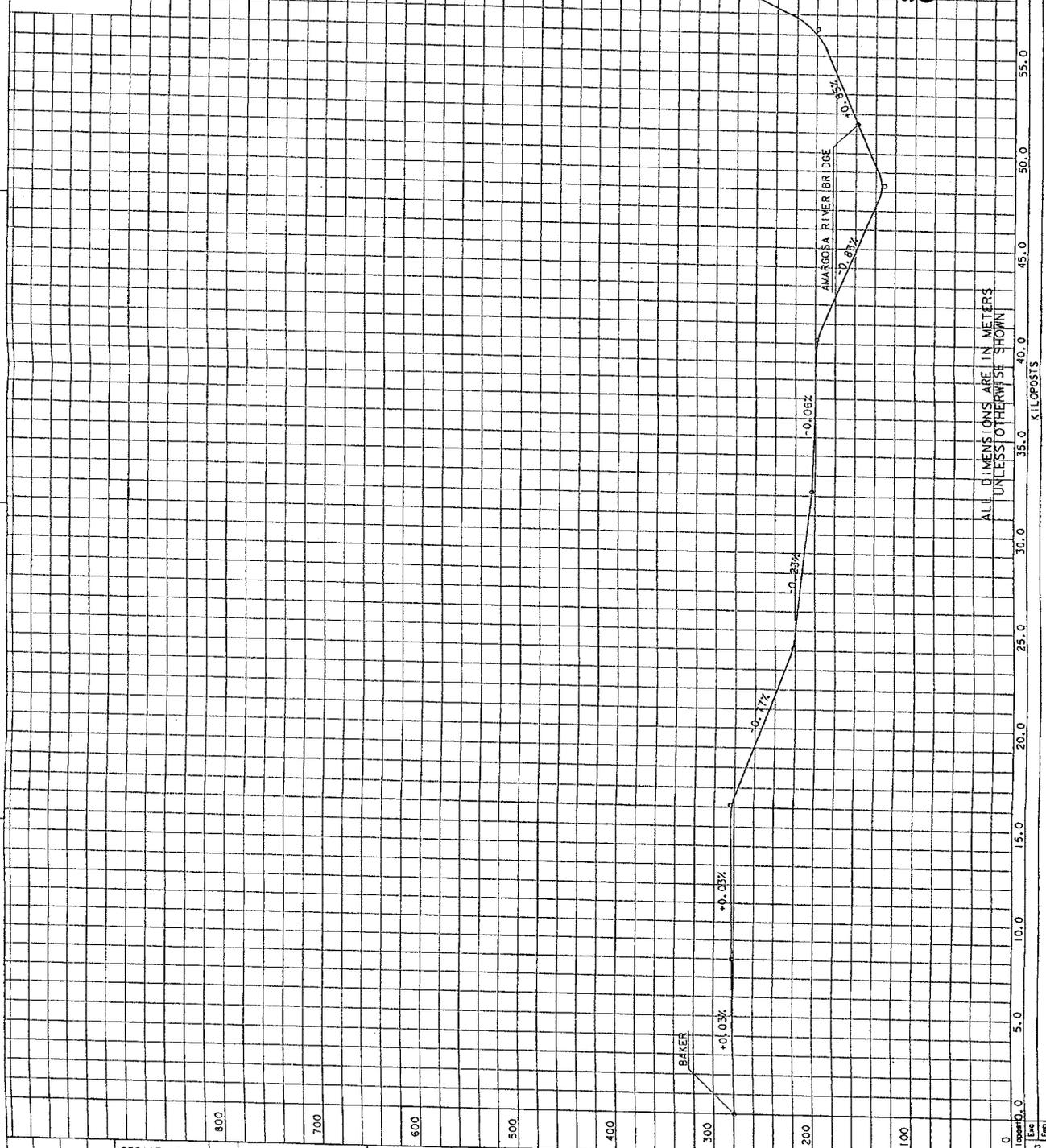
EA 30520K

DATE PLOTTED 22-20-DEC-2002
 03-26-02 Time PLOTTED 2:14:31

DIST COUNTY ROUTE VOLUME PER POST SHEET TOTAL
 09 INYO 127 079.5 079.5
 08 SRD 127 0.66.7 0.66.7

REGISTERED CIVIL ENGINEER
 PLANS APPROVAL DATE
 The State of California or its officers or agents, in connection with the preparation or completion of any plan, map or specification for any public work, shall not be held liable for any error or omission on the part of the engineer or architect who has prepared or completed the same.

California now has a web site to get to the web site go to: <http://www.cesb.ca.gov>



SR-127 VERTICAL PROFILE (SAN BERNARDINO)

SCALE: Horiz 1:100
Vert 1:2000

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

P-1

STA CAL PART OF THE STATE PROJECT ENGINEER
 PROJECT ENGINEER
 DESIGNED BY
 CHECKED BY
 DATE REVISOR
 DATE REVISOR

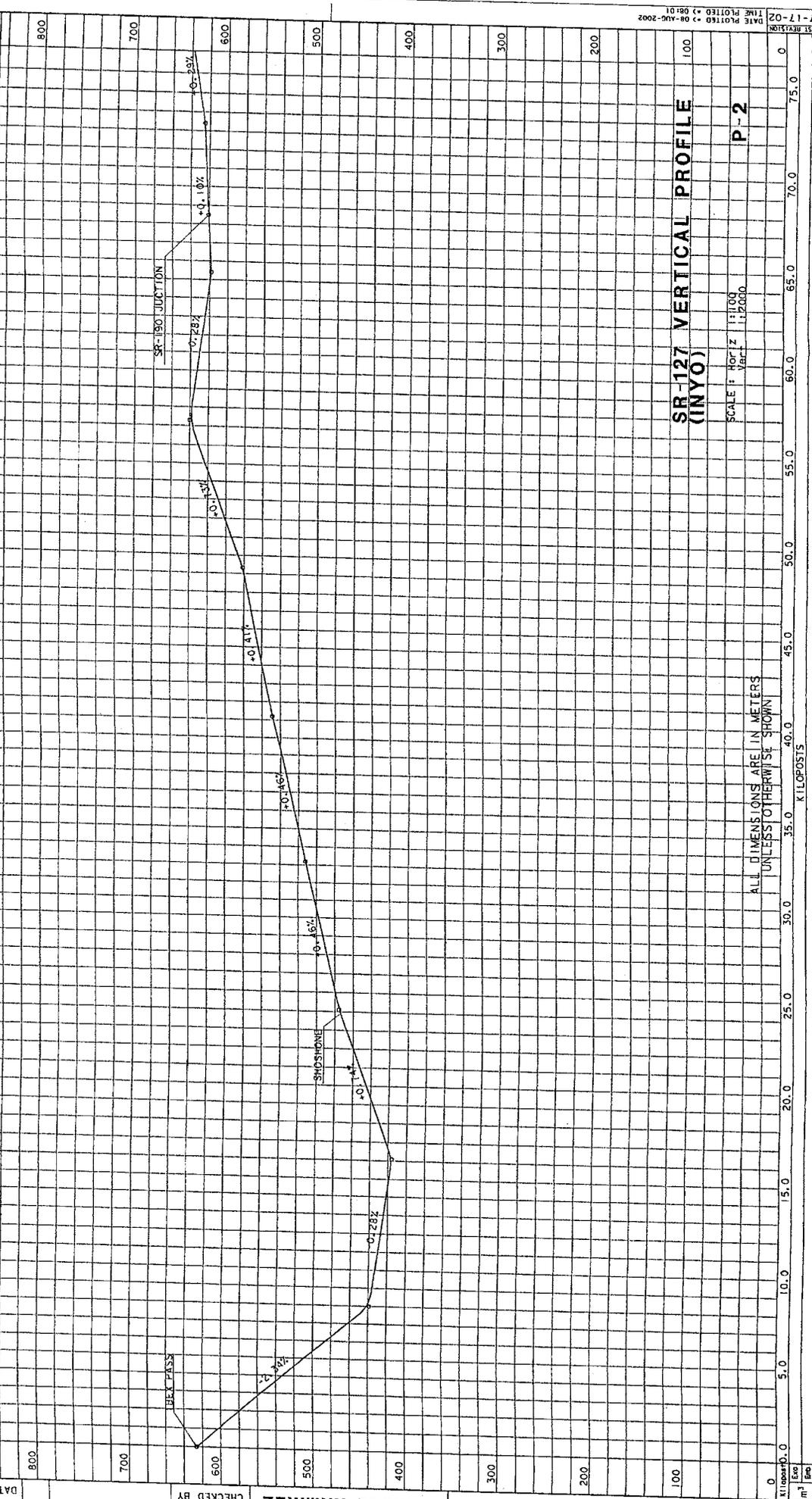
FOR REDUCED PLANS ORIGINAL 0 20 40 60 80 100 METERS

DIST COUNTY ROUTE TOTAL SHEETS
 09 INYO 27 079.5
 08 SBD 27 066.7

REGISTERED CIVIL ENGINEER
 REGISTERED PROFESSIONAL ENGINEER

PLANS APPROVAL DATE: _____
 The undersigned hereby certifies that the above is a true and correct copy of the original as shown to the undersigned or his/her representative at the time of approval.

Caltrans now has a web site to get to the web site, go to: <http://www.caltrans.gov>



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans DESIGN DIVISION
 PROJECT ENGINEER
MANUEL RAMIREZ
 CALCULATED/DESIGNED BY
 CHECKED BY
 REVISIONS
 DATE
 REVISIONS
 DATE



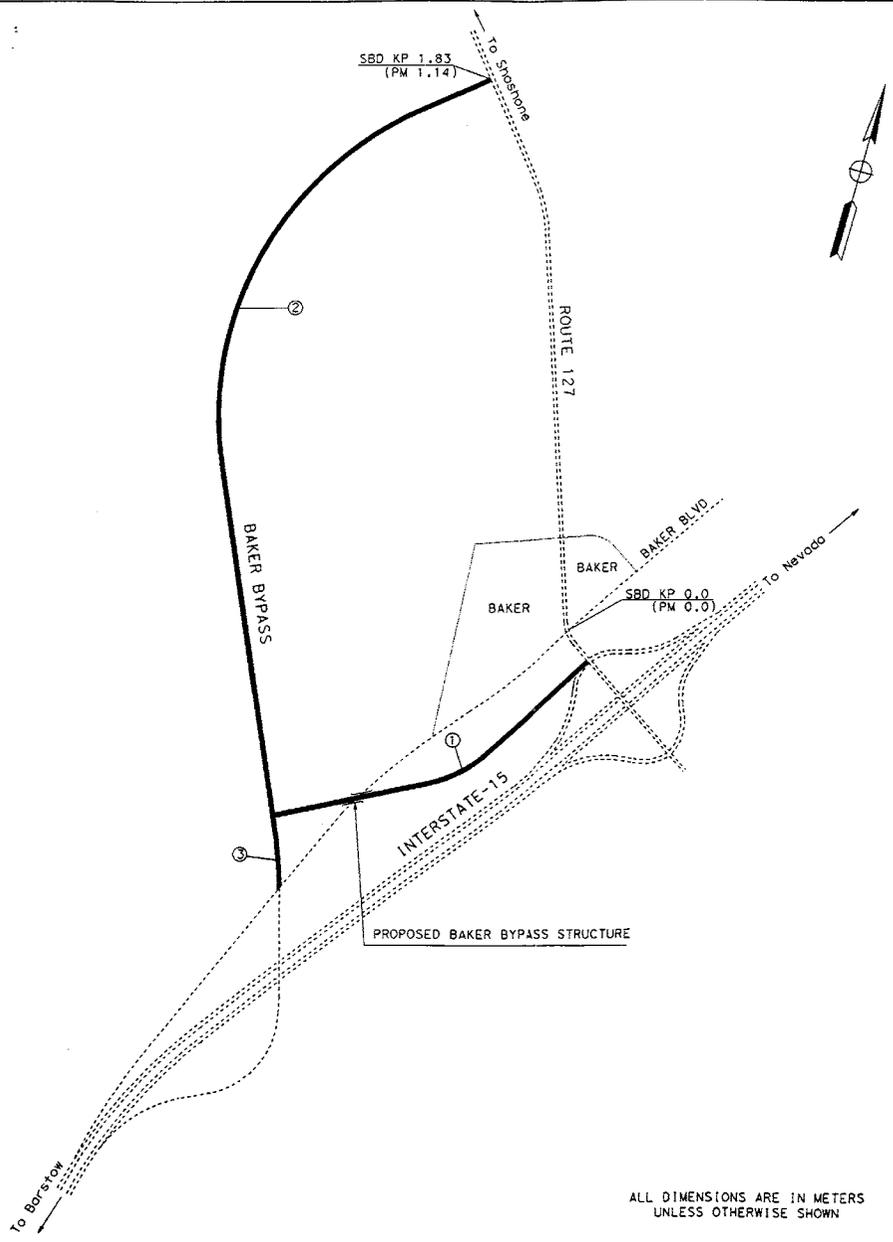
DIST	COUNTY	ROUTE	KILOMETER TOTAL PROJECT	POST MILE TOTAL PROJECT	SHEET NO	TOTAL SHEETS
03	INYO	127	0/719	0/719	5	
08	SBD	127	0/55	0/55	7	

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Caltrans now has a web site! To get to the web site, go to: <http://www.dtd.ca.gov>



CURVE DATA

No	R	Δ	T	L
①	400	30°40'45"	114	214
②	1000	74°23'44"	759	1298
③	2215	3°53'22"	72	157

ALL DIMENSIONS ARE IN METERS
 UNLESS OTHERWISE SHOWN

BAKER BYPASS

No Scale

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

USERNAME: j2johnson
 XPO: 01/1/02

CU 06247

FA 30520K

DATE PLOTTED = 3.19.02
 DATE PLOTTED = 3.19.02

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans DESIGN DIVISION
 PROJECT ENGINEER
MANUEL RAMIREZ
 M. S. M. S.
 CALCULATED BY DESIGNED BY CHECKED BY
 DATE 2/8/2 DATE 2/8/2

INYO COUNTY
 127 CURVE CORRECTION

No.	PM	KP	APPROXIMATE AREA REQUIRED (M2)
1	2.1	3.38	4000
2	2.4	3.86	4000
3	3.9	6.28	4000
4	6.0	9.65	4000
5	14.2	22.85	4000
6	15.7	25.27	4000
7	15.9	25.59	4000
8	16.0	25.75	4000
9	16.2	26.07	4000
10	16.8	27.04	4000
11	17.4	28.00	4000
12	18.3	29.48	4000
13	20.2	32.51	4000
14	34.5	55.52	4000
15	36.8	59.22	4000
16	39.0	62.76	4000
SUB TOTAL			64000

SAN BERNARDINO COUNTY
 127 CURVE CORRECTION

No.	PM	KP	APPROXIMATE AREA REQUIRED (M2)
1	28.0	45.06	4000
2	28.2	45.36	4000
3	37.8	60.83	4000
4	39.2	63.08	4000
5	39.5	63.57	4000
SUB TOTAL			20000

TOTAL	84000
-------	-------



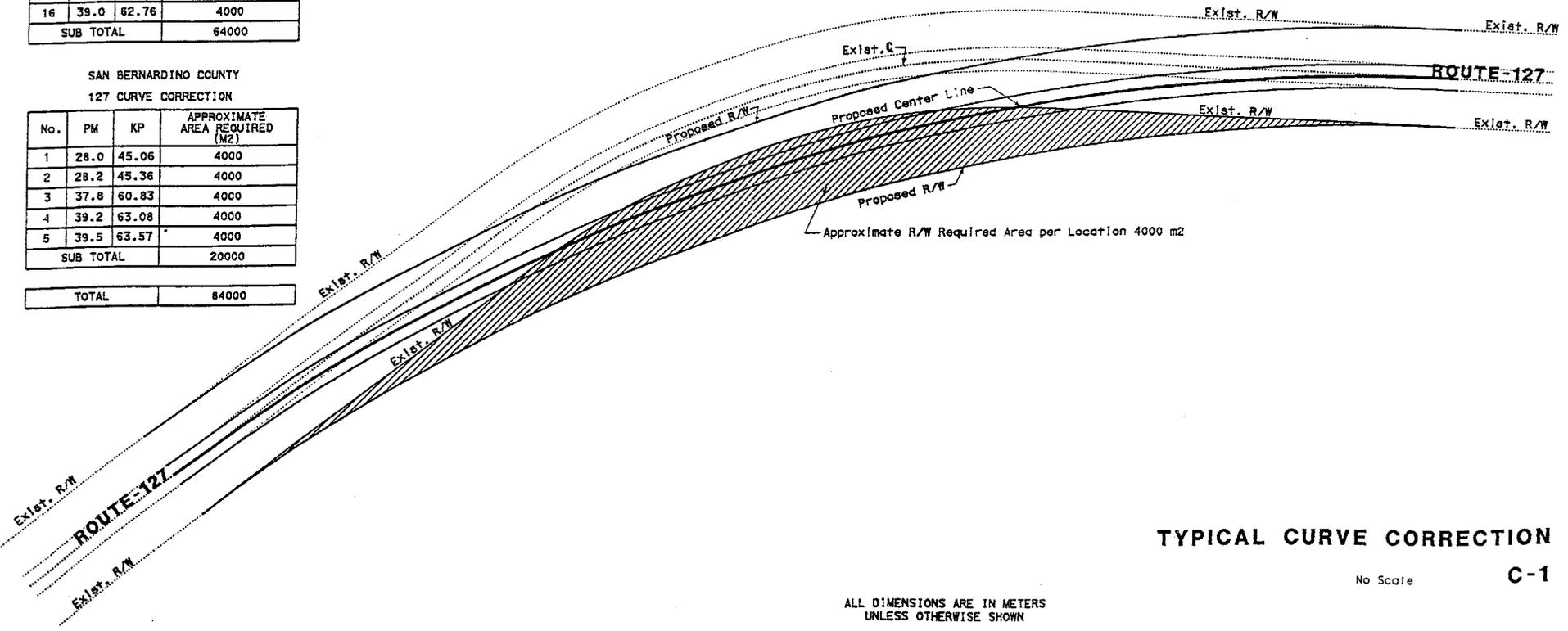
DIST	COUNTY	ROUTE	ISSUE NO	PROJECT NO	SHEET NO	TOTAL SHEETS
09	Inyo	127	0/79.5			
08	SBD	127	0/66.7			1

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Caltrans now has a web site! To get to the web site, go to the <http://www.dot.ca.gov>



TYPICAL CURVE CORRECTION

No Scale C-1

ALL DIMENSIONS ARE IN METERS
 UNLESS OTHERWISE SHOWN

ATTACHMENT B

TRAFFIC DATA

AS E E TRI
 SELECTIVE ACCIDENT RATE CALCULATION
 COMBINED RATES

O C C A T I O N	D E S C R I P T I O N	RA GRP (RUS)	*-NUMBER OF ACCIDENTS/SIGNIFICANCE*							PER KLD INJ	*ADT * MAIN X-ST	TOTAL *-ACCIDENT RATE MV+ OR MVM	*-ACCIDENT RATE ACCS/MV+ OR MVM-*					
			TOT	FAT	INJ	F+I	VEH	WET	DARK				MV+ OR MVM	FAT	F+I	TOT	FAT	F+I
ATES COMBINED FOR THIS REQUEST		I	13	0	1	1	11	0	1	0	1.6	7.65+	.000	.13	1.70	.006	.32	.76
8-0001	97-01-01 01-12-31 60 MO	(R) H97								3	2.6							
ATES COMBINED FOR THIS REQUEST		I	1	0	0	0	0	0	0	0	.8	1.44+	.000	.00	.69	.003	.06	.14
8-0002	97-01-01 01-12-31 60 MO	(R)								0	.0							
ATES COMBINED FOR THIS REQUEST		I	2	0	1	1	2	0	0	0	.5	2.13+	.000	.47	.94	.004	.10	.22
9-0003	97-01-01 01-12-31 60 MO	(R)								5	.7							
ATES COMBINED FOR THIS REQUEST		I	3	0	2	2	0	0	3	0	.8	2.56+	.000	.78	1.17	.004	.10	.22
9-0004	97-01-01 01-12-31 60 MO	(R) H95			H95	H95			H99	3	.6							

+ DENOTES MV USED IN RATES

AXR251-A 06-03-02

TASAS TABLE B SELECTIVE ACCIDENT RATE CALCULATION
REQUEST ACTIVITY REPORT

PAGE 1

MESSAGE	DT REQ A L RTE D	TIME PERIOD	SELECT LOCATION	S SEQ R A	AVE	PC PC	ADT ADT R RR PR
	NO S T I	FROM TO	BEGIN END	C 123 T P	RATE	IN FA MAIN XST T UA DT	
* * * * *	09 0001 C H 127 T	01/01/97-12/31/01	INY 002.050-INY 002.250	I			P 09

Actual Accident Rate Calculation for Spot Location

(Highway Segments < 0.5 mile)

Formulas used in calculation:

of Accidents / Travel

Travel = Time x Distance x ADT

Travel is expressed in Million Vehicles Miles (MVM)

Given Information

Rte 127 - INY - PM 2.050 to 2.250
 KP 3.299 to 3.621

ADT = 700

Table B Dates = 01/01/97 to 12/31/01 = 5 years

Distance = 0.2 miles < 0.5 miles, use 0.5 Mile which turns rate calculation into 'MVM'

Data from Table B printout:

Actual Fatal Accident Rate =	0.000
Actual Fatal + Injury Accident Rate =	7.40
Actual Total Accident Rate =	11.11
Average Fatal Accident Rate =	0.047
Average Fatal + Injury Accident Rate =	0.64
Average Total Accident Rate =	1.27
Number of Fatal Accidents =	0
Number of Injury Accidents =	2
Number of Total Accidents =	3

Time = 5 years x 365 days/year
 Average Daily Traffic = 700 vehicles/days

Calculation is as Follows:

$$\text{Travel} = \frac{0.5 \text{ Miles} \times 5 \text{ Years} \times 365 \text{ Days/Yr.} \times 700 \text{ Vehicles/Day}}{1,000,000}$$

Travel = 0.64

The Correct Accident Rates are as Follows:

Actual Fatal Accident Rate =	0 / 0.64	=	0.000
Actual Fatal + Injury Accident Rate =	2 / 0.64	=	3.13
Actual Total Accident Rate =	3 / 0.64	=	4.70
Average Fatal Accident Rate =	0.047	=	0.047
Average Fatal + Injury Accident Rate =	0.64	=	0.64
Average Total Accident Rate =	1.27	=	1.27

4.9x
3.7x

Actual Accident Rate Calculation for Spot Location

(Highway Segments < 0.5 mile)

Formulas used in calculation:

of Accidents / Travel

Travel = Time x Distance x ADT

Travel is expressed in Million Vehicles Miles (MVM)

Given Information

Rte 127 - INY - PM 16.150 to 16.300
 KP 25.991 to 26.232

ADT = 400

Table B Dates = 01/01/97 to 12/31/01 = 5 years

Distance = 0.15 miles < 0.5 miles, use 0.5 Mile which turns rate calculation into 'MVM'

Data from Table B printout:

Actual Fatal Accident Rate =	0.000
Actual Fatal + Injury Accident Rate =	43.49
Actual Total Accident Rate =	43.49
Average Fatal Accident Rate =	0.066
Average Fatal + Injury Accident Rate =	0.84
Average Total Accident Rate =	1.73
Number of Fatal Accidents =	0
Number of Injury Accidents =	5
Number of Total Accidents =	5

Time = 5 years x 365 days/year

Average Daily Traffic = 400 vehicles/days

Calculation is as Follows:

Travel = $\frac{0.5 \text{ Miles} \times 5 \text{ Years} \times 365 \text{ Days/Yr.} \times 400 \text{ Vehicles/Day}}{1,000,000}$

Travel = 0.37

The Correct Accident Rates are as Follows:

Actual Fatal Accident Rate =	0 / 0.37	=	0.000	<i>16.3x</i> <i>7.9x</i>
Actual Fatal + Injury Accident Rate =	5 / 0.37	=	13.70	
Actual Total Accident Rate =	5 / 0.37	=	13.70	
Average Fatal Accident Rate =	0.066	=	0.066	
Average Fatal + Injury Accident Rate =	0.84	=	0.84	
Average Total Accident Rate =	1.73	=	1.73	

AXR253-A 06-03-02

TASAS TABLE B DISTRICT 09
SELECTIVE ACCIDENT RATE CALCULATION
ROUTE SEQUENCE

PAGE 1

LOCATION	DESCRIPTION	RA	*-NUMBER OF ACCIDENTS/SIGNIFICANCE*										PER	*ADT	* TOTAL	*-ACCIDENT RATE ACCS/MV+ OR MVM-					
			GRP	MULTI			KLD		MAIN		MV+ OR					ACTUAL			AVERAGE		
(RUS)	TOT	FAT	INJ	F+I	VEH	WET	DARK	INJ	X-ST	MVM	FAT	F+I	TOT	FAT	F+I	TOT					
127	INY	17.300	THRU	INY	017.449	H02	4	0	2	2	0	0	1	0	.3	.09	.00023.32	46.63	.077	.98	2.02
09-0001	0.150M	97-01-01	01-12-31	60	MO (R)	H99			H97	H97				2							

Actual Accident Rate Calculation for Spot Location

(Highway Segments < 0.5 mile)

Formulas used in calculation:

of Accidents / Travel

Travel = Time x Distance x ADT

Travel is expressed in Million Vehicles Miles (MVM)

Given Information

Rte 127 - INY - PM 17.300 to 17.450
 KP 27.842 to 28.083

ADT = 300

Table B Dates = 01/01/97 to 12/31/01 = 5 years

Distance = 0.15 miles < 0.5 miles, use 0.5 Mile which turns rate calculation into 'MVM'

Data from Table B printout:

Actual Fatal Accident Rate =	0.000
Actual Fatal + Injury Accident Rate =	23.32
Actual Total Accident Rate =	46.63
Average Fatal Accident Rate =	0.077
Average Fatal + Injury Accident Rate =	0.98
Average Total Accident Rate =	2.02
Number of Fatal Accidents =	0
Number of Injury Accidents =	2
Number of Total Accidents =	4

Time = 5 years x 365 days/year
 Average Daily Traffic = 300 vehicles/days

Calculation is as Follows:

$$\text{Travel} = \frac{0.5 \text{ Miles} \times 5 \text{ Years} \times 365 \text{ Days/Yr.} \times 300 \text{ Vehicles/Day}}{1,000,000}$$

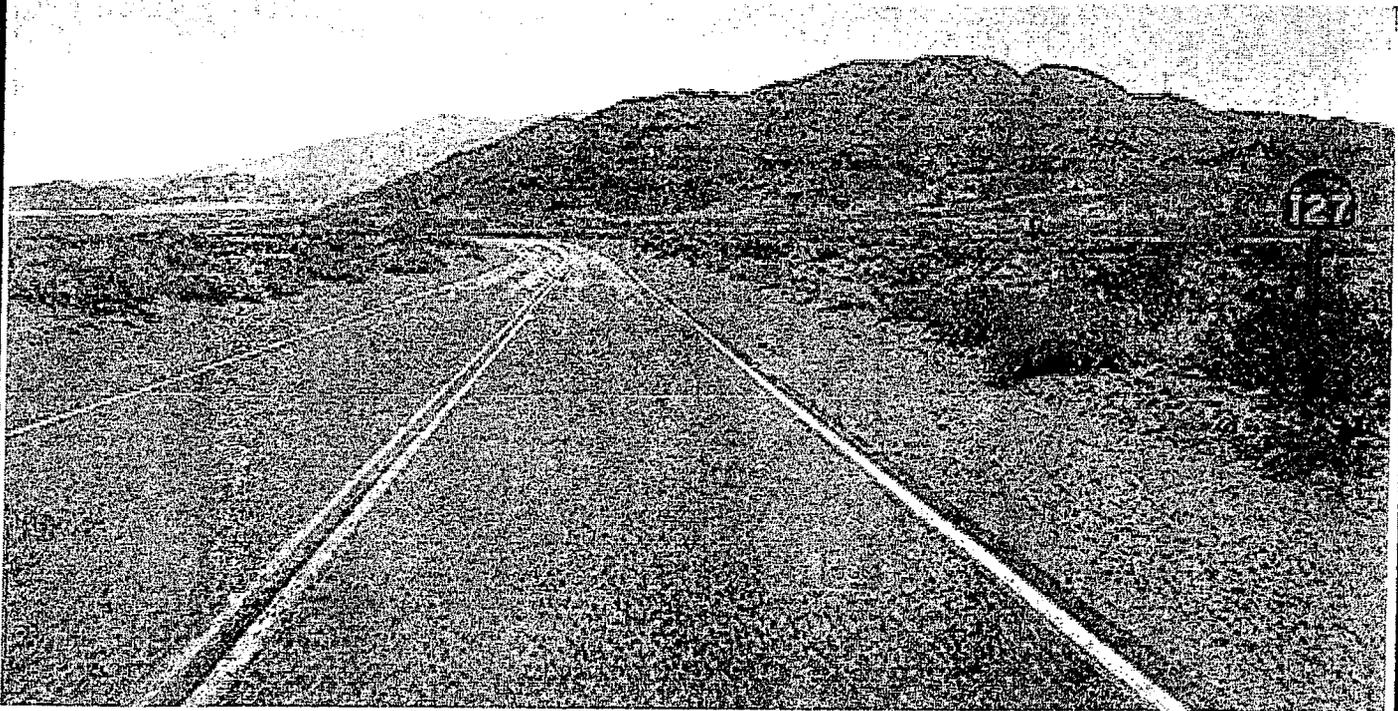
Travel = 0.27

The Correct Accident Rates are as Follows:

Actual Fatal Accident Rate =	0 / 0.27	= 0.000	
Actual Fatal + Injury Accident Rate =	2 / 0.27	= 7.31	7.5x
Actual Total Accident Rate =	4 / 0.27	= 14.61	
Average Fatal Accident Rate =	0.077		7.2x
Average Fatal + Injury Accident Rate =	0.98		
Average Total Accident Rate =	2.02		

CALIFORNIA DEPARTMENT OF TRANSPORTATION

**ROUTE CONCEPT REPORT
DISTRICT 8
ROUTE 127**



08-SBD-127
KP L0.00/66.79
PM L0.00/41.47

OFFICE OF TRANSPORTATION PLANNING
SAN BERNARDINO COUNTY
JANURAY1998

ROUTE CONCEPT REPORT
STATE ROUTE 127

This Route Concept Report is approved as a guide toward which today's decisions and/or recommendations for highway capacity improvements should be directed.

Original signed by S. Lisiewicz

STAN LISIEWICZ

District Director

District 8

January 6, 1998

Date

**1997 ROUTE CONCEPT REPORT
STATE ROUTE 127
08-SBd-127 KP LO.00/66.79 (PM LO.00/41.47)**

This Route Concept Report (RCR) covers the portion of State Route 127 located within the boundaries of Caltrans District 8.

CONCEPT RATIONALE

Route 127 is Federally functionally classified as a Rural Minor Arterial. Its main purpose is to provide for inter-regional and recreational travel as well and local commute traffic in Baker. The Route provides a link between California and Nevada and is a major access route to Death Valley National Park. With minimal growth expected within the corridor, no capacity or operational improvements are planned for SR-127.

Route 127 is included in the Freeway and Expressway System (F&E) and is part of the California Inter-regional Road System (IRRS). It is part of the State Scenic Highway System, but is not designated as a scenic highway. Route 127 is included in the California State Highways Truck Network. It is a Federal Surface Transportation Assistance Act designated truck route for oversized trucks (STAA).

ROUTE CONCEPT

Segment	Kilometerpost Limit	Concept	1995 LOS	2015 LOS	Existing Facility	Special Characteristics
1	LO.00/1.03 (PM LO.00/0.64)	Maintain Only	C	D	2-Lane Conventional	None
2	1.03/66.79 (PM 0.64/41.47)	Maintain Only	A	B	2-Lane Conventional	None

The Route Concept for SR-127 is to "maintain only" (no capacity or operational improvements) through the year 2015. The existing Route 127 facility is projected to operate as shown above.

PROGRAMMED PROJECTS

No highway capacity or operational improvement projects are programmed for SR-127.

PROPOSED LAND USE DEVELOPMENT PROJECTS

An expansion of the Fort Irwin National Training Center has been proposed by the U.S. Army, which would allow military training on both sides SR-127. Another proposal to use SR-127 for transporting high-level nuclear waste to Yucca -Mountain, Nevada is also being considered by the Department of Energy. Should either or both of these proposals be approved, some structural/operational improvements to the route may be necessary. Further studies would be required by Caltrans, the Department of Energy (Yucca Mountain proposal) and the U.S. Army (Fort Irwin expansion proposal) as to the types of improvements needed. The funding of any improvements to SR-127, due to the proposed projects, would be the responsibility of the lead agencies.

ULTIMATE TRANSPORTATION CORRIDOR (UTC)

State Route 127 is planned to remain a 2-lane conventional highway through the year 2015.

PRESENT AND FUTURE OPERATING CONDITIONS

PRESENT (1995)	SEGMENT 1	SEGMENT 2
County & Route	SBd-127	SBd-127
Kilometerpost	LO.00/1.03	1.03/66.79
Post Mile	LO.00/0.64	0.64/41.47
Type of Facility	Conventional	Conventional
No. of Lanes	2	2
No. of Passing Lanes	0	0
No. of Auxiliary Lanes	0	0
No. of HOV Lanes	0	0
No. of Truck Climbing Lanes	0	0
% of Trucks in the Peak Hour	10.3	10.3
Highway Gradeline	R	R
Terrain R	R	
Traveled Way	7.2 m(24 ft.)	7.2 m(24 ft.)
Total Shoulder Width	2.4 m(8 ft.)	2.4 m(8 ft.)
outside	2.4 m(8 ft.)	2.4 m(8 ft.)
Inside	0	0
Median Width	0	0
Directional Split	65/35	65/35
Bicycle ADT	0	0
No. of Nearby Park-Ride Lots	0	0
Transit Centers	0	0
Rail	0	0
ADT	2900	700
Peak Hour Volume	377	91
V/C Ratio	0.25	0.06
Level of Service	C	A

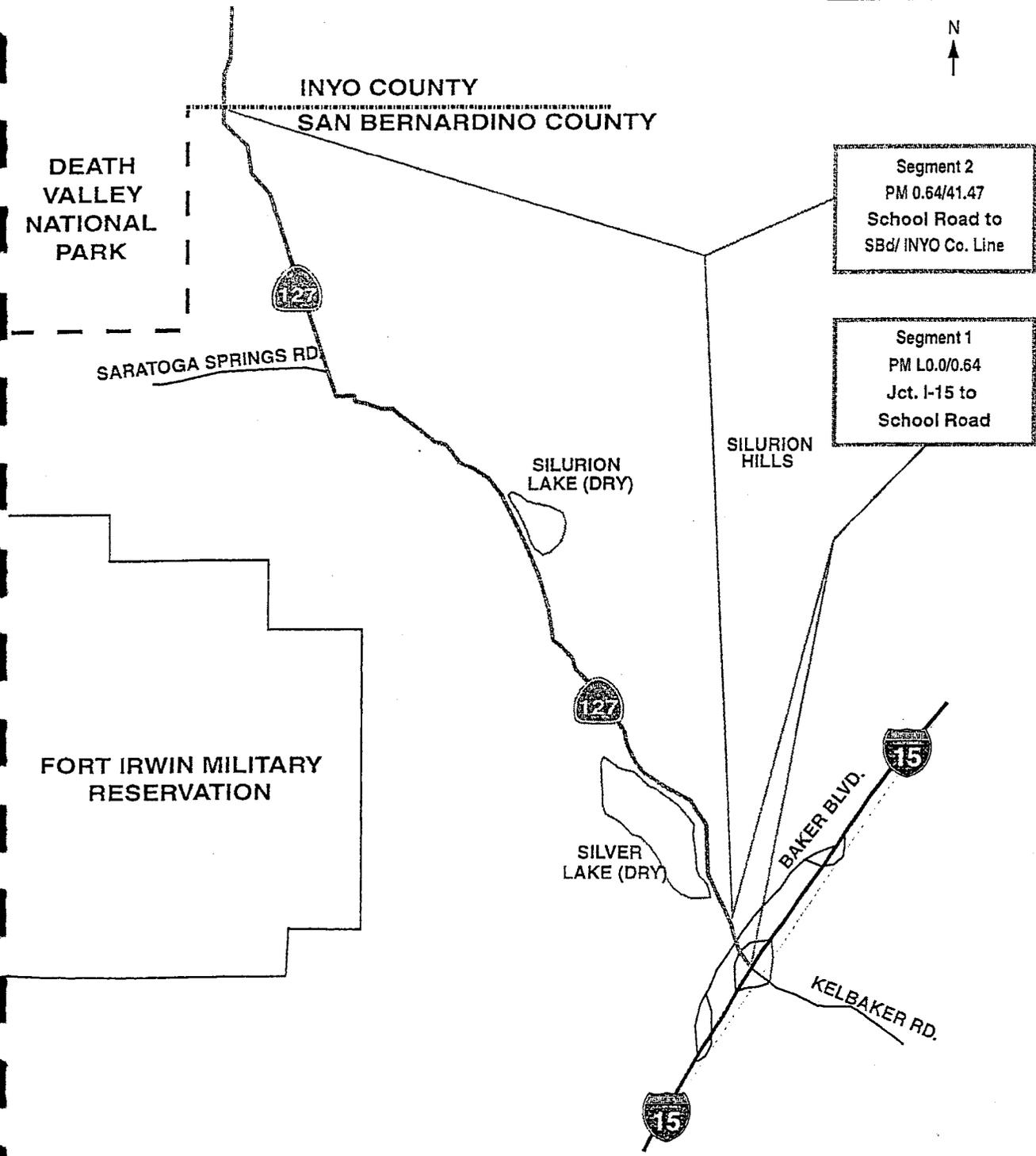
FUTURE (2015) NO BUILD

ADT	4000	1500
Peak Hour Volume	520	195
V/C Ratio	0.34	0.13
Level of Service	D	B

ACCIDENT RATES

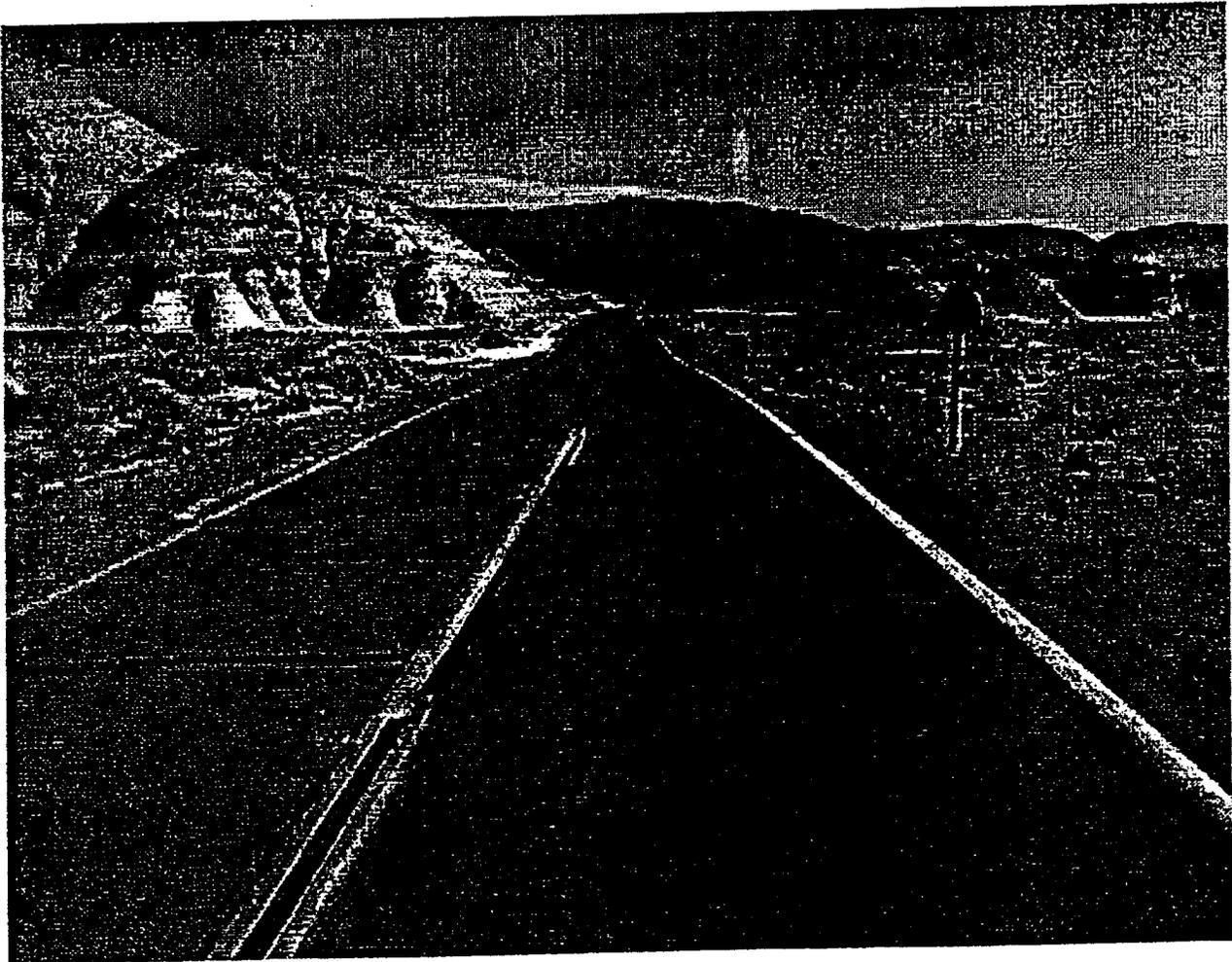
A total of 23 accidents were reported between November 1, 1993 and October 10, 1996 on SR-127. This three-year accident data is based on the "TASAS Table B" available from the District 8 Traffic Operations Department. The actual total accident rate was 0.66 per million vehicle miles of travel. The average statewide rate for similar facilities in the same period was 1.28 per MVM.


DISTRICT 8
STATE ROUTE 15
 Segment Map



Caltrans

Route 127 Route Concept Report



California Department of Transportation
District 9
November 1997

CONTENTS

Contents.....	i
Tables and Figures.....	ii
Abbreviations.....	ii
Statement of Planning Intent.....	iii
Route 127 Concept Report Summary.....	1
Route 127 Concept Report	
Route Description.....	2
Route Segmentation.....	2
Route Purpose.....	2
Route Concept.....	3
Concept Rationale.....	3
Route Analysis	
Land Use.....	3
Existing Facilities	
Type of Facility.....	4
Pavement Width (Traveled Way).....	4
Pavement Condition (Traveled Way).....	4
Pavement Width (Shoulder).....	4
Right of Way (Existing).....	5
Terrain.....	5
Interchanges, Signals, and Changeable Message Signs.....	5
Parallel and Alternate Facilities.....	5
Bicycles.....	5
Aviation.....	5
Rail.....	5
Roadside Rests.....	5
Agriculture Inspection Station.....	6
Traffic Data	
Accident Rates.....	6
Traffic Volume.....	6
Transit Services.....	7
Buses.....	8
Trucks.....	8
Recreational Vehicles.....	9
Present and Future Operating Conditions.....	9
Conditions Covered by the STIP.....	9
Present and Future Concerns.....	10
Improvements to Achieve Concept Plan.....	11
Pavement Deflection Study Summary.....	11
Transit/High Occupancy Vehicle Considerations.....	12
The Ultimate Transportation Corridor (UTC).....	12
Effects of Nuclear Waste Shipments on the UTC.....	13
Long Range Operations Plan Coordination.....	13
Environmental Considerations.....	14
References.....	15

Tables

Table 1: Level of Service and Facility Type.....	3
Table 2: Paved Shoulder Widths.....	5
Table 3: Average Profile Grades.....	5
Table 4: Three-Year Traffic Data.....	6
Table 5: Traffic Vehicle Distribution.....	9
Table 6: Present and Future Operating Conditions.....	10
Table 7: Asphalt Concrete Overlay Depth Recommendations.....	12

Figures and Exhibits

Figure 1: Vehicle Mix of All Traffic.....	6
Figure 2: Monthly Distribution of All Vehicles (by type).....	7
Figure 3: Monthly Distribution of All Vehicles.....	7
Figure 4: Monthly Distribution of Buses.....	8
Figure 5: Monthly Distribution of Trucks.....	8
Figure 6: Monthly Distribution of RVs.....	9
Exhibit A: Vicinity Map.....	16
Exhibit B: Location Map.....	17
Exhibit C: Sub-segments Schematic.....	18

Abbreviations

Units of Measurement

m.....	meter (1 m = 0.3048 feet)
mm.....	millimeter
kg.....	kilogram (1 kg = 35.3 lbs)
km.....	kilometer (1 km = 0.62 mile)
Mha.....	million hectares (1 ha = 2.47 acres)
MT.....	metric tonne (1MT = 1000 kg = 1.1 ton)
MTHM.....	metric tonne heavy metal
KP.....	kilometer post
PM.....	post mile
mph.....	miles per hour

Miscellaneous

ADT.....	Average Daily Traffic
AADT.....	Average Annual Daily Traffic
BLM.....	Bureau of Land Management
Caltrans.....	California Department of Transportation
DOE.....	U.S. Department of Energy
DVCC.....	Death Valley Chamber of Commerce
DVNP.....	Death Valley National Park
I.....	Interstate
LOS.....	Level of Service
NTS.....	Nevada Test Site
OCRWM.....	Office of Civilian Radioactive Waste Management
RV.....	Recreational Vehicle
SHELL.....	Subsystem of Highways for the Movement of Extra Legal Permit Loads
SR.....	State Route
UTC.....	Ultimate Transportation Corridor

STATEMENT OF PLANNING INTENT

This Route Concept Report is a planning document which expresses the California Department of Transportation's (Caltrans) judgment on what the characteristics of the state highway should be to respond to the projected travel demand over a twenty-year planning period. This report contains the Department's goals for the development of State Route 127 within Inyo County in terms of Level of Service (LOS) and broadly identifies the nature and extent of improvements needed to achieve those goals. It is a preliminary step in the planning process which leads to subsequent programming and preparation of the Route Development Plan—a systems analysis that indicates the LOS possible on the route at various funding levels.

Facility information (e.g., roadway widths, number of lanes, etc.) described in this report represents an initial planning approach to scoping candidate improvements. All information in this report is subject to change as conditions change and new information is obtained. Consequently, the nature and size of identified improvements may change through the later stages of project development, with final determinations made at the time of project planning and design.

The draft version of this report was prepared by Environmental Science Associates, Inc., a consultant, with oversight by Caltrans, in cooperation with Inyo County Planning staff. The final report was prepared by Caltrans Planning staff.

ROUTE CONCEPT REPORT
SUMMARY SHEET
State Route 127
09-Iny-127-0.00/79.53 (PM 0.00/49.42)

ROUTE CONCEPT

Shoulder widening, horizontal curve realignments, relocation of several sections of highway, and minor drainage improvements are necessary in order to improve the operational and safety characteristics of State Route 127. District 9's concept for this facility is *Level of Service C*.

CONCEPT RATIONALE

According to Section 307.3 of the 1995 Metric Highway Design Manual, widening paved shoulders is justified as part of roadway Resurfacing, Restoration, and Rehabilitation projects not only by the current traffic volumes but also by the projected and anticipated traffic mix. Realignment of several horizontal curves will enhance the roadway's operational and safety characteristics. Relocation of certain sections of highway will eliminate the potential for flash flood related damage to the facility.

ISSUES OF CONCERN

State Route 127 is under consideration for use as a haul route for truck shipments of radioactive waste to both the proposed radioactive waste repository at Yucca Mountain, Nevada, and the Nevada Test Site. Significant increases in the daily truck traffic on the route are possible.

The combined effect of narrow paved and soft dirt shoulders causes operational and safety concerns with regards to vehicles that are slow moving or are forced to perform emergency maneuvers. The narrow paved shoulders and the relatively high percentage of trucks and recreational vehicles reduce roadway capacity and operational characteristics.

The posted speed limit on SR 127 is 60 mph but numerous horizontal curves on the route have much lower advisory speeds. The advisory speeds for the majority of these curves are between 40 and 50 mph but two such curves, immediately south of Death Valley Junction, are posted at 25 and 35 mph.

Flash floods present recurring problems at numerous locations where the roadway crosses the normally dry Amargosa River. On average such flooding occurs twice a year causing considerable damage to the pavement surface and supporting roadbed, and results in road closures for sustained periods once every two years. [a]

Two culvert locations on this route show evidence of significant erosion. These drainage facilities need to be modified in order to eliminate potential damage to the roadway.

PROPOSED IMPROVEMENTS

The District recommends the following roadway improvements, as funding becomes available:

- Widen paved shoulders to 0.6 m minimum between KPs 1.29/9.01 (PM 0.8/5.6), 9.49/22.20 (PM 5.9/13.8), and 60.67/79.53 (PM 37.7/49.4);
- Relocate the highway to the bluff line west of the current alignment between KPs 35.08/37.66 (PM 21.8/23.4) and 46.99/50.85 (PM 29.2/31.6) constructing new roadway with 2.4 m paved shoulders;
- Realign horizontal curves at KPs 22.85, 25.75, 27.20, 28.00, 29.45, 32.51, 55.79, 59.54 and 63.08 (PMs 14.2, 16.0, 16.9, 17.4, 18.3, 20.2, 34.7, 37.0, 39.2 and 41.6, respectively) constructing new roadway with 2.4 m paved shoulders; and,
- Improve drainage facilities located near KPs 17.70 and 77.25 (PMs 11.0 and 48.0, respectively).

ROUTE CONCEPT REPORT
State Route 127
09-Iny-127-0.00/79.53 (PM 0.00/49.42)

ROUTE DESCRIPTION

State Route (SR) 127 extends northward from its southern junction with Interstate 15, near Baker, in San Bernardino County, for 66.79 km through Caltrans District 8 to the Inyo County line. From there SR 127 traverses 79.53 km through Caltrans District 9, in Inyo County, to the Nevada State boundary where it is designated Nevada SR 373. SR 127 intersects SR 178 east and west junctions in Shoshone and SR 190 in Death Valley Junction (refer to Exhibits A & B).

State Route 127 is functionally classified as a Minor Arterial, is part of the National Highway System, and is included in the Freeway and Expressway System. It is an eligible highway in the Scenic Highway System although it is not currently designated as a scenic highway. The route is not included in the Subsystem of Highways for the movement of Extra-Legal Permit Loads (SHELL) system; nor does AB 866 [b] or the Federal Highway Administration as a route suitable for larger trucks designate it.

State Route 127 is a rural two-lane conventional highway. In Inyo County, the traveled lanes are each generally 3.6 m wide with about half of the total existing paved shoulders measuring less than 0.6 m in width.

ROUTE SEGMENTATION

State Route 127, in Inyo County, is designated as Segment 1. For planning purposes, however, the route has been divided into the following four sub-segments:

- Sub-segment 1: KP 0.00/23.74 (PM 0.00/14.75) Extending from the San Bernardino/Inyo County line to the junction of SR 127 and SR 178 east, in Shoshone.
- Sub-segment 2: KP 23.74/26.44 (PM 14.75/16.43) Extending from the junction of SR 127 and SR 178 east, in Shoshone, to the junction of SR 127 and SR 178 west, north of Shoshone.
- Sub-segment 3: KP 26.44/67.83 (PM 16.43/42.15) Extending from the junction of SR 127 and SR 178 west, north of Shoshone, to the junction of SR 127 and SR 190 at Death Valley Junction.
- Sub-segment 4: KP 67.83/79.53 (PM 42.15/49.42) Extending from Death Valley Junction at the junction of SR 127 and SR 190 to the Nevada State Line.

ROUTE PURPOSE

In 1994, Inyo County and Caltrans conducted a highway travel survey on SR 127 to determine a profile of the highway's users. This survey, hereinafter referred to as the *1994 Travel Survey*, was conducted in two parts. The first part of the study, spanning five consecutive days between the 26th and 29th of March, captured all traffic coming into the system at each of five locations. The second part, conducted on the 16th and 17th of May, captured all north and southbound traffic on SR 127 at each of two locations, one of which was over a 24-hour period. Each vehicle passing a station was stopped, the vehicle type and number of occupants noted, and the drivers asked to respond to a number of questions including purpose for trip and geographic locations of origin and destination. Survey results indicated that about 66 percent of all trips on this route were recreational in nature while only about 20 percent were work and/or business related. The survey revealed that as high as 87 percent of all trips began and ended outside the SR 127 corridor. Since most travelers on this highway are visitors to Death Valley National Park (DVNP), SR 127 has local, regional, and interstate significance.

Of major importance to the long range system planning of SR 127 is the fact that, although neither a designated SHELL highway nor an AB866 truck route, this highway is being considered as a potential designated route for transporting high-level radioactive waste to the proposed nuclear waste repository at Yucca Mountain, Nevada. It is also being considered as a route to transport transuranic materials (protective clothing, etc., with low levels of radioactive contamination) from the Nevada Test Site to the Waste Isolation Pilot Plant located in New Mexico.

Information provided by the Death Valley Chamber of Commerce, in Shoshone, indicates that as high as 25 percent of the trucks currently traveling SR 127 are hauling hazardous waste to the Nevada Test Site near Mercury, Nevada and to the U.S. Ecology commercial hazardous waste disposal facility near Beatty, Nevada. [a]

ROUTE CONCEPT

State Route 127 currently provides a theoretical *LOS A*; however, reduced advisory speeds through numerous horizontal curves and regulatory speed limits through Shoshone limit the Level of Service to much lower than *A* in spot locations. Since the traffic volume on SR 127 is so low, and locations with reduced operating speeds somewhat isolated, *LOS A* conditions prevail along most of the overall route segment.

The District's concept Level of Service is *C* for all four sub-segments of the route. With a projected one percent annual growth rate in daily traffic over the next 20 years, better than *LOS C* conditions should be maintained along the entire route segment. District 9 will determine if physical and/or operational improvements are necessary to restore the roadway to the concept Level of Service if conditions along SR 127 deteriorate beyond this level. Table 1 summarizes the current and concept Levels of Service and facility types for the four sub-segments of SR 127.

Table 1: Level of Service and Facility Type for State Route 127, in Inyo County

Route Sub-segment	Location KP (PM)	Current		Concept	
		LOS	Facility	LOS	Facility
1,2,3,4	0.00/79.53 (0.00/49.42)	A \1\	2C \2\	C	2C

\1\ Indicates a theoretical *LOS A* over the majority of the route segment

\2\ Indicates a two-lane, conventional highway

CONCEPT RATIONALE

Due to low traffic volumes and District 9's priorities, the primary concept for SR 127 is to keep the road open and in safe operating condition. Since this is a minor arterial/low volume route it has been assigned a Maintenance Service Level rating of 3. Caltrans may determine that this route should be upgraded to a higher Maintenance Level of Service should the traffic conditions of SR 127 change considerably.

Even though this facility is currently Maintenance Service Level 3, widening paved shoulders is justified not only by the current traffic volume but also by the projected and anticipated traffic mix. Realigning several horizontal curves will increase the operating speeds while enhancing the roadway's operational and safety characteristics. Relocating specific sections of highway will eliminate the expenses and traveler inconvenience and hazards due to flash flood related damage and road closures. Improving certain drainage systems will lessen the likelihood that future storm runoff will damage and/or close the roadway.

ROUTE ANALYSIS

Land Use

The region through which SR 127 passes is characterized as a rural, sparsely populated area. The Death Valley Chamber of Commerce estimates that the current population east of DVNP within Inyo County is only about 450 people—a density of less than one person per square mile. [c] Data provided in 1990 by the Inyo County Planning Department indicate that the population density of a five-mile bandwidth along SR 127 is about 1.3 persons per square mile. The 1990 Federal Census indicated that the entire region sustained only about 840 people, most of whom were listed as residents of Furnace Creek, within DVNP. Shoshone sustains a population of about 150 people. There are some 225 people residing in the Tecopa/Tecopa Hot Springs area located a few miles east of SR 127. [d]

State Route 127 is located along the eastern boundary of DVNP. In late 1994, Congress passed the Desert Protection Act, SB 21, which expanded the size of Death Valley National Monument by 0.48 Mha and reclassified it as a National Park. The Act transferred ownership and management responsibility from the Bureau of Land Management (BLM) to the National Park Service and moved the eastern Park boundary right up to the highway right of way. Given the highway's

close proximity to the Park and its predominant use by recreational travelers, it can be stated that SR 127 supports the region's economic viability.

Some 5.06 Mha of land in the California Desert Conservation Areas surrounding DVNP are administered by BLM. Included in this vast area are the Ibox Hills Wilderness, located between Shoshone and DVNP, and a large area in Nevada adjacent to Inyo County. BLM manages these lands for grazing, mining, and recreation according to the multiple use/sustained yield philosophy.

Mining was a traditional economic mainstay for this region until the late 1980s when several mines cut back or eliminated operations entirely because of environmental constraints. Due largely to the decline of mining activity, population and economic activity have dwindled. Regional unemployment has been high over the past five to seven years. According to the 1990 Federal Census, available through the Department of Finance, response to *Journey to Work* indicates very limited employment opportunities. The Federal Census indicated that more than 60 percent of those responding to the *Mode to Work* question either worked at home or were close enough to walk to their place of employment. Travel time to place of employment was found to be ten minutes or less for over 80 percent of the population and fifteen minutes or less for over 90 percent. [d]

The State Department of Finance forecasts negligible economic growth for this region due to its isolation, primarily public lands ownership, and DVNP's strict environmental regulations. [e]

Existing Facilities

Type of Facility

State Route 127 in Inyo County is a rural, two-lane, conventional highway.

Pavement Width (Traveled Way)

The average total width of traveled way on SR 127, in Inyo County, is about 7.3 m, with some notable exceptions. Between KPs 64.73 and 67.59 (PM 40.0/42.0), a relatively straight section with few sight distance restrictions, the traveled way is as narrow as 7.07 m. The traveled way measures about 7.16 m through Death Valley Junction and is as narrow as 6.71 m near the SR 178-East junction, although the lanes widen to 8.53 m in the intersection.

Pavement Condition (Traveled Way)

A Pavement Deflection Study conducted on this route by Caltrans staff in May 1995, revealed that the average evaluated (80th percentile) deflection levels, measured at 1.6 km intervals, exceeded tolerable levels over much of the highway's length. The study reported that roadway conditions exhibited varying degrees of transverse, lateral, and alligator cracking throughout. During the field inspection of pavement conditions, the most deteriorated pavement conditions were observed between KPs 54.72 and 59.54 (PM 34.0/37.0), with slightly better conditions continuing northward to KP 74.03 (PM 46.0). Also noted was that chip seals had been applied to most areas with cracking. The roadway through Death Valley Junction exhibits substantial cracking but has received no such treatment. Although pavement conditions between KPs 74.02 and 79.53 (PM 46.0/49.42) also show signs of transverse and lateral cracking, the roadway is generally in better condition than the segment to the immediate south. The District's *Pavement History and Plan* indicates that there has been no overlay work performed on the segment between KPs 55.52 and 79.53 (PM 34.5/49.42) since 1980, nor have chip seals been placed since 1985. [f]

Pavement Width (Shoulder)

About 51 percent of the existing paved shoulders are less than 0.6 m wide and overall average only about 0.4 m in width. Refer to Exhibit C for a schematic drawing and to Table 2 for a summary of paved shoulder widths along the highway. The width of unpaved shoulders is as much as, and at times exceeds 2.44 m, but these generally consist of loosely compacted dirt, crushed stone, or gravel. Cracking and failure at the edge of pavement is prevalent along the roadway without paved shoulders. This condition was observed at KPs 8.85, 17.70, and 55.52 (PMs 5.5, 11.0, and 34.5, respectively) and is likely to exist at other locations. [f]

Table 2: Paved Shoulder Widths on State Route 127, in Inyo County

Width (m)	0	0.30	0.6	1.2	2.4
Length (km)	21.24	19.31	37.66	1.45	0.16
Percentage of Segment	27	24	47	2	NA

Right of Way (Existing)

Much of the property on either side of SR 127 is publicly owned. The highway right of way, both owned in fee by Caltrans and with prescriptive rights, varies in width between 30.5 and 122 m over the course of the entire route segment.

Terrain

SR 127 traverses the scenic, desolate, relatively flat desert terrain of the Amargosa River Valley, at elevations ranging from 396 to 701 m above sea level. The highway profile grades throughout the segment are generally less than 3 percent. Table 3 presents a summary of average profile grades for the route segment.

Table 3: Average Profile Grades on State Route 127, in Inyo County

Grade Percentage	Less than 3	Between 3 & 6	Greater than 6
Percentage of Segment	98	1	1

Sight distance restrictions along the route are relatively few but numerous horizontal curves have posted advisory speeds ranging between 25 and 50 mph. The percentage of the segment with sight restrictions is only about 12 percent.

Interchanges, Signals and Changeable Message Signs

There are no existing or planned grade-separated interchanges, traffic signal-controlled or four-way stop controlled intersections, or changeable message signs on SR 127, in Inyo County.

Parallel and Alternate Facilities

There are two alternate paved facilities for local travel along this segment of SR 127, both of which add considerable time for the motorist intending to travel SR 127. State Route 178 West intersects SR 127 north of Shoshone and ultimately connects with SR 190 in Furnace Creek. SR 178 east may be traveled to Pahrump to connect with State line Road and ultimately intersect SR 127 near Death Valley Junction.

Bicycles

Bicycle travel is allowed on SR 127 but there are no facilities such as designated bicycle route signing, striped bike lanes, separate paths, or designated rest/parking stops. The total length of SR 127 with paved shoulders that could reasonably accommodate bicycles is negligible. Organized special events do attract cyclists to the area during the year, but are only occasional in nature.

Aviation

There are no regularly scheduled passenger- or freight-air services in this region. Aviation facilities near SR 127 are limited to small airfields located in Amargosa, Shoshone, Stove Pipe Wells, and Furnace Creek. Short runways able to accommodate only small aircraft characterize these landing strips. The nearest major commercial air passenger terminal is McCarran Airport in Las Vegas, Nevada, approximately 145 km from Shoshone.

Rail

There is no passenger or freight rail service along the SR 127 corridor. The long-abandoned Tonopah/Tidewater Railroad parallels much of SR 127 through Inyo County. This rail line, defunct since the early 1900's, once operated between Ludlow, California and Goldfield, Nevada. The right of way once occupied by the rail line currently belongs to BLM and the State of California Lands Commission. Although remnants of the original elevated railroad foundation berm still exist, all track and related facilities have been removed.

Roadside Rests

There are no designated rest stop facilities along the four sub-segments of SR 127. Shoshone and Death Valley Junction provide the only convenient roadside areas offering traveler services. Shoshone, 45.1 km from Death Valley Junction and 48.3 km from Pahrump, Nevada, has a general store, gas station, and parking area. Death Valley Junction, 48.3 km from

Furnace Creek, in DVNP, and 37.0 km from Amargosa Valley, Nevada, offers only the Amargosa Hotel in the way of services.

Agriculture Inspection Station

Since SR 127 is not a significant haul-route for agribusiness, there is no California Department of Food and Agriculture Inspection Station near the California/Nevada State boundary.

TRAFFIC DATA

Accident Rates

The accident rates on SR 127 summarized in Table 4 are based on three years of accidents reported between January 1, 1994 and December 31, 1996. Most of the accidents reported during this time period were "run-off-road" incidents and all occurred when the posted speed limit was 55 mph. Since accidents do not become a critical concern until the actual rate is one and a half times the statewide average rate for the type of facility, none of the four sub-segments present an unusual potential for accidents.

Table 4: Three-Year Accident Rate Summary for State Route 127, in Inyo County (based on TASAS data available in District 9 Traffic Department)

Sub-segment		1	2	3	4
Accident Rates	Actual	0.93	1.25	0.69	0.47
	Average	1.20	1.70	1.87	1.55
F+I+V Rates	Actual	0.67	1.25	0.20	0.47
	Average	0.65	0.90	0.99	0.82

\\ Fatalities & Injuries

Traffic Volume

Machine vehicle counts were collected and used to determine the type distribution (i.e., trucks, RVs, buses, passenger vehicles) and volume of vehicles traveling on SR 127. The District 9 Traffic Department gathered this data (hereinafter referred to as 1995 Machine Counts [g]) continuously between mid-December 1994 and the end of December 1995 at a station located south of SR 178 East in Sub-segment 1. Figure 1 illustrates the relative distribution of vehicles determined by this study.

Figure 1: Vehicle Mix of All Traffic Counted on State Route 127, in Inyo County (during 1995 Machine Counts Study)

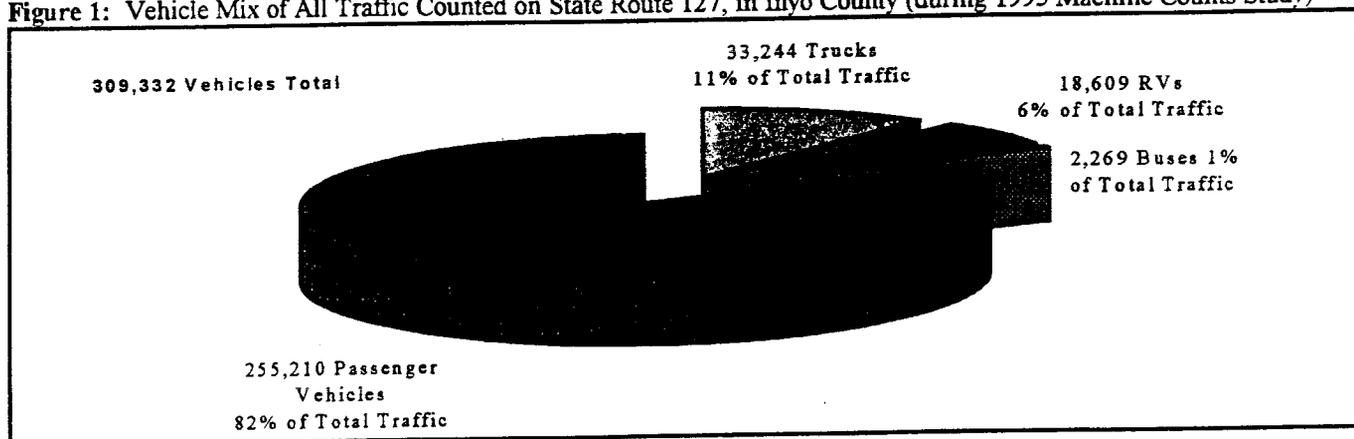


Figure 2 illustrates the monthly distribution of the traffic, which traveled over the count station during the 1995 Machine Counts study period.

Figure 2: Monthly Distribution of All Vehicles (by Type) Counted on State Route 127, in Inyo County (during 1995 Machine Counts Study).

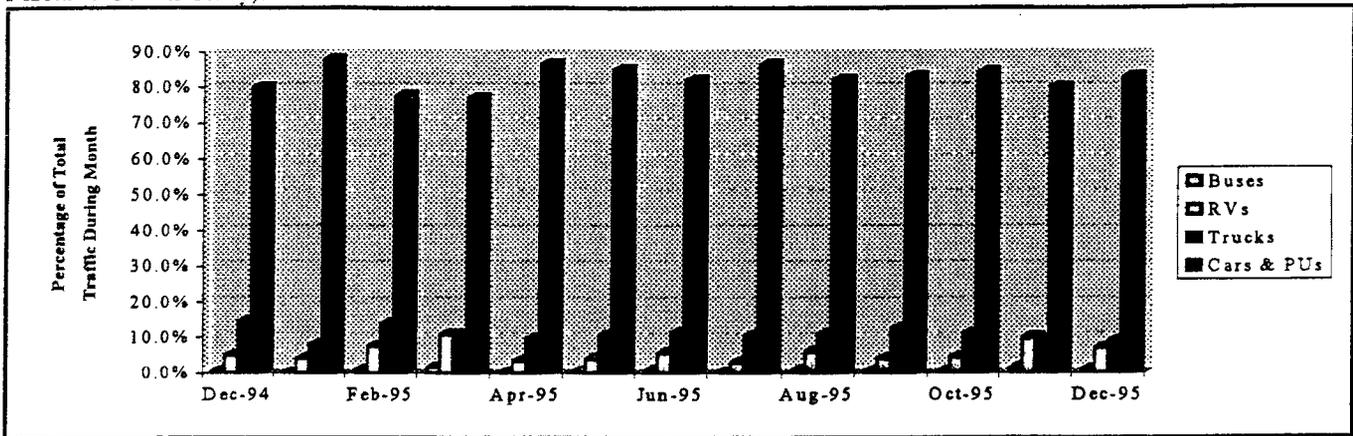
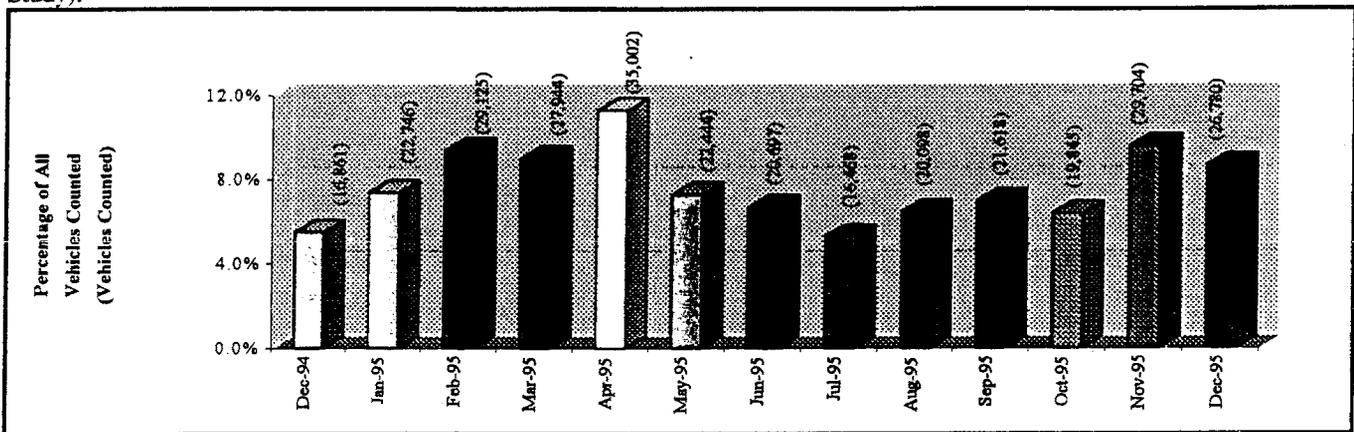


Figure 3 presents the monthly distribution of all vehicles (all types of vehicles combined) counted during the study. The monthly counts ranged from a low of 16,468, in July, to a high of 35,002 vehicles in April and averaged about 23,800 vehicles per month.

Figure 3: Monthly Distribution of All Vehicles Counted on State Route 127, in Inyo County (during 1995 Machine Counts Study).



Transit Services

There are two public transit routes that service the communities of Tecopa and Shoshone to Victorville and Pahrump. The weekly Tecopa-Pahrump route utilizes Route 178 and provides dial-a-ride pickup service in the communities of Tecopa and Shoshone. The trips generated on this route are for basic medical services and basic life necessities (i.e., groceries).

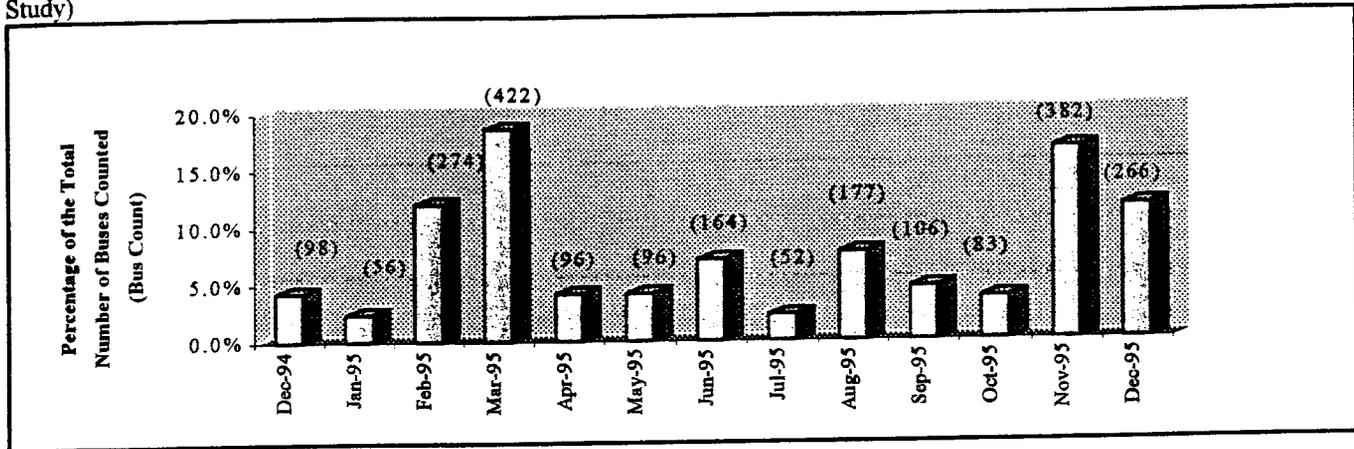
The monthly Tecopa-Victorville route utilizes SR 127 and I-15 as a link to services and to intermodal connections that are not readily available by the Tecopa-Pahrump route. In 1995, the Inyo County Local Transportation Commission established a pilot project to provide transit services for the Tecopa and Shoshone areas to the City of Victorville. With good coordination by the local program administrator, high ridership numbers, and surpassing the farebox return established by the Inyo County Local Transportation Commission this route became permanent in 1996. The Tecopa-Victorville route also interfaces with other transit providers within the cities of Barstow and Victorville upon request. The trips generated on this route are for activities such as shopping, medical appointments, and entertainment.

Buses

SR 127 is used by school buses to transport high school-age students to Pahrump, Nevada. Charter buses also frequent DVNP during the peak tourism months.

Figure 4 shows the monthly distribution of buses relative to the total number of buses counted during the 1995 Machine Count study. Bus volumes accounted for between 0.2 and 1.5 percent of the total traffic counted on SR. These figures are in fair agreement with the 1994 Travel Survey which reported the number of buses at anywhere from one to two percent of the total traffic observed (see Table 5). Bus traffic peaked at 422 vehicles in March, dropped to a low of 52 in July, and averaged about 182 buses per month.

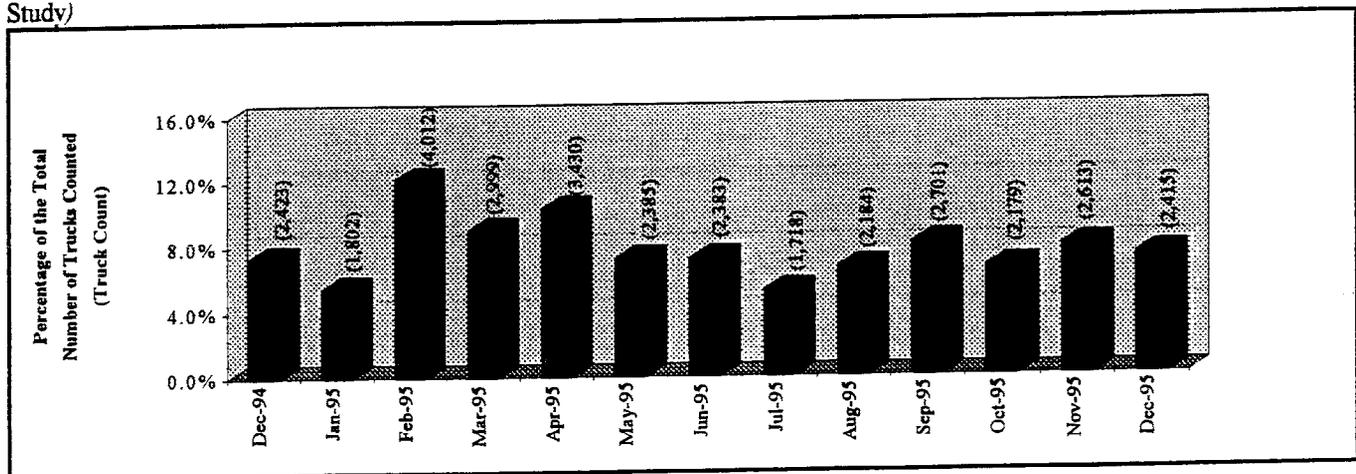
Figure 4: Monthly Distribution of All Buses Counted on State Route 127, in Inyo County (during 1995 Machine Counts Study)



Trucks

Figure 5 shows the monthly distribution of trucks relative to the total number of trucks counted. Trucks (excluding RVs and pickups) accounted for between 8 and 14 percent of the total traffic counted on SR 127. These statistics agree closely with the 1994 Travel Survey which reported the number of trucks at between 9 and 15 percent of the total traffic observed (see Table 5). The 1995 Machine Count Study revealed that truck traffic ranged from a high of 4,012 vehicles in February, to a low of 1,718 in July, and averaged about 2,660 per month.

Figure 5: Monthly Distribution of All Trucks Counted on State Route 127, in Inyo County (during 1995 Machine Counts Study)



Information provided by the Death Valley Chamber of Commerce suggests that the volume of truck traffic has remained relatively constant since the mid 1980s despite widespread mine closures since that time. A Chamber of Commerce representative suggested that this may be attributable to the noticeable increase in the transport of hazardous wastes along the route. [a]

Recreational Vehicles

Figure 6 shows the monthly distribution of RVs relative to the total number of RVs counted during the 1995 Machine Count study. Recreational vehicles comprised between 3 and 11 percent of the total traffic counted on SR 127. These RV counts agree fairly well with the 1994 Travel Survey which reported a range of between 3 and 12 percent of the total traffic observed (see Table 5). The RV traffic peaked in March with 3,016 RVs, dropped to as low as 493 in July, and averaged about 1,490 RVs per month.

Figure 6: Monthly Distribution of All RVs Counted on State Route 127, in Inyo County (during 1995 Machine Counts Study)

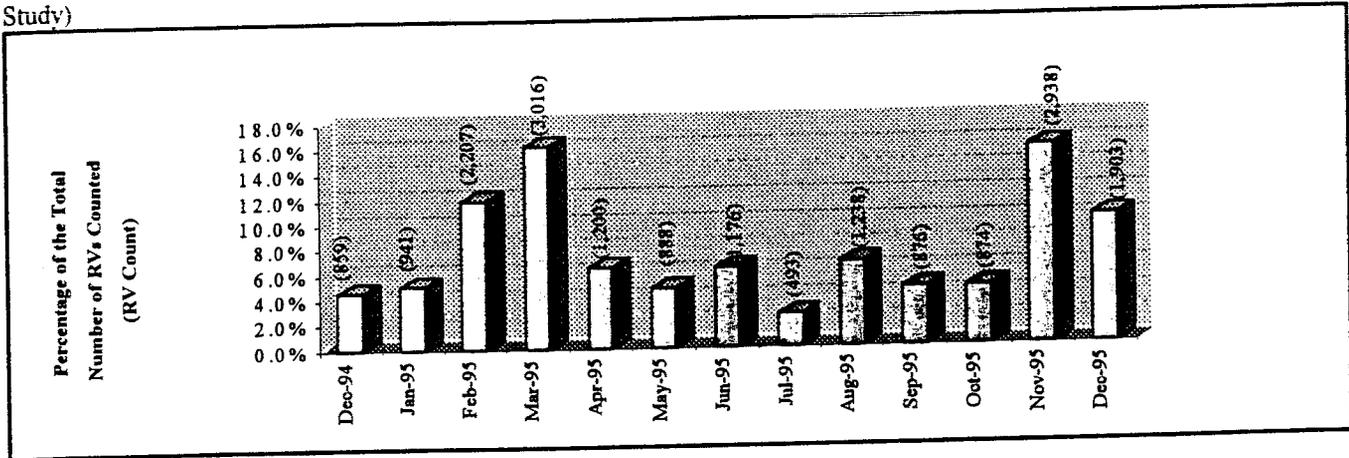


Table 5: Distribution of Buses, Trucks, and RVs Observed on State Route 127, in Inyo County (during 1994 Travel Survey)

Sub-segment Number	Observed Percentage of Total Traffic			
	1	2	3	4
Buses	1-2	1-2	1	2
Trucks	9-11	9-11	11-15	12-13
RVs	4-12	4-12	3-11	3-7

PRESENT AND FUTURE OPERATING CONDITIONS

Current and future operating conditions, such as Level of Service and the Volume-to-Capacity (V/C) ratios, were derived using the methodology outlined in the 1985 Highway Capacity Manual. In general, Level of Services range between *A* and *F*, with *A* representing ideal, free-flowing conditions and *F*—slow, stop-and-go movement resulting in jammed conditions with extensive delay and congestion.

Table 6 summarizes present and future operating conditions for SR 127. The figures reported for years 2005 and 2015 were calculated with a one percent annual growth rate assuming no improvements will have been made to the system. Each sub-segment of SR 127 currently operates at *LOS A*. During the next twenty-year forecast period Sub-segment 1 will decline to an *LOS B* while the remaining sub-segments will continue to operate at an *LOS A*. These high levels of service are primarily due to the low base and forecast year traffic volumes, the flat terrain, and the unencumbered sight distance along most of the route which results in a low percentage of passing restrictions. The actual spot-Level of Service is as low as *E* in numerous isolated locations due to reduced operating speeds at certain horizontal curves and through the town of Shoshone.

CONDITIONS COVERED BY THE STIP

The improvements proposed in this Route Concept Report for the concept facility are intended to address operational concerns and maintainability of the facility. There are no capital improvement projects programmed for SR 127 in the adopted 1996 State Transportation Improvement Program (STIP) or 1998 Proposed STIP.

Table 6: Present and Future Operating Conditions on State Route 127, in Inyo County

Sub-segment		1	2	3	4
Length (km)		23.80	2.64	41.39	11.70
Location	KP	0.00/23.80	23.80/26.44	26.44/67.83	67.83/79.53
	PM	0.00/14.79	14.79/16.43	16.43/42.15	42.15/49.42
AADT (1)	1995	900	400	300	600
	2005	990	440	330	660
	2015	1098	488	366	732
Year	LOS	A	A	A	A
	V/C	0.06	0.03	0.02	0.03
Year	LOS	A	A	A	A
	D/C	0.07	0.03	0.02	0.04
Year	LOS	B	A	A	A
	D/C	0.08	0.03	0.02	0.04

(1) AADT denotes the weighted annual average daily traffic, taken from 1996 Highway Inventory Data

PRESENT AND FUTURE CONCERNS

All four sub-segments of SR 127 will probably continue to operate at a high Level of Service over the next twenty years. In the future, if this route is designated as a route used to haul high-level radioactive wastes to Yucca Mountain, and because of the probable cumulative impacts of increased truck traffic on the facility, further improvements not currently included in the District's route concept, i.e., changes to the structural section, capacity, roadway cross-section (shoulder widths), and/or alignment, may become necessary for all four sub-segments. The combined effects of roadway topography, alignment, and the fairly high volumes of truck and RVs could cause delays and possible platooning on all four sub-segments. The recommended shoulder widening, curve realignments, and highway relocations would be necessary in order to accommodate a significant increase in truck traffic due to highway shipments of high-level radioactive wastes.

Sub-segment 1

The operational-related concerns of this sub-segment are suggested by a comparison of the actual-to-average accident rates to those of Sub-segments 3 and 4. Nearly all of the accidents that occurred during the previously noted accident history were "run-off-the-road" type and all occurred in the areas with narrow paved shoulders. Widening the narrow paved shoulders between KPs 1.29 and 10.30 (PM 0.8/6.4) and between KPs 10.78 and 23.17 (PM 6.7/14.4) would improve the operational conditions, especially where joint use by bicyclists is concerned. The horizontal curve at KP 22.85 (PM 14.2) has a reduced advisory operating speed.

Sub-segment 2

The horizontal curve at about KP 25.75 (PM 16.0) is actually a broken back curve with a reduced advisory speed. The geometrics of this combination of curves, if improved, would enhance the roadway operational characteristics. The actual fatality and injury accident rate was slightly higher than the average rate. The single reported accident occurred at the north end of this curve. It should be noted that the cause of the accident was speeding and defective vehicle or equipment leading to overturning.

Sub-segment 3

Deteriorated pavement conditions along specific sections of this sub-segment may warrant resurfacing. The worst pavement conditions exist between KPs 55.52 and 59.54 (PM 34.5/37.0) but pavement conditions between KPs 59.54 and 74.03 (PM 37.0/46.0) are also deteriorating and may require pavement maintenance. Portions of this sub-segment between KPs 35.08 and 37.66 (PM 21.8/23.4), and between KPs 46.99 and 50.85 (PM 29.2/31.6) cross the normally dry Amargosa Riverbed. Even with drainage systems in generally good condition, certain locations are vulnerable to severe flooding which occasionally results in extended roadway closure and considerable damage to the paved surface, roadbed, and embankment.

Widening the paved shoulders between KPs 60.67 and 67.83 (PM 37.7/42.15) would improve the operational conditions on this sub-segment.

Realigning the horizontal curves at KPs 27.20, 28.00, 29.45, 32.51, 55.79, 59.54, and 63.08 (PMs 16.9, 17.4, 18.3, 20.2, 34.7, 37.0, and 39.2, respectively), which all have reduced advisory speeds, would enhance the operational characteristics within this sub-segment.

The horizontal curves immediately south of Death Valley Junction, at KPs 41.6 and 41.7 (PM 25.8 and 25.9), are highly restrictive, short radius curves that slow traffic to 35 and 25 mph. Realigning these curves would significantly improve the operational characteristics of this sub-segment.

Sub-segment 4

Even though the actual accident rate on this sub-segment is considerably lower than the statewide average for this type of facility, the overall narrow width of paved shoulders between KP 67.83 and 79.50 (PM 42.15/49.4) does reduce the operational conditions.

In the future, roadway maintenance along much of this sub-segment may be necessary due to the substantial transverse, lateral, and alligator cracking present in the pavement.

IMPROVEMENTS TO ACHIEVE CONCEPT PLAN

The recommended improvements shown below are conceptual in nature and meet the requirements of a Maintenance Level 3 roadway; they will not increase traffic capacity but will enhance the operational characteristics and minimize the periodic maintenance requirements. Identification of precise locations, alignment, cross-section designs, right-of-way requirements, and construction costs will require further analysis as part of the project study and design process.

Sub-segment 1:

- Widen paved shoulders between KPs 1.29 and 10.30 (PM 0.8/6.4) and between KPs 10.78 and 23.17 (PM 6.7/14.4) to a minimum of 0.6 m
- Realign horizontal curve at KP 12.87 (PM 8.0), construct 2.4 m paved shoulders
- Repair erosion damage at culvert near KP 17.70 (PM 11.0)

Sub-segment 2:

- Realign broken-back horizontal curve at KP 25.75 (PM 16.0), construct 2.4 m paved shoulders
- Improve angle of intersection with old State Highway at KP 24.94 (PM 15.5) to 90 degrees

Sub-segment 3:

- Overlay with asphalt concrete between KPs 55.52 and 59.54 (PM 34.5/37.0) and in Death Valley Junction
- Widen paved shoulders between KPs 60.67 and 67.83 (PM 37.7/42.15) to a minimum of 0.6 m
- Relocate the route to follow the bluff line to the west of the current alignment between KPs 35.08 and 37.66 (PM 21.8/23.4), and between KPs 46.99 and 50.85 (PM 29.2/31.6), construct 2.4 m shoulders
- Realign horizontal curves at KPs 27.20, 28.00, 29.45, 32.51, 55.79, 59.54, and 63.08 (PMs 16.9, 17.4, 18.3, 20.2, 34.7, 37.0, and 39.2, respectively), construct 2.4 m shoulders

Sub-segment 4:

- Widen paved shoulders between KPs 67.83 and 79.53 (PM 42.15/49.42) to a minimum of 0.6 m
- Improve drainage characteristics of system at KP 77.25 (PM 48.0) to reduce erosion problems

Pavement Deflection Study Summary

The following is a summary of roadway surface rehabilitation strategies recommended in the *Pavement Deflection Study*. [f] In several areas, rehabilitation is recommended due to the extent and frequency of load-induced alligator cracking, even though the average evaluated deflection level is below the tolerable level. These recommendations are designed to provide an additional ten years of service life for the roadway while minimizing maintenance costs. These strategies are based on the traffic/design scenarios designated by the varying traffic index (TI) value shown below:

TI 7.5: Continuation of existing truck volume and percentage of ADT

- TI 8.5: A doubling of existing truck volume and percentage of ADT, including shipments of radioactive materials to Yucca Mountain, weighing up to 36,288 kg
- TI 9.5: Overload trucks specially designed to haul high-weight, multi-purpose canisters of radioactive materials to Yucca Mountain, weighing upwards of 113,400 kg are present on roadway

Alternative 1:

Locate specific areas of severe pavement failure—identified by rutting greater than 15 mm, and/or loose or spalling pavement—and cold plane the existing surface to a depth of 30 mm. Dig out and repair areas of localized failure, seal cracks wider than 5 mm, then place a dense graded asphalt concrete [to the depths shown in Table 7] for reflection crack retardation or for structural adequacy.

Alternative 2:

All rehabilitation strategy for this alternative is the same as Alternative 1 except that asphalt rubber hot mix-gap graded overlay [to the depths shown in Table 7] is recommended in lieu of dense graded asphalt concrete.

Table 7: Asphalt Concrete Overlay Depth Recommendations (from Pavement Deflection Study)

KP Limits	PM Limits	Alternate 1 Dense Graded AC (mm)			Alternate 2 Asphalt Rubber Hot Mix Gap Graded (mm)		
		Traffic Index			Traffic Index		
		7.5	8.5	9.5	7.5	8.5	9.5
0.00/11.27	0.0/7.0	45	45	45	30	30	30
11.27/14.48	7.0/9.0	120	165	180	60	45\2\	60\1\
14.48/16.90	9.0/10.5	60	90	120	45	45	60
16.90/22.53	10.5/14.0	105	150	165	45	45\1\	45\2\
22.53/27.36	14.0/17.0	180	210	225	60\1\	60\3\	60\4\
27.36/41.84	17.0/26.0	45	60	60	30	30	45
41.84/53.11	26.0/33.0	45	45	45	30	30	30
53.11/67.59	33.0/42.0	45	90	120	30	45	60
67.59/71.61	42.0/44.5	150	195	210	45\1\	60\2\	60\3\
71.61/79.50	44.5/49.4	105	150	165	45	45\1\	45\2\

- \1\ Place dense graded asphalt concrete (DGAC) 45 mm thick prior to placing asphalt rubber hot mix-gap graded (ARHM-GG)
- \2\ Place DGAC 60 mm thick prior to placing ARHM-GG
- \3\ Place DGAC 75 mm thick prior to placing ARHM-GG
- \4\ Place DGAC 90 mm thick prior to placing ARHM-GG

TRANSIT/HIGH OCCUPANCY VEHICLE CONSIDERATIONS

Transit or high occupancy vehicle measures will not contribute to the route concept; the identified shortcomings are limited to issues related to operations, safety, and maintainability.

THE ULTIMATE TRANSPORTATION CORRIDOR

With the exception of paved shoulders, it is unlikely that the SR 127 would have to be widened beyond its current condition within the 20-year study time frame for the following reasons: the Inyo County General Plan does not anticipate substantial economic development within the corridor; virtually all land along the route is publicly-owned inhibiting commercial development; the low base-year traffic volumes would have to grow enormously to justify an expansion of the facility for increased capacity; and, the State of California forecasts low growth in both local and regional traffic volumes.

The Ultimate Transportation Corridor (UTC) should incorporate the improvements recommended herein to achieve the concept plan of improving the operational and safety characteristics. In the next 20 to 50 years, recreational opportunities could expand in or near the study corridor and DVNP. If past trends continue, metropolitan Las Vegas and southern

California will experience growth, and consequently the travel demand in this corridor may eventually exceed that of a two-lane facility. Initial measures aimed at increasing capacity would include installation of left turn and acceleration lanes and appropriate forms of traffic controls at existing or future intersections. It is conceivable that in the next half century, expansion of this facility to four lanes could be required to accommodate an increased demand.

Effects of Nuclear Waste Shipments on the UTC Requirements [i]

In the foreseeable future, the roadway cross section and Maintenance Service Level may be dictated by the need to accommodate truck shipments of radioactive waste to and from the proposed repository at Yucca Mountain, Nevada and the Nevada Test Site (NTS).

The U.S. Department of Energy, Office of Civilian Radioactive Waste Management (DOE-OCRWM) plans to transport radioactive waste and spent nuclear fuel using the General Atomics GA-4/9 canister system on legal-weight truck-trailer combinations weighing less than 36.3 MT. With specially designed, light-weight transport-trailers to haul them, these legal-weight, semi-trailers would be 18.29 m long and 2.44 m wide. The allowable canister size constraint limits legal-weight trucks to carrying total payloads of about 24.6 MT with each shipment's total payload consisting of approximately 2 metric tonnes of heavy metal, MTHM (uranium, plutonium, etc.).

The DOE-OCRWM has developed a series of access options to Yucca Mountain and NTS that include truck access via SR 127/Nevada SR 373. This corridor is an integral part of two (of the three) candidate routes under consideration. Shipments of high-level radioactive waste along this corridor may pass to Yucca Mountain and the NTS, via I-15, in the quantities dictated by two shipment scenarios—*primarily long-distance rail and highway only*.

In the *primarily long distance rail shipment* scenario, the majority of waste would be transported over long distance railways. DOE estimated that legal-weight trucks would transport the balance of material—anywhere from 2,000 to 7,000 MTHM—over a 35 year acceptance period. This amount constitutes anywhere from 4 to 11 percent of the total amount that Yucca Mountain could ultimately accept. At about 2 metric tonnes heavy metal per legal-weight truck shipment, nearly 3,500 truck shipments in all might be necessary, an average of about 8 shipments per month.

In the *highway shipment only* scenario the DOE assumed no rail or intermodal access to Yucca Mountain. Consequently, the SR 127/373 corridor would conceivably accommodate the highway transport of about 45,414 MTHM of radioactive waste. This would result in about 22,707 shipments using GA-4/9 canisters, an average of 54 shipments per month.

According to one source, "the largest number of shipments to or from a single site would occur at NTS...A combined total of more than 295,000 truck shipments or more than 106,000 rail shipments of waste could occur at NTS, or about 118 truck shipments or 42 rail shipments per day (assuming receipt of shipments during 250 days per year)." [j] This estimate of truck traffic would result in a range of from 13% to 40% increase in the overall average daily traffic.

When considering the current condition of the highway, i.e., capacity, typically narrow paved shoulders, the presence of numerous restrictive horizontal curves, and the existing alignment through the occasionally flooded Amargosa river, as well as the current fairly high volume of truck traffic, the potential frequency of shipments raises numerous maintenance, operational, and safety related concerns.

Given the conditions on SR 127 where many of the existing paved shoulders are narrower than the stated minimum width, and the projected increased truck traffic, Caltrans' metric design guidelines require 1.2 m paved shoulders on the right side of vehicle lanes as part of roadway Resurfacing, Restoration, and Rehabilitation projects. This being the case, the recommended minimum shoulder width would double from 0.6 to 1.2 m. Truck volumes could also possibly warrant installation of passing lanes in some locations. The cumulative impacts of truck shipments of radioactive waste to Yucca Mountain and NTS could also affect Caltrans' designated Maintenance Service Level and the District's plans for pavement overlay and repair strategies as well as the roadway structural section, cross sectional and alignment design.

LONG RANGE OPERATIONS PLAN COORDINATION

The District works cooperatively with local, regional, and other state agencies in developing route concept plans. Route Concept Reports are circulated internally within Caltrans and externally to interested agencies. Departments, agencies.

entities, and individuals are consulted, their input solicited, and, if appropriate, incorporated during the draft review stage. The Route Concept Report is compatible with relevant goals and programs of the District's Long Range Operations Plan and the District System Management Plan. [k] These include such elements as motorist information services (i.e. message signs), ongoing surveillance and traffic data collection programs, truck census programs, highway operational elements and improvements, and incidence response actions.

San Bernardino County's General Plan states that it (the County) will "strive to achieve LOS C on all highways," with the concept for SR 127 as a two-lane facility with LOS C requiring maintenance only. [l] The Inyo County General Plan states that "all two-lane state highways with average daily traffic counts between 1,500 and 3,000 shall generally have an eight-foot shoulder." The portion of SR 127 in Inyo County has not yet achieved this traffic volume threshold and as such, 2.4 m shoulders are not mandated.

This Route Concept Report may be updated as needed to reflect new information and changing priorities, particularly as needs related to facilitating material shipments to Yucca Mountain become more definite. In the event that SR 127 is selected as a haul route, considerable capital improvements would be necessary to safely accommodate shipments of high-level radioactive waste, regardless of the transport scenario implemented. Caltrans' District 9 would request DOE to fund the necessary facility improvements as mitigation of impacts to the transportation system.

District 9 has worked in cooperation and coordination with the Inyo County Planning Department and its Yucca Mountain Repository Assessment Office that is responsible for monitoring ongoing site characterization tasks for the proposed high-level radioactive waste repository at Yucca Mountain. The forecasted travel demand and facility requirements are consistent with the most recent Inyo County General Plan Land Use designations, Regional Development Plans, demographic forecasts, and the Regional Transportation Plan.

ENVIRONMENTAL CONSIDERATIONS

The segment of SR 127 in Inyo County passes through the Amargosa River Valley. This is a low elevation region of the Mojave Desert in the transition between Great Basin Desert and the Sonoran Desert that contains some special status plant and animal species.

The desert marshes present in this region support vegetation such as tule (*Scirpus acutus*), cattail (*Typha* sp.), willows (*Salix exigua*, *S. gooddingii*, *S. lasiolepis*, and *S. laevigata*), and an occasional mesquite thicket (*Prosopis pubescens* and *P. juliflora*). [m,n] The small playas of alkaline soil found along the riverbed support wormwood (*Iva acerosa*), white rabbit brush (*Chrysothamnus albidus*), Amargosa nitrophila (*Nitrophila mohavensis*), and alkali sacaton (*Sporobolus airoides*). [n] A population of Tecopa bird's-beak (*Cordylanthus tecopenis*), a federal candidate (C2) plant species, is reported to exist in an alkali flat located approximately 3 miles south of Shoshone, along the Amargosa River.

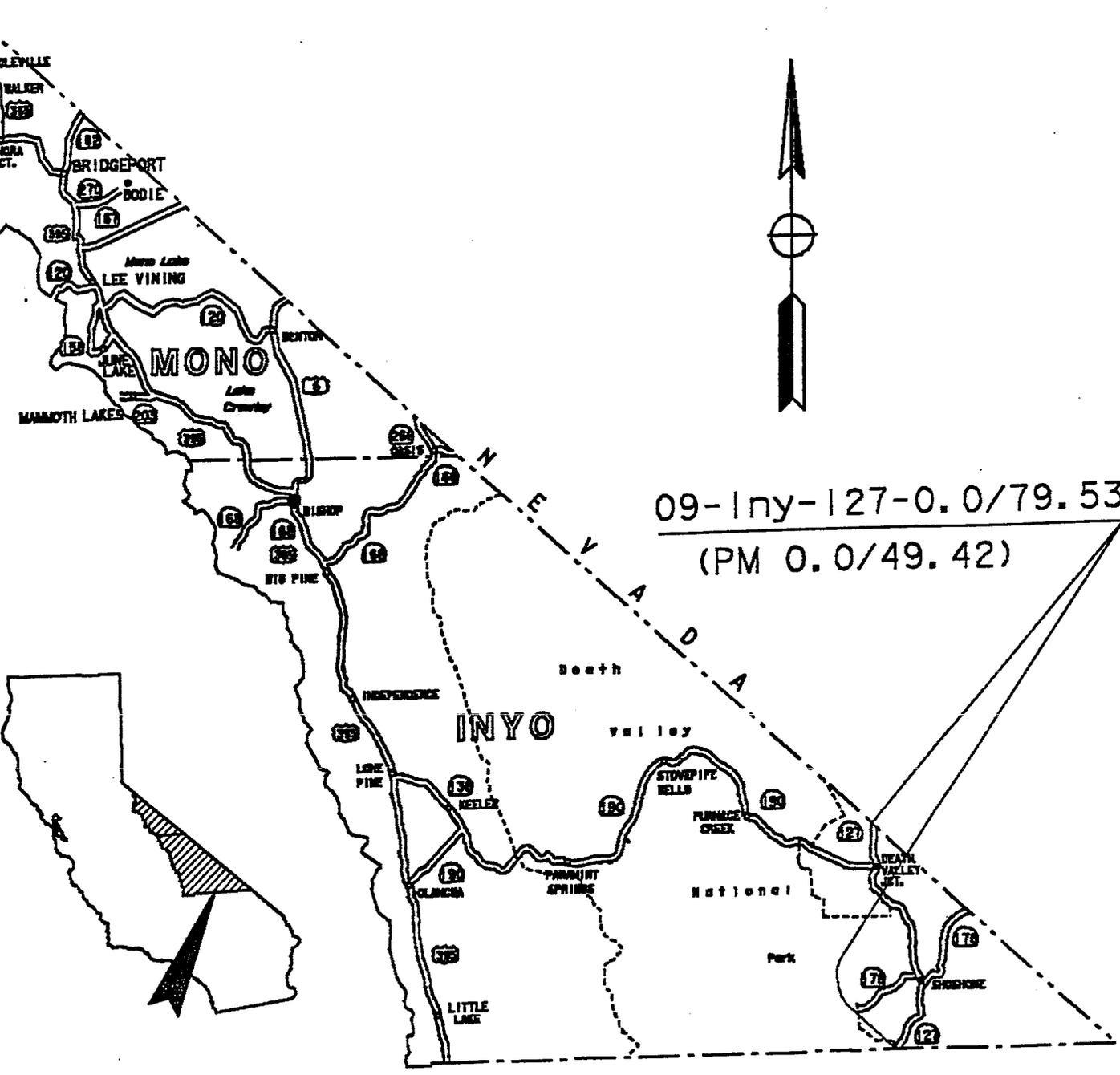
The Amargosa vole (*Microtus californicus scirpensis*), a federal and state listed endangered species, inhabits the saline and alkaline tule wetlands found in the bed of the Amargosa River. The endemic Amargosa naucorid bug (*Pelocoris shoshone*), a federal candidate (C2) for listing as endangered is also present in these areas. A man-made spring and drainage canal near Shoshone supports a population of Shoshone pupfish, a federal candidate (C2) for listing as endangered. [n] . The vermilion flycatcher (*Pyrocephalus rubinus*), yellow warbler (*Dendroica petchia brewsteri*) and yellow-breasted chat (*Icteria virens*), all California Species of Concern, are among the several species of birds known to inhabit the tule environment.

The Amargosa River cuts through the lower elevations of alluvial fans formed at the base of the bordering desert mountain ranges. These alluvial fans and level plains are covered with creosote bush scrub (*Larrea tridentata*) and in places hop-sage (*Grayia spinosa*) or desert holly (*Atriplex hymenolytra*) dominates the scrub. In the dry river bed washes, burro weed (*Ambrosia dumosa*) is a common co-dominant species with creosote bush.

More than thirteen species of amphibians and reptiles are common to the sandy, rocky alluvial fans [o] two of which have special status: the chuckwalla (*Sauromalus obesus*), a federal candidate (C2) for listing as endangered; and the Mojave fringe-toed lizard (*Uma scoparia*), a California Species of Concern. [p] The desert tortoise (*Xerobates [Gopherus] agassizi*, a federal and state listed threatened species, also inhabits the area.

REFERENCES

- a 8/31/95 and 1/31/97 conversations with Ms. Martha Watkins, Death Valley Chamber of Commerce
- b California State Assembly Bill (AB) 866 designates
- c Ms. Martha Watkins, op. cit.
- d Department of Commerce, Bureau of Census, 1990 Census of Population and Housing, STF-1, Data for Inyo County, California
- e 1993 Population Projection Series, California Department of Finance, Demographic Research Unit
- f *AC Pavement Deflection Study Report*, and *Pavement History and Plan for State Route 127*, Caltrans District 9, May 1995.
- g Caltrans Machine Traffic Counts from between December 1994 and 1995 (available in District 9 Traffic and Planning Departments)
- h *Highway Capacity Manual*, Chapter 8 (Rural Highways)
- i *Nevada Potential Repository Preliminary Transportation Strategy, Study 1*, U.S. Department of Energy Office of Civilian Radioactive Waste Management, TRW Environmental Systems, Inc., 1995
- j *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*, U.S. Department of Energy, Office of Environmental Management, DOE/EIS-0200-F, Summary, May 1997
- k *District 9 Long Range Operation Plan - First Update*, 1988
- l *General Plan*, San Bernardino County, Environmental Public Works Agency, Department of Land Management, Office of Planning, 1990
- m Jaeger, E. C., 1975. *A Naturalist's Death Valley*, 5th Edition, Inland Printing, Inc., San Bernardino, CA
- n California Natural Diversity Data Base, 1995. California Natural Diversity Data Base search report for the Ixex Pass, Shoshone, East of Deadman Pass, Eagle Mt., West of Eagle Mt., Death Valley Junction, and Franklin Well 7.5 minute quad sheets, Sacramento, CA
- o Stebbins, R.C., 1985. *A Field Guide to Western Reptiles and Amphibians*, Houghton Mifflin Company, Boston, MA, 236 pp.
- p California Department of Fish and Game. Special Animal List, August 1994



09-Iny-127-0.0/79.53
 (PM 0.0/49.42)

EXHIBIT A
 VICINITY MAP

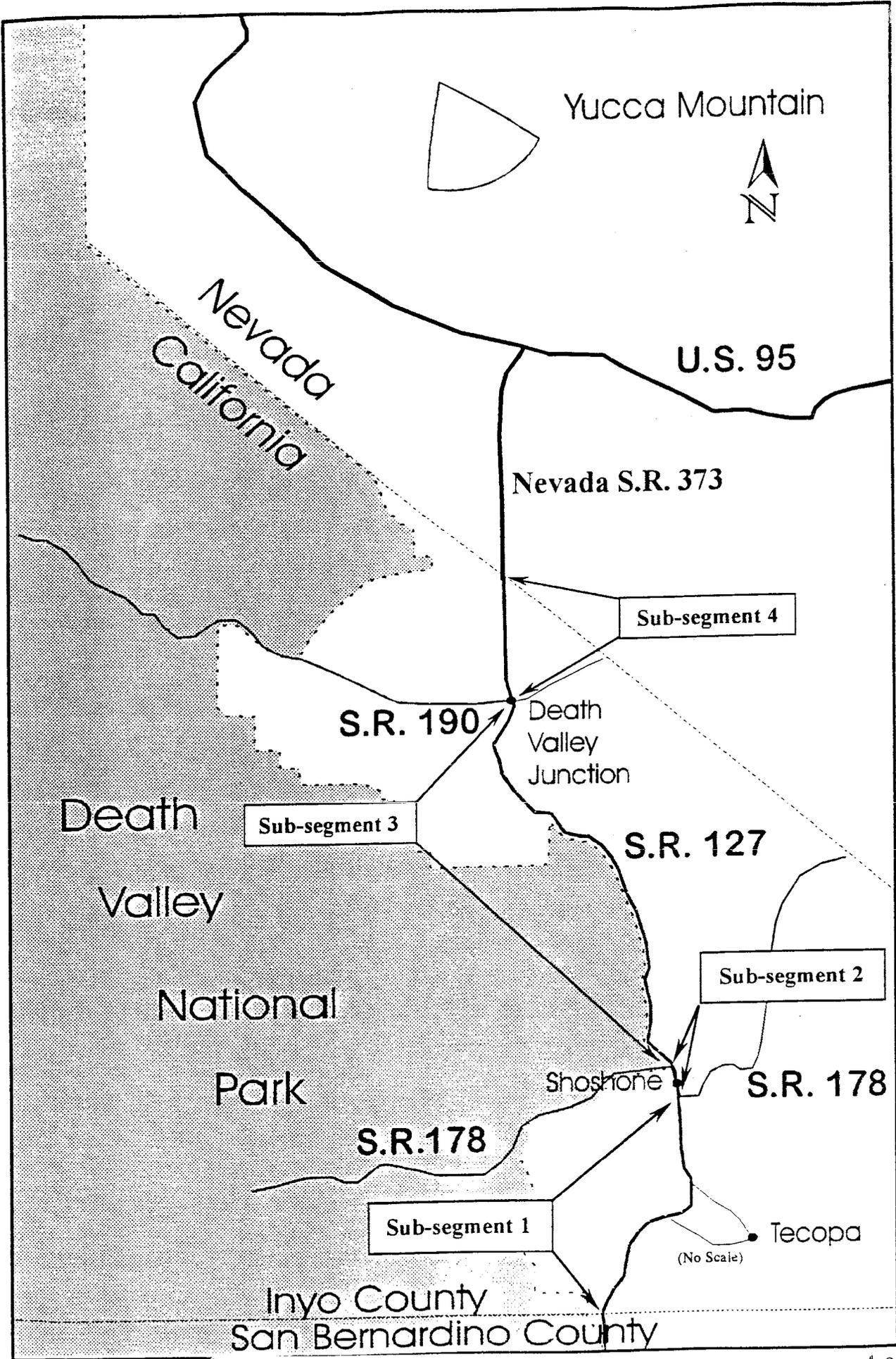
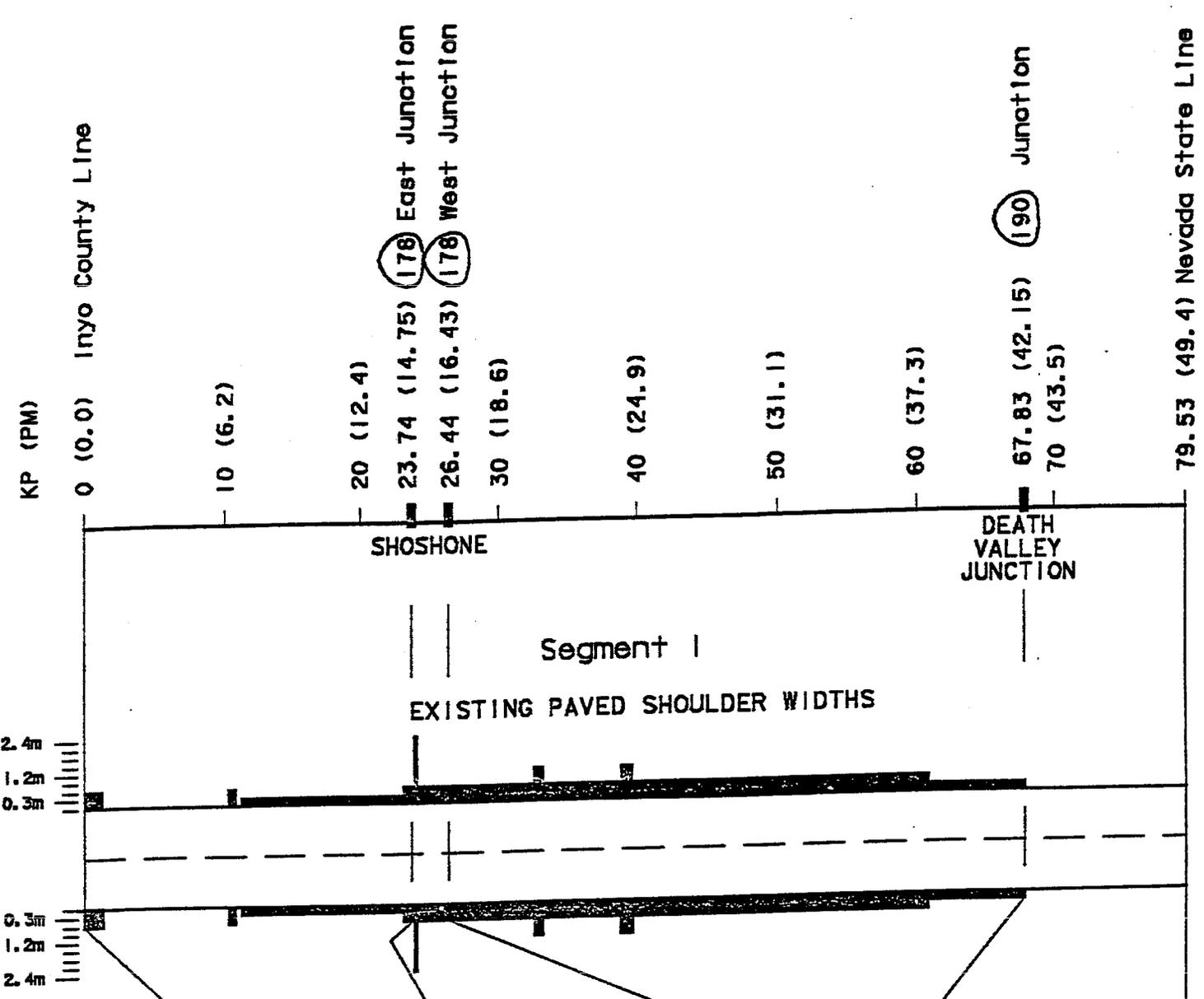


Exhibit B
Location Map



		Sub-segment 1	Sub-segment 2	Sub-segment 3	Sub-segment 4
KP Location		0.0/23.80	23.80/26.44	26.44/67.83	67.83/79.53
PM Location		0.0/14.79	14.79/16.43	16.43/42.15	42.15/49.42
1995	AADT	900	400	300	600
	LOS	A	A	A	A
	V/C	0.06	0.03	0.02	0.03
2005	AADT	990	440	330	660
	LOS	A	A	A	A
	D/C	0.07	0.03	0.02	0.04
2015	AADT	1098	488	366	732
	LOS	B	A	A	A
	D/C	0.08	0.03	0.02	0.04

EXHIBIT C
SUB-SEGMENTS SCHEMATIC
 09-INY-127-0.0/79.53 (0.0/49.42)

Inyo County SR 127 Operating Conditions

Segment	1	2	3	4	
KP	0.00/23.80	23.80/26.44	26.44/67.83	67.83/79.53	
PM	0.00/14.78	14.78/16.42	16.42/42.13	42.13/49.39	
Length (km)	23.8	2.64	41.39	11.7	
Length (m)	14.78	1.64	25.7	7.27	
Design Hour 30th Highest	146	137	57	116	
AADT 1995	900	400	300	600	
AADT 2005	990	440	330	660	
AADT 2015	1098	488	366	732	
Average Speed (kph)	99.78	54.72	104.61	101.39	
Average Speed (mph)	62	34	65	63	
Truck Volume	10.60%	17.00%	22.00%	30.00%	
Year 1995 LOS	A	A	A	A	
	V/C	0.06	0.03	0.02	0.03
Year 2005 LOS	A	A	A	A	
	V/C	0.07	0.03	0.02	0.04
Year 2015 LOS	B	A	A	A	
	V/C	0.08	0.03	0.02	0.04

ATTACHMENT C

DRAFT COST ESTIMATES

PROJECT REPORT COST ESTIMATE
ATTACHMENT D



DIST-CO-RTE: 08/09-SBd/INY-127
 KP(PM): 0/66.79-0/79.53 (0/41.47-0/49.42)
 EA: 09-30520K
 Program Code: _____

Project Description:

Limits In San Bernardino County Kp 0.00 to KP 66.79 (PM 0.00 to PM 41.47) and Inyo County KP 0.00 to KP 79.53
(PM 0.00 to PM 49.42)

Proposed Improvement (Scope) Operational Improvements including overlay and 3.0 m shoulder
widening, horizontal curve corrections and vertical realigning the existing alignment in response to repository at Yucca Mtn.

ALTERNATIVE _____ BUILD _____

PROJECT REPORT COST ESTIMATE SUMMARY

TOTAL ROADWAY ITEMS	<u>\$273,000,000</u>
TOTAL STRUCTURE ITEMS	<u>\$11,500,000</u>
SUBTOTAL CONSTRUCTION COSTS	<u>\$284,500,000</u>
TOTAL RIGHT OF WAY ITEMS	<u>\$500,000</u>
TOTAL PROJECT CAPITAL OUTLAY COSTS	<u>\$285,000,000</u>

Reviewed by Program Manager _____
 (Signature)

Approved by Project Manager _____
 Srinath Balasubramanian

Phone No. (760) 872-2372 Date _____

PROJECT REPORT COST ESTIMATE

DIST-CO-RTE: 08/09-SBd/INY-127
 KP(PM): 6.79-0/79.53 (0/41.47-0/49.42)
 EA: 09-30520K

2)

Section 6 - Minor Items

(Subtotal Sections 1-5)	<u>\$148,808,700</u>	X (15%) =	<u>\$22,321,305</u>
TOTAL MINOR ITEMS			<u>\$22,321,305</u>

Section 7 - Roadway Mobilization

(Subtotal Sections 1-6)	<u>\$171,130,005</u>	X (10%) =	<u>\$17,113,001</u>
TOTAL ROADWAY MOBILIZATION			<u>\$17,113,001</u>

Section 8 - Roadway Additions

Supplemental Work (Subtotal Sections 1-7)	<u>\$188,243,006</u>	X (10%) =	<u>\$18,824,301</u>
Contingencies (Subtotal Sections 1-7)	<u>\$188,243,006</u>	X (35%) =	<u>\$65,885,052</u>
TOTAL ROADWAY ADDITIONS			<u>\$84,709,353</u>
TOTAL ROADWAY ITEMS (Total of Sections 1-8)			<u>\$273,000,000</u>

Estimate Prepared By _____

Date _____

PROJECT REPORT COST ESTIMATE

DIST-CO-RTE: 08/09-SBd/INY-127
KP(PM): 0/66.79-0/79.53 (0/41.47-0/49.42)
EA: 09-30520K

III. RIGHT OF WAY ITEMS

ESCALATED
VALUE

A. Acquisition, including excess lands
and damage to remainder (\$)

\$500,000

B. Utility Relocation (State share)

C. Clearance/Demolition

D. RAP

E. Title and Escrow Fees
Admin Fees

TOTAL RIGHT OF WAY ITEMS

\$500,000

Anticipated Date of Right of Way Certification
(Date to which Values are Escalated)

(Non-escalated)

F. Construction Contract Work

Brief Description of Work:

Right of Way Branch Cost Estimate for Work

\$500,000

COMMENTS:

Estimates Prepared by _____

Date _____

Phone No _____

ATTACHMENT D

PRELIMINARY ENVIRONMENTAL ANALYSIS REPORT



Preliminary Environmental Analysis Report

Project Information

District 09 County SBD/INY Route 127
Kilometer Post (Post Mile) 0.0/66.7 0.0/79.5 (0.0/41.5 0.0/49.4) EA 09-30520K

Project Title: State Route 127 Improvements

Project Manager S Balasubramanian Phone # (760) 872-2372

Project Engineer Manuel Ramirez Phone # (559) 243-3596

Environmental Branch Chief Bryan Apper Phone # (559) 243-8156

Environmental Planner Generalist David Farris Phone # (559) 243-8170

Project Description

Description of work: This project would add operational improvements to State Route 127. The proposed work includes the overlay of existing travel ways, construction of 2.4 m shoulders, correction of horizontal and vertical curves.

Anticipated Environmental Approval

CEQA

- Categorical/Statutory Exemption
- Negative Declaration / focused ND
- Environmental Impact Report

NEPA

- Categorical Exclusion
- Finding of No Significant Impact
- Environmental Impact Statement

PSR Summary Statement

The anticipated environmental document for the proposed project is an Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The Federal Highways Administration and the California Department of Transportation would act as lead agencies in the preparation of a joint CEQA/NEPA (California Environmental Quality Act/National Environmental Policy Act) environmental document. The final environmental determination is projected to occur within 109 months from the start of environmental studies. Assuming a start date of January 2004, Project Approval and Environmental Document would be anticipated by February of 2013. This schedule is based on Federal Highway Administration's agreed upon review times. The anticipated person hours for this project are 36,315 Caltrans Hours and 12,040 Consultant Hours.

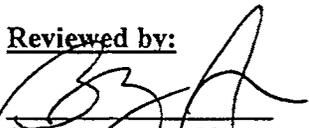
Special Considerations

This project is in an area of high sensitivity for cultural resources. It is anticipated that the amount of Section 106 work would significantly effect the schedule. This project comes right against Death Valley National Park; consultation with the Park Service would be necessary. Caltrans District 9 has historically maintained the San Bernardino County section of State Route 127. However, consultation with District 8 should be maintained due to this projects likelihood of controversy.

Disclaimer

This report is not an environmental document. Preliminary analysis, determinations, and estimates of mitigation costs are based on the project description provided in this report. The estimates and conclusions provided are approximate and are based on cursory analysis of probable effects. This report is to provide a preliminary level of environmental analysis to supplement the Project Study Report. Changes in project scope, alternatives, or environmental laws will require a re-evaluation of this report.

Reviewed by:


Bryan Apper, AICP
Environmental Branch Chief

Date: 6/14/02

Project Manager

Date: _____

Environmental Technical Reports or Studies Required

	Study	Document	N/A
Community Impact Study	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmland	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Section 4(f) Evaluation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Visual Resources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water Quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Floodplain Evaluation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Noise Study	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Air Quality Study	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Paleontology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild and Scenic River Consistency	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cumulative Impacts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural			
ASR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HSR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HASR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HPSR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 106 / SHPO	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Native American Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other			
Finding of Effect _____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data Recovery Plan _____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous Waste			
ISA (Additional)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PSI	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological			
Endangered Species (Federal)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Endangered Species (State)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Species of Concern (CNPS, USFS, BLM, S, F)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological Assessment (USFWS, NMFS, State)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wetlands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive Species	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural Environment Study	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEPA 404 Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Permits			
401 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
404 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1601 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

City/County Coastal Permit Coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
State Coastal Permit Coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
NPDES Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
US Coast Guard (Section 10)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion of Technical Review

Socio-economic and Community Effects. The project would impact the communities of Mojave (3,763), Shoshone (79) and other communities along State Route 127, thus a Community Impact Assessment would be required.

Public Interest. This project is likely to generate intense public scrutiny for both the project itself and the purpose of the project. Involvement with the general public and public interest groups on the local, state and national level should be anticipated.

Farmlands. There are no farmlands within the project area.

4(f) Impacts. Death Valley National Park lies against State Route 127. If any parkland is taken, section 4(f) evaluation would be required. Under Section 4(f) we are not allowed to take a parkland unless we show that there is no prudent and reasonable alternative to the taking of that property.

Wilderness Area. This project is adjacent to designated Wilderness area in several locations. North of State Route 178, Wilderness areas surround State Route 127 on both sides. To the west Death Valley National Park, and to the east the Resting Springs Wilderness Area. The Resting Springs Wilderness Area is under the jurisdiction of the Bureau of Land Management. Wilderness areas typically don't include land within 30 – 300 feet of paved roads. If Right of Way is necessary within the designated Wilderness area, that designation must be changed. A Wilderness Area Designation can only be changed by the United States Congress.

Visual Resources. A visual impact assessment would be necessary.

Water Quality and Erosion. The site should be evaluated for potential water quality impacts associated with the project. If site dewatering is required for new construction, a dewatering plan is required. Site access for construction must be included in any water quality analysis.

Floodplain. A floodplain evaluation report will need to be prepared to analyze the effects of the alterations to the 100-year floodplain.

Air and Noise. No further studies are anticipated.

Wild and Scenic River. No wild and scenic rivers are within the project area.

Cultural Resources. An archaeological survey will be required for the project. The proposed Area of Potential Effect (APE) must include all access roads, work areas and staging areas beyond the existing paved highway. Any subsequent changes in project scope may require additional archaeological or historical review. The project area would need around 100 miles of pedestrian survey. There are at least 80 known prehistoric archeology sites, as well as numerous historic landscapes that would fall in the future Area of Potential Effect. Pedestrian surveys are expected to yield even more resources. Phase II and Phase III studies are anticipated. The area of effect is large and within an area where weather makes surveying more difficult. Thus, time estimated for Phase I studies (Pedestrian Surveys) is 2.5 years and for Phase II (Eligibility determination) is 3 years. Both of these would have to be done prior to approval of the draft environmental document.

Hazardous Waste/Materials. An Initial Site Assessment (ISA) will be required to address the potential for hazardous waste.

Biological Resources. This project would affect sensitive biological resources. Formal consultation with the U.S. Fish and Wildlife Service would be required. Extensive field surveys would be required.

Special-status species with potential to occur within or adjacent to the project area		Status		
Common Name	Scientific Name	Fed	CA	Other
PLANTS				
Gilman's cymopterus	<i>Cymopterus gilmanii</i>			1B
Shockley's rock cress	<i>Arabis shockleyi</i>			
Preuss's milk-vetch	<i>Astragalus preussii</i> var. <i>preussii</i>			
Death Valley Round-leaved Phacelia	<i>Phacelia mustelina</i>			
Rusby's desert-mallow	<i>Sphaeralcea rusbyi</i> var. <i>eremicola</i>			
Ripley's gilia	<i>Gilia ripleyi</i>			
Utah monkeyflower	<i>Mimulus glabratus</i> ssp. <i>utahensis</i>			
ANIMALS				
Vermilion Flycatchers	<i>Pyrocephalus rubinus</i>			
Yellow warbler	<i>Dendroica petechia</i>			
Yellow Breasted Chat	<i>Icteria virens auricollis</i>		SSC	
Amargosa Canyon speckled dace	<i>Rhinichthys osculus</i> ssp. <i>1</i>		SSC	
Amargosa pupfish	<i>Cyprinodon nevadensis nevadensis</i>		SSC	
Shoshone pupfish	<i>Cyprinodon radiosus</i>	SE	FE	
Amargosa Vole	<i>Microtus californicus scirpensis</i>	SE	FE	

Key to Status

FE = Federal Endangered SE = State Endangered 1B = CNPS Rare or Endangered in
 FT = Federal Threatened ST = State Threatened California and elsewhere
 FSC = Federal Species of Concern SC = Species of Concern

Wetlands. A delineation of jurisdictional wetlands and waters of the United States needs to be done. Executive Order 11990 requires an avoidance alternative analysis for wetland impacts unless there is no practicable alternative available. Impacts to waters of the U.S. and wetlands from the project and any temporary access roads will need to be quantified.

Invasive Pest Plant Species. Executive Order 13112 requires that any Federal action may not cause or promote the spread or introduction of invasive species.

Right-of-Way Relocation or Staging Area. Material sites and disposal sites are indicated, but not identified. These areas, which must be identified prior to initiating environmental studies, will require complete environmental evaluation as part of this project. A relocation impact report would be required for any residents being moved because of the project.

Permits. Permits from the State Department of Fish and Game (1601), U. S. Army Corps of Engineers (404) and the Regional Water Quality Control Board (401) will be required. Additional permits for the material site and disposal site may be required.

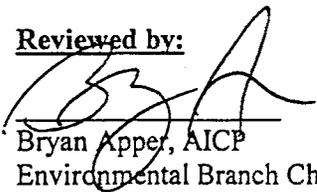
Special Considerations

This project is in an area of high sensitivity for cultural resources. It is anticipated that the amount of Section 106 work would significantly effect the schedule. This project comes right against Death Valley National Park; consultation with the Park Service would be necessary. Caltrans District 9 has historically maintained the San Bernardino County section of State Route 127. However, consultation with District 8 should be maintained due to this projects likelihood of controversy.

Disclaimer

This report is not an environmental document. Preliminary analysis, determinations, and estimates of mitigation costs are based on the project description provided in this report. The estimates and conclusions provided are approximate and are based on cursory analysis of probable effects. This report is to provide a preliminary level of environmental analysis to supplement the Project Study Report. Changes in project scope, alternatives, or environmental laws will require a re-evaluation of this report.

Reviewed by:


Bryan Apper, AICP
Environmental Branch Chief

Date: 6/14/02

Project Manager

Date: _____

Environmental Technical Reports or Studies Required

	Study	Document	N/A
Community Impact Study	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmland	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Section 4(f) Evaluation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Visual Resources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water Quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Floodplain Evaluation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Noise Study	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Air Quality Study	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Paleontology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild and Scenic River Consistency	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cumulative Impacts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural			
ASR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HSR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HASR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HPSR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section 106 / SHPO	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Native American Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other			
Finding of Effect _____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data Recovery Plan _____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous Waste			
ISA (Additional)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PSI	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological			
Endangered Species (Federal)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Endangered Species (State)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Species of Concern (CNPS, USFS, BLM, S, F)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological Assessment (USFWS, NMFS, State)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wetlands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive Species	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural Environment Study	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEPA 404 Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Permits			
401 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
404 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1601 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

City/County Coastal Permit Coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
State Coastal Permit Coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
NPDES Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
US Coast Guard (Section 10)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion of Technical Review

Socio-economic and Community Effects. The project would impact the communities of Mojave (3,763), Shoshone (79) and other communities along State Route 127, thus a Community Impact Assessment would be required.

Public Interest: This project is likely to generate intense public scrutiny for both the project itself and the purpose of the project. Involvement with the general public and public interest groups on the local, state and national level should be anticipated.

Farmlands. There are no farmlands within the project area.

4(f) Impacts. Death Valley National Park lies against State Route 127. If any parkland is taken, section 4(f) evaluation would be required. Under Section 4(f) we are not allowed to take a parkland unless we show that there is no prudent and reasonable alternative to the taking of that property.

Wilderness Area. This project is adjacent to designated Wilderness area in several locations. North of State Route 178, Wilderness areas surround State Route 127 on both sides. To the west Death Valley National Park, and to the east the Resting Springs Wilderness Area. The Resting Springs Wilderness Area is under the jurisdiction of the Bureau of Land Management. Wilderness areas typically don't include land within 30 – 300 feet of paved roads. If Right of Way is necessary within the designated Wilderness area, that designation must be changed. A Wilderness Area Designation can only be changed by the United States Congress.

Visual Resources. A visual impact assessment would be necessary.

Water Quality and Erosion. The site should be evaluated for potential water quality impacts associated with the project. If site dewatering is required for new construction, a dewatering plan is required. Site access for construction must be included in any water quality analysis.

Floodplain. A floodplain evaluation report will need to be prepared to analyze the effects of the alterations to the 100-year floodplain.

Air and Noise. No further studies are anticipated.

Wild and Scenic River. No wild and scenic rivers are within the project area.

Cultural Resources. An archaeological survey will be required for the project. The proposed Area of Potential Effect (APE) must include all access roads, work areas and staging areas beyond the existing paved highway. Any subsequent changes in project scope may require additional archaeological or historical review. The project area would need around 100 miles of pedestrian survey. There are at least 80 known prehistoric archeology sites, as well as numerous historic landscapes that would fall in the future Area of Potential Effect. Pedestrian surveys are expected to yield even more resources. Phase II and Phase III studies are anticipated. The area of effect is large and within an area where weather makes surveying more difficult. Thus, time estimated for Phase I studies (Pedestrian Surveys) is 2.5 years and for Phase II (Eligibility determination) is 3 years. Both of these would have to be done prior to approval of the draft environmental document.

Hazardous Waste/Materials. An Initial Site Assessment (ISA) will be required to address the potential for hazardous waste.

Biological Resources. This project would affect sensitive biological resources. Formal consultation with the U.S. Fish and Wildlife Service would be required. Extensive field surveys would be required.

Special-status species with potential to occur within or adjacent to the project area		Status		
Common Name	Scientific Name	Fed	CA	Other
PLANTS				
Gilman's cymopterus	<i>Cymopterus gilmanii</i>			1B
Shockley's rock cress	<i>Arabis shockleyi</i>			
Preuss's milk-vetch	<i>Astragalus preussii</i> var. <i>preussii</i>			
Death Valley Round-leaved Phacelia	<i>Phacelia mustelina</i>			
Rusby's desert-mallow	<i>Sphaeralcea rusbyi</i> var. <i>eremicola</i>			
Ripley's gilia	<i>Gilia ripleyi</i>			
Utah monkeyflower	<i>Mimulus glabratus</i> ssp. <i>utahensis</i>			
ANIMALS				
Vermilion Flycatchers	<i>Pyrocephalus rubinus</i>			
Yellow warbler	<i>Dendroica petechia</i>			
Yellow Breasted Chat	<i>Icteria virens auricollis</i>		SSC	
Amargosa Canyon speckled dace	<i>Rhinichthys osculus</i> ssp. <i>1</i>		SSC	
Amargosa pupfish	<i>Cyprinodon nevadensis nevadensis</i>		SSC	
Shoshone pupfish	<i>Cyprinodon radiosus</i>	SE	FE	
Amargosa Vole	<i>Microtus californicus scirpensis</i>	SE	FE	

Key to Status

FE = Federal Endangered SE = State Endangered 1B = CNPS Rare or Endangered in
 FT = Federal Threatened ST = State Threatened California and elsewhere
 FSC = Federal Species of Concern SC = Species of Concern

Wetlands. A delineation of jurisdictional wetlands and waters of the United States needs to be done. Executive Order 11990 requires an avoidance alternative analysis for wetland impacts unless there is no practicable alternative available. Impacts to waters of the U.S. and wetlands from the project and any temporary access roads will need to be quantified.

Invasive Pest Plant Species. Executive Order 13112 requires that any Federal action may not cause or promote the spread or introduction of invasive species.

Right-of-Way Relocation or Staging Area. Material sites and disposal sites are indicated, but not identified. These areas, which must be identified prior to initiating environmental studies, will require complete environmental evaluation as part of this project. A relocation impact report would be required for any residents being moved because of the project.

Permits. Permits from the State Department of Fish and Game (1601), U. S. Army Corps of Engineers (404) and the Regional Water Quality Control Board (401) will be required. Additional permits for the material site and disposal site may be required.

List of Preparers

Hazardous Waste Review by Peter Hansen	Date 02/20/02
Biological Review by Craig Olofson	Date 04/26/02
Cultural Review by Tom Mills	Date 04/26/02
Community Impact Review David Farris	Date 05/14/02
Visual Review by	Date
Floodplain Review by David Farris	Date 05/14/02

Attachment A - PEAR Mitigation and Compliance Cost Estimate*(Standard PSRs Only)

Dist.-Co.-Rte.-KP/PM: 09-SBD/INY 127 0.0-66.7/0.0/79.5 (0.0-41.5/0.049.4

EA: 09-30520

Project Description: This project would add operational improvements to State Route 127. The proposed work includes the overlay of existing travel ways, construction of 2.4 m shoulders, correction of horizontal and vertical curves.

Person completing form/ Dist. Office David Farris

Project Manager: S Balasubramanian

Phone: (760) 872-2372

Date: 05/28/02

	Mitigation			Compliance
	Project Feature ¹	Enviro. Obligation ²	Statutory Require. ³	Permit & Agreement ⁴
Fish & Game 1601 Agreement				
Coastal Development Permit				
State Lands Agreement				
NPDES Permit				
COE 404 Permit- Nationwide				
COE 404 Permit- Individual				
COE Section 10 Permit				
COE Section 9 Permit				
Other:				
Noise attenuation				
Special landscaping				
Archaeological		5,000		
Biological		500		
Historical				
Scenic resources		750		
Wetland/riparian				
Other:				
TOTAL (Enter zeros if no cost)		6,225		

- Costs are to be reported in \$1,000's.
- Costs are to include all costs to complete the commitment including: 1) capital outlay and staff support; 2) cost of right-of-way or easements; 3) long-term monitoring and reporting; and 4) any follow-up maintenance.

¹ Mitigation that Caltrans would normally do if not required by a permit or environmental agreement.

² Mitigation that Caltrans would not normally do but is required by conditions of a permit or environmental agreement.

³ Mitigation that Caltrans would not normally do and is not required by a permit or Enviro. Agreement, but is required by a law.

⁴ Non-mitigation Caltrans would not normally do but is required by conditions of a permit or agreement.

*Prepare a separate form for each practicable alternative in the PSR.

ATTACHMENT E

RIGHT OF WAY SCOPING CHECKLIST



Right of Way Scoping Checklist

This Right of Way Scoping document is provided solely for the purpose of Environmental Activity Programming only. Right of Way capital should not be programmed based on this document. A Right of Way Data Sheet should be requested prior to programming the Right of Way component. The Data Sheet will supercede all information contained in this document.

Project Information

District: 09 County: INYO Route: 127 Post Mile: 0.0/49.42 KP: 0.0/79.5

EA: 09-30520k

Description: operational improvements along State Route 127 in Inyo (District 09's area) and San Bernardino Counties as to enhance hwy for future truck route usage: overlay, widen shoulders, and correct horizontal and vertical alignments within the proposed limits.

Project Manager: Srikanth Balasubramanian - Bishop
2372

Phone No. 760-872-

Project Engineer: Mohammad Samami - Fresno

Phone No. 559-243-3573

Design Manager: Rodrick Lee - Fresno
3573

Phone No. 559-243-

Right of Way Manager: Nancy Escallier - Bishop

Phone No. 760-872-0641

Right of Way Scoping

Describe and identify in the following sections a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, access modifications, etc.). The right of way issues should be discussed in sufficient detail to determine a preliminary planing level cost of Right of Way and identify the project's sensitive acquisition issues. Any environmental mitigation that requires R/W cost should also be identified.

Anticipated Right of Way Acquisition

Anticipated number of Right of Way Parcels to be acquired: Cannot be determined at this time.

NOTE: The Project Engineer has stated that the required amount of right of way to be acquired for this project will be 100 hectares (approximately 247 acres), although exact areas are unknown.

Upon review of preliminary mapping the R/W Engineering-Surveys Agent has stated that on portions of Hwy 127 through Inyo County we have no record r/w on sections of land across USDA-BLM land or we have either a 200 or 400 foot r/w across BLM lands. There are also sections of hwy across NPS-Death Valley Park land and some privately owned land.

Values for r/w acquisitions on public will have a low dollar value while on privately owned land the value would be approximately \$1,000/acre.

At this time there is no way to ascertain the need for utility relocations, railroad involvement and relocation assistance from the mapping provided.

ESTIMATED TOTAL RW COST: \$500,000 (non-escalated)

Project Screening

Attach the project location map to this checklist to show location of all right of way acquisition identified.

1. Project Features: New R/W?: yes Excavation?: unknown.
Railroad Involvement?: not determined. Access Changes?: not determined.
Structure demolition/modification?: not determined.
Subsurface utility relocation?: not determined.
2. Project Setting: mainly unimproved, vacant high desert lands.
Rural or Urban: Junction of Rte 127/190 has commercial businesses. Rte 127 at approximately PM 14.6 runs through the little town of Shoshone.
Current land uses: mainly high desert recreational.
Adjacent land uses: some commercial and residential uses but majority of land use is

recreational.

Right of Way Screening

- 1) Are any utility facilities or rights of way affected? : not able to determine at this time. Potholing has been requested so there is the possibility of conflicts.
- 2) Railroad facilities or right of way affected?: probably not.
- 3) Any known or potential sites with hazardous waste and/or material found?: There could be a couple of old gas station signs along Rte 127 (in Shoshone and near the 127/190 intersection.) otherwise unknown at this time.
- 4) Environmental Mitigation parcels anticipated?: none noted by Project Engineer unknown at this time.
- 5) Any parcels with access modifications?: unknown at this time.
- 6) Any parcels with indirect access modifications?: unknown at this time.
- 7) Any fees required for Environmental Document filing?: yes, John Colberg has identified the need for \$1,250.00.

Preliminary Evaluation provided by:

Right of Way Estimator - Bishop:

Lora Rischer
Lora Rischer

Date

2/8/02

Reviewed by:

Field Office Chief

Right of Way - Bishop:

Nancy Escallier
Nancy Escallier

Date

2/8/02

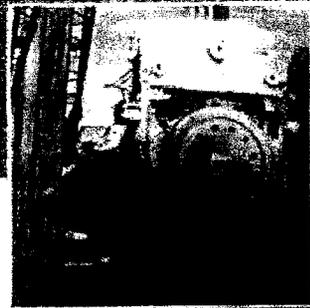
Right-of-Way Scoping Checklist
EA 09-30520k
Page 4 of 4

Entered PMCS (Event, Cost, Agree) By: _____ Date: _____

ATTACHMENT F

**SPENT NUCLEAR FUEL TRANSPORTATION
(TITLE SHEET AND INTRODUCTION ONLY)**

Spent Nuclear Fuel Transportation



U.S. Department of Energy
Office of Public Affairs
www.energy.gov - www.ymp.gov



Next>

Transportation of Radioactive Materials and Yucca Mountain

Introduction

The established record of transportation of spent nuclear fuel overwhelmingly indicates that it is safe. Since the 1960s, over 1.6 million miles have been traveled by more than 2,700 spent nuclear fuel shipments without any harmful release of radioactive material. If Yucca Mountain is approved and a repository is built, transportation of spent nuclear fuel and high-level radioactive waste from the 131 temporary storage sites located in 39 states would begin in 2010-the scheduled opening date for Yucca Mountain. No spent fuel can be moved to Yucca Mountain until the Nuclear Regulatory Commission (NRC) licenses the repository for receipt of spent fuel.

Should a repository be licensed at Yucca Mountain, the Department of Energy (DOE) projects that it would conduct approximately 4,300 shipments over a 24-year period. That's an average of about 175 shipments of spent nuclear fuel per year, a relatively small amount compared with the approximately 300 million annual shipments of hazardous materials¹-explosives, chemicals, flammable liquids, corrosive materials, and other types of radioactive materials-that are currently transported around the country every day.

The shipment of nuclear waste is highly regulated and subject to the utmost scrutiny. We follow the strict Department of Transportation (DOT) and NRC transportation rules, including the use of NRC-certified transportation casks, advance route approvals and notification, and shipment escorts. The Department also tracks its shipments by satellite on a 24-hour basis. DOE follows these precautions carefully now and will follow or exceed any others that may be required in the future, whether by the Congress or by DOT or NRC.

Preliminary route selection and detailed planning will begin at least five years before the first shipment takes place. As is current practice, the federal government will work with States and Tribes before shipments of spent nuclear fuel begin. For example, for highway shipments, each State's Governor has the ability to provide the DOT its preferred routes for use. This and similar interaction will ensure that all routes meet the regulatory requirements set for safe and secure transport of spent nuclear fuel.

Finally, the Department is committed to ensuring safe practices in the transportation of nuclear materials. DOE has already trained emergency response teams in 34 States, under a variety of programs and in cooperation with other government agencies. Using funds and expertise provided by the Department, local fire and police will continue to be trained in advance to respond appropriately to challenges unique to these shipments.

¹ Hazardous Materials Shipments. Washington, DC: U.S. Department of Transportation, The Office of Hazardous Materials Safety Research and Special Programs Administration, October 1998.

[<Previous](#)

[Next>](#)

ATTACHMENT G

PRELIMINARY DRAINAGE RECOMMENDATIONS

Memorandum

To: RODRICK LEE, Chief
Design Engineer, Branch I

Date: May 3, 2002

File: 8-SBD/9-INY-127
KP SBD 0.0/66.8
(PM 0.0/41.5)
KP INY 0.0/79.5
(PM 0.0/49.4)
EA 9-30520K

From: DEPARTMENT OF TRANSPORTATION – District 6
Hydraulics Branch

Subject: Preliminary Drainage Recommendations

This is to provide preliminary drainage recommendations for the subject project. The subject project proposes to construct improvements on SR 127 in San Bernardino and Inyo Counties. SR 127 is a rural two-lane conventional highway. The scope of the project is operational improvements that includes overlay of travel ways, construction of new 2.4 meter shoulders, correction of horizontal and vertical alignments within the project limits. References used are as follows:

1. Aerial photographs of SR 127 (PM 0.0/41.5) within San Bernardino County
2. Aerial photographs of SR 127 (PM 16.19/PM 49.42) within Inyo County
3. Notes from field trip taken on 7/11/01. Participants on field trip were:
 - Brad Mattam – D09 Planning
 - Jim Wilson – D09 Maintenance
 - Jeff Frederiksen – D09 Maintenance
 - Manny Ortiz – Area Superintendent; D09 Maintenance
 - Tom Dayak – D09 Environmental
 - Craig Olofson – D09 Environmental
 - Rodrick Lee – D06 Design
 - Josh Rogers – D06 Design
 - Manuel Ramirez – D06 Design
4. District 9 maintenance records for Inyo County

The following preliminary comments and recommendations are presented:

1. SBD-127, PM 0.2: There is a wash with established banks with invert at grade with highway at this location. The wash appears to connect State property by I-15 southeast of SR 127 with the wash that is to the west of SR 127. It is assumed, although not confirmed at this time, that the wash drains from the east to the west, into the river wash. The levees of the wash separate the wash from an adjacent

mobile home park. It is recommended a group of box culverts be provided below the roadway to convey stormflows across the highway alignment.

2. SBD-127, PM 0.2-3: Aerial photos show numerous smaller (1-meter wide) dry ditches or washes draining from west to east on each side of the highway. Flows do not appear to be concentrated beyond minor ditches along this segment, and flooding has been identified by maintenance personnel as recurrent in this segment. It is recommended that the highway profile be raised and that culverts (600 mm to 900 mm) be provided at the ditch locations and at regular intervals (100 m) to allow sheet flows to concentrate and cross the highway through the culverts. This may require the construction of diagonal berms on the alluvial plains uphill from the highway at regular intervals to concentrate sheetflows and direct them to the culverts.
3. SBD-127, PM 8.07-8.43: This area is identified as Silver Lake on USGS Quad Map (North of Baker.) Review of the Caltrans photolog indicates that the vehicle turnout on the east side of highway appears to be raised above the highway profile. Aerial photo of the area appears to show drainage ditches or washes that direct flow from west side of highway to east side. It is recommended that the highway profile be raised in this area and that culverts be provided for cross drainage. Additional ditches should be provided off site on the east side of the turnout to prevent any barriers to sheet flows from the turnout.
4. SBD-127, PM 14.92-15.15: Maintenance personnel have reported past flooding with flow depths of plus or minus 1-ft of water across the route in this vicinity. Aerial photographs show a waterbody identified as Salt Creek (USGS Silurian Valley Quad) crossing the route at this location. It is recommended that the profile of roadway be raised in this segment and that a combination of culverts and levees be provided in this segment to convey flows across the roadway.
5. SBD-127, PM 15.15-26.19: Aerial photos show that on the alluvial plain west of the highway, ditches and/or berms are constructed to concentrate sheet flows to points at the shoulder of the highway where they can cross the roadway to the east side. It is recommended that the roadway profile be raised and that CMP culverts be placed at flow concentration points and at 100-meter intervals.
6. SBD-127, PM 27.56: Aerial photos show a branch of Salt Creek crossing the roadway at grade. Drainage pattern is distinctive, although direction of flow is not clear at this time. It is recommended that the profile of the roadway in this segment be raised, and that a series of pipe culverts or box culverts be provided for this branch of Salt Creek.
7. SBD-127, PM 27.56-28.81: Aerial photos show natural drainage patterns for alluvial plain on west side of highway (i.e., no diagonal ditches) indicating drainage across roadway to east side of highway. Cross culverts may be existing at concentration

points where they meet the shoulder of the roadway. It is recommended that culverts at this segment be upgraded in size, and that new CMP culverts be provided at 100-meter spacing.

8. SBD-127, PM 29.90: Salt Creek crosses the highway at this location. Existing CMP pipe culverts (three 5-ft diameter?) are provided, with sacked concrete or stone headwalls and wingwalls. It is recommended that a bridge crossing be provided at this location for flood control.
9. SBD-127, PM 31.87: Amargosa River Bridge location. Pending research from maintenance records (has the river ever overtopped the bridge since its construction in 1993?), it is recommended that the bridge be maintained.
10. SBD-127, PM 33.39: Dumont Dunes area. Aerial photos show a distinct wash at this location. Preliminary reports from maintenance personnel indicate that this is a flood area. Recommend roadway profile grade raise and series of culverts at the wash location.
11. SBD-127, PM 37.78: Aerial photos of this segment do not show any significant sheetflow runoff concentrations on the west side of the roadway. On the east side of the roadway, a wash (man-made?) appears to run parallel to the highway throughout this segment. Diagonal ditches or swales have been cut at regular intervals from the eastern highway shoulder to the wash. Preliminary reports from maintenance personnel do not comment on this segment as a flooding problem. No recommendations for this location.
12. SBD-127, PM 37.78-41.42: Several culverts appear to exist in this segment, based on drainage patterns shown in aerial photos. This segment is characterized by small hills, with better-defined small washes crossing the roadway. The roadway is aligned through cut/fill sections. It is recommended that CMP culverts be provided where washes cross the highway. SBD/Inyo county line occurs here.
13. INY-127, PM 4.0: Historical records indicate flooding at this location. There appears to be a wash at this location that crosses the highway at grade. It is recommended that the roadway profile be raised at this location and a series of CMP culverts be provided below the roadway to convey stormflows across the highway alignment.
14. INY-127, PM 5.9: Historical records indicate flooding at this location. There is a wash at this location that crosses the highway at grade. It is recommended that the roadway profile be raised at this location and a series of box culverts be provided below the roadway to convey stormflows across the highway alignment.
15. INY-127, PM 9.5: Historical records indicate flooding at this location. There is a wash at this location that crosses the highway at grade. It is recommended that the

roadway profile be raised at this location and a series of box culverts be provided below the roadway to convey stormflows across the highway alignment.

16. INY-127, PM 6.0-8.5: Field notes from field trip taken 7/11/01 indicate that this is a flood area. It is recommended that the highway profile be raised and that CMP culverts be provided at regular intervals.

17. INY-127, PM 8.95: Photolog reveals possible culvert at this location. It is recommended that aerial photographs and maintenance records (if available) be consulted to further evaluate this location.

18. INY-127, PM 9.11: Photolog reveals possible culvert at this location. It is recommended that aerial photographs and maintenance records (if available) be consulted to further evaluate this location.

19. INY-127, PM 10.8: Photolog review reveals a culvert at this location. Field notes from field trip taken 7/11/01 indicate that this is a flood area. It is recommended that reinforced concrete box culverts be provided at this location, and that the highway profile be raised.

20. INY-127, PM 12.6: Historical records indicate past flooding at this location. Provide CMP culverts at low ground through this hilly area.

21. INY-127, PM 11.16-12.21: Photolog review reveals what may be a segment with multiple at-grade crossings of surface runoff across the highway. It is recommended that CMP culverts be provided at washes in this segment.

22. INY-127, PM 16.00-PM 17.81: Aerial photos dated 5/5/97 appear to show numerous small concentrations of surface flow parallel to and across the highway within this segment. The highway appears to be located a low flow area in this segment. It is recommended that the highway profile be raised and that CMP culverts be provided at 100-meter intervals in this segment.

23. INY-127, PM 19.6-PM 22.3: Historical records indicate past flooding in this segment. It is recommended that the highway profile be raised and that CMP culverts be provided at 100-meter intervals in this segment.

24. INY-127, PM 22.70: Aerial photos indicate that this is the location of a crossing of the Amargosa River. The river crosses from west to east across the highway. At this location, a group of at six large CMP culverts conveys flows across the highway. Aerial photo dated 5/5/97 shows the river flow path as being approximately 180 feet wide on the west (downstream) side of the highway. It is recommended that the highway profile be raised at this location. It is also recommended that a bridge be constructed at this location to facilitate river flow separation from traffic.

25. INY-127, PM 23.22: Aerial photos indicate that this is the location of a crossing of the Amargosa River. The river crosses from east to west across the highway. At this location, a group of at least three large CMP culverts conveys flows across the highway. Aerial photo dated 5/5/97 shows the river flow path as being approximately 360 feet wide on the west (upstream) side of the highway. It is recommended that the highway profile be raised at this location. It is also recommended that a bridge be constructed at this location to facilitate river flow separation from traffic.
26. INY-127, PM 22.7-PM 42.5: Along this segment, aerial photos show various small washes that drain from west (between topographic rises) of the highway to east of the highway, toward the Amargosa River, that parallels the highway here. There may be individual culverts existing at points of concentrated flow. Historical flooding reported at various locations within this segment. It is recommended that the highway profile be raised, and that CMP culverts be provided at regular intervals.
27. INY-127, PM 29.75: Aerial photos indicate that this is the location of a crossing of the Amargosa River during a past flooding event. The river crosses from west to east across the highway (no culverts at this location) over a 400-ft wide path. It is recommended that the highway profile be raised at this location. It is also recommended that a bridge be constructed at this location to facilitate river flow separation from traffic.
28. INY-127, PM 31.44: There is a group of six 5-ft diameter (estimated) CMP culverts at this location that functions as a crossing for the Amargosa River. It is recommended that the culverts at this location be upgraded to a bridge crossing to provide improved conveyance capabilities for the river. Aerial photo of this crossing appears to show 320-ft wide path for the river on the downstream side of the highway.
29. INY-127, PM 42.16: Small wash appears to cross the highway at this location via CMP culvert. It is recommended that CMP culverts at this location be upgraded in size or number.
30. INY-127, PM 42.74: Low spot in highway profile appears to be location of at grade floodwater crossing. Aerial photos show shallow wash approximately 100-ft long on west side of highway. It is recommended that the roadway profile be raised and culverts be provided at this location.
31. INY-127, PM 43.06: Low spot in highway profile appears to be location where floodwaters may cross highway. Aerial photo does not clearly indicate direction that floodwaters may take at this location. It is recommended that the roadway profile be raised and culverts be provided at this location.

32. INY-127, PM 44.86: This location correlates with Caltrans Photolog 44.96. Aerial photos appear to indicate that floodwaters cross at this location, just south of the vertical rise in the highway. It is recommended that the highway profile be raised at this location, and that a group of culverts be provided here to convey floodwaters across roadway.
33. INY-127, PM 45.19: This location correlates with Caltrans Photolog 45.29. Aerial photos appear to indicate that floodwaters cross at this location, just south of the vertical rise in the highway. It is recommended that the highway profile be raised at this location, and that a group of culverts be provided here to convey floodwaters across roadway.
34. INY-127, PM 45.62: This location correlates with Caltrans Photolog 45.72. Aerial photos appear to indicate that floodwaters cross at this location, just south of the vertical rise in the highway. It is recommended that the highway profile be raised at this location, and that a group of culverts be provided here to convey floodwaters across roadway.
35. INY-127, PM 47.82: Aerial photos indicate that floodwaters cross the highway at this location, linking up with the larger flood crossing at PM 47.90. Provide a culvert at this location. Raise highway profile in conjunction with the following item.
36. INY-127, PM 47.90-47.92: Aerial photos indicate that floodwaters cross the highway at this location, with a distinct flow path. Preliminary reports from maintenance also indicate recurrent flooding here. The Caltrans photolog shows that this is a low profile highway segment, with floodwaters crossing at grade. It is recommended that the highway profile be raised at this location, and that a series of culverts be provided to convey floodwaters across the highway.

Attached is a rough cost estimate of the recommended drainage improvements. If you have any questions, contact me at 243-3514 or my supervisor, Sam Wong at 243-3507.



ANTHONY BARRIOS, P.E.
Hydraulics Branch A

AB:ab
c: File
Attachment

Drainage Cost Estimate
 Project: 9-Iny-127
 KA: 09-30520K

Page No: 1
 Date: 5/3/02
 Prepared By: Anthony Barrios

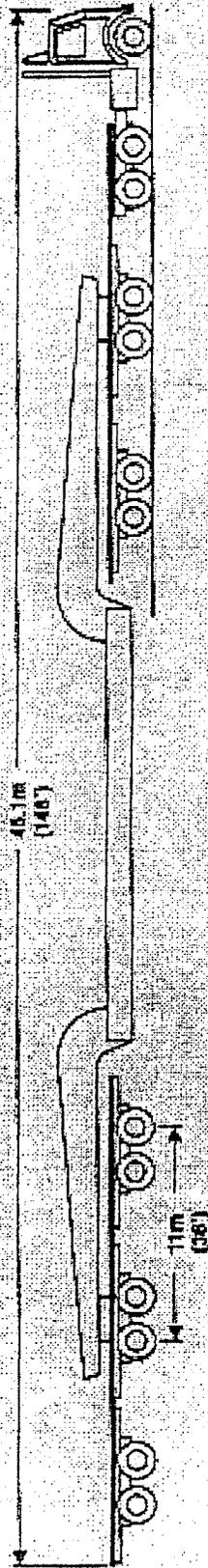
No.	County	Post Mile	Item Description	Units	Quantity	Unit Cost	Amount	Remarks
1	SBD	0.2	DBL RCB	LS	1.0	75,000.00	75,000.00	
2	SBD	.2/3.0	CMP culverts	LS	1.0	247,500.00	247,500.00	
3	SBD	8.07/8.43	CMP culverts	LS	1.0	33,000.00	33,000.00	
4	SBD	14.92/15.15	CMP culverts	LS	1.0	22,000.00	22,000.00	
5	SBD	15.15/26.19	CMP culverts	LS	1.0	979,000.00	979,000.00	
6	SBD	27.56	DBL RCB	LS	1.0	75,000.00	75,000.00	
7	SBD	27.56/28.81	CMP culverts	LS	1.0	110,000.00	110,000.00	
8	SBD	29.9	Bridge	LS	1.0	150,000.00	150,000.00	45-m minimum length
9	SBD	31.87	----	----	----	----	----	
10	SBD	33.39	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
11	SBD	37.78	----	----	----	----	----	
12	SBD	37.78/41.42	CMP culverts	LS	1.0	324,500.00	324,500.00	
13	INY	4	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
14	INY	5.9	DBL RCB	LS	1.0	75,000.00	75,000.00	
15	INY	9.5	DBL RCB	LS	1.0	75,000.00	75,000.00	
16	INY	6.0/8.5	CMP culverts	LS	1.0	220,000.00	220,000.00	
17	INY	8.95	----	----	----	----	----	
18	INY	9.11	----	----	----	----	----	
19	INY	10.8	DBL RCB	LS	1.0	75,000.00	75,000.00	
20	INY	12.6	CMP culverts	LS	1.0	44,000.00	44,000.00	
21	INY	11.16/12.21	CMP culverts	LS	1.0	93,500.00	93,500.00	
22	INY	16.00/17.81	CMP culverts	LS	1.0	165,000.00	165,000.00	
23	INY	19.6/22.3	CMP culverts	LS	1.0	242,000.00	242,000.00	
24	INY	22.7	Bridge	LS	1.0	150,000.00	150,000.00	45-m minimum length
25	INY	23.22	Bridge	LS	1.0	150,000.00	150,000.00	45-m minimum length
26	INY	22.7/42.5	CMP culverts	LS	1.0	1,754,500.00	1,754,500.00	
27	INY	29.75	Bridge	LS	1.0	150,000.00	150,000.00	45-m minimum length
28	INY	31.44	Bridge	LS	1.0	150,000.00	150,000.00	45-m minimum length
29	INY	42.16	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
30	INY	42.74	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
31	INY	43.06	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
32	INY	44.86	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
33	INY	45.19	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
34	INY	45.62	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
35	INY	47.82	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
36	INY	47.90/47.92	CMP culverts	LS	1.0	50,000.00	50,000.00	(4)5-ft Dia. CMP
			Grade and reconstruct ditches	LS	1.0	3,045,000.00	3,045,000.00	
Subtotal Drainage							8,905,000.00	
20 percent Contingencies							1,781,000.00	
Total Drainage							10,686,000.00	

NOTE: QUANTITIES FOR EARTHWORK ASSOCIATED WITH BRIDGES AND BOX CULVERTS ARE NOT INCLUDED IN ESTIMATE

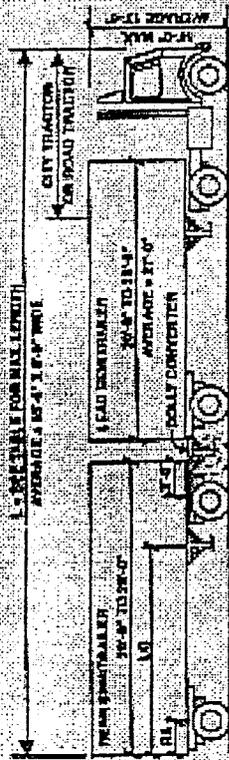
ATTACHMENT H

HEAVY HAUL TRANSPORTER

Heavy Haul Transporter Comparison to Semitrailer and Tractor

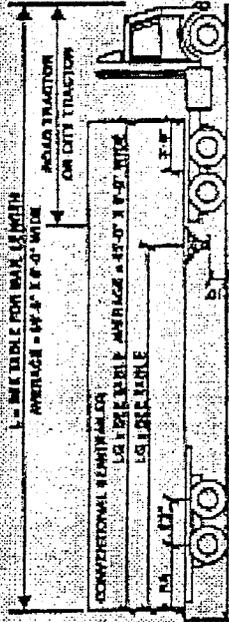


Double Semitrailer



DOUBLE SEMITRAILER AND TRACTOR
THIS SIZE APPLIES TO 20' TO 44' WIDE

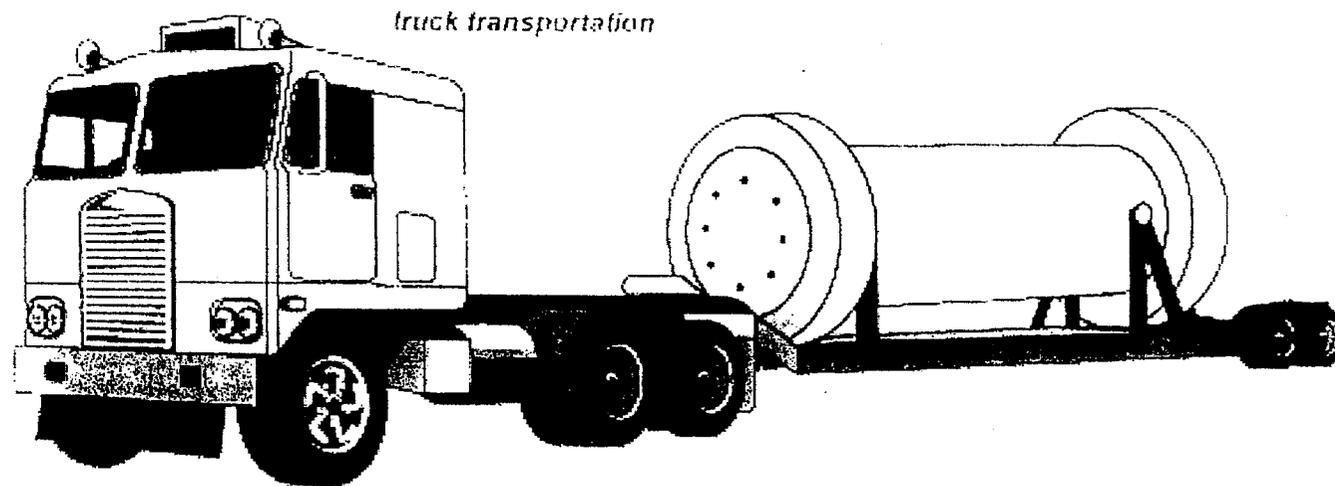
Conventional Semitrailer



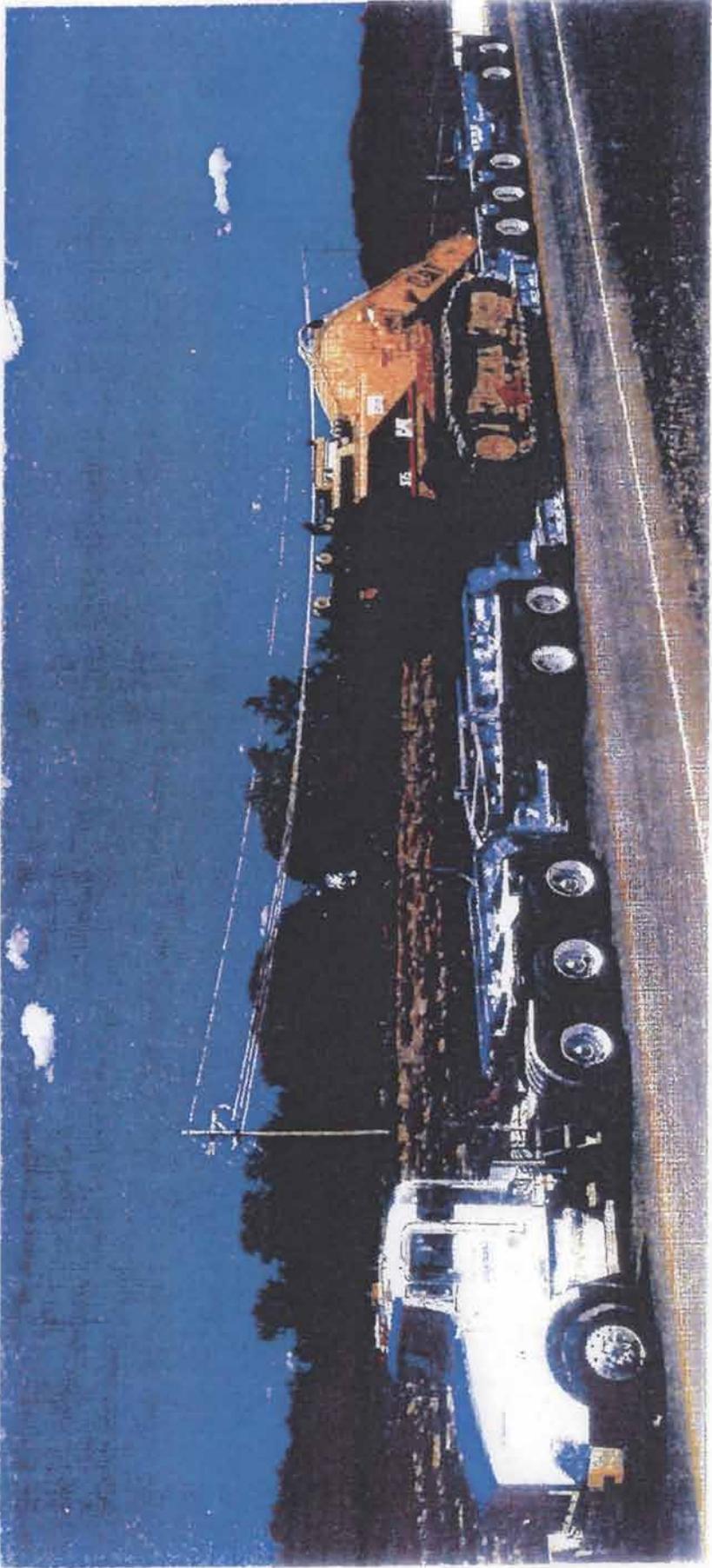
SEMITRAILER AND TRACTOR
THIS SIZE APPLIES TO 20' TO 44' WIDE

AVERAGE DIMENSIONS OF VEHICLES

	TYPE OF VEHICLES		
	DOUBLE SEMITRAILER	CONVENTIONAL SEMITRAILER	STRAIGHT BODY TRUCK
Length (L)	55'0"	55'0"	17'0" to 25'0"
Width (W)	8'0"	8'0"	8'0"
Height (H)	13'6"	13'6"	13'8"
Floor Height (FH)	4'0" to 4'6"	4'0" to 4'4"	3'0" to 4'0"
Track (T)	5'6"	5'6"	5'10" to 5'4"
Rear Axle (RA)	3'0" to 4'0"	4'0" to 12'0"	2'3" to 12'0"
VAN DELIVERY			15'0" to 20'0"
			7'0"
			7'0"
			2'0" to 2'8"
			3'0" to 5'4"



Either rail or truck can be used to bring the nuclear waste in transportation casks to the repository



11

TRAILERS.CDR.1214/4-26-86



TRAILERS CDR 17141/76