

# INFORMATION HANDOUT

For Contract No. [10-0W1404](#)  
At [SCI,Mer - 152 - R35.0/R35.0, R0.0/R2.4](#)

Identified by  
Project ID [1012000042](#)

## PERMITS

U.S. Fish and Wildlife Service

## MATERIALS INFORMATION

Water Source Information

[Manufacturer's Drawings for Alternative Flared Terminal System](#)

[Manufacturer's Drawings for Alternative Crash Cushion](#)

[Manufacturer's Drawings for Temporary Alternative Crash Cushion](#)



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Sacramento Fish and Wildlife Office  
2800 Cottage Way, Room W-2605  
Sacramento, California 95825-1846

In Reply Refer To:  
08ESMF00-2014-F-0034

**APR 10 2014**

Ms. Dena Gonzalez  
Acting Chief, Central Region Biology North Branch  
California Department of Transportation, District 10  
855 M Street Suite 200  
Fresno, California 93721

Subject: Formal Consultation for the State Route 152 Median Barrier near Pacheco Pass Summit Project, Merced and Santa Clara Counties, California (California Department of Transportation 10-MER-152-PM 0.0/2.4, 04-SCL-152-PM 35.0/35.2, EA 10-0W140)

Dear Ms. Gonzalez:

This is the U.S. Fish and Wildlife Service's (Service) response to the California Department of Transportation's (Caltrans) request for formal consultation on its action to construct the State Route 152 Median Barrier near Pacheco Pass Summit Project (project) in Merced and Santa Clara Counties, California.

The Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law on July 16, 2012. Caltrans was approved to participate in the MAP-21 Surface Transportation Project Delivery Program through the National Environmental Policy Act (NEPA) assignment Memorandum of Understanding (MOU) between the Federal Highway Administration (FHWA) and Caltrans (effective October 1, 2012), as codified in 23 U.S.C. 327. The MOU allows Caltrans to assume the FHWA's responsibilities under NEPA as well as FHWA's consultation and coordination responsibilities under Federal environmental laws for the majority of transportation projects in California.

Your initial letter requesting informal consultation, dated October 16, 2013, was received in this office on October 30, 2013. In this letter, Caltrans concluded that the proposed project may affect, but is not likely to adversely affect the federally-listed as endangered San Joaquin kit fox (*Vulpes macrotis mutica*) and will have no effect on the federally-listed as threatened California red-legged frog (*Rana draytonii*) and the central California distinct population segment (DPS) of the California tiger salamander (*Ambystoma californiense*; central California tiger salamander). Following further project discussion between the Service and Caltrans, Caltrans modified its determinations for the California red-legged frog and the central California tiger salamander in an email dated March 18, 2014, to conclude that the proposed project is likely to adversely affect both species. This document

represents the Service's biological opinion on the effects of the proposed project on the listed species and has been prepared in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*) (Act).

The findings and recommendations of this biological opinion are based on: (1) Caltrans' October 16, 2013, letter requesting concurrence, and the accompanying October 2013 *SR 152 Median Barrier Near Pacheco Pass Summit Biological Assessment* (BA); (2) email and telephone correspondence between the Service and Caltrans; (3) Caltrans' March 18, 2014, email requesting a change to formal consultation; and (4) other information available to the Service.

Caltrans has determined that the proposed project may affect, but is not likely to adversely affect the San Joaquin kit fox. No San Joaquin kit foxes or potential den sites were observed within the project footprint during the reconnaissance survey conducted by Caltrans on April 24, 2013. According to the California Department of Fish and Wildlife's Natural Diversity Database (CNDDB, 2014), there are no recorded detections of the species located within the project footprint. Habitat in the median of State Route (SR) 152 (in which all work will occur with the exception of the installation of a changeable message sign [CMS] and maintenance vehicle pullout [MVP]) is composed of highly disturbed areas of both barren and weedy land; because the median is highly disturbed, it is unlikely to provide foraging opportunities for the species. The CMS and MVP will be installed in a gravel pullout adjacent to the travel way; the surrounding habitat here contains no vegetation due to a recent fire. Because there is no suitable denning or foraging habitat for the species within the footprint, it is unlikely that the species actually inhabits the footprint or has access to an available food source given the habitat's impaired condition. The San Joaquin kit fox is also unlikely to be present in the non-native annual grasslands bordering the footprint since these grasslands west of the San Luis Reservoir are in hilly and steep terrain and San Joaquin kit fox presence is negatively associated with ruggedness of the terrain (Service, 2010). It is therefore unlikely that the species would use the grasslands north and south of the highway to move into the project footprint.

Although the species is not expected to be present in the project area or surrounding grasslands, Caltrans proposes to implement the following avoidance and minimization measure as a precautionary measure to reduce the potential for adverse effects to the San Joaquin kit fox. The Service's most recent guidelines will be followed; currently, this is the January 2011 *U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (Recommendations). Caltrans will conduct preconstruction surveys, as described on page two of the Recommendations; set up exclusion zones around any dens that are identified during preconstruction surveys, as described beginning on page three; and implement the construction and on-going operational requirements described beginning on page five. Provision #1 below is a modification to an existing measure in the Recommendations.

1. All food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in closed containers and removed daily from the entire project site in order to reduce the potential for attracting predator species.

Because the project area does not support San Joaquin kit fox denning habitat or foraging; is located within an area of steep terrain that is unsuitable for the San Joaquin kit fox; and because Caltrans will implement its proposed avoidance and minimization measure, the Service concurs that it is

reasonably likely that any effects to the San Joaquin kit fox will be insignificant or discountable and that the action is not likely to adversely affect the species.

If changes are made to the proposed project or if new information becomes available such that adverse effects to the San Joaquin kit fox have occurred, or are likely to occur, then Caltrans must initiate formal consultation for the species. The remainder of this biological opinion will address the effects of the proposed project on the California red-legged frog and central California tiger salamander.

### **Consultation History**

*October 30, 2013.* The Service received Caltrans' consultation request letter and accompanying BA.

*January 30, 2014.* The Service emailed Caltrans to request additional project information concerning the BA.

*February 5, 2014.* Caltrans emailed the Service to provide responses to the Service's request for further information.

*February 27, 2014.* The Service emailed Caltrans 1) to follow-up on several responses from Caltrans' February 5 email; 2) to recommend that Caltrans reconsider its determinations for the California red-legged frog and central California tiger salamander; and 3) to request additional information pertaining to crossing features, i.e. existing culverts in the project area and passageway openings in the median barrier.

*March 3, 2014.* Caltrans telephoned and emailed the Service 1) to discuss potential changes to the determinations for the California red-legged frog and central California tiger salamander; 2) to provide additional information pertaining to the culverts and median passageways, as well as other conservation measures for the project; 3) to provide clarifications regarding several of its February 5 responses; and 4) to inquire if there was a sufficient basis for conducting informal consultation, rather than formal consultation.

*March 10, 2014.* Based on further internal discussion and review of the additional information provided by Caltrans on March 3, the Service emailed Caltrans to report that the proposed action was likely to adversely affect the California red-legged frog and central California tiger salamander; therefore, the Service continued to recommend that Caltrans reconsider its determinations and conservation measures.

*March 11, 2014.* Caltrans and the Service exchanged emails to further discuss 1) potential modifications to the median passageway design and the extra measures recommended by the Service; and 2) the rationale behind the recommendation to change the consultation type.

*March 12, 2014.* Caltrans emailed the Service to express concerns regarding the approaching scheduling deadline and to provide information pertaining to the presence of additional culverts within the project area.

*March 13, 2014.* Caltrans telephoned the Service to inquire if the Service had finished conferring on the project. The Service replied that discussions were still ongoing and that several topics were still in need of clarification. Caltrans emailed the Service to provide the information requested by the Service on March 10 regarding the extra avoidance and minimization measures.

*March 17, 2014.* The Service telephoned Caltrans to confirm that the effects to the California red-legged frog and central California tiger salamander from introducing a permanent barrier structure to the landscape could not be considered discountable or insignificant; therefore, the project was likely to adversely affect these two species and Caltrans should modify its determinations and request formal consultation.

*March 18, 2014.* Caltrans emailed the Service to change its effect determinations for the California red-legged frog and central California tiger salamander and to request formal consultation for these two species.

## **BIOLOGICAL OPINION**

### **Project Description**

Caltrans has identified the need to improve traffic safety on SR 152 near the Pacheco Pass Summit due to the severity and number of cross-median collisions. Caltrans therefore proposes to install a concrete median barrier in the center divider of SR 152 between post miles (PM) 0.0-2.4 in Merced County and PM 35.0-35.2 in Santa Clara County, with crash cushions placed at either end of the barrier segment. Caltrans also proposes to install a CMS and MVP in an existing gravel pullout adjacent to the travel way located at PM 35.0 on the western end of the project site. The sign will sit on an 18 feet (ft.) tall by 4 ft. wide concrete pile; its placement will require utility trenching.

Drainage work will involve relocating the existing drainage inlets located in the highway median so that the barrier structure and any earthen fill will not interfere with stormwater flows. These inlets will be moved laterally relative to their current positions. The existing asphalt concrete ditch located within the median will be removed and reconstructed at a new location within the median where the relocated drainage inlets are placed.

Specific staging areas have not yet been determined, but will be located either in the median or in wide gravel pull-out areas on the outside shoulder along the project's length. Caltrans will determine suitable areas prior to construction.

Construction is anticipated to begin in April 2016 and last approximately five months. All work, other than installation of the CMS and MVP, will occur within the existing median. Some activities will need to occur at night for safety reasons, including installation of the k-rail barriers, pouring the median barrier, paving an additional 5 ft. of the inside shoulder (part of the median), and delivering concrete and asphalt. Grading and trenching activities for the CMS, as well as drainage work, will be conducted during the day.

### Proposed Avoidance and Minimization Measures

Caltrans proposes to implement the following measures in order to minimize adverse effects to the California red-legged frog and the central California tiger salamander.

1. Prior to construction, a Service-approved biologist(s) will conduct environmental awareness training for all construction personnel covering, at minimum, a description of the species and their habitats, the specific measures being implemented to reduce the potential for adverse effects, the project boundaries, and the penalties for non-exempted take.
  - a. The qualifications of the Service-approved biologist will be presented to the Service for review and approval at least 15 calendar days prior to the start of construction.
2. All refueling, maintenance, and staging of equipment and vehicles will occur at least 100 ft. from water sources. The Service-approved biologist(s) will ensure that contamination of habitat does not occur during such operations. All personnel will be informed of the importance of spill prevention and effective response.
3. Construction will be conducted during the dry season (between approximately April 15 and the first qualifying rain event after October 15, defined as precipitation of more than one half inch over a 24 hour period) so as to minimize potential contact with any individuals dispersing through the project area during rain events. The dry season window may depend on rainfall and/or site conditions. Caltrans will confirm its seasonal start and end dates with the Service no less than 30 days prior to the commencement of both groundbreaking and the completion of work.
  - a. Construction (including night work) will be suspended during any rain event and for a subsequent 24 hour drying-out period.
4. Caltrans will install a modified Type 60/S median barrier with 9-inch radius semicircular openings (also known as scuppers) spaced every 100 ft. in order to maintain a degree of permeability; this will reduce the potential to disrupt species' movement and connectivity in the project area.
5. Caltrans' Maintenance Department will inspect and clear the scuppers as needed; these activities will be a priority in the winter, particularly before, during, and following rain events. Scuppers also will be cleaned during sweeping operations, which will become a maintenance activity in the paved median once the Maintenance Department takes possession of the project, as well as during litter and debris removal activities. Culverts will be inspected annually by local maintenance crews, and periodically by the Culvert Inspection Team as scheduled.

### Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area is composed of the project impact area (PIA), which encompasses all areas that will be permanently or temporarily affected by construction activities: this includes the 2.6 mile (mi) segment of SR 152,

including the center divider where the median barrier will be installed; plus the gravel pullouts adjacent to the travel way in which the CMS and MVP will be located and staging areas will be set up. The action area also includes the culverts located on either side of the highway through which segments of two ephemeral drainages flow under SR 152, as well as the expanse of annual grassland that extends from the edge of the roadway downhill to these culverts; these areas will be accessed by future maintenance activities.

### **Analytical Framework for the Jeopardy/No Jeopardy Determination**

In accordance with policy and regulation, the following analysis relies on four components to support the jeopardy/no jeopardy determination for the California red-legged frog and central California tiger salamander: (1) the *Status of the Species*, which evaluates the species' range-wide conditions, the factors responsible for those conditions, and their survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the role of the action area in the species' survival and recovery; (3) the *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

In accordance with policy and regulation, the jeopardy/no jeopardy determination is made by evaluating the effects of the proposed action in the context of the current status of each species, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the California red-legged frog and central California tiger salamander in the wild.

The following analysis places an emphasis on consideration of the range-wide survival and recovery needs of the species and the role of the action area in meeting those needs as the context for evaluating the significance of the effects of the proposed action, combined with cumulative effects, for purposes of making the jeopardy/no jeopardy determination. In short, a non-jeopardy determination is warranted if the proposed action is consistent with maintaining the role of habitat for the species' populations in the action area for the survival and recovery of the species.

### **Status of the Species**

#### *California red-legged frog*

**Listing Status:** The California red-legged frog was listed as threatened on May 23, 1996 (61 FR 25813) (Service, 1996). Critical habitat was designated for this species on April 13, 2006 (71 FR 19244) (Service, 2006) and revisions to the critical habitat designation were published on March 17, 2010 (75 FR 12816) (Service, 2010). At that time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.*, 2010). A recovery plan was published for the species on September 12, 2002 (Service, 2002).

**Description:** The California red-legged frog is the largest native frog in the western United States (Wright and Wright, 1949), ranging from 1.5 to 5.1 inches in length (Stebbins, 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color.

Dorsal spots usually have light centers (Stebbins, 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer, 1925).

Distribution: The historic range of the California red-legged frog extended from the vicinity of Elk Creek in Mendocino County, California, along the coast inland to the vicinity of Redding in Shasta County, California, and southward to northwestern Baja California, Mexico (Fellers, 2005; Jennings and Hayes, 1985; Hayes and Krempels, 1986). The species was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service, 2002). California red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the Central California Coast. Isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular Ranges, but is still present in Baja California, Mexico (California Department of Fish and Wildlife, 2012).

Status and Natural History: California red-legged frogs use both aquatic and upland habitat. When using aquatic habitat they predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 ft. in elevation (Jennings and Hayes, 1994; Bulger *et al.*, 2003; Stebbins, 2003). However, they also inhabit ephemeral creeks, drainages, and ponds with minimal riparian and emergent vegetation. California red-legged frogs breed from November to April, although earlier breeding records have been reported in southern localities. Breeding generally occurs in still or slow-moving water often associated with emergent vegetation, such as cattails, tules, or overhanging willows (Storer, 1925; Hayes and Jennings, 1988). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or near the surface of the water (Hayes and Miyamoto, 1984).

Upland habitat includes nearly any area within 1-2 mi of a breeding site that stays moist and cool through the summer including vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees (Fellers, 2005). Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and includes any landscape feature that provides cover, such as animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers, 2005). Adults are often associated with permanent bodies of water. Some individuals remain at breeding sites year-round, while others disperse to neighboring water features. Dispersal distances are typically less than 0.5 mi, with a few individuals moving up to 1-2 mi (Fellers, 2005). Movements are often made along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers, 2005).

In a study of the species' terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger *et al.* (2003) categorized terrestrial use as migratory and non-migratory. Migratory movements were characterized as overland travel between aquatic sites and were most often associated with breeding activities. Non-migratory movements included short-range forays into upland habitats for periods of days to weeks and were associated with precipitation events. Bulger *et al.* (2003) reported that 90 percent of radio-tagged non-migrating frogs typically stayed within 200 ft. of aquatic habitat at all times, and the farthest any non-migrating frog moved from water was approximately 425 ft. These frogs were most often associated with dense vegetative cover, i.e., California blackberry, poison oak and coyote brush. Migrating frogs in northern Santa Cruz County traveled distances from 0.25 mi to more than 2 mi without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.*, 2003).

Populations can fluctuate from year to year; favorable conditions allow the species to have extremely high rates of reproduction and thus produce large numbers of dispersing young and an associated increase in the number of occupied sites. In contrast, the animal may temporarily disappear from an area when conditions are stressful (*e.g.* during periods of drought and disease).

Threats: Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range. Several researchers in central California have noted the decline and eventual local disappearance of both California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes, 1990; Twedt, 1993), red swamp crayfish, signal crayfish, and several species of warm water fish including sunfish, goldfish, common carp, and mosquitofish (Moyle, 1976; Barry, 1992; Hunt, 1993; Fisher and Schaffer, 1996). This has been attributed to predation, competition, and interference with reproduction. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult California red-legged frogs as well. Bullfrogs may have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan, 1984). In addition, bullfrogs have an extended breeding season (Storer, 1933) during which an individual female can produce as many as 20,000 eggs (Emlen, 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis, 1977). Bullfrogs interfere with California red-legged frog reproduction by eating adult male California red-legged frogs. Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat also has affected the species. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and bullfrogs. Diseases also may pose a significant threat, although the specific effects of disease on the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson *et al.*, 2003). Chytridiomycosis and ranaviruses are a potential threat because these diseases have been found to adversely affect other amphibians, as well as the California red-legged frog (Davidson *et al.*, 2003; Lips *et al.*, 2006). Mao *et al.* (1999, as cited in Fellers, 2005) reported on northern red-legged frogs infected with an iridovirus, which was also presented in sympatric threespine sticklebacks in northwestern California. Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.*, 2006). Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by

acting as carriers themselves (i.e., contaminated boots, waders or fishing equipment). Human activities also can introduce stress by other means, such as habitat fragmentation, that results in the species being more susceptible to disease.

### *California tiger salamander*

**Listing Status:** On May 23, 2003, the Service proposed to list the central California DPS of the tiger salamander as threatened. At that time, the Service also proposed reclassification of the Santa Barbara County DPS and Sonoma County DPS from endangered to threatened (Service, 2003). In the same notice, the Service further proposed a special rule under section 4(d) of the Act to exempt take for routine ranching operations for the central California DPS and, if reclassified to threatened, for the Santa Barbara and Sonoma County DPSs (Service, 2003). On August 4, 2004, after determining that the listed central California DPS of the California tiger salamander was threatened (Service, 2004), the Service determined that the Santa Barbara and Sonoma County populations were threatened as well, and reclassified the central California tiger salamander as threatened throughout its range (Service, 2004), removing the Santa Barbara and Sonoma County populations as separately listed DPSs (Service, 2004). In this notice, the Service also finalized the special rule to exempt take for routine ranching operations for the central California tiger salamander throughout its range (Service, 2004).

On August 18, 2005, as a result of litigation of the August 4, 2004, final rule on the reclassification of the California tiger salamander DPSs (*Center for Biological Diversity et al. v. United States Fish and Wildlife Service et al.*, C 04-04324 WHA (N.D. Cal., 2005), the District Court of Northern California sustained the portion of the 2004 rule pertaining to listing the central California tiger salamander as threatened with a special rule, but vacated the portion of the 2004 rule that re-classified the Santa Barbara and Sonoma DPSs to threatened status thereby reinstating their status as endangered. On August 31, 2011, the List of Endangered and Threatened Wildlife in part 17, subchapter B of Chapter I, title 50 of the Code of Federal Regulations (CFR) was amended to reflect the vacatures contained in the 2005 court order, classifying the Santa Barbara DPS and the Sonoma DPS of the California tiger salamander as endangered, and the central DPS of the California tiger salamander as threatened with a special rule to exempt routine ranching operations from take (Service, 2011).

**Species Description:** The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Recorded adult measurements have been as much as 8.2 inches long (Petranka, 1998; Stebbins, 2003). California tiger salamanders exhibit sexual dimorphism (differences in body appearance based on gender) with males tending to be larger than females. The coloration of the adults generally consists of random white or yellowish markings against a black body. The markings tend to be more concentrated on the lateral sides of the body whereas other salamander species tend to have brighter yellow spotting that is heaviest on the dorsal surface.

**Distribution:** The California tiger salamander is endemic to California and historically inhabited the low-elevation grassland and oak savanna plant communities of the Central Valley, adjacent foothills, and Inner Coast Ranges (Jennings and Hayes, 1994; Storer, 1925; Shaffer *et al.*, 1993). The species has been recorded from near sea level to approximately 3,900 ft. in the Coast Ranges and to approximately 1,600 ft. in the Sierra Nevada foothills (Shaffer and Trenham, 2004). Along the Coast Ranges, the species occurred from the Santa Rosa area of Sonoma County, south to the vicinity of Buellton in Santa Barbara County. The historic distribution in the Central Valley and surrounding

foothills included northern Yolo County southward to northwestern Kern County and northern Tulare County.

The central California tiger salamander occupies the Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and the majority of San Benito counties), Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeastern Alameda, Calaveras, San Joaquin, Stanislaus, Merced, and northwestern Madera counties), southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings Counties), and the Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties).

Life History: The California tiger salamander has an obligate biphasic life cycle (Shaffer *et al.* 2004). Although the larvae develop in the vernal pools and ponds in which they were born, the species is otherwise terrestrial and spend most of their post-metamorphic lives in widely dispersed underground retreats (Shaffer *et al.*, 2004; Trenham *et al.*, 2001). Because they spend most of their lives underground, the animals rarely are encountered even in areas where California tiger salamanders are abundant. Subadult and adult California tiger salamanders typically spend the dry summer and fall months in the burrows of small mammals, such as California ground squirrels and Botta's pocket gopher (Storer, 1925; Loredo and Van Vuren, 1996; Petranka, 1998; Trenham, 1998a). Although ground squirrels have been known to eat these amphibians, the relationship with their burrowing hosts is primarily commensal (an association that benefits one member while the other is not affected) (Loredo *et al.*, 1996; Semonsen, 1998).

California tiger salamanders also may use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Burrows often harbor camel crickets and other invertebrates that provide likely prey for the amphibians. Underground refugia also provide protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Although California tiger salamanders are members of a family of "burrowing" salamanders, they are not known to create their own burrows. This may be due to the hardness of soils in the California ecosystems in which they are found. California tiger salamanders depend on persistent small mammal activity to create, maintain, and sustain sufficient underground refugia for the species. Burrows are short lived without continued small mammal activity and typically collapse within approximately 18 months (Loredo *et al.*, 1996).

California tiger salamanders typically emerge from their underground refugia at night during the fall or winter rainy season (November-May) to migrate to their breeding ponds (Stebbins, 1985, 1989; Shaffer *et al.*, 1993; Trenham *et al.*, 2000). The breeding period is closely associated with the rainfall patterns in any given year with fewer adults migrating and breeding in drought years (Loredo and Van Vuren, 1996; Trenham *et al.*, 2000). Historically, breeding ponds were likely limited to vernal pools, but now include livestock stock ponds. Ideal breeding ponds are typically fishless, free of non-native predators, and seasonal or semi-permanent (Barry and Shaffer, 1994; Petranka, 1998). After breeding and egg-laying is complete, adults leave the pool and return to their upland refugia (Loredo *et al.*, 1996; Trenham, 1998a). Adult California tiger salamanders often continue to emerge nightly for approximately the next two weeks to feed amongst their upland habitat (Shaffer *et al.*, 1993).

Following metamorphosis, juvenile California tiger salamanders leave their pools and move to upland habitat. This emigration can occur in both wet and dry conditions (Loredo and Van Vuren, 1996; Loredo *et al.*, 1996). Wet conditions are more favorable for upland travel but summer rain events seldom occur as metamorphosis is completed and ponds begin to dry. As a result, juveniles may be forced to leave their ponds on rainless nights. Under dry conditions, juveniles may be limited to seeking upland refugia in close proximity to their aquatic larval pool. These individuals often wait until the next winter's rains to move further into more suitable upland refugia. The peak emergence of these metamorphs in ponds is typically between mid-June and mid-July (Loredo and Van Vuren, 1996; Trenham *et al.*, 2000). Juveniles remain active in their upland habitat, emerging from underground refugia during rainfall events to disperse or forage (Trenham and Shaffer, 2005). Depending on location and other development factors, metamorphs will not return as adults to aquatic breeding habitat for two to five years (Loredo and Van Vuren, 1996; Trenham *et al.*, 2000).

Dispersal and migration movements made by California tiger salamanders can be grouped into two main categories: (1) breeding migration; and (2) interpond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. At a study in Monterey County, it was found that upon reaching sexual maturity, most individuals returned to their natal/birth pond to breed, while 20 percent dispersed to other ponds (Trenham *et al.*, 2001). After breeding, adult California tiger salamanders return to upland habitats, where they may live for one or more years before attempting to breed again (Trenham *et al.*, 2000).

California tiger salamanders are known to travel long distances between breeding ponds and their upland refugia. Generally it is difficult to establish the maximum distances traveled by any species, but salamanders in Santa Barbara County have been recorded dispersing up to 1.3 mi from their breeding ponds (Sweet, 1998). As a result of a five-year capture and relocation study in Contra Costa County, Orloff (2007) estimated that captured California tiger salamanders were traveling a minimum of 0.5 mi to the nearest breeding pond and that some individuals were likely traveling more than 1.3 mi to and from breeding ponds. California tiger salamanders are also known to travel between breeding ponds. One study found that 20 to 25 percent of the individuals captured at one pond were recaptured later at other ponds approximately 1,900 and 2,200 ft. away (Trenham *et al.*, 2001). In addition to traveling long distances during juvenile dispersal and adult migration, salamanders may reside in burrows far from their associated breeding ponds.

A trapping study conducted in Solano County during the winter of 2002/2003 suggested that juveniles dispersed and used upland habitats further from breeding ponds than adults (Trenham and Shaffer, 2005). More juvenile California tiger salamanders were captured at traps placed at 328 ft., 656 ft., and 1,312 ft. from a breeding pond than at 164 ft. Approximately 20 percent of the captured juveniles were found at least 1,312 ft. from the nearest breeding pond. The associated distribution curve suggested that 95 percent of juvenile California tiger salamanders were within 2,099 ft. of the pond, with the remaining five percent being found at even greater distances. Preliminary results from the 2003-04 trapping efforts at the same study site detected juvenile California tiger salamanders at even further distances, with a large proportion of the captures at 2,297 ft. from the breeding pond (Trenham, 1998a). Surprisingly, most juveniles captured, even those at 2,100 ft., were still moving away from ponds. These data show that many California tiger salamanders travel far while still in the juvenile stage. Post-breeding movements away from breeding ponds by adults

appear to be much smaller. During post-breeding emigration from aquatic habitat, radio-equipped adult California tiger salamanders were tracked to burrows between 62 ft. and 813 ft. from their breeding ponds (Trenham, 2001). These reduced movements may be due to adult California tiger salamanders exiting the ponds with depleted physical reserves, or drier weather conditions typically associated with the post-breeding upland migration period.

California tiger salamanders also are known to use several successive burrows at increasing distances from an associated breeding pond. Although previously cited studies provide information regarding linear movement from breeding ponds, upland habitat features appear to have some influence on movement. Trenham (2001) found that radio-tracked adults were more abundant in grasslands with scattered large oaks, than in more densely wooded areas. Based on radio-tracked adults, there is no indication that certain habitat types are favored as terrestrial movement corridors (Trenham, 2001). In addition, captures of arriving adults and dispersing new metamorphs were evenly distributed around two ponds completely encircled by drift fences and pitfall traps. Thus, it appears that dispersal into the terrestrial habitat occurs randomly with respect to direction and habitat types.

Threats: The central California tiger salamander is imperiled throughout its range due to a variety of human activities (Service, 2004). Current factors associated with declining central California tiger salamander populations include continued habitat loss and degradation due to agriculture and urbanization; hybridization with the non-native eastern salamander (Fitzpatrick and Shaffer, 2004; Riley *et al.*, 2003); and predation by introduced species. Central California tiger salamander populations are threatened by multiple factors but continued habitat fragmentation and colonization of non-native salamanders may represent the most significant current threats.

While the central California tiger salamander may survive for more than 10 years, many breed only once, and in one study, less than five percent of marked juveniles survived to become breeding adults (Trenham, 1998b). Given such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events, as well as human-caused factors that reduce breeding success and individual survival. Such factors include habitat isolation and fragmentation within many watersheds that preclude dispersal between sub-populations; predation and competition from introduced exotic species; possible commercial over-utilization; diseases; various chemical contaminants; road mortality; and certain mosquito and rodent control operations. Currently, these various primary and secondary threats are largely not being offset by existing Federal, State, or local regulatory mechanisms.

### **Environmental Baseline**

The PIA does not contain suitable aquatic or refuge habitat for the California red-legged frog and central California tiger salamander: the median is a frequently disturbed strip of land in the center of a heavily used highway containing both weedy and barren areas; the proposed site of the CMS and MVP installation is a gravel pullout devoid of any surrounding vegetation due to recent fire damage; and sites established for staging of construction equipment and vehicles will be confined to gravel pullouts or the median. Furthermore, no small mammal burrows were observed along the length of the PIA during the reconnaissance survey conducted by Caltrans on April 24, 2013. However, there is some suitable habitat outside of the PIA (but still within the action area) in the form of non-native annual grassland and ephemeral drainages. Non-native annual grassland extends from the edge of pavement of the highway downhill to segments of two unnamed drainages that flow several hundred

feet below-grade, i.e. under SR 152 through large, open-bottom arch culverts (9 ft. and 10 ft. in diameter), and connect to the San Luis Reservoir outside of the action area. Within the action area, there also are 11 culverts ranging between 8-48 inches in diameter with outlets on both sides of the highway (i.e. at the foot of the embankment), and at least six culverts leading to the drainage inlet in the median.

Caltrans did not conduct species-specific surveys but assumed the California red-legged frog could be present since there are known occurrences and suitable habitat in the vicinity of the action area; also, some California red-legged frogs and central California tiger salamanders are expected to move through the action area. Although no California red-legged frogs or central California tiger salamanders have been identified within the action area (CNDDDB, 2014), there are numerous records for the California red-legged frog located north and south of SR 152 (CNDDDB, 2014). Even though there are no records for the central California tiger salamander at these locations, the species is known from approximately 3 mi northwest of the PIA, and there is habitat suitable for this species. Therefore, it is reasonably likely that both species could enter the action area from these neighboring uplands and cross the highway either below- or at-grade.

### **Effects of the Proposed Action**

Because the sites at which the CMS and MVP will be installed and the staging areas will be established are existing gravel pullouts, which do not support aquatic or refuge habitat for the California red-legged frog and central California tiger salamander, no suitable habitat will be affected by these installation and staging activities.

The California red-legged frog and central California tiger salamander are known to sometimes travel along riparian corridors and other water channels; therefore, they may move along the ephemeral drainages and through the culverts below SR 152. However, the species also are known to make linear, point-to-point movements without apparent regard to topography, vegetation type, or riparian corridors, and for this reason, there is potential for them to disperse through upland habitat and enter the action area in order to cross the highway at-grade.

Mortality to the California red-legged frog and central California tiger salamander is likely to occur when individuals attempt to cross roads. SR 152 is already an existing hazard to both species and it will continue to be a hazard. The construction of the new concrete median barrier will further obstruct the movement of those individuals that successfully cross the highway halfway, which will result in an incremental increase in mortality to a small number of individuals of either species (although it is not possible to quantify the extent of this). To minimize the effects of the obstruction, Caltrans will install wildlife passageways (i.e. scuppers) at regular 100 ft. intervals along the length of the median in order to maintain a degree of permeability for species' movement. But in spite of this on-site design modification, the barrier is reasonably likely to increase the risk of death by desiccation or predation by either increasing the time it will take for the species to cross the other half of the highway (provided individuals encounter and successfully use a scupper), or presenting an impenetrable obstacle (in the event that individuals fail to encounter and successfully use a scupper).

### **Cumulative Effects**

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The Service is not aware of any future non-Federal actions currently planned specifically in the action area that will further directly affect the California red-legged frog or the central California tiger salamander or remove or disturb their habitats.

### **Conclusion**

The conservation measures set forth for implementation before, during, and following construction work, plus the design modifications built into the project (i.e. wildlife passageways in the median) will serve to minimize the project's effects and the extent of take associated with the California red-legged frog and central California tiger salamander. After reviewing the current status of each species, the environmental baseline for the action area for the species, the effects of the proposed project on the species, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the California red-legged frog and the central California tiger salamander.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by FWS regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described are nondiscretionary, and must be undertaken by Caltrans for the exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If Caltrans (1) fails to assume and implement the terms and conditions, or (2) fails to require any of its contractors to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Caltrans must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

### **Amount or Extent of Take**

It is infeasible for the Service to quantify the exact number of California red-legged frogs and central California tiger salamanders that will be taken as a result of the proposed action because the number of individuals of each species in the action area is unknown and estimates of population density in the action area are unavailable. In instances in which the number of individuals that may be taken cannot be determined, the Service may use a surrogate to quantify take. In this instance, since take is expected to result from the introduction of a permanent barrier to the landscape, the length of the barrier becomes a direct surrogate for the species that will be taken. Therefore, the Service anticipates take incidental to the project as the 2.6 mi segment of concrete barrier that will be installed along the highway median. Upon implementation of the *Reasonable and Prudent Measures, Terms and Conditions*, and the *Proposed Avoidance and Minimization Measures* considered herein, incidental take in the forms of harm and death resulting from the increased risk of desiccation and predation to those individuals impeded by the barrier, will become exempt from the prohibitions described under section 9 of the Act.

### **Effect of the Take**

The Service has determined that the level of anticipated take is not likely to jeopardize the continued existence of the California red-legged frog and the central California tiger salamander.

### **Reasonable and Prudent Measures**

The following reasonable and prudent measure is necessary and appropriate to minimize the effects of the proposed action on the California red-legged frog and the central California tiger salamander.

1. All of the conservation measures proposed in the *Project Description*, and as supplemented and modified in the Terms and Conditions below, must be fully implemented.

### **Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, Caltrans, as well as any contractor acting on Caltrans' behalf, must comply with the following Terms and Conditions, which implement the reasonable and prudent measure described above. These Terms and Conditions are nondiscretionary.

The following Terms and Conditions implement Reasonable and Prudent Measure one:

1. Caltrans shall be responsible for implementing all measures described in this biological opinion.
2. A post-construction report detailing compliance with the project design criteria and proposed avoidance and minimization measures described under the *Project Description* section of this biological opinion shall be provided to the Service within 90 calendar days of completion of the project. The report shall include: (1) dates of project groundbreaking and completion; (2) pertinent information concerning the installation of the 2.6 mi median barrier; (3) known project effects on the California red-legged frog and central California

tiger salamander, if any; (4) observed incidents of harm to or mortality of the California red-legged frog and central California tiger salamander, if any; and, (5) any other pertinent information.

### **Salvage and Disposition of Individuals**

In the case of an injured and/or dead California red-legged frog or central California tiger salamander, the Service shall be notified of events within one day and the animal shall be handled only by a Service-approved biologist. Injured animals shall be cared for by a licensed veterinarian or other Service-approved person. In the case of a dead individual, it shall be preserved, as appropriate, and shall be bagged and labeled (i.e. species type; who found or reported the incident; when the report was made; when and where the incident occurred; and if possible, cause of death). Carcasses shall be held in a secure location, such as a freezer or cooler, until instructions are received from the Service regarding the disposition of the specimen or until the Service, or another appropriate agency or Service-approved person, takes custody of the specimen. Caltrans must report to the Service within one calendar day any information about take or suspected take of federally-listed species not exempted in this opinion. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal. The Service contacts are Daniel Russell, Deputy Assistant Field Supervisor, Endangered Species Program, Sacramento, at (916) 414-6600 and Rebecca Roca, Resident Agent in Charge of the Service's Division of Law Enforcement, at (916) 569-8444.

Any contractor or employee who, during routine operations and maintenance activities inadvertently kills or injures a listed wildlife species must immediately report the incident to their representative at their contracting/employment firm and to Caltrans. This representative must contact the Service within one calendar day.

### **CONSERVATION RECOMMENDATIONS**

Conservation recommendations are suggestions of the Service regarding discretionary measures to minimize or avoid further adverse effects of a proposed action on listed, proposed, or candidate species or on designated critical habitat, or regarding the development of new information. They may also serve as suggestions on how action agencies can assist species conservation in furtherance of their responsibilities under section 7(a)(1) of the Act, or recommend studies improving an understanding of a species' biology or ecology. Wherever possible, conservation recommendations should be tied to tasks identified in recovery plans. The Service is providing you with the following conservation recommendations:

1. Caltrans should continue to include culverts, tunnels, or other structures along roads and highways. Crossing structures and other types of passageways contribute to creating safer dispersal corridors for wildlife species, and will help reduce wildlife road mortalities and enhance public safety. Caltrans is encouraged to explore designs and include photos, plans, and other information in its BAs concerning the incorporation of wildlife passageway designs into its projects.
2. Caltrans should report new sightings of the California red-legged frog and central California tiger salamander to the CNDDDB. A copy of the reporting form and a topographic map

clearly marked with the location in which the animals were observed also should be provided to the Service.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

### REINITIATION—CLOSING STATEMENT

This concludes the Service's review of the proposed State Route 152 Median Barrier near Pacheco Pass Summit Project, as outlined in your letter. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained or is authorized by law and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or an extent not considered in this biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

Please contact Jen Schofield, Fish and Wildlife Biologist, or Thomas Leeman, Chief, San Joaquin Valley Division, at the letterhead address or at (916) 414-6600 if you have any questions regarding this letter.

Sincerely,



Jennifer Norris  
Field Supervisor

cc:

Annee Ferranti, California Department of Fish and Wildlife, Fresno, California

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## **Water Source Information**

Date: 1/7/15

Time: 2:44 PM

Contacted: South San Joaquin Irrigation District  
11011 E. Highway 120  
Manteca, CA 95336  
Phone: (209) 249-4619

Email summary: Emailed Julie Vrieling (Water Conservation Coordinator) at South San Joaquin Irrigation District. She responded and said that they have non-potable water available and could be listed as a potential water source for project 10-0W1401. This water agency is not located nearby our project limits, however none of the local water agencies would commit to having non-potable water available. According to the online drought map <http://www.acwa.com/content/drought-map> they are currently under voluntary water restrictions for their District. Julie mentioned that the Contractor should apply for a temporary construction permit prior to the start of construction. There is a \$100 fee to be included with the application for the permit.

## Lao, Allen@DOT

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**From:** Julie Vrieling [jvrieling@ssjid.com]  
**Sent:** Wednesday, January 07, 2015 2:35 PM  
**To:** Lao, Allen@DOT  
**Cc:** Dawn Driesen  
**Subject:** RE: Water Availability (Caltrans Project in Summer 2015)

Non-potable, again just be sure to apply for a temporary construction permit well before your project begins. 😊

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**From:** Lao, Allen@DOT [<mailto:allen.lao@dot.ca.gov>]  
**Sent:** Wednesday, January 07, 2015 2:29 PM  
**To:** Julie Vrieling  
**Subject:** RE: Water Availability (Caltrans Project in Summer 2015)

Sounds good Julie,

Our Contractor will apply for the temporary construction permit prior to construction. For now, I just need information if there is potable or non-potable water available. Please let me know.

Thanks,

### Allen Lao

Project Engineer  
Caltrans District 10  
Design IV, Branch L  
*New # (209) 948-3888*  
*New Location "Room 258"*

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**From:** Julie Vrieling [<mailto:jvrieling@ssjid.com>]  
**Sent:** Wednesday, January 07, 2015 2:23 PM  
**To:** Lao, Allen@DOT  
**Cc:** Dawn Driesen  
**Subject:** RE: Water Availability (Caltrans Project in Summer 2015)

Thanks for your inquiry Allen. You will need to apply for a temporary construction permit with Dawn Driesen in our Engineering Department.

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**From:** Lao, Allen@DOT [<mailto:allen.lao@dot.ca.gov>]  
**Sent:** Wednesday, January 07, 2015 2:14 PM  
**To:** Julie Vrieling  
**Subject:** Water Availability (Caltrans Project in Summer 2015)

Hi Julie,

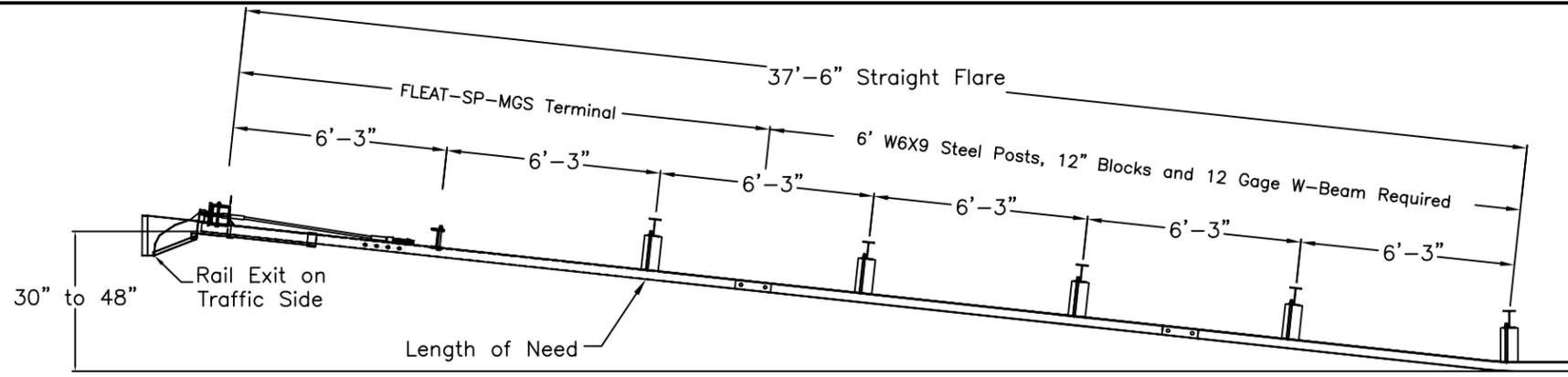
I am looking for a point of contact within your organization because I have a Caltrans project which will be starting construction during the summer/fall of 2015. We are looking for potential sources of water for the construction of our project during the summer. Current Caltrans policy requires me to inquire about the availability of potable or non-potable water from various water agencies prior to construction. As part of this requirement, I have to notify the water agencies that the estimated time to complete this project is 70 working days and the amount of water to be used is approximately 450,000 gallons.

Please provide information whether your district is under mandatory or voluntary water restrictions and if there is potable or non-potable water available for a private Contractor to purchase. If so, may I have the contact information to provide to the Contractor?

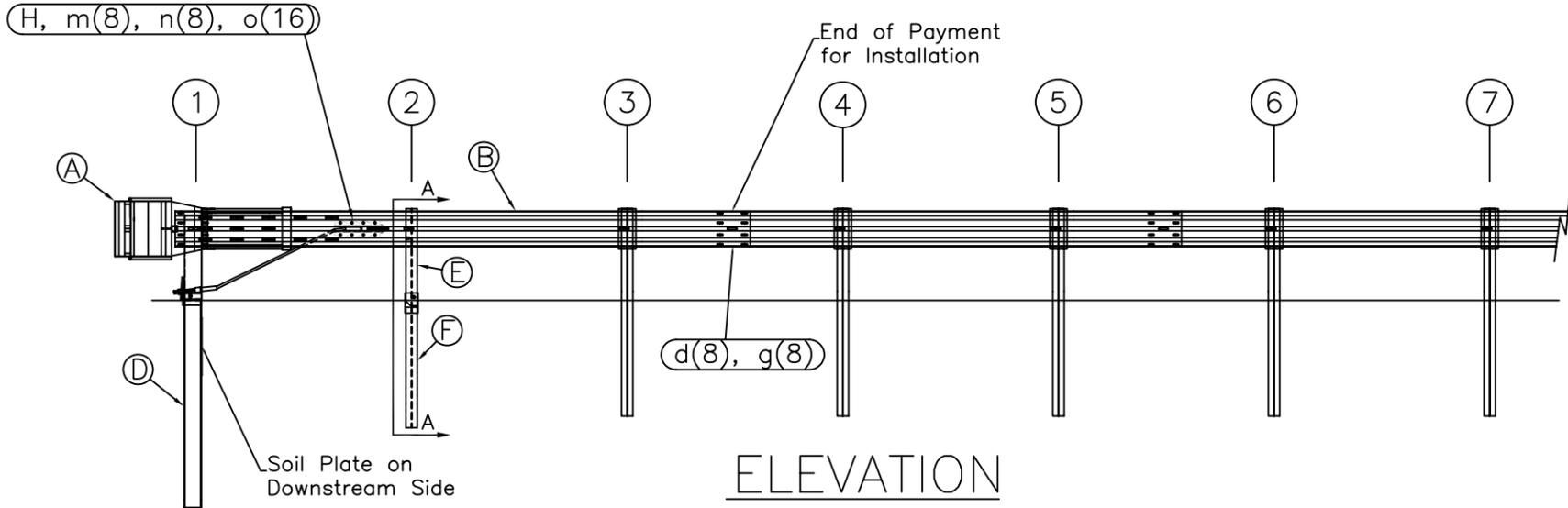
Thank you,

**Allen Lao**

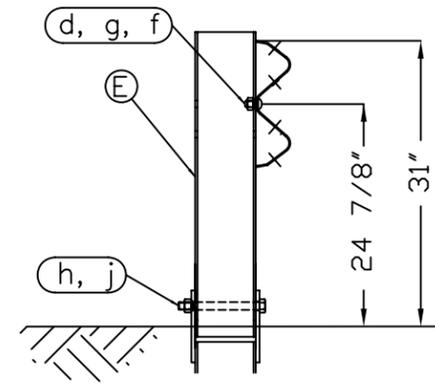
Project Engineer  
Caltrans District 10  
Design IV, Branch L  
*New # (209) 948-3888*  
*New Location "Room 258"*



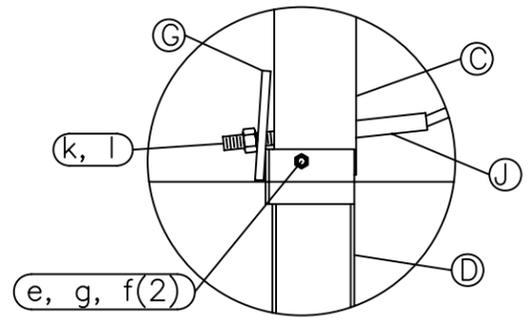
PLAN



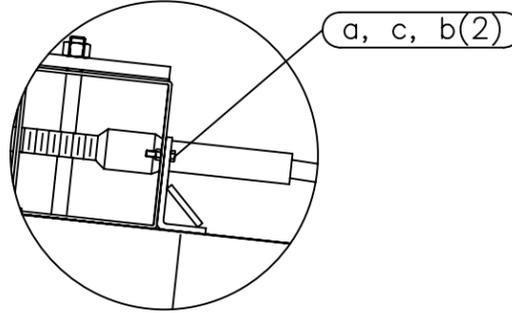
ELEVATION



SECTION A-A  
Post #2



Post #1 Connection Detail



Impact Head Connection Detail

ITEM	QTY	BILL OF MATERIALS	ITEM NO.
A	1	IMPACT HEAD	F3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	MGS-SF1303
C	1	FIRST POST TOP (6X6X $\frac{1}{8}$ " Tube)	TPHP1A
D	1	FIRST POST BOTTOM (6' W6X15)	TPHP1B
E	1	SECOND POST ASSEMBLY TOP	UHP2A
F	1	SECOND POST ASSEMBLY BOTTOM	HP3B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770

HARDWARE (ALL DIMENSIONS IN INCHES)			
a	2	5/16 x 1 HEX BOLT GRD 5	B5160104A
b	4	5/16 WASHER	W0516
c	2	5/16 HEX NUT	N0516
d	9	5/8 Dia. x 1 1/4 SPLICE BOLT (POST #2)	B580122
e	1	5/8 Dia. x 9 HEX BOLT GRD 5	B580904A
f	3	5/8 WASHER	W050
g	10	5/8 Dia. H.G.R NUT	N050
h	1	3/4 Dia. x 8 1/2 HEX BOLT GRD A449	B340854A
j	1	3/4 Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	CABLE ANCHOR BOX SHOULDER BOLT	SB58A
n	8	1/2 A325 STRUCTURAL NUT	N055A
o	16	1 1/16 OD x 9/16 ID A325 STR. WASHER	W050A

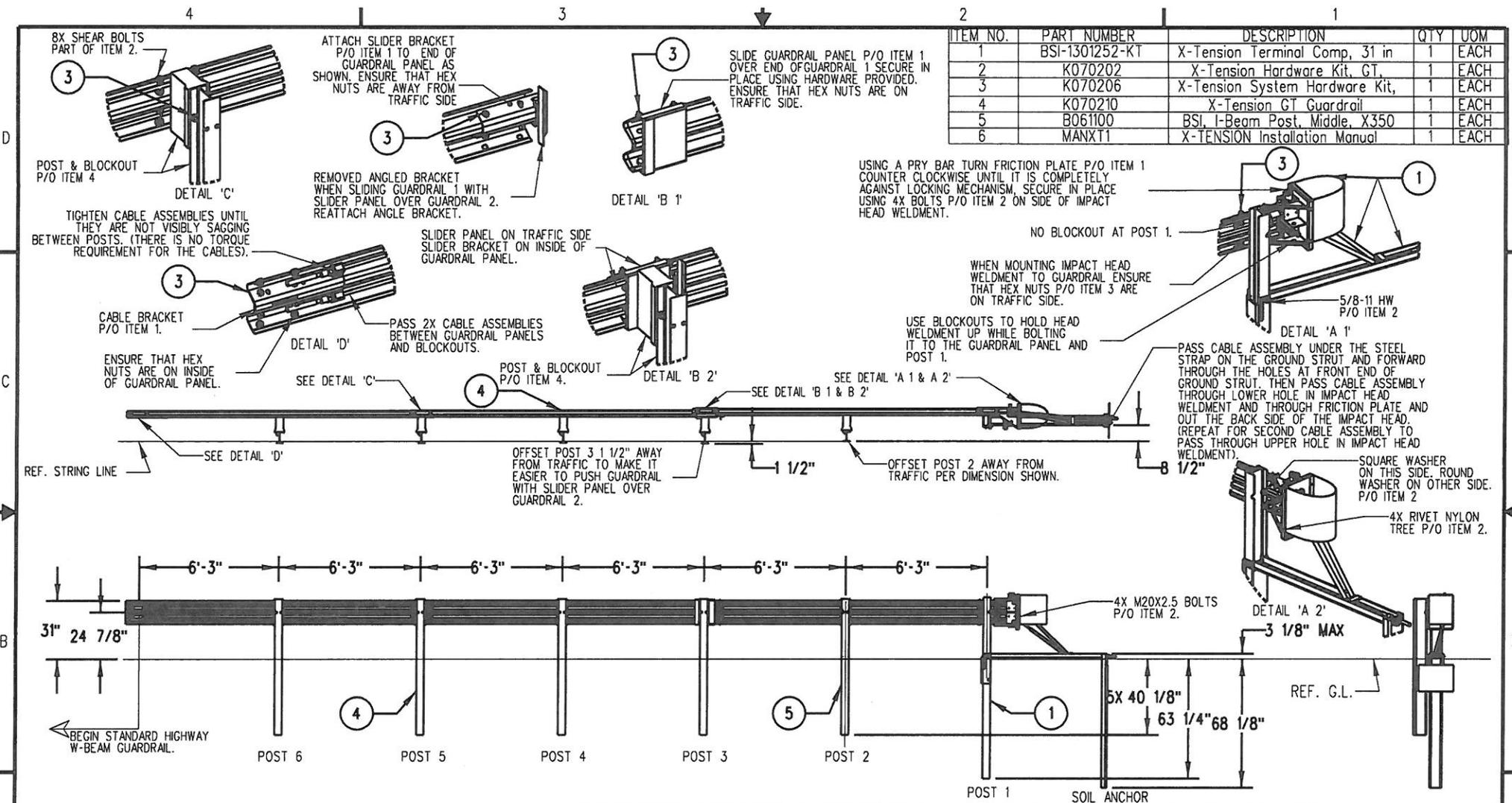
GENERAL NOTES:

- All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
- The lower sections of the Posts 1&2 shall not protrude more than 4 in above the ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
- The lower sections of the hinged posts should not be driven with the upper post attached. If the post is placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
- When competent rock is encountered, a 12" Ø post hole, 20 in. deep cored into the rock surface may be used if approved by the engineer for post 1. Granular material will be placed in the bottom of the hole, approximately 2.5" deep to provide drainage. The first post can be field cut to length, placed in the hole and backfilled with suitable backfill. The soil plate may be trimmed if required.
- The breakaway cable assembly must be taut. A locking device (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening nuts.

Big Spring, TX  
Phone: 432-263-2435  
or Phone: 330-346-0721

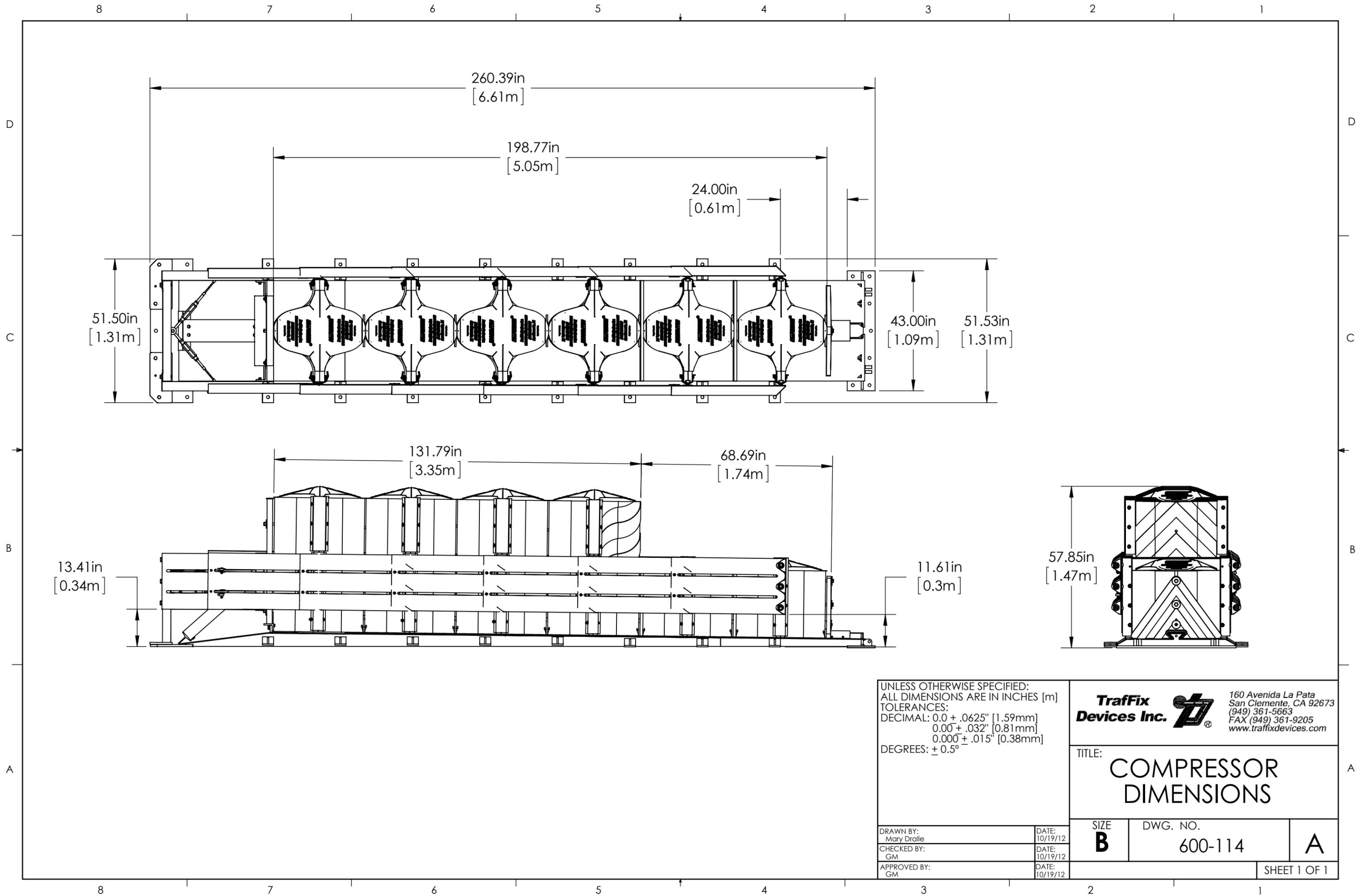
<b>FLEAT-SP-MGS Terminal Midwest Guardrail System 31" Top of Rail</b>		Sheet:	1
		Date:	02/24/10
Drawing Name: <b>FLT-SP-S-MGS</b>		By:	JRR
		Scale:	None
		Rev:	0





- NOTES: UNLESS OTHERWISE SPECIFIED.
- SYSTEM TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS.
  - ONLY TIGHTEN THE CABLE ASSEMBLIES USING THE NUTS AT THE CABLE BRACKET (SEE DETAIL 'D'). DO NOT TIGHTEN THE CABLES AT THE FRONT OF THE GROUND ANCHOR.
  - WHEN DRIVING STEEL POST, ENSURE THAT A DRIVING CAP WITH TIMBER OR PLASTIC INSERT IS USED TO PREVENT DAMAGE TO THE GALVANIZING TO THE TOP OF THE POST.

<small>©2012 BARRIER SYSTEMS INC. THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF BARRIER SYSTEMS INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF BARRIER SYSTEMS INC. IS PROHIBITED.</small>		<small>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:</small> <small>FRACTIONS DECIMAL ANGLES</small> <small>± 1/16 .003 ± .03 ± 1/2°</small> <small>.XXX ± .010</small>			
<b>APPROVALS</b> <small>DRAWN BY: NMV</small> <small>DRAWN DATE: 2/08/13</small> <small>APPR'D BY: JMT</small> <small>APPR'D DATE: 2/08/13</small>		<small>THIRD ANGLE PROJECTION</small> 		<small>REV 2067 03/02/13</small> <small>REV 2022 2/08/13</small>	
<small>DO NOT SCALE DRAWING</small>		<small>REV ECN* DATE</small>		<small>SCALE 1:50</small>	
<small>1/2012 BARRIER SYSTEMS INC. 3333 Voco Valley Parkway, Ste 800, Vacaville, CA 95688, Tel: 800-800-5691, www.barriersystemsinc.com</small>				<small>REV. B</small>	



UNLESS OTHERWISE SPECIFIED:  
 ALL DIMENSIONS ARE IN INCHES [m]  
 TOLERANCES:  
 DECIMAL: 0.0 + .0625" [1.59mm]  
           0.00 + .032" [0.81mm]  
           0.000 ± .015" [0.38mm]  
 DEGREES: ± 0.5°

**Traffix  
 Devices Inc.**  160 Avenida La Pata  
 San Clemente, CA 92673  
 (949) 361-5663  
 FAX (949) 361-9205  
 www.traffixdevices.com

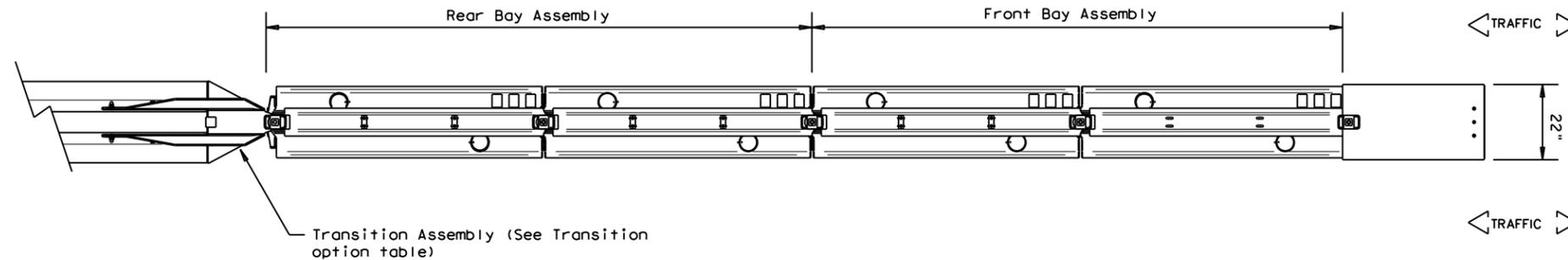
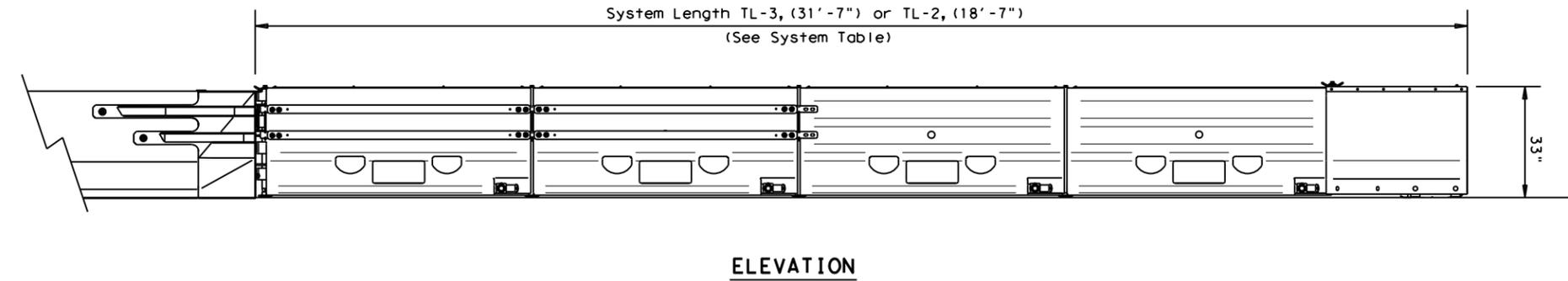
TITLE:  
**COMPRESSOR  
 DIMENSIONS**

DRAWN BY: Mary Dralle	DATE: 10/19/12
CHECKED BY: GM	DATE: 10/19/12
APPROVED BY: GM	DATE: 10/19/12

SIZE <b>B</b>	DWG. NO. 600-114	<b>A</b>
		SHEET 1 OF 1

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:  
FILE:



**PLAN**  
Bi-Directional traffic flow shown.

**GENERAL NOTES**

1. For additional information contact: Energy Absorption Systems Inc. 35 E. Wacker Dr. Suite 1100 Chicago, IL. 60601. 1(888)323-6374.
2. Refer to Installation manual and configuration chart for specific system assembly and element orientation.
2. The ACZ 350 system is approved for use in temporary (Work Zone) locations. The ACZ 350 is a water filled non-redirective, gating crash cushion that does not need to be attached to a foundation and can be installed on top of concrete, asphalt, or any surface capable of bearing the weight of the system.
3. The ACZ 350 system consist of four major components, the transition assembly, rear bay assembly, front bay assembly, and nose assembly. See manufacturer's installation manual for details.
4. Maximum permissible cross-slope is 8% .
5. The installation area should be free from curbs, elevated objects, or depressions.
6. The ACZ 350 should be approximately parallel with the barrier or  $\frac{1}{2}$  of merging barrier.

PARTS LIST			
ITEM	PART NO.	DESCRIPTION	QTY
1	3595601-0000	FRONT BAY ASSY, ACZ-350, TL-3	1
2	3595601-0000	REAR BAY ASSY, ACZ-350, TL-3	1
* 3	3595608-*000	NOSE, ACZ-350, (See Below)	1
4	SEE TABLE	TRANSITION ASSEMBLY	1

\*See details below for nose delineation

TRANSITION ASSEMBLY OPTIONS	
PART NO.	BARRIER
3595616-0000	CTB SAFETY SHAPE (8" TOP)
3595618-0000	CSB F-SHAPE (9 1/2" TOP)
3595620-0000	SSCB SINGLE SLOPE (8" TOP)

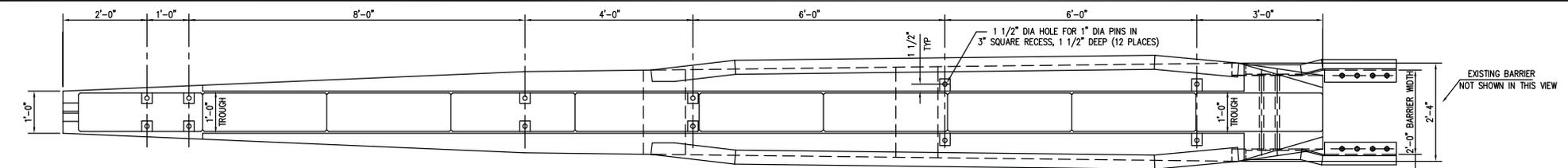
ACZ-350 (NARROW) SYSTEM	
TEST LEVEL	SYSTEM LENGTH
TL-2	18' - 7"
TL-3	31' - 7"

TRANSITION OPTIONS
The ACZ 350 system is approved for use at bi-directional sites, additional hardware may be required. (See the Manufacturer's product manual)

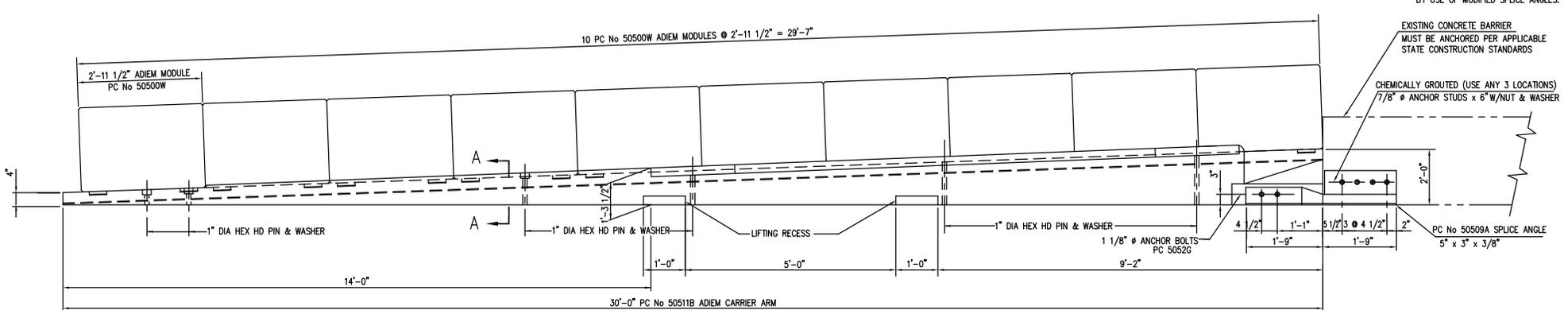
Backup and Transition types are shown elsewhere on the plans (i.e. Attenuator location details or in the general notes).



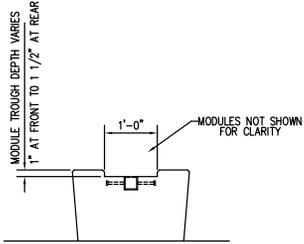
		Design Division Standard	
<b>ENERGY ABSORPTION ACZ-350 CRASH CUSHION (TEMPORARY, WORK ZONE) ACZ(350)-13</b>			
FILE: acz35013.dgn	DN: TxDOT	CK: AM	DW: BD
© TxDOT March 2010	CONT	SECT	JOB
REVISIONS	DIST		COUNTY
REVISED JUNE, 2013 (VP)	SHEET NO.		



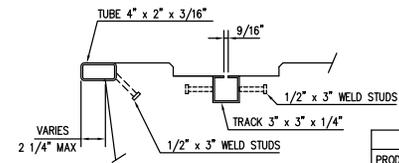
PLAN VIEW



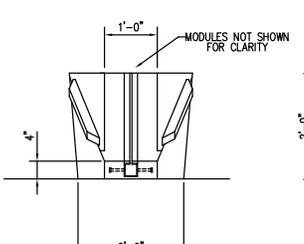
ELEVATION VIEW



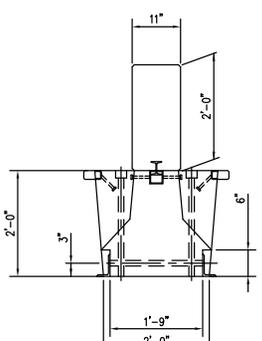
SECTION A-A



TRACK & BUMPER DETAIL



FRONT ELEVATION VIEW



REAR ELEVATION VIEW

BILL OF MATERIAL			ANCHOR PIN SCHEDULE PER SURFACE (SEE NOTES 1-5)		
PRODUCT CODE	QTY	DESCRIPTION	PCC	ACP	BASE
50500W	10	MODULES x 2'-11 1/2"			
50511B	1	BASE x 30'-0"			
50508A	1	SPLICE ANGLE x 3'-6" RT			
50509A	1	SPLICE ANGLE x 3'-6" LT			
6549W	1	GARNA-THANE COATING (1 GAL)			
5052G	2	1 1/8" Ø x 25" HEX HD BOLT			
4963G	4	1 1/8" WASHER			
3976G	2	1 1/8" HEX NUT			
4616G	6	7/8" Ø STUD x 6" (FULL THD)			
3725G	6	7/8" WASHER			
3735G	6	7/8" HEX NUT			
5206B	1	ADHESIVE HY150 CARTRIDGE			
3900G	12	1" WASHER			
5665G	SEE SCHEDULE	1" Ø HEX HD PIN x 48"			4
5642G		1" Ø HEX HD PIN x 42"		4	
5650G		1" Ø HEX HD PIN x 36"	4		4
5641G		1" Ø HEX HD PIN x 30"		4	4
5646G		1" Ø HEX HD PIN x 24"	4	4	
5643G		1" Ø HEX HD PIN x 18"	4		

- ADIEM INSTALLATION INSTRUCTIONS**
- The ADIEM base is to be placed on a smooth surface (the same horizontal plane as the concrete barrier) and parallel to the mainline or ramp traveled lane(s).
  - Install anchor rods for ADIEM base by driving in soil or soft asphalt or driving in pre-drilled holes for hard asphalt or concrete (no epoxy required). The base should not be moved after the holes are drilled. The holes should be drilled using, at a minimum, a 35# hammer and minimum 36 inch long drill bit. (A 50# hammer is recommended.)
  - Attach connection brackets to base with two (2) 1 1/8" X 25" hex head bolts provided. Then field drill holes in the existing barrier and attach connection brackets to it with chemically grouted hardware provided.
  - Oil the ADIEM base track. Slide the modules onto the base. Be careful not to damage edges of the modules while sliding onto the base.
  - If the modules are scuffed or nicked, apply GARNA-THANE coating to the affected area.
  - Recommended tools and equipment:  
35/50# air hammer/drill  
1 3/8" Ø x 36" rock drill  
1 1/4" Ø x 12" rock drill  
Sledge hammer  
Oil  
Wrenches

OPTIONAL ANCHOR ITEMS	
PRODUCT CODE	DESCRIPTION
5205B	ADHESIVE DISPENSER
5207B	MIXER HIT HY150 (NOZZLE)
5208B	FILLER HIT HY150 (FILLER TUBE)
5209B	BIT TE-C+ 11/16-18 (11/16" Ø BIT)

- ★ EACH CARTRIDGE INCLUDES 1 EACH : MIXER HY 150 CARTRIDGE (NOZZLE) : FILLER HIT HY 150 (FILLER TUBE)
- NOTES:  
1) ANCHOR PINS ARE 1" DIA HEX HD, POINTED, GALV RODS (A307)  
2) PORTLAND CEMENT CONCRETE (PCC)  
3) ASPHALTIC CONCRETE (ACP)  
4) BASE AND/OR COMPACTED SOIL (BASE)  
5) ADIEM INSTALLATION NOT RECOMMENDED ON LOOSE SOIL.

- ALTERNATE ADIEM INSTALLATION INSTRUCTIONS**
- At a holding site, the modules are slid into the ADIEM base after the base track. Be careful not to damage the edges of the modules while sliding them onto the base.
  - If the modules are scuffed or nicked, apply GARNA-THANE coating to the affected area.
  - The unit is then delivered to the job site. The unit is to be placed on a smooth surface (the same horizontal slope as the concrete barrier) and parallel to the mainline or ramp traveled lane (s).
  - The front module should be removed so the remaining modules can be shifted for easy access for drilling the anchor rod holes.
  - Install anchor rods for ADIEM base by driving in soil or soft asphalt or driving in predrilled holes for hard asphalt or concrete (no epoxy required). The base should not be moved after the holes are drilled. The holes should be drilled using, at a minimum, a 35# hammer and a minimum 36 inch long drilling bit. (A 50# hammer is recommended.)
  - Attach connection brackets to base with two (2) 1 1/8" X 25" hex head bolts provided. Then field drill holes in the existing barrier and attach connection brackets to it with chemically grouted hardware provided.

REV	CHKD	BY	DATE	REMARKS
6	B.T.	L.H.	12/10/03	REPLACED GROUT WITH HILTI, UPDATED DWG
5	L.H.	03/12/03		DELETED NOTE #7, REVISED NOTE #3
4	D.D.	L.H.	12/17/99	REVISED COATING, ADDED TITLE BLOCK
3	BT	3-14-97		DELETED PC 5484, ADDED PC 5052, CHG QTY PC 3976
2	BT	2-14-97		GENERAL UPDATES

**ERECTION DETAILS**

TRINITY INDUSTRIES, INC.  
HIGHWAY SAFETY PRODUCTS  
2525 STEMMONS FREEWAY, DALLAS, TX 75207

DRAWN	B.TAKACH
CHECKED	D.D.
APPROVED	
DATE	3/19/96
ENG. FILE #	SS349-01E
SHTS:	E1 OF 1
DRAWING NO.	SS 349
REV.	8

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