U. S. Army Corps of Engineer

PERMIT APPLICATION

FOR THE

San Francisco-Oakland Bay Bridge East Span
Seismic Safety Project

September 2001

Submitted by:
California Department of Transportation
District 4
111 Grand Avenue
Oakland, CA 94611

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT Authority: 33 USC 401, Section 10: 1413, Section 404. Principal Purpose: These laws require authorizing activities in, or affecting, navigable waters of the United States, the discharge or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. Application No.	2. Field Office Code	3. Date Received	4. Date Application Completed

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. Applicant's Name H.P Hensley Deputy District Director/Program Manager Toll Bridge Program California Department of Transportation	8. Authorized Agent's Name and Title Mara Melandry, Environmental Project Manager California Department of Transportation
6. Applicant's Address 111 Grand Avenue P.O. Box 23660 Oakland, CA 94623-0660	9. Agent's Address 111 Grand Avenue P.O. Box 23660 Oakland, CA 94623-0660
7. Applicant's Phone No. w/Area Code a. Residence b. Business (510) 286-6250	10. Agent's Phone No. w/Area Code a. Residence b. Business (510) 286-5582

STATEMENT OF AUTHORIZATION

I hereby authorize Mara Melandry to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information i support of this permit application.

Applicant's Signature

9/12/01
Date

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. Project Name or Title

San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

13. Name of Waterbody, if Known

See attached

14. Project Street Address

N/A

15. Location of Project

See attached

County State

16. Other Location Descriptions, if known (Section, Township, Range, Lat/Lon, and/or Assessor's Parcel Number, for example.)

See attached

17. Directions to the Site

See attached

18. Nature of Activity (Description of project, include all features)

See attached

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

See attached

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

See attached

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

See attached

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

See attached

23. Is Any Portion of the Work Already Complete? Yes No X IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

See attached

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

See attached

* Would include but is not restricted to zoning, building, and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Signature of Applicant 9/12/01 Date

Signature of Agent 9/12/01 DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

ATTACHMENTS TO APPLICATION
FOR
DEPARTMENT OF ARMY PERMIT

13. NAME OF WATERBODY

The Waters of the United States directly impacted by the project include:

a) San Francisco Bay between Yerba Buena Island (YBI) and the Oakland Touchdown area in San Francisco and Alameda Counties; and
b) The Pacific Ocean (if the San Francisco Deep Ocean Disposal Site [SF-DODS] is used).

14. PROJECT STREET ADDRESS

N/A

15. LOCATION OF PROJECT

The project would be located at Interstate 80 between the cities of San Francisco and Oakland in the counties of San Francisco and Alameda (see Figure 1). The western project limit is the eastern portal of the YBI tunnel located within the City and County of San Francisco (CCSF); however, project related traffic controls may extend to the western portal of the Yerba Buena Island (YBI) tunnel and project signage may extend to the western approach to the West Span in San Francisco. The eastern project limit is located approximately1,300 feet (400 meters) west of the Bay Bridge Toll Plaza on a spit of land referred to as the Oakland Touchdown area in the City of Oakland, Alameda County (See Figure 2). The project site includes San Francisco Bay waters adjacent to the bridge in which construction activities would occur and Bay waters on the north and east sides of YBI and the Oakland Touchdown area to allow for delivery of bulk materials by barges to staging areas. A portion of U.S. Army property located east of the Oakland Touchdown area would also be used for construction staging if the land is available. The Port of Oakland is currently using the land.

16. OTHER LOCATION DESCRIPTIONS

The limits of construction on Interstate 80 crossing San Francisco Bay are 04-SF-80 KP 12.6/KP 14.3, 04-ALA-80 KP 0.0/KP 2.7. The project limit in latitude and longitude begins at N 37-48-35.47 W 122-21-57.65 (defined by U.S. Reservation Monument #102 (Granite) near the midpoint of the YBI tunnel) and ends at N 37-49-14.71 W 122-19-48.74 (defined by N.G.S. point (Mole) near the PG&E substation on the Oakland side).

17. DIRECTIONS TO THE SITE

The site is located on Interstate 80, west from the Bay Bridge Toll Plaza in Oakland and east from YBI tunnel in San Francisco.

18. NATURE OF ACTIVITY

A. Project Overview

The California Department of Transportation (Caltrans) proposes to replace the East Span of the San Francisco-Oakland Bay Bridge (East Span Project). The project would be located on Interstate 80 between the cities of San Francisco and Oakland (see Figure 1). The western project limit is the eastern portal of the Yerba Buena Island (YBI) tunnel located in San Francisco; however, project related traffic controls may extend to the western portal of the YBI tunnel and project signage may extend to the western approach of the West Span in San Francisco. The eastern project limit is located approximately 1,312 feet (400 meters) west of the Bay Bridge Toll Plaza on a spit of land referred to as the Oakland Touchdown area in the City of Oakland. The project site also includes the waters of San Francisco Bay adjacent to the bridge and on the north and east sides of YBI and the Oakland Touchdown area.

The new bridge would be constructed north of the existing East Span and would be approximately 2.18 miles long (3.5 kilometers long) and approximately 230 feet wide (70 meters wide), including a 50-foot (15.3-meter) minimum space between the east and westbound bridge decks (see Figure 3). The bridge decks would be side-by-side, except for the double deck portion between the existing YBI tunnel and the transition structures where the double deck structure becomes two parallel structures. Each deck would consist of five traffic lanes and inside and outside shoulders. The traffic lanes would be 12 feet wide (3.6 meters wide) with 10-foot-wide (3.0-meter-wide) shoulders. A bicycle/pedestrian path would be constructed on the south side of the eastbound structure and would be 15.5 feet wide (4.7 meters wide). The bicycle/pedestrian path would be located 1 foot (0.3 meters) above the roadway grade and would be separated from traffic by the roadway shoulder, a safety barrier and a railing. The distance between the edge of the bridge deck and the path would vary from approximately 17 inches (43 centimeters) to 10 feet (3 meters) depending on the bridge segment. The bicycle/pedestrian path would extend from the eastern approach in Oakland to the western terminus of the East Span on YBI in San Francisco.

The East Span Project would also replace the eastbound on-ramp on YBI. The existing ramp needs to be dismantled to construct the new bridge. The ramp would be rebuilt and would meet current design and safety standards.

B. New Bridge Construction

The East Span Project would take seven years to complete, including two years to remove the existing East Span. However, seismic safety and lifeline criteria would be achieved for westbound traffic four years after the start of construction and, for eastbound traffic, five years after the start of construction. Construction is scheduled to begin in early 2002 and targeted for completion in early 2009.

The new structures and roadway consist of a viaduct from the YBI tunnel to a self-anchored suspension span (SAS), the SAS or main span, a skyway from the SAS to the Oakland approach, and a geotechnical approach embankment and roadway at the Oakland Touchdown (see Figure 3). The structures would be supported by 25 piers over water and 19 bents set on YBI and the Oakland Touchdown area. Construction of the new bridge would be divided among four separate contracts including the SAS/YBI Contract (which includes YBI transition structures and the main span), the Skyway Contract, the Oakland

Approach Structures Contract, and the Geofill Contract at the Oakland Touchdown. In addition, there would be a demolition contract to remove the existing bridge.

The project would require the use of large-scale equipment and involve labor-intensive activities. Materials and equipment would arrive to the site by land (truck) and by water (boat and barge). Depending on the location, timing, and size of the deliverables, they could be moved into position by land and/or barge mounted cranes. Work crews would arrive by vehicle and by boat depending on location. Temporary access trestles, which may be built on or in close proximity to YBI and the Oakland Touchdown area, would also be used for delivery of materials. These structures would likely have timber, steel, or concrete driven foundations and timber, steel, or concrete decks, depending on their exact use and the materials selected by the contractor. The access trestles would be designed by the contractor.

For land-based support structures (bents), pre-mixed concrete could be delivered by truck and dumped or pumped into place, or mixed on-site at batch plants, transported by truck and dumped or pumped into place. For in-Bay structures (piers), concrete would be delivered to docked barges, placed on barges for batching and transport, and then dumped or pumped into place.

Excavators, backhoes, haulers, graders, and other large-scale earth moving and construction equipment would be used to clear and excavate portions of the site on YBI and the Oakland Touchdown. Excavated material would be stockpiled for reuse or removed from the site by truck or barge for disposal.

Dredging in-Bay near the Oakland Touchdown area would also be required for the project. Dredging would provide adequate clearance for barge access during construction of the new bridge and dismantling of the existing bridge. Dredging would also be required to excavate and remove sediment at individual pier locations for construction of the new bridge. Dredging equipment (e.g., clamshells, dredges and backhoes) would be used to remove sediments and the material would be transported from the site by barges for disposal or reuse.

Temporary Detours at YBI

Except for delivery of materials and personnel, the main span and skyway would be constructed without interrupting traffic on the existing East Span. However, temporary detours would be required on YBI to route traffic around work areas (see Figure 5).

The temporary westbound detour would be 1,607 feet long (490 meters long) and constructed north of the existing East Span, while the temporary eastbound detour would be 1,574 feet long (480 meters long) and constructed south of the existing East Span. Both west and eastbound detour structures would be approximately 56 feet wide (17 meters wide) with five 11-foot-wide (3.4-meter-wide) lanes in each direction. The temporary detours would be operational for approximately two years; however, it would be approximately four years between the beginning of construction and the dismantling of the temporary detours. The temporary detours could be removed as soon as they are no longer needed to carry traffic or as one of the last steps of bridge construction, depending on whether the contractor chooses to use them as platforms from which to construct other portions of the bridge.

- Substructure Construction

  Creating access to construct footings would require grading the area surrounding the temporary detours and excavating up-slope near the tunnel portal on YBI. Sheet pile, soldier piles, tie backs, and/or other temporary shoring may be used to stabilize excavated slopes.

For construction of the bents, piles would be driven into bearing soil strata to achieve required capacity on YBI, forms would be built for pile caps or spread footings; the forms would be filled with reinforcing steel and concrete and removed after the concrete has cured. The towers and bent caps would then be erected using cranes to lift and fit manufactured sections together. Temporary supports may be used during construction to keep the bent towers in a vertical position.

- Superstructure Construction

  Steel girders would be raised by crane, forms would be built for laying the deck, reinforcing steel and concrete would be placed in the forms, and the forms would be removed after the concrete has cured. Construction of the roadway barriers would follow the same sequence and be followed by the installation of signage.

Temporary Detours at the Oakland Touchdown Area

At the Oakland Touchdown area, an eastbound temporary detour would be built at-grade, south of the existing eastbound lanes, requiring relocation of the existing Caltrans maintenance road (see Figure 6). The detour and maintenance road relocation would require a temporary construction easement from the City of Oakland. Following construction of the eastbound approach and structure, eastbound traffic would shift from the temporary detour onto the new structure, and the Caltrans maintenance road would be realigned. Temporary detours would not be required for construction of the westbound approach and structure.

Transition Structures at YBI

At Bent 48 on YBI, the new bridge would begin with transition structures that would move from the double-decked structure into two parallel structures (see Figure 5a). The structures would be prestressed, concrete box-girders.

- Substructure Construction

  Creating access for footings, driving piles to bearing strata, and construction of the pile caps would require the same construction methods as the temporary detours (see above). To construct the piers, forms would be constructed, reinforcing steel would be placed in the forms, concrete would be cast into the forms, and the forms would be removed after the concrete has cured.

- Superstructure Construction

  Deck forms would be built, reinforcing steel would be placed in the forms, concrete would be cast into the forms, and the forms would be removed after the concrete has cured and the prestressing placed. Construction of the roadway barriers would follow the same sequence as that of the deck forms and then signage, utilities and pre-stressing cables would be installed.

Main Span

The main span, located between Pier W2 on YBI and Pier E2 on the eastern side of the main navigation opening, would be a steel deck, self-anchored suspension bridge design (see Figure 4b).

- Main Tower Construction

  The main tower would be set offshore from YBI. Bay bottom sediments would be removed, holes would be drilled into bedrock, hollow steel pipe piles would be driven or socketed into the holes, and a pre-fabricated steel box (with concrete cover) pile cap would be floated into position and sunk onto the piles, sealed around them, and pumped dry. The piles would be filled with concrete and welded to the pile cap, which would be filled with reinforcing steel and concrete, and covered with a top slab. Precast concrete fenders would be brought to the site and attached to the pile cap. The slab would provide the surface on which four pre-fabricated steel tower legs would be erected. The legs would be raised by cranes and bolted together. Steel link beams would be bolted between the legs along their length. Temporary support piers may be placed in the Bay and on either side of the permanent main tower during its construction. Depending on methods selected by the contractor, cofferdams may be used during construction of the main tower foundation; however, it is unlikely due to water depths at this location.

  All removed sediment would be placed on a barge for transport and disposed of per Dredged Materials Management Office (DMMO) recommendations.

- Pier E2 Construction

  Hollow steel pipe piles would be driven into Young Bay Mud and a pre-fabricated steel box (with concrete cover) pile cap would be floated into position and sunk onto the piles, sealed around them, and pumped dry. The piles would be filled halfway with concrete and welded to the pile cap, which would be filled with reinforcing steel and concrete, and covered with a top slab. All sediments within the piles resulting from pile driving would be removed, placed on a barge for transport, and disposed.

- Pier W2 Construction

  Rock on YBI would be removed mechanically, and the rock faces stabilized or retained. The pile holes would be drilled deeper into the rock. The holes may have to be dewatered. A concrete reinforcing cage would be placed in the pile holes, and the hole filled with concrete. The pile cap would be formed, a reinforcing cage would be placed, then the forms filled with concrete. The forms would be removed after the concrete cures.

  Construction of both piers above the pile caps would include constructing forms, placing reinforcing steel and concrete in the forms, and removing the forms once the concrete has cured. The process would be the same for the pier caps; however, the pier caps would be prestressed. Tie-down cables would be placed between the pile cap and pier cap to anchor the pier.

- Superstructure Construction

  Temporary falsework on piles would be constructed between Pier W2 and the main tower. Two temporary towers would be constructed between the main tower and Pier E2. There would be falsework on the island as well to support the superstructure while it is being constructed. Pre-fabricated steel segments of the superstructure would be

delivered to the site by barge and lifted onto the falsework and the temporary towers. Each segment would then be connected to the adjacent segments. Completed portions of the deck could be used as working platforms for other construction activities including delivery of materials and equipment and lifting and positioning of structural components.

Suspension cables would then be lifted and placed between the top of the main tower and each side of the bridge. Cable suspenders would then be hung from the suspension cable and connected to the deck. After the suspension cables and suspenders are stressed and positioned, the falsework and temporary towers would be removed, the barriers and riding surface overlay would be placed, and utilities, lighting and signs would be installed.

Skyway

The skyway would be a prestressed, concrete box-girder (see Figure 4g).

A temporary access trestle may be utilized to build portions of the skyway and allow for the delivery of materials, equipment, and work crews. It is expected that the trestle would be used in conjunction with the barges in areas of shallow water. The trestle for the skyway would be approximately 75,350 square feet (7,000 square meters). Barges may support the heavier equipment.

- Substructure Construction

  Construction of the piles and the pile caps would be similar to construction of Pier E2. All sediments within the piles resulting from pile driving would be removed, placed on a barge for transport, and disposed. Depending on methods selected by the contractor, cofferdams may be used.

  Near the Oakland approach, cofferdams may be required. The cofferdam would be placed, sediment excavated, and the cofferdam dewatered. The steel pipe piles would be driven to the Alameda formation. A steel box pile cap would be lowered onto the piles and welded to them. If necessary, the piles would be emptied of Bay sediments then the piles and pile caps would be filled with reinforced concrete.

  The pier forms would be placed, filled with reinforcing steel and concrete, then removed once the concrete is cured. The pier caps would be constructed similarly. Once the pier is complete, the cofferdams would be removed either fully or to at least 1.5 feet (0.46 meter) below the mudline.

  Where the new structure is in close proximity to the existing East Span, the contractor would have to ensure the existing structure foundations remain stable. This may require placing a stabilizing system (such as sheet piling) in the Bay. When the pile cap construction is complete, the stabilizing system would be removed either fully or to at least 1.5 feet (0.46 meter) below the mudline.

- Precast Superstructure Construction

  All sections of the deck would be cast off-site, delivered to the site by barge, lifted by cranes, placed on alternating sides of the pier for balance, and attached to the previous segment with prestressing cable. When the sections meet in the mid-span, they would be jacked together and either joined with prestressed concrete or a mechanical expansion hinge. The barriers and the riding surface overlay would be constructed in a

sequence similar to that of the main span, after which utilities, lighting, and signage would be installed.

- Cast-in-place Superstructure Construction

  A form traveler would be lifted and secured to the pier table. Steel reinforcing would be placed inside the form. Concrete would be delivered and poured. After the concrete cures, the prestressing cable would be placed, then the form traveler would be moved out over the new section to form the next section. When the sections meet in mid-span, they would be jacked together and either joined with prestressed concrete or a mechanical expansion hinge.

- Temporary Towers

  Pile-supported temporary towers would be placed by the skyway contractor where the skyway joins the main span and Oakland approach. These towers would support the skyway until the adjoining structures are complete. Once the main span and Oakland approach are complete and all structures are joined, the temporary towers would be removed.

Oakland Approach Structures

The Oakland approach structures (see Figures 4h and 4i) would include a cast-in-place, prestressed, concrete box-girder supported by a cast-in-place, reinforced, concrete substructure. A temporary access trestle would be utilized to facilitate construction and would be approximately 150,700 square feet (14,000 square meters).

- Substructure Construction

  Construction in-Bay would include dredging for barge access, building a temporary access trestle, driving piles, and placing cofferdams in areas of shallow water near the Oakland Touchdown. The cofferdam method would involve driving sheet piles into Young Bay Mud to isolate a working area that would be dredged and dewatered to create access for construction of footings. All sediments resulting from pile driving and dredging would be removed, placed on a barge for transport, and disposed.

  Construction on land would include excavation at footings and driving piles. The sequence to construct the pile caps and the piers and bents above the pile caps would be similar to the sequence followed to construct the pile caps and the bents of the transition structures (see above).

  Where the new structure is in close proximity to the existing East Span, the contractor would have to ensure the existing structure foundations remain stable. This may require placing a stabilizing system (such as sheet piling) in the Bay. When the pile cap construction is complete, the stabilizing system would be removed either fully or to at least 1.5 feet (0.46 meter) below the mudline.

- Superstructure Construction

  The construction sequence to build the bridge decks of the skyway would be the same as for the transition structure (see above). Construction of the roadway barriers would be in the same sequence and be followed by the installation of signage, utilities, and prestressing cables after the concrete has cured (see above).

Additional Oakland Touchdown Area Activities

At the Oakland Touchdown area, a portion of the new westbound roadway and the relocated maintenance road would encroach into the Bay, requiring use of engineered fill and surcharge in the Bay and upland areas.

For construction of the westbound roadway, a geotube would be placed in tidal areas north of the Oakland Touchdown area, along a distance of approximately 1,970 feet (600 meters), to temporarily protect the work area from tidal and wave action and to facilitate installation of wick drains and the placement of fill. A geotube is a large diameter tube of permeable geotextile fabric into which Bay sand and water would be pumped. When the geotube is filled, it would act as a tidal barrier to protect the work area.

Within the area protected by the geotube the existing soils would be excavated to an elevation of approximately –2.6 feet (-0.8 meters). Wick drains and vertical drains would be installed and evenly distributed throughout the excavated area to facilitate consolidation of underlying Bay mud and prevent liquefaction of overlying sand. The drains would be covered with a layer of gravel upon which clean fill material would be placed. The fill is referred to as "surcharge material." The weight of the surcharge material on the underlying Bay mud would force the pore water in the substrate up through the wick drains. The wick drains reduce the distance the pore water has to travel to reach a more permeable flow path, which reduces the time required to consolidate the Bay mud. The vertical drains would also convey some pore water during the surcharge period. However, they are primarily to provide a drainage path for pore water during a seismic event. The water that drains from the substrate through the wick drains and vertical drains would flow through the gravel blanket to the Bay.

Runoff from the surface of the fill would drain to existing and temporary drainage features and would be subject to Storm Water Pollution Prevention requirements and standards. Best management practices (BMPs) that would be used include, but are not limited to temporary slope drains, erosion control blankets, and fiber rolls. When the substrate has been drained and compacted by the weight of the surcharge material, a portion of the surcharge would be removed and the road surface would be constructed upon the remaining fill. The excess surcharge material would be removed to an upland site for reuse.

C. Dismantling of the Existing Bridge

Dismantling activities would consist of seven major stages, which represent major components of the existing bridge and construction-related structures, including:

- YBI viaduct;
- YBI 288-foot (88-meter) steel truss approach spans;
- Oakland approach structures;
- YBI temporary detours;
- Cantilever truss spans;
- 504-foot (154-meter) steel truss spans; and
- 288-foot (88-meter) steel truss spans.

The YBI viaduct, the YBI steel truss approach spans, the Oakland approach structures, and the YBI temporary detours would be dismantled during construction of the replacement bridge because of construction staging. The temporary detours could be removed as soon as they are no longer needed to carry traffic or as one of the last steps of bridge construction, depending on whether the contractor chooses to use them as platforms from which to construct other portions of the bridge. The three remaining sections would be dismantled under separate contracts.

Dredging

Some areas near the Oakland Touchdown are too shallow to accommodate barges to dismantle the existing bridge; thus, a barge access channel would need to be dredged. The suitability of sediments in the barge access channel for dismantling the existing bridge would be evaluated prior to disposal per the Dredged Material Management Office's (DMMO) recommendation.

After dismantling the superstructure, the bridge foundations would be removed to an elevation of at least 1.5 feet (0.46 meter) below the mudline. This would require the removal of sediments around the footings through the use of cofferdams. Techniques such as reverse circulation drilling, jetting, and air lifting may be used by the contractors to remove the material around the footings. These methods would involve creating a slurry of material within the cofferdam and lifting or pumping it into the drilling vessel or barge. The concrete from the dismantled footings would be removed and transported by barge or truck to a predetermined site for reuse, recycling, or disposal. Existing piles would be cut off to an elevation at least 1.5 feet (0.46 meter) below the mudline. Once the cofferdams are removed, natural sedimentation would fill the area surrounding the cut-off-piles.

Superstructure

Removal of decks could be performed by cutting them into pieces or by disassembling them panel-by-panel. Truss spans near the Oakland shore may be removed by conventional barge and crane methods due to the shallow water and low clearance under the deck. Options include constructing temporary supports under the span and disassembling the truss segment by segment, dredging for barge clearance, constructing temporary embankments of engineered fill within the Bay for access, or using special shallow-draft barges or rigging devices for lowering sections onto barges from the bridge deck. Protective measures would be taken to prevent materials or debris from falling into the Bay. Depending on location, materials could be removed by barge or truck to a predetermined site for reuse, recycling, or disposal.

Substructure

Substructure elements could be lifted from their bases in one piece or piece by piece. Dismantling of concrete foundations would require reducing the reinforced concrete to pieces small enough to be hauled away, which could be done by mechanical means such as saw cutting, flame cutting, mechanical splitting, or pulverizing and hydro-cutting. The hollow interiors of the piles remaining below the mudline could also be used as receptacles for pieces of concrete as the pier above is dismantled. This method would substantially reduce the quantity of material requiring transport and disposal and would lower dismantling costs. The piles remaining below the mudline could be capped or would radually fill in through siltation. Any reinforcing steel would be cut off to be flush with the face of the concrete that remains below the mudline.

Removal of the piles to 1.5 feet (0.46 meter) below the mudline could be completed by an underwater dismantling method or by constructing cofferdams at each pier. The use of

cofferdams at YBI would depend on methods selected by the contractor, however their use is assumed for purposes of estimating dredged quantities generated by existing bridge removal.

D. Other Construction Issues

Temporary Dewatering

During construction of the foundation structures, dewatering may be required from cofferdams, pile shafts, and upland excavations. Water removed from cofferdams and marine-based piles would be filtered to remove suspended solids and the receiving water would be monitored for turbidity and discoloration. Discharges would not be allowed to increase the turbidity of the receiving water by more than ten percent.

In some cases the foundation construction may occur within areas of petroleum-contaminated ground water resulting mainly from diesel fuel leaks. If ground water is encountered during the foundation construction and dewatering is required in these locations, the water would be contained, analyzed, and treated, if necessary, prior to discharge. Treatment would include removing settleable solids in a holding tank and removing petroleum compounds by filtration though granulated activated carbon. The water would be treated to conform to State standards before being discharged back into the Bay. In addition, excavations would be sealed to minimize further contaminant transport due to drawdown.

During the time the geotube is in place, there may be instances when water accumulating behind the geotube would need to be pumped over the barrier to the Bay. The discharge would include groundwater from the wick drains and vertical drains, Bay water infiltrating from below and through the geotube, and storm water. Analysis of groundwater samples from both the shallow and deep water-bearing zones within the influence of the wick drains and vertical drains did not detect contaminants at concentrations that could adversely impact beneficial uses or exceed any water quality objective or standard. Water quality characteristics of concern would be settleable material, suspended material, turbidity, and color. During any discharge, BMPs, such as a filtration device or settling tank, would be implemented to remove settleable material from the effluent. In addition, the turbidity and color of the receiving water would be monitored. The BMPs would be described in the project's Storm Water Pollution Prevention Plan (SWPPP).

Temporary and Permanent Drainage

The East Span Project includes modification and enhancement of existing drainage facilities including the outfalls at the Oakland Touchdown and at YBI. Currently, the westbound roadway at the Oakland Touchdown is drained by sheet flow that is filtered by a vegetated strip. Some portions of the eastbound roadway drain to an existing drainage system, which leads to an open channel that drains south to the Bay. The existing drainage channel is part of the City of Oakland drainage system. The remaining eastbound roadway portions drain north to the Bay via four existing outfalls.

Three existing outfalls that drain to the north of the existing bridge would be modified to accommodate the new fill and new roadway features. All three outfalls would be extended. In addition, four new 1.5-feet-diameter (0.46-meter-diameter) outfalls would be required to drain the roadway surface runoff to the Bay. The outfalls would drain to the north shore of the Oakland Touchdown. Runoff from the relocated maintenance road would drain south to the Bay through the open channel.

During construction of the East Span Project, four additional 1.5-feet-diameter (0.46-meter-diameter) outfalls, which would temporarily drain to the northern shore of the Oakland Touchdown, would be required to accommodate the runoff from the surcharge material placed adjacent to the geotube. The drains would be removed when the surcharge is removed.

Within the project area, drainage at YBI would use existing outfalls and drainage features as well as new ones. Currently the system collects the bridge and surface runoff from YBI and conveys it to the Bay via a number of existing outfalls. The new drainage system would separate the Caltrans runoff from the rest of the YBI drainage and carry it through a number of new drainage systems to the Bay.

The new drainage system would discharge into the Bay via four outfalls; two outfalls would be in new locations, one outfall would utilize an existing outfall location, and one of the outfalls would be an unmodified existing outfall where a new system would connect.

The first new outfall would be located on the northeast side of YBI just north of Pier W2 of the westbound structure. It would carry some of the runoff from the new bridge deck and the surface runoff of the portion of Caltrans right-of-way located north of the new structure.

The second new outfall would be located east of the U.S. Coast Guard (USCG) facility, south of the new bridge, on a small beach area. At this location two new pipes would be placed adjacent to the existing pipe, one for local drainage and one for Caltrans drainage.

The modified outfall would be located at the USCG facility between Building 27 and the tennis court. A new outfall pipe would be placed at this location, adjacent to the existing outfall pipe to carry Caltrans drainage. A portion of new local roadway runoff would be tied to the existing outfall pipe.

At the unmodified outfall location, part of the new YBI drainage system would tie into a portion of the existing system which would carry water to the Bay via an existing outfall pipe located north of Building 22 on the USCG facility. Although the existing pipe would not be replaced with a different diameter pipe, the amount of flow could change, mostly likely reduced.

19. PROJECT PURPOSE

The San Francisco – Oakland Bay Bridge is an important transportation component of the Bay Area providing regional access between the San Francisco Peninsula and the East Bay. On average, 272,000 vehicles currently use the bridge each day. As part of Interstate 80, it is also a critical link in the interstate highway network. The existing East Span is not expected to withstand a maximum credible earthquake (MCE)[1] on the San Andreas fault or

[1] An MCE is the largest earthquake reasonably capable of occurring, based on current geological knowledge. Caltrans has projected the MCE for the East Span as an earthquake of magnitude 8 (Richter scale) on the San Andreas Fault or magnitude 7-

Hayward fault. An MCE is the largest earthquake reasonably capable of occurring based on current geological knowledge. The United States Geological Survey (USGS) and other scientists conclude that there is a 70 percent probability of at least one magnitude 6.7 or greater quake, capable of causing widespread damage, striking the San Francisco Bay region before 2030. The existing East Span does not meet lifeline criteria[2] for providing emergency relief access following an MCE and it does not meet all current operations and safety design standards.

The Purpose and Need of the project is to provide a lifeline vehicular connection that:

- Connects YBI in San Francisco and the toll plaza in Oakland;
- Connects to a lifeline route linking the East Bay, San Francisco, and the San Francisco Peninsula;
- Maintains the current vehicular capacity of the existing East Span;
- Provides for the safety of East Span users during an MCE on the San Andreas fault or Hayward fault; and
- Improves operational and safety design to meet current standards to the greatest extent possible.

Additional criteria applied to the development of the East Span Project include the following:

- Meets Caltrans designation as a lifeline route;
- During and after construction, maintains the existing number of traffic lanes for peak hours;
- Does not preclude a bicycle/pedestrian path;
- Does not preclude future improvements to YBI access ramps;
- Minimizes impacts to environmental resources;
- Provides a high level of visual quality; and
- Is a cost-effective solution.

1/4 on the Hayward fault. However, while earthquakes are often described in terms of their magnitude, they can also be described in terms of their return period, which is the approximate time interval expected between two earthquakes of comparable intensity. Designers of major engineering structures design for an earthquake with a long return period of approximately 1,000 to 2,000 years, called a Safety Evaluation Event (SEE). Designers for the East Span Project are using an SEE with a 1,500-year return period in their design criteria for a replacement bridge. This SEE is an earthquake that would generate the largest rock motions expected to occur at the bridge site an average of once every 1,500 years, or ten times the projected 150-year life span of the replacement bridge. The Seismic Safety Peer Review Panel and the ground motion subcommittee of MTC's Engineering and Design Advisory Panel (EDAP) considered it appropriate to design the bridge for these ground motions.

[2] Lifelines are the systems and facilities that provide services vital to the function of an industrialized society and are critical to the emergency response and recovery after a natural disaster. In the case of the East Span, a lifeline connection would provide for post-earthquake relief access linking major population centers, emergency relief routes, emergency supply and staging centers, and intermodal links to major distribution centers.

The East Span Project is one of several that Caltrans has completed or is currently undertaking to address the overall need for a bridge connection between the cities of San Francisco and Oakland that meets lifeline criteria.

20. REASON(s) FOR DISCHARGE

Dredging and discharge of material within Waters of the U.S. is required for construction of the East Span Project.

Temporary discharge of fill may include:

- Two trestles in waters near the Oakland Touchdown area for construction access;
- A trestle at YBI for construction access;
- A geotube to serve as a tidal berm to protect the westbound roadway construction area at the Oakland Touchdown from wave action and tidal inundation;
- Construction of cofferdams to install piles and pile caps;
- Falsework piers in deep waters near YBI to support the main span and to support the skyway and Oakland approach structures during construction;
- A barge dock at Clipper Cove along the northern shore of YBI. The dock would be used for the movement and loading of materials, equipment and work crews; and

Permanent discharge of fill would include:

- New piers and pile caps to support the new bridge structure;
- Engineered fill and rock slope protection for the westbound roadway at the east approach to the bridge;
- Engineered fill and riprap to relocate the Caltrans maintenance road at the Oakland Touchdown; and
- Fenders to protect the piers and pile caps from boats.

Discharges may result from some or all dredging activities as described below:
Dredging would be required for barge access in intertidal areas at the Oakland Touchdown area. A barge access channel would be created along the northern side of the existing bridge in the vicinity of the Oakland Touchdown area. The channel would make it possible for construction activities to be staged from barges. A second access channel would be created to allow barge access during the dismantling of the existing bridge, also at the Oakland Touchdown area. Additional dredging would be required during the installation of piles and pile caps.

Dredging techniques may include hydraulic methods utilizing cutterheads, dustpans, hoppers, hydraulic pipelines, and plain suction equipment. In addition, mechanical dredging techniques may be utilized including clamshell (open and closed bucket), dipper, or ladder dredging methods. Sediments are dislodged and excavated and then raised to the

surface and discharged into a barge or scow. Caltrans is still investigating dredging techniques.

The DMMO has reviewed the proposed dredged material disposal plan for the project and concurs with the plan. See letters in Figures 12 and 13).

21. TYPES OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS

To avoid or minimize the discharge or runoff of harmful materials into Bay waters, contractors would be required to develop and implement site specific Storm Water Pollution Prevention Plans (SWPPP) that meet the requirements of San Francisco Bay Regional Water Quality Control Board (RWQCB).

Temporary Fill Materials

The project would result in a temporary increase in the volume of fill in Other Waters of the U.S. The net temporary change in fill volume in Waters of the U.S. is estimated to be approximately 54,000 cubic yards (41,000 cubic meters). Table 1 summarizes the types and volumes of temporary fill.

Table 1-Temporary Fill (Volume)

Project Element	**Section 404 Fill in Other Waters of the U.S. Cubic Yards (Cubic Meters)[a]**
YBI/Main Span (Bent W2, E1 – E2)	
Barge Dock - Near Clipper Cove (North Side of YBI)	93 (71)
Construction Access Trestle	69 (53)
Falsework Piers (2 Footings, 4 Piers)	2,855 (2,183)
Cofferdams (2 Cofferdams)	12,585 (9,622)
Skyway (E3 – E16)	
Construction Access Trestle	232 (177)
Falsework Piers (6 Footings)	610 (466)
Cofferdams (28 Cofferdams)	30,885 (23,615)
Oakland Touchdown Area (E17-E23)	
Construction Access Trestle	656 (502)
Falsework Piers (4 Footings)	729 (557)
Cofferdams (7 Cofferdams)	1,873 (1,432)
Geotube (Westbound Roadway)	2,849 (2,178)
Total Temporary Fill	53,436 (40,856)

Note:

[a] Quantities in Table 1 are based on National Geodetic Vertical Datum (NGVD) 1929 and were calculated to the High Tide Line (HTL).

Permanent Fill Materials

Table 2 identifies the types and volumes for permanent fill.

Table 2-Permanent Fill (Volume)

Project Element	Section 404 Fill in Other Waters of the U.S. Cubic Yards (Cubic Meters)[a]
Main Span (Bent W2, E1-E2)	
Piles/Pile Caps (2 Piles/Pile Caps)	18,705 (14,302)
Fenders (2 Fenders)	3,254 (2,488)
Skyway (E3 - E16)	
Piles/Pile Caps (28 Piles/Pile Caps)	36,852 (28,177)
Fenders (6 Fenders)	5,474 (4,185)
Oakland Touchdown Area (E-17-E-23)	
Piles/Pile Caps (9 Piles/Pile Caps)	1,694 (1,295)
Total New Permanent Fill[b]	65,979 (50,447)

Notes:

[a]Quantities in Table 2 are based on National Geodetic Vertical Datum (NGVD) 1929 and were calculated to the High Tide Line (HTL).

[b]The project would not discharge fill in designated jurisdictional wetlands. However, fill would be discharged in special aquatic sites such as intertidal sandflats and eelgrass beds. Table 2 does not include fill discharged in special aquatic sites.

As seen in Table 3, the proposed East Span Project would result in an overall increase in the volume of Other Waters of the U.S.

Table 3 – Net Change in Volume of Other Waters of the U.S. (Volume)

Activity	Estimated Volume of Fill Cubic Yards (Cubic Meters)[a]
Construction of East Span Project (Addition of Fill)	65,979 (50,447)
Net Removal of Sediment[b] (Removal of Fill)	364,910 (278,994)
Removal of Existing Bridge Piers and Fenders (Removal of Fill)	85,600 (65,450)
Net Change in Volume of Waters of the U.S.	Increase in volume of Waters of the U.S: 384,531 (293,997)

Notes:

[a] Quantities in Table 3 are based on National Geodetic Vertical Datum (NGVD) 1929 and were calculated to the High Tide Line (HTL).

[b] Removal of sediments is necessary to create barge access and to prepare for pile installation and results in an increase in Bay volume. These calculations do not include that portion of the barge access channel to be used for eelgrass restoration described in the Conceptual Mitigation Plan for Special Aquatic Sites.

The overall increase in the volume of Other Waters of the U.S. would result from the following construction activities:

- Removing dredged sediments to create a barge access channel for construction at the Oakland Touchdown;
- Removing dredged sediments to construct piers for the new bridge;
- Removing dredged sediments to create a barge access channel to dismantle the existing structure at the Oakland Touchdown;
- Removing dredged sediments to dismantle the existing bridge piles below the mud line; and
- Removing the existing bridge piers and fenders.

A summary of dredging activities, agency jurisdiction, proposed reuse/disposal methods, and volumes to be dredged is presented in Table 4.

Table 4 – Dredging and Disposal

Activity	Dredging to Create Barge Access Channel to Construct new Bridge	Dredging to Construct New Piers and Footings	Dredging to Create Barge Access Channel to Dismantle Existing Bridge	Dredging to Remove Existing piers	Total Dredged Volume
Jurisdiction of Dredging Activity	U. S. Army Corps of Engineers	U. S. Coast Guard[a]	U. S. Army Corps of Engineers	U. S. Coast Guard[a]	
Proposed Reuse/ Disposal Site(s) for SUAD Material	SF-DODS[b]	SF-11[b]	Upland wetland reuse, SF-DODS, and/or landfill reuse[c]	SF-11[b]	
Jurisdiction of Disposal Activity	EPA if SF-DODS is used for disposal	ACOE	EPA if SF-DODS is used for disposal	ACOE	
Volume[d]	216,230 yards^3 (165,320 m^3)	187,087 yards^3 (143,038 m^3)	190,680 yards^3 (145,785 m^3)	22,724 yards^3 (17,374 m^3)	616,721 yards^3 (471,517 m^3)

Notes:

[a] The U. S. Coast Guard would regulate the dredging at individual pier locations and notify mariners of barge trips associated with dredging and disposal activities. The ACOE would regulate dredging to create barge access channels for construction and dismantling and disposal of all dredged materials within Waters of the U.S., regardless of which agency regulates the dredging of that material.

[b] The DMMO concurred with this disposal site (SF-DODS) for SUAD material from this activity. All dredging and disposal of dredged materials would be consistent with the recommendations of the DMMO. (Please see Figures 12 and 13).

[c] Discharge may or may not be within ACOE jurisdiction, pending the final recommendation of the DMMO. Should the DMMO recommend that all materials be disposed of at an upland site, there would be no discharge into ACOE jurisdiction.

[d] Quantities in Table 4 are based on National Geodetic Vertical Datum (NGVD) 1929 and were calculated to the High Tide Line (HTL).

The preferred option would be to reuse and dispose of the dredged materials at a combination of sites. Dredged material generated by the construction of the barge access channel (see Table 4) would be disposed of at the San-Francisco Deep Ocean Disposal Site (SF-DODS). The materials dredged for construction of new piers would be disposed of in small quantities over a four-year period at the SF-11 site (see Table 4 above). Dredged materials generated for construction of the dismantling access channel (see Table 4 above) would be beneficially reused at the Hamilton restoration site, assuming the site is operational, can accept the materials, and reuse is practicable. Dredged material generated by removal of the existing East Span piers (see Table 4 above) is proposed for disposal at the SF-11 site.

22. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED

Table 5 shows the estimated area of Temporary Fill in Other Waters of the U.S.

Table 5 – Temporary Fill in Other Waters of the U.S. (Surface Area)

Project Element	**Section 404 Fill in Other Waters of the U.S. Acres (Hectares)** [a]
YBI/Main Span (Bent W2, E1 – E2)	
Barge Dock - Near Clipper Cove (North Side of YBI)	0.004 (0.0016)
Construction Access Trestle	0.001 (0.0004)
Falsework Piers (2 Footings, 4 Piers)	0.22 (0.088)
Cofferdams (2 Cofferdams)	0.23 (0.092)
Skyway (E3 - E16)	
Construction Access Trestle	0.01 (0.004)
Falsework Piers (6 Footings)	0.05 (0.02)
Cofferdams (28 Cofferdams)	0.81 (0.324)
Oakland Touchdown Area (E17-E23)	
Construction Access Trestle	0.05 (0.02)
Falsework Piers (4 Footings)	0.10 (0.04)
Cofferdams (7 Cofferdams)	0.13 (0.052)
Geotube	0.23 (0.092)
Total Temporary Fill	1.84 (0.73)

Notes:

[a]Quantities in Table 5 are based on National Geodetic Vertical Datum (NGVD) 1929 and were calculated to the High Tide Line (HTL).

Table 6 shows the estimated area of Permanent Fill in Other Waters of the U.S.

Table 6 – Permanent Fill in Other Waters of the U.S. (Surface Area)

Project Element	Section 404 Fill in Other Waters of the U.S. Acres (Hectares) [a]
YBI/Main Span (Bent W2, E1-E2)	
Piles/Pile Caps (2 Piles/Pile Caps)	0.61 (0.24)
Fenders (2 Fenders)	0.05 (0.02)
Skyway (E3 - E16)	
Piles/Pile Caps (28 Piles/Pile Caps)	1.27 (0.51)
Fenders (6 fenders)	0.40 (0.16)
Oakland Touchdown Area (E-17-E-23)	
Piles/Pile Caps (9 Piles/Pile Caps)	0.10 (0.04)
Total Permanent Fill	2.43 (0.97)

Notes:
[a] Quantities in Table 6 are based on National Geodetic Vertical Datum (NGVD) 1929 and were calculated to the High Tide Line (HTL).

[b] The project would not discharge fill in designated wetlands. However, fill would be discharged in special aquatic sites such as intertidal sandflats and eelgrass beds.

As seen below in Table 7, the proposed East Span Project would result in an overall increase in the area of Other Waters of the U.S.

Table 7 –Net Change in Area of Other Waters of the U.S.

Activity	Estimated Area of Fill Acres (Hectares)
Construction of East Span Project (Addition of Fill)	2.43 (0.97)
Net Removal of Sediment (Removal of Fill)[a]	Not Applicable
Removal of Existing Bridge Piers and Fenders (removal of Fill)	1.98 (0.80)
Net Permanent Change in Area of Other Waters of the U.S.	0.45 (0.17)

Note:
[a] Removal of submerged sediments to create barge access, prepare for pile installation, and remove the existing bridge does not increase the surface area of Other Waters of the U.S.

The East Span Project would temporarily and permanently fill special aquatic sites within the project site including sand flats and eelgrass beds. Based on a survey of eelgrass beds completed in October of 2000, the East Span Project would:

- Permanently impact approximately 3.24 acres (1.31 hectares) of eelgrass beds;
- Temporarily impact approximately 0.36 acres (0.14 hectares) of eelgrass beds
- Permanently impact approximately 4.19 acres (1.70 hectares) of sand flats; and

- Temporarily impact approximately 0.80 acres (0.32 hectares) of sand flats.

The majority of the impacts to special aquatic sites would occur in the intertidal areas just to the north of the Oakland Touchdown as a result of dredging for a barge access channel and the placement of solid fill to construct the westbound roadway (bridge approach) and relocate the Caltrans maintenance road. There would be relatively minor impacts to eelgrass beds at Clipper Cove from the construction of a temporary barge dock.

Avoidance and Minimization of Impacts to Special Aquatic Sites

Design considerations to avoid and minimize impacts to special aquatic sites include:

- The westbound roadway at the Oakland Touchdown was initially designed on a straight alignment west of the Bay Bridge Toll Plaza. When Caltrans determined that this alignment would bisect and significantly impact large portions of Radio Beach and intertidal habitat areas, the roadway was realigned to the south. The proposed traffic lanes now curve slightly southward, significantly reducing the impacts to Radio Beach, eelgrass beds, and sand flats.
- In the Dredged Material Management Plan, dated June 1999, the proposed width of the barge access channel was 270 feet (82 meters). Since then, Caltrans has reduced the width of the barge access channel to 165 feet (50 meters) to further minimize impacts to special aquatic sites. Near the Oakland Touchdown, Caltrans has tapered the width of the channel to 150 feet (45 meters) and reduced the depth of the access channel from –14 feet (–4.3 meters) mean sea level to –12 feet (–3.7 meters) mean sea level. These reductions would reduce the amount of area in special aquatic sites that would be affected by dredging.

Caltrans would also implement special measures to minimize potential impacts during construction and protect special aquatic sites including:

- Marking environmentally sensitive areas in the field with fencing, buoys or similar devices to limit construction activities to pre-determined areas;
- Placing geotextile fabric and plywood onto the sand flats before placing the geotube to minimize mud boils;
- Using a geotube as a tidal berm rather than engineered fill. The geotube utilizes sand contained within a geotextile fabric;
- Using temporary trestles, rather than placing temporary solid fill in the Bay, for construction access; and
- Implementing a turbidity control program to contain and control turbidity impacts to eelgrass beds. If necessary, additional turbidity control measures would be implemented.

Mitigation

Location of Mitigation/Site Feasibility

Caltrans conducted an extensive review of potential mitigation sites in the central San Francisco Bay over the course of 1 ½ years to identify areas suitable for creating and/or restoring eelgrass beds, sand flats, mudflats and tidal marsh. Most of the sites were not feasible because they were either too small or were not available for mitigation purposes. Only one site within the Central Bay, the Breuner property, was large enough to meet the mitigation requirements of the project. However, several significant constraints precluded Caltrans from utilizing the site. As a result, Caltrans now proposes on-site restoration of sand flats and eelgrass beds and providing $8,000,000 to the USFWS to acquire and restore Skaggs Island in southern Sonoma County. Although Skaggs Island is not within the Central Bay, it would result in significant benefits to the San Francisco Bay ecosystem by supporting restoration of approximately 3,000 acres (1,214 hectares) of diked historic baylands to aquatic habitat. Below is a summary of the potential mitigation sites evaluated by Caltrans.

Potential mitigation sites immediately adjacent to the project area and the Emeryville Crescent were rejected because the sites were too small or not available for the required mitigation. These sites included:

- Radio Point

  The Radio Point site is located immediately north of the Bay Bridge Toll Plaza, less than 525 feet (160 meters) from the project area in the City of Oakland. The Port currently owns the land and has reserved it for its own future mitigation needs.

- West Grand Avenue

  The West Grand Avenue site is located north of the new West Grand Avenue overpass at Interstate 80, just east of the Bay Bridge Toll Plaza in the City of Oakland. This site is partially owned by the Port of Oakland and the State of California. The East Bay Regional Park District (EBRPD) manages the state-owned portion of this site as part of the Eastshore State Park. Caltrans previously used the state-owned portion of the site as mitigation for the I-80 HOVL and I-880 Cypress projects. The Port may retain its portion of the site for future mitigation needs.

- Oakland Touchdown

  The Oakland Touchdown site is within the existing Caltrans right-of-way where the existing Bay Bridge touches land in Oakland. It would revert to the Port of Oakland if Caltrans declares it excess to transportation needs. EBRPD has expressed interest in this land becoming part of the proposed Gateway Park. Caltrans may also use a portion of this site for its off-bridge collection and treatment of stormwater runoff.

Several potential sites north of the project area within the Eastshore State Park are managed by the EBRPD. EBRPD is developing a long-range plan for the Park to identify potential recreational uses and improvements. This may include habitat creation and enhancement. However, the planning process, which will include extensive public participation, may not be completed until 2002. EBRPD's timeline is not in accord with the plans for the East Span Project; therefore these sites were eliminated from consideration as potential mitigation sites. These sites included:

- Brickyard Cove

  The Brickyard Cove site is located just south of University Avenue on the west side of Interstate 80 in the City of Berkeley. The EBRPD manages Brickyard Cove as part of the Eastshore State Park and the State of California owns the property.

- Berkeley Meadows/Virginia Street

  The Virginia Street site is located north of University Avenue on the west side of Interstate 80 in the City of Berkeley. The EBRPD manages the Virginia Street site as part of the Eastshore State Park complex and the State of California owns the property.

Potential mitigation sites at and near the City of Albany's former landfill were also evaluated. However, these sites are too small to meet Caltrans' mitigation needs. Moreover, the City of Albany has received funds from the State of California to restore Albany Bulb and Albany Beach, precluding the use of these sites by Caltrans for mitigation purposes. These sites included:

- Buchanan Marsh

  The Buchanan Marsh site is located south of Buchanan Street and west of Interstate 80 in the City of Albany. Magna Entertainment, owner of the adjacent Golden Gate Fields Racetrack, owns this property.

- Albany Bulb and Beach

  The Albany Bulb and Beach are located northwest of Golden Gate Fields racetrack, west of Interstate 80, near the terminus of Buchanan Street. The City of Albany owns these parcels and has funds for their restoration.

Two potential mitigation sites were identified in the City of Richmond including the Liquid Gold property and the Breuner property. The Liquid Gold/Hoffman site is too small to meet Caltrans' mitigation needs. The Breuner site is sufficiently large and was initially identified by Caltrans as a preferred mitigation site. Caltrans developed conceptual mitigation scenarios for the site. However, several significant constraints precluded Caltrans from utilizing the site for mitigation.

- Liquid Gold/Hoffman Marsh
  The Liquid Gold/Hoffman Marsh site is located just north of Point Isabel Regional Park in the City of Richmond. Southern Pacific and the EBRPD own these properties.

- Breuner
  The Breuner site is located west of Interstate 80 and north of the Richmond Parkway in the City of Richmond. Bay Area Wetlands (BAW) owns this property and plans to develop it as a wetlands mitigation bank.

In preparing the site feasibility analysis in the Conceptual Mitigation Plan for Special Aquatic Sites, dated November 2000, Caltrans consulted with state and federal resource agencies including: the San Francisco Bay Conservation and Development Commission (BCDC); the Regional Water Quality Control Board (RWQCB); the California Department of Fish and Game (CDFG); U.S. Army Corps of Engineers (ACOE); U.S. Environmental Protection Agency (USEPA); and USFWS. Caltrans presented and refined its site selection and mitigation proposal in response to agency concerns expressed at several ACOE

Interagency meetings. Recognizing the inherent uncertainty in creating new eelgrass habitat and sand flats within San Francisco Bay, and the difficulty in finding suitable mitigation sites in the central Bay, the Interagency Group reached consensus that off-site and out-of-kind mitigation at the Breuner site was acceptable. Pursuant to the NEPA/404 process, the USFWS, USEPA and the ACOE gave preliminary agreement that the Conceptual Mitigation Plan for Special Aquatic Sites was adequate.
At the Breuner property, off-site mitigation would have involved creating and enhancing approximately 64.35 acres (26.05 hectares) of a tidal marsh ecosystem including:

- 1.01 acres (0.41 hectares) of new mudflats;
- 2.05 acres (0.83 hectares) of new tidal marsh channels;
- 22.86 acres (9.25 hectares) of new tidal marsh;
- 5.94 acres (2.41 hectares) of enhanced uplands;
- 24.39 acres (9.87 hectares) of enhanced jurisdictional wetlands; and
- 8.10 acres (3.28 hectares) of existing intertidal areas.

This approach provided a replacement of aquatic habitat at a 3 to 1 ratio. The estimated cost for implementing mitigation at the Breuner property was approximately $8,000,000 based on initial per-acre costs provided by BAW.

Below is a summary of the issues that would have significantly delayed implementing mitigation at the Breuner site and obtaining state and federal permits for the East Span Project:

- Hazardous Materials Testing

  Caltrans requires access to the mitigation site to determine whether hazardous materials are present and the extent of their presence prior to entering into any agreement for mitigation services. BAW would not grant Caltrans access to the site and would not do so unless Caltrans enters into an agreement to acquire BAW's services;

- Section 7 Endangered Species Consultation

  Under the Endangered Species Act, the ACOE must ensure that the project does not adversely affect an endangered or threatened species or their habitat. Accordingly, the ACOE would require that Caltrans initiate Section 7 Endangered Species Consultation with the USFWS. Given its proximity to Giant Marsh at Point Pinole, the Breuner property is likely to support the endangered Salt Marsh Harvest Mouse (SMHM). To ascertain the presence and distribution of the SMHM and other endangered and threatened wildlife and plant species, Caltrans must survey the site. However, BAW would not grant Caltrans access to the site to conduct such surveys;

- Sole Source Contracts.

  BAW has acquired the Breuner property with the intention of creating a wetland mitigation bank. It proposes to design, construct, and monitor the mitigation site consistent with the requirements of state and federal resource agencies and sell a turn-key product to interested parties on a per-acre basis. In essence, BAW is providing a service. A contract with BAW would be a sole source contract. Sole source contracts under State law are extremely difficult and time-consuming to justify. Caltrans has explored other arrangements to avoid a sole source contract but has not found any;

- Acquisition of Property Interest.

  BAW will only sell its service, not its land to Caltrans. Absent a willing seller, Caltrans must invoke the State's powers of eminent domain to acquire the property. The California Transportation Commission must approve any condemnation action. The process to approve a condemnation can be very time-consuming and may not be successful; and

- Public Access

  The Bay Trail Project identifies a future Bay Trail segment along the eastern perimeter of the Breuner property and a spur trail along the shoreline to a spit of land that juts into the Bay. The Bay Trail Project, BCDC, the EBRPD and local trail groups all support implementation of the Bay Trail at the Breuner Property. However, the USFWS and USEPA have expressed some concern over siting the spur trail through potential endangered species habitat. Caltrans has concluded that disagreements among the various regulatory and resource agencies, as well as citizens' groups, on siting and designing the public access could result in additional delays to obtaining the necessary permits to construct the bridge.

Proposed Mitigation

To offset the placement of permanent and temporary fill in San Francisco Bay and impacts to eelgrass beds and sand flats, Caltrans proposes on-site restoration of eelgrass beds and sand flats. In addition, Caltrans proposes to provide $8,000,000 to the USFWS to acquire and restore approximately 3,000 acres (1,214 hectares) of diked historic baylands at Skaggs Island in southern Sonoma County consistent with the Baylands Ecosystem Habitat Goals. Below is a discussion of on-site mitigation followed by off-site mitigation.

On-site Mitigation

Caltrans evaluated options for in-kind replacement of permanently impacted sand flats at or near the project site. Although in-kind mitigation is preferable, Caltrans has concluded that this is not feasible on the scale required for the East Span Project due to the difficulty of finding sufficient and suitable land at or near the project site. However, Caltrans proposes on-site restoration of a portion of the sand flats that would be temporarily impacted by construction activities.

Creation of new sand flat habitat is constrained by several factors. First, sand flats are a transitional intertidal habitat. Water permanently borders the lower edge of the sand flat while the upper edge of the sand flat transitions to tidal marsh or directly to uplands. There are two options for creating new sand flats: (1) extend the sand flat at the lower edge; or (2) extend the sand flat at the upper edge. Extending the sand flat at the lower edge is feasible, but not desirable, because it requires filling open water to create appropriate intertidal elevations. Extending the sand flat at the upper margin is desirable only if the sand flat is bordered directly by uplands. Otherwise it is necessary to excavate wetlands or other jurisdictional habitat.

If the sand flat is bordered directly by uplands, the sand flat can be extended on the landward side by excavating the uplands. The uplands would need to be excavated to a sufficient depth to prevent colonization by tidal marsh plant species. However, the upper edge of an existing sand flat is generally slightly lower than the lower limit of tidal marsh species. This leaves very little space with which to construct the new sand flats. It is likely that the created sand flats would quickly fill with sediment and become colonized by tidal marsh species. One possible solution, creating long strips of

narrow sand flats, is not feasible because there are no sites in the project vicinity with a sufficient amount of shoreline available.

Caltrans also evaluated options for in-kind replacement of permanently impacted eelgrass beds at or near the project site. Initially, Caltrans proposed to create new eelgrass beds at the Oakland Touchdown area and at Clipper Cove on YBI by placing sand-filled plateaus to raise the elevations of the Bay bottom to a level suitable to support eelgrass growth and then planting the areas with eelgrass from a donor site. However, the staff of several resource and regulatory agencies, including BCDC, opposed creating new habitat in the Bay using fill material.

Creation of eelgrass habitat is still experimental in the Bay, and the success rate for such projects varies depending on what method is used[3]. The Richmond Harbor Training Jetty Eelgrass Transplant Program, which was completed in 1985, was among the first transplant programs in the Bay Area. Eelgrass was transplanted to a site that was not manipulated. The survival of the plants was mixed, depending on the location and age of the donor material. The eelgrass in the control and transplant areas did not expand their range in the spring and summer of the transplant year. Based on the experience of this project, Merkel concluded that in the Bay sites specifically manipulated for eelgrass transplantation may be more successful[3,4]. Although much research on eelgrass restoration has occurred in southern California, the habitat in the San Francisco Bay is sufficiently different that available data from southern California is not readily transferable.

Despite these challenges, Caltrans proposes on-site restoration of eelgrass habitat. This approach is distinct from creating new eelgrass habitat in that it focuses on restoring areas that are historically known to have supported eelgrass habitat. The proposed restoration would maximize the potential for planting success by incorporating site manipulation, monitoring and data collection.

Proposed on-site mitigation includes:

- Harvesting approximately 0.55 acres (0.22 hectares) of eelgrass from the footprint of the barge access channel prior to dredging, planting test plots in adjacent eelgrass beds and monitoring to evaluate performance;
- Restoring to its pre-construction bathymetry up to approximately 1.73 acres (0.70 hectares) of the barge access channel. Dredged material and excavated sand would be used to facilitate eelgrass colonization and the area would be replanted with eelgrass from an adjacent donor site;
- Restoring approximately 1.70 acres (0.69 hectares) of sand flats that are temporarily affected by the placement of a geotube or mud boils from engineered fill;

[3] Merkel & Associates, Inc., Analysis of Eelgrass and Shallow Water Habitat Restoration Programs Along the North American Pacific Coast: Lessons Learned and Applicability to Oakland Middle Harbor Enhancement Area Design, Report to the Port of Oakland, CA, August 10, 1998.

[4] Fredette, T.J., M.S. Fonseca, W.J. Kenworthy and S. Wyllie-Echeverria, An Investigation of Eelgrass (*Zostera marina*) Transplant Feasibility in San Francisco Bay, CA, COE Report EL-88-2, Army Engineer Waterways Experiment Station, Vicksburg, MS, 1988.

- Constructing rock slope protection to allow sand to accrete over the rock areas subject to tidal action. Slope gradients would be 1(V):3(H) at the toe of the slope and transition to a 1(V):2(H) gradient at mid-slope; and
- Capping rock slope protection areas with soil above the limits of tidal action to provide a medium to support growth of native upland plants and provide more natural upland transition than the existing abrupt slope.

Off-site Mitigation

In addition to on-site mitigation, Caltrans proposes to provide $8,000,000 to USFWS to acquire and restore approximately 3,000 acres (1,214 hectares) of habitat at Skaggs Island consistent with the Baylands Ecosystem Habitat Goals. Prior to construction of any portion of the East Span Project, Caltrans would deposit the funds in an interest-bearing trust account for use by USFWS. All principal and accrued interest would be available for acquisition and restoration of aquatic habitat. Caltrans would continue consultation with state and federal resource and regulatory agencies on the parameters of the acquisition and restoration fund and mitigation opportunities at Skaggs Island. The relevant agencies would include:

- San Francisco Bay Conservation and Development Commission;
- Regional Water Quality Control Board;
- California Department of Fish and Game;
- US Army Corps of Engineers;
- US Environmental Protection Agency;
- US Fish and Wildlife Service; and
- National Marine Fisheries Service.

Caltrans proposes the following parameters for the off-site mitigation:

- USFWS would be fully responsible for designing, constructing, monitoring and managing the habitat creation and/or restoration;
- USFWS would be responsible for obtaining all necessary local, state and federal permits and completing any required environmental compliance including endangered species consultation;
- The habitat creation and/or restoration would be consistent with the recommendations of the Baylands Ecosystem Habitat Goals and should include eelgrass and sand flat habitat to the extent practicable;
- The habitat creation and/or restoration should be planned and designed to be self-sustaining over time to the extent possible;
- The acquisition and restoration funds should be used for replacing the functions and values of aquatic habitat and not to finance non-mitigation programs (e.g., education projects or research); and
- The area encompassed by the habitat creation and/or restoration should be protected in perpetuity with appropriate real estate arrangements (e.g., conservation easements, transfer of title to federal or state resource agency or non-profit conservation agency).

Timing of Mitigation

The first phase of mitigation, which involves harvesting and transplanting eelgrass, would occur prior to dredging for the Oakland Approach Structures contract. The remaining on-site eelgrass mitigation cannot be fully implemented until project completion, which would take approximately seven years. Sand flat mitigation could begin once the Geofill contract has been completed and the rock slope protection installed at the Oakland Touchdown. Establishment of the acquisition and restoration fund could be implemented prior to construction of the Skyway contract. Implementation of off-site mitigations at Skaggs Island depends on several factors including USFWS obtaining site control, preparing an appropriate plan, conducting environmental review and obtaining necessary regulatory permits.

23. IS ANY PORTION OF THE WORK ALREADY COMPLETE?

No.

24. ADDRESSES OF PROPERTY OWNERS, LESSEES, ETC., WHOSE PROPERTY LIES WITHIN THE PROJECT AREA.

The United States Navy
Assistant Secretary of the Navy
Installations and Environment
1000 Navy Pentagon
Washington, D.C. 20360-5000

The United States Army
Oakland Army Base
Oakland, CA 94626

The United States Coast Guard
Coast Guard Island
Building 54D
Alameda, CA 94501-5100

The Port of Oakland
P.O. Box 2084
Oakland, CA 94604-2064

The Port of San Francisco
Ferry Building
San Francisco, CA 94111

The City of Oakland
City Hall
One City Hill Plaza
Oakland, CA 94612

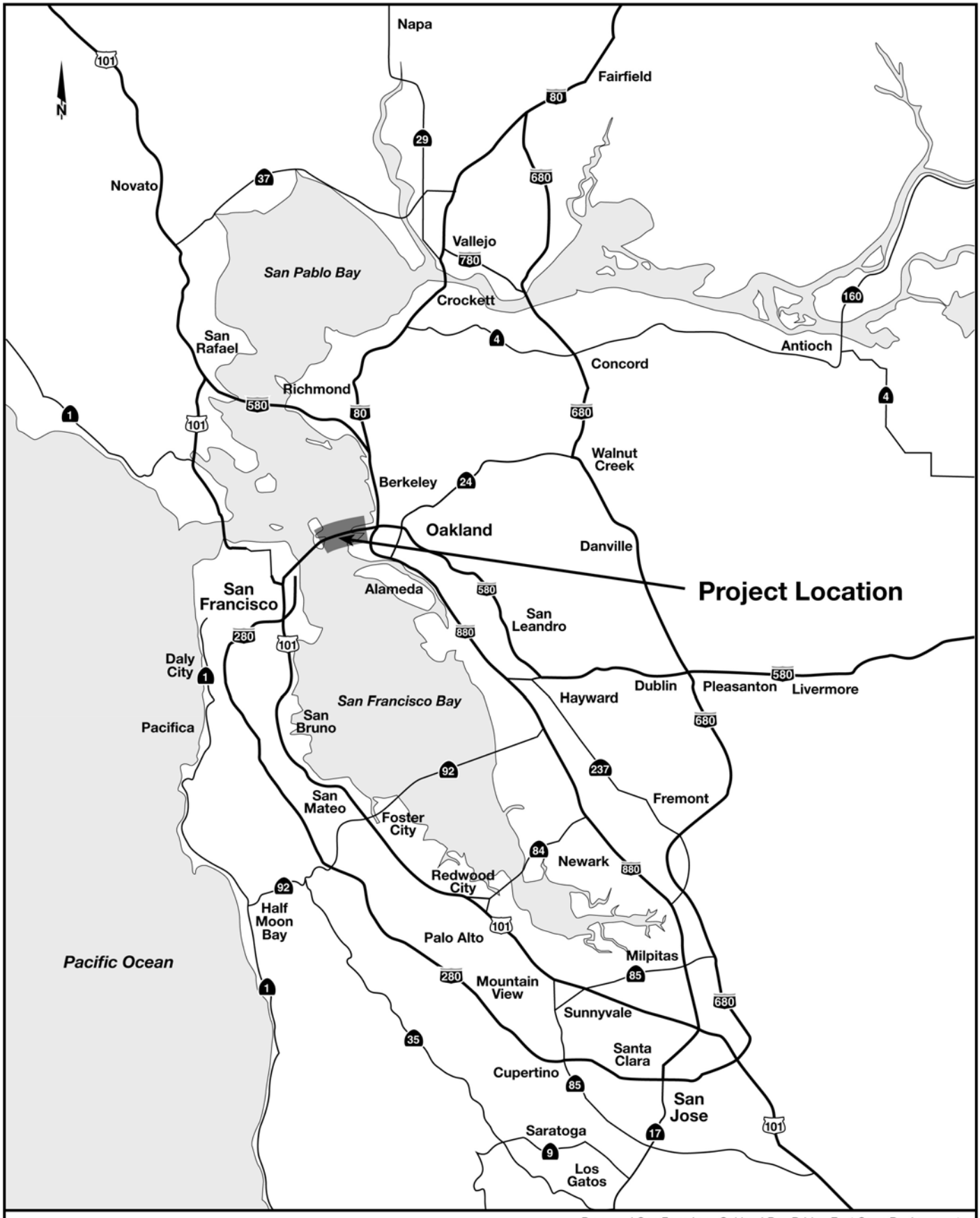
The State of California
Department of Transportation
District 4
111 Grand Avenue
Oakland, CA 94612

ADDRESSES OF PROPERTY OWNERS WHOSE PROPERTY BORDERS THE PROJECT AREA

East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055

25. LIST OF OTHER CERTIFICATION OR APPROVAL/DENIAL RECEIVED FROM OTHER FEDERAL, STATE, OR LOCAL AGENCIES FOR WORK DESCRIBED IN THIS APPLICATION

Agency Approvals and Certifications Summary		
Agency and Approval Required	Date of Submittal	Status
FHWA Record of Decision	EIS submitted 5/8/01.	Record of Decision issued 7/11/01.
EPA LEDPA Determination Permit to Discharge at SF-DODS site.	LEDPA analysis submitted 1/27/01.	LEDPA determination granted 3/15/01.
USFWS Section 7 Consultation (Endangered Species)	Biological Assessment submitted 7/99.	Letter of 8/31/99 found that Section 7 Consultation was not required.
NMFS Section 7 Consultation (Endangered Species) Incidental Harassment Authorization – Marine Mammals Incidental Take Statement - Fish	Biological Assessment submitted 7/99. Submittal to NMFS is forthcoming. Submittal to NMFS is forthcoming.	Letter of 9/24/99 concluded informal consultation. Authorization is pending. Authorization is pending.
SFRWQCB 401 Water Quality Certification	RWQCB permit application submitted September 13, 2001.	Authorization is pending.
U.S. Coast Guard Permit to Construct New Bridge Piers Only.	Permit application submitted 5/24/01.	USCG is reviewing application.
BCDC Permit to Dredge and Place Fill within San Francisco Bay.	Permit application submitted September 13, 2001.	Authorization is pending.
CEQA	Project is exempt by statute from the requirements of CEQA (see Section 1).	Statutory exemption issued in 1998.
DMMO	Consultation has been conducted regarding suitability of dredged material for unconfined aquatic disposal.	Letter indicating percent of sediments SUAD and NUAD issued 10/31/00. Concurrence letters from DMMO on disposal options issued 7/06/01 and 8/17/01.



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

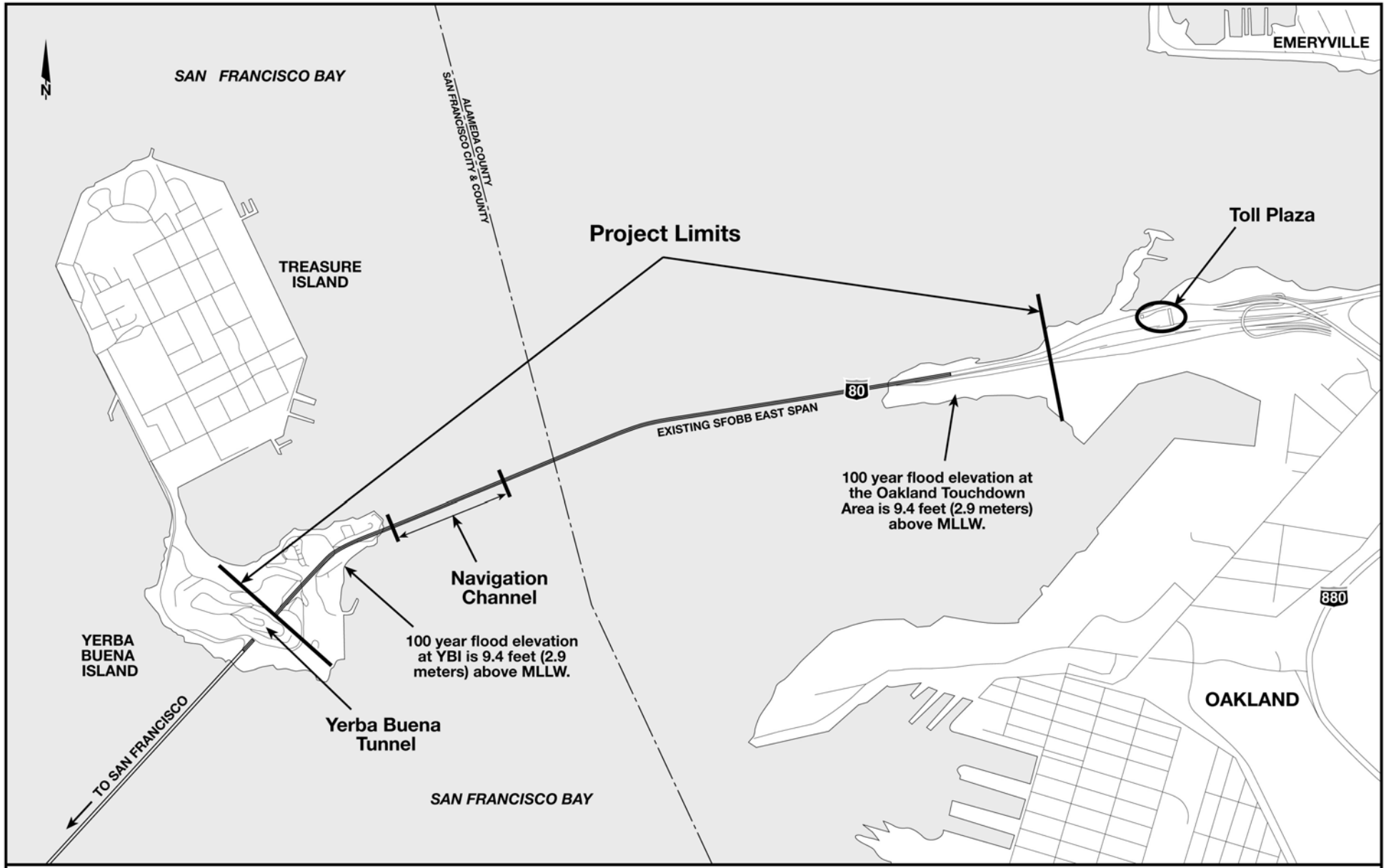
Project Vicinity

Scale

Kilometers 0 5 10 15 20 Kilometers

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
May 2001

Figure 1



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Project Limits

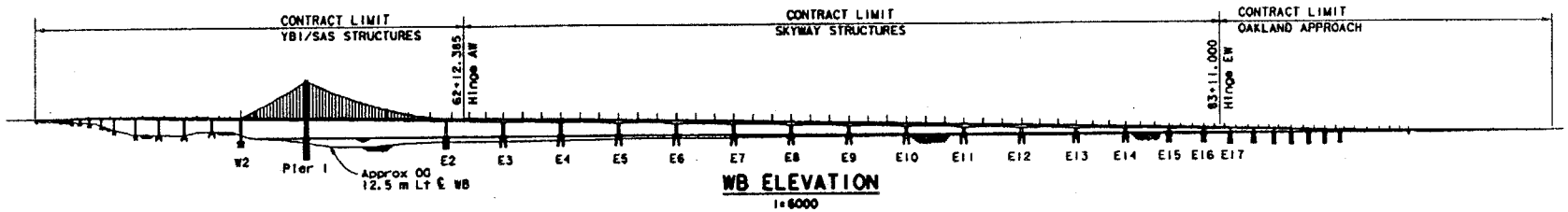
GRAPHIC SCALE 1:27,500

0 250 500 1000 m

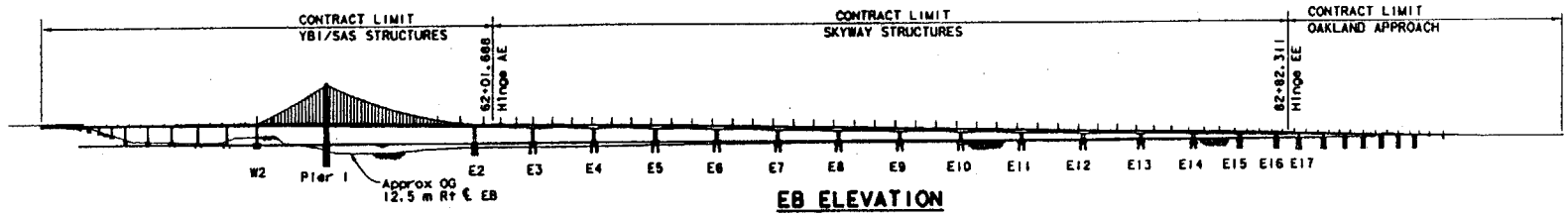
Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
May 2001

Figure 2

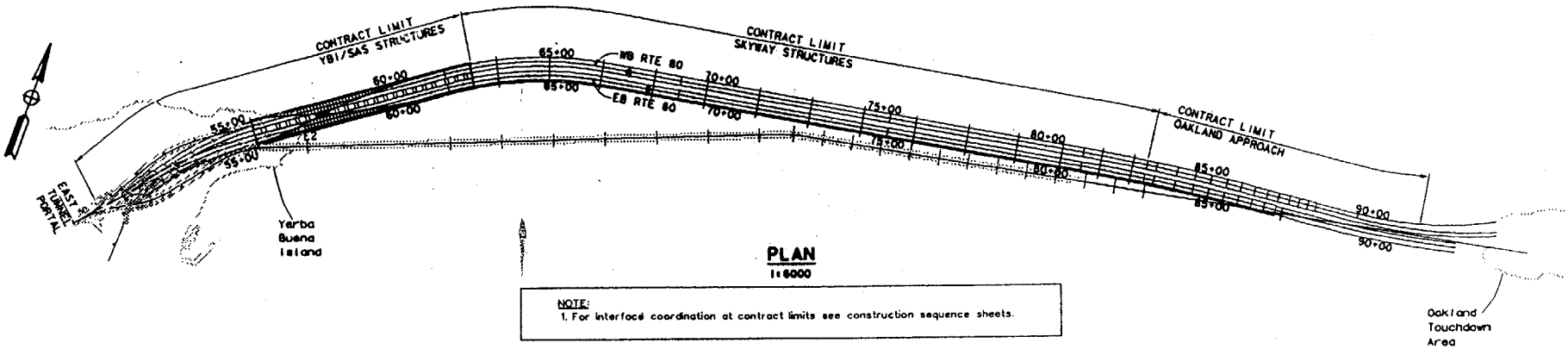
Mean Low Water Line = -0.875m
Mean High Water Line = +0.82m



WB ELEVATION
1:6000



EB ELEVATION
1:6000



PLAN
1:6000

NOTE:
1. For interface coordination at contract limits see construction sequence sheets.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge General Plan

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

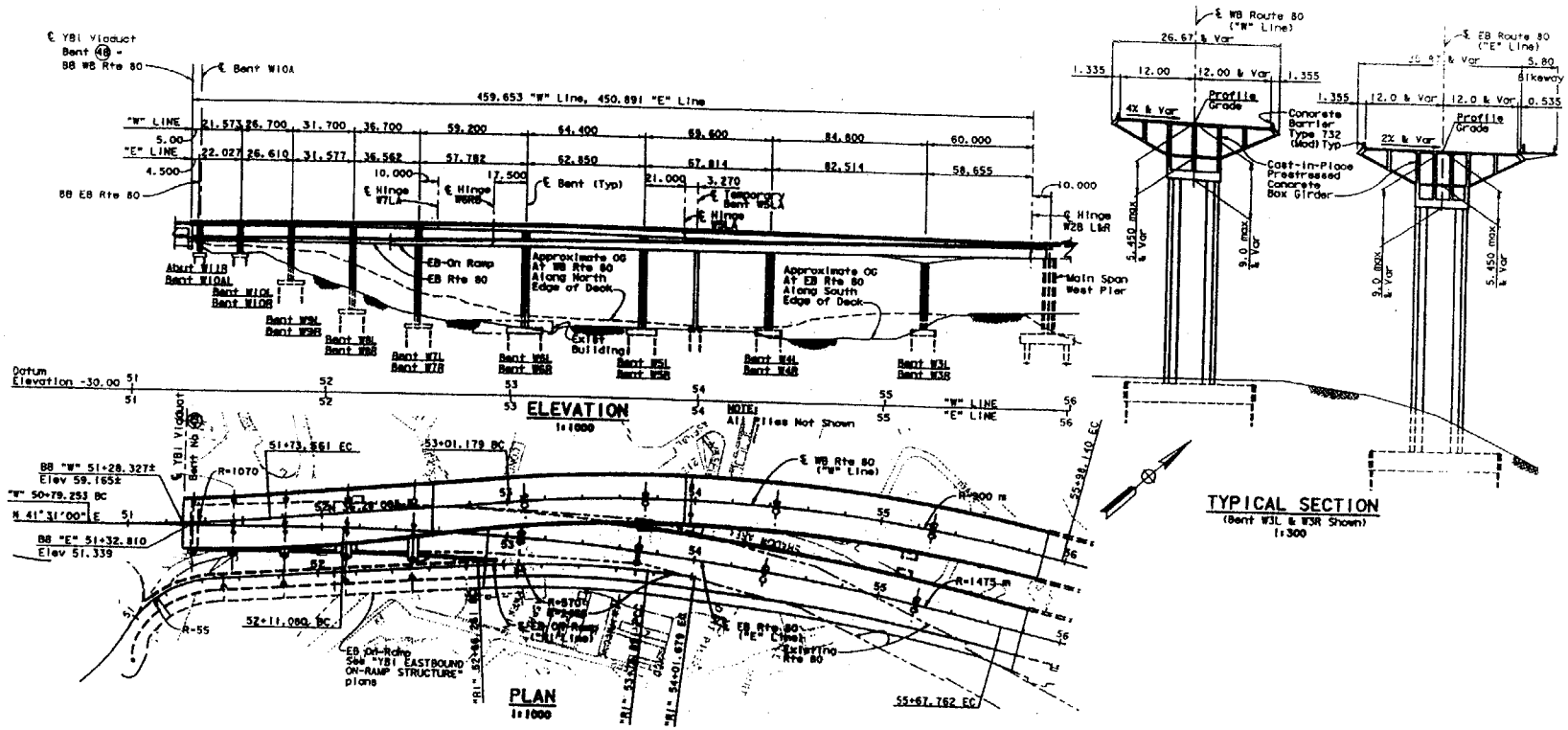
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 3



All dimensions are in meters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge Plan
(Abut W11, Bent W10 to W3)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

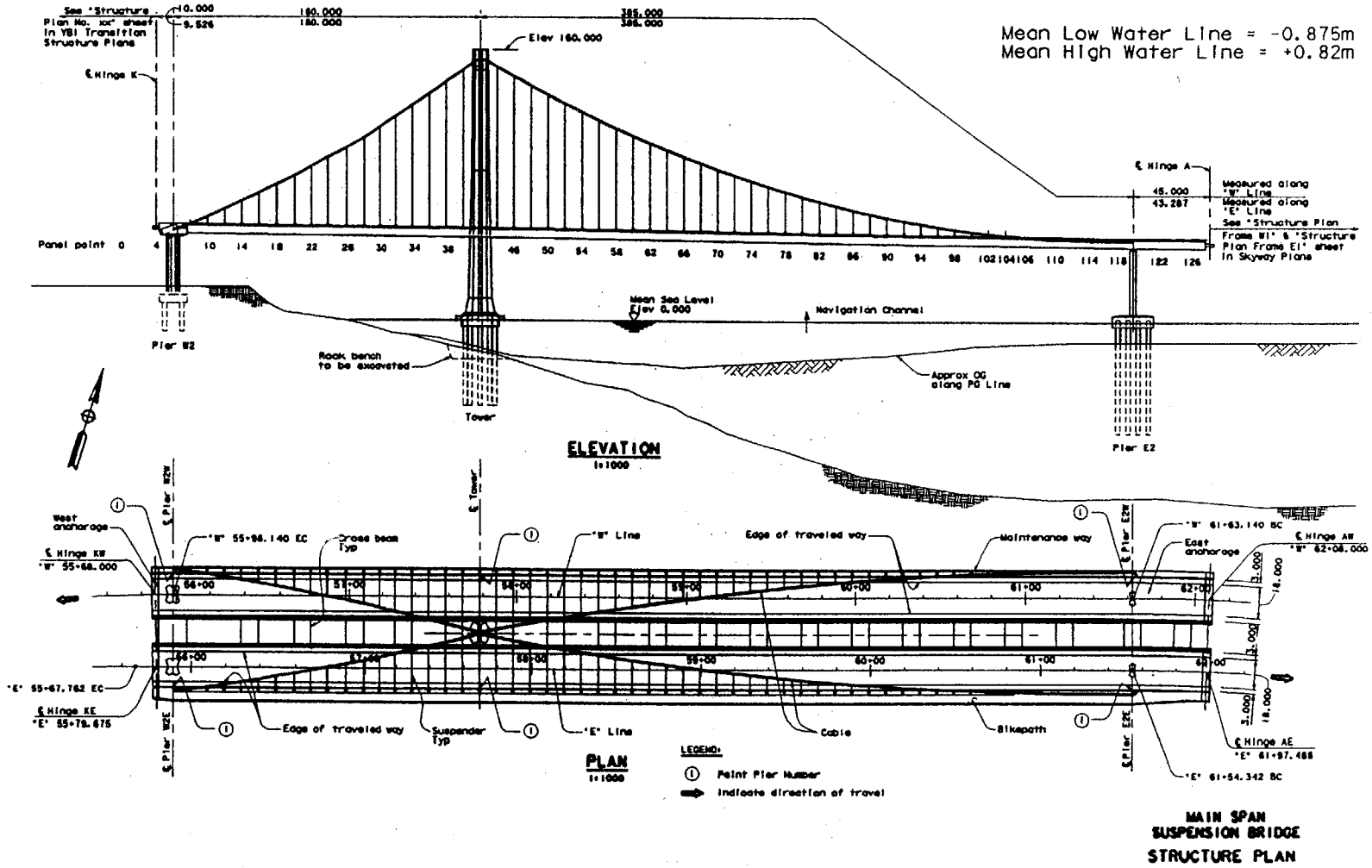
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4a



MAIN SPAN SUSPENSION BRIDGE STRUCTURE PLAN

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge Plan (Pier W2, Main Tower, and Pier E2)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

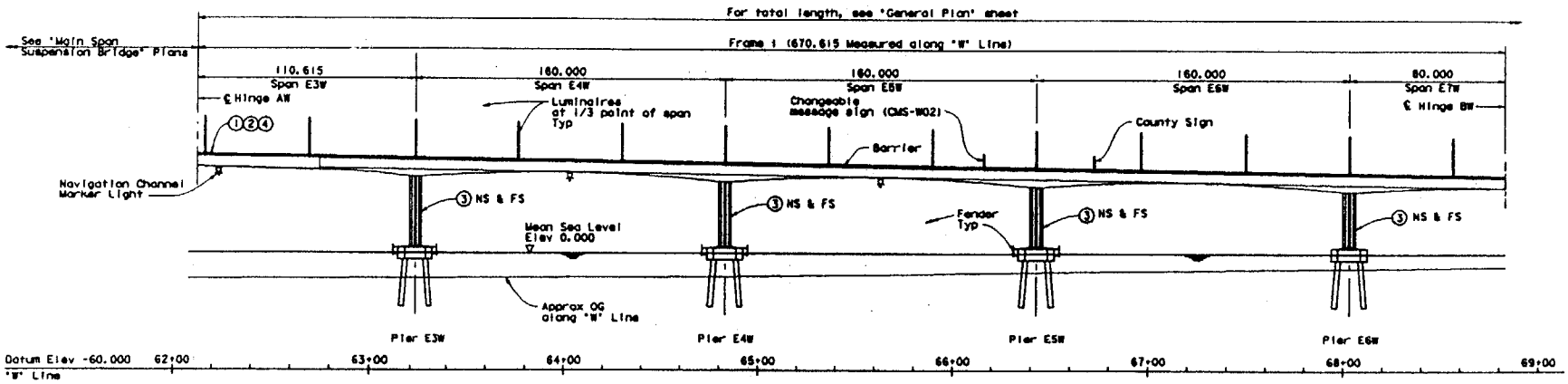
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

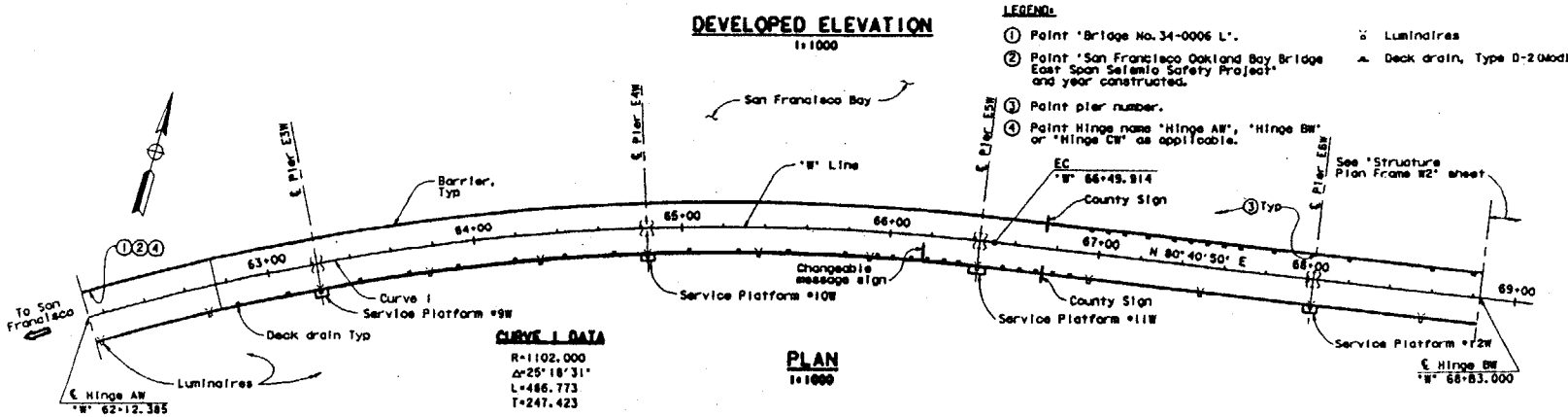
May 2001

FIGURE 4b

Eastbound Plan/Elevation
Matches Westbound.

Mean Low Water Line = -0.875m
Mean High Water Line = +0.82m





SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge Plan
(Pier E3W, E4W, E5W, E6W)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

Waterway - San Francisco Bay

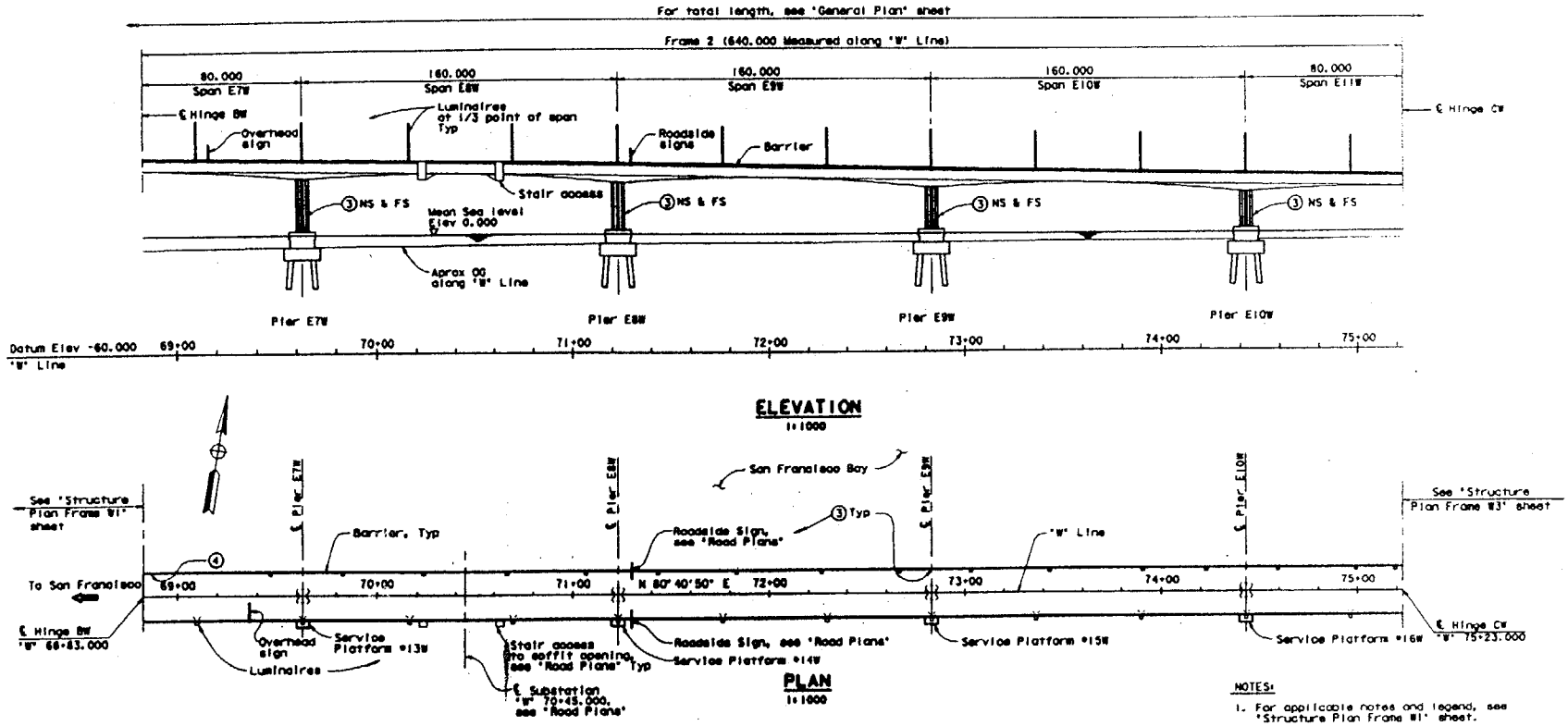
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4C

Mean Low Water Line = -0.875m
Mean High Water Line = +0.82m



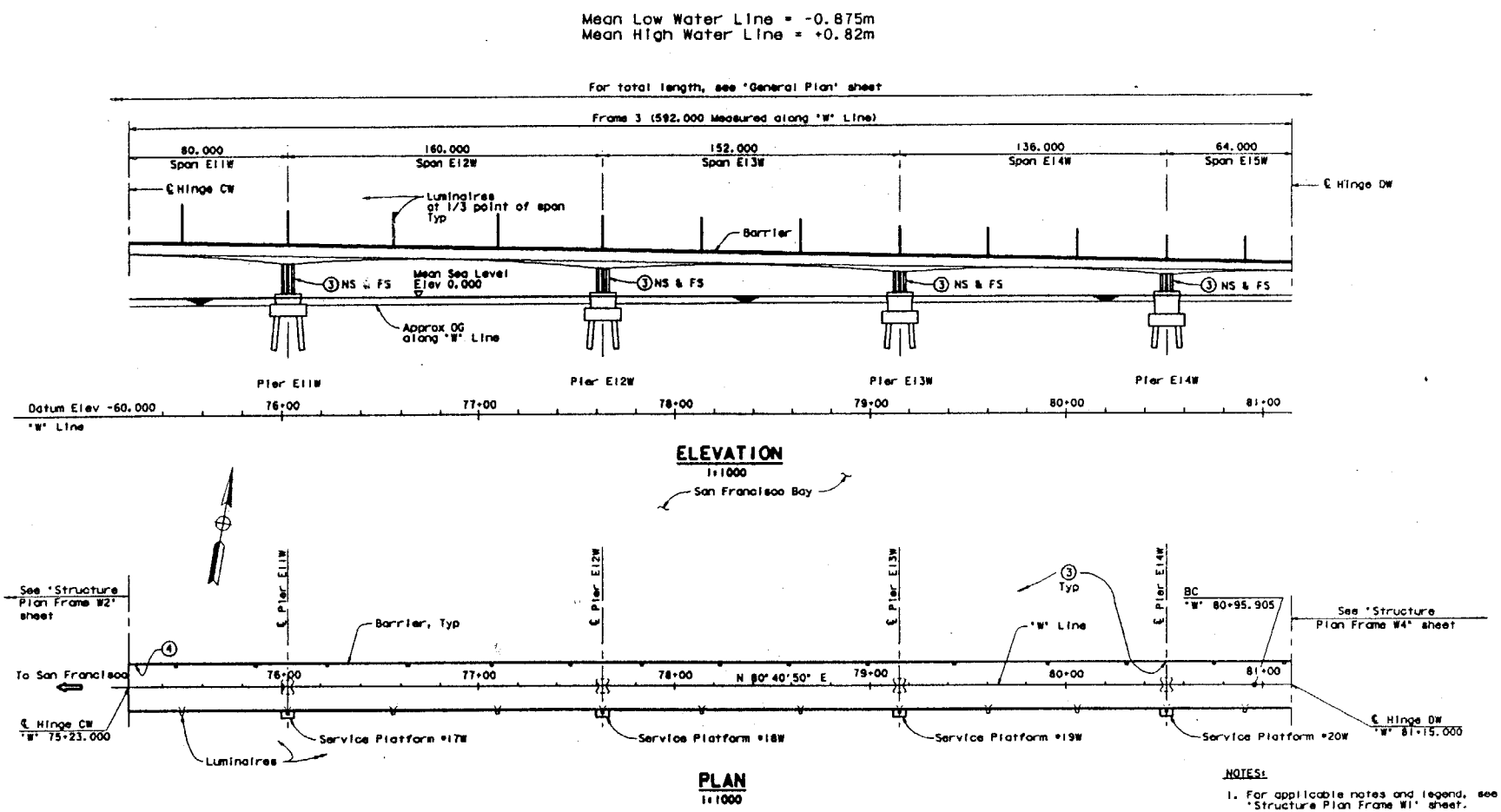
SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge Plan
(Pier E7W, E8W, E9W, E10W)

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3 SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA Oakland, Alameda County, CA
May 2001
FIGURE 4d



SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge Plan (Pier E11W, E12W, E13W, E14W)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

Waterway - San Francisco Bay

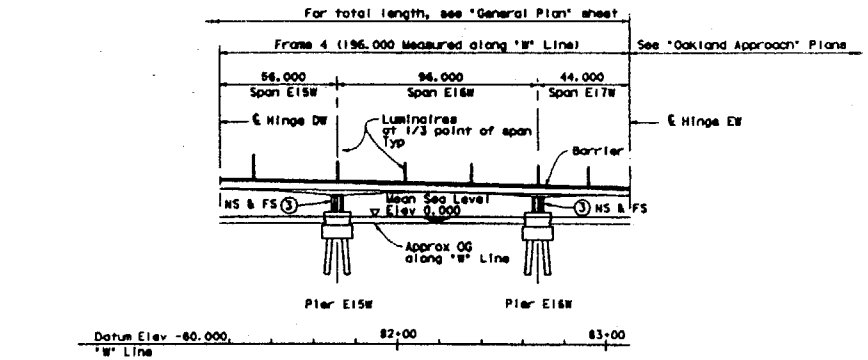
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

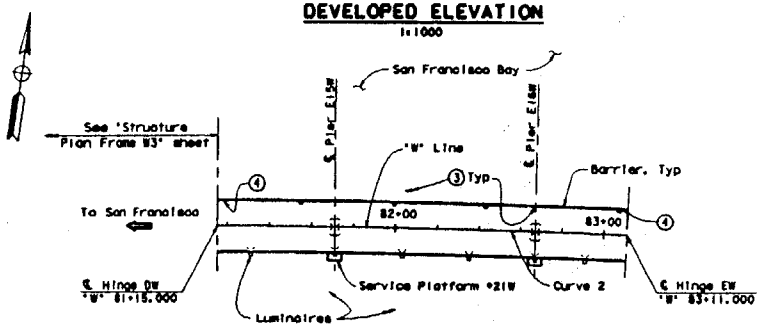
May 2001

FIGURE 4e

Mean Low Water Line = -0.875m
Mean High Water Line = +0.82m



DEVELOPED ELEVATION
1=1000



PLAN
1=1000

CURVE 2 DATA
R=6001.000
Δ=04°59'10"
L=522.245
T=261.287

NOTES:
1. For applicable notes and legend, see "Structure Plan Frame W1" sheet.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge Plan (Pier E15W, Pier E16W)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

Waterway - San Francisco Bay

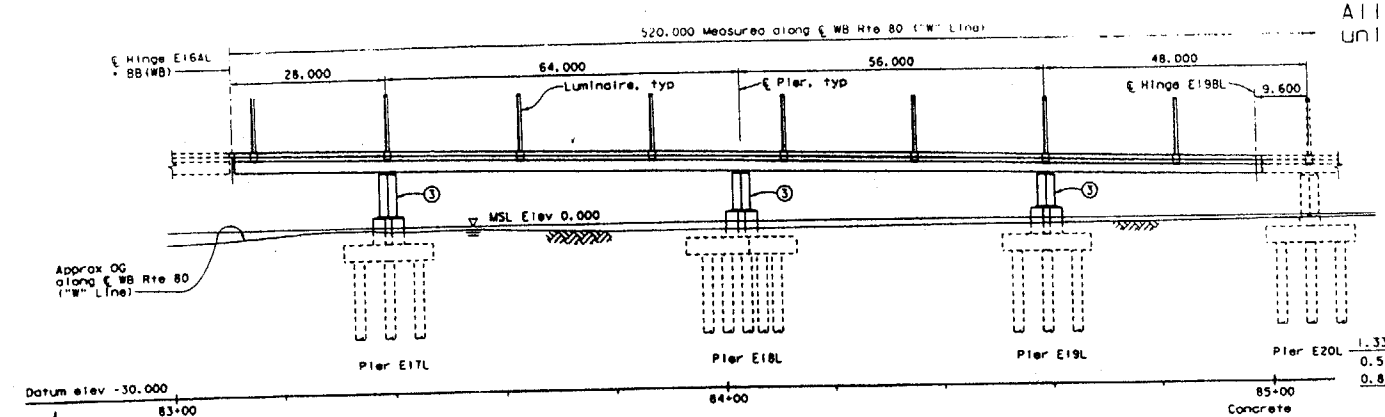
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

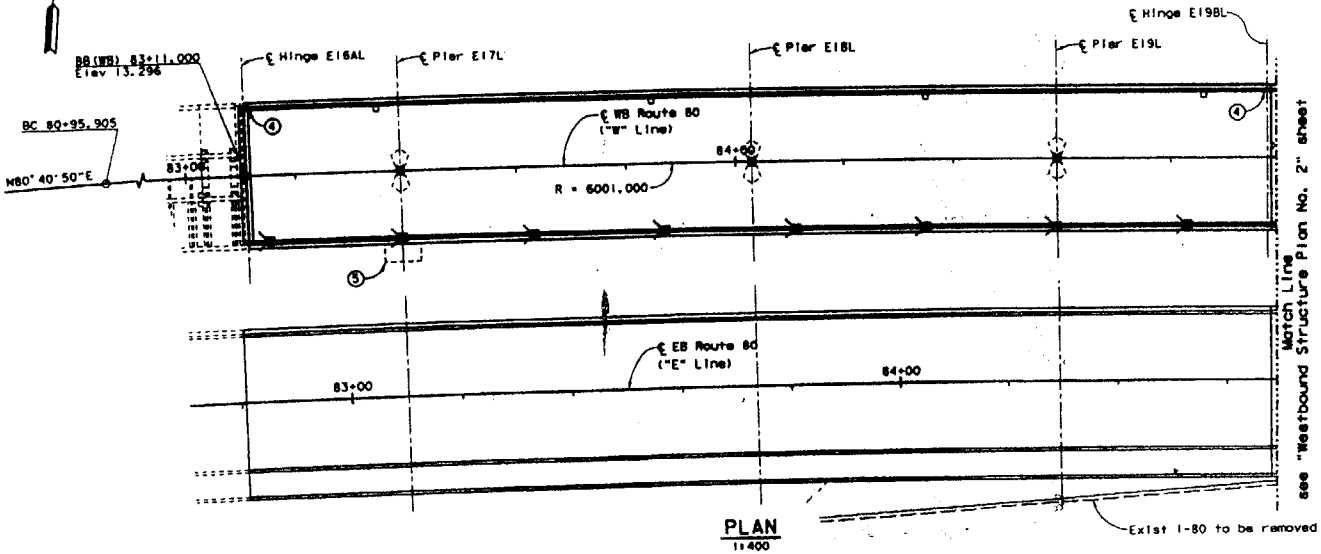
May 2001

FIGURE 4f

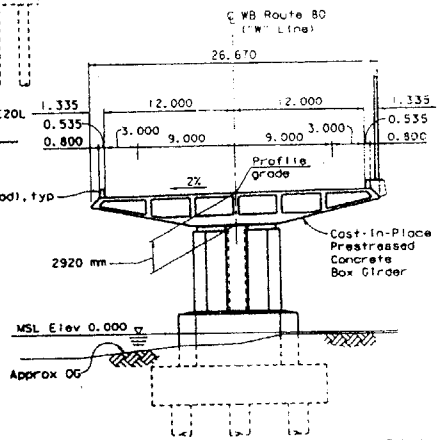
All dimensions are in meters unless otherwise shown.



ELEVATION
1:400



PLAN
1:400



TYPICAL SECTION-PIER E17L SHOWN
1:200

Notes:
1. Piers E18L & E19L similar.
2. For Eastbound structure, see "Eastbound Structure Plans" sheet.
3. For deck drain details, see "Deck Details No. 1" sheet.
4. For Luminaire Details & locations, see "Luminaire Details" sheet.
5. For deck drain locations, see "WB Structure Plan No. 2" sheet.
6. For exist I-80 removal, see "General Plan - Demolition" sheet.

LEGEND

- Indicates luminaire
- Indicates deck drain, Type D-2 (Mod)
- ③ Point pier number (NS & FS)
- ④ Point Hinge name "Hinge E16AL" or "Hinge E19BL".
- ⑤ Type I electrical service platform, see "Platform Details" sheet.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge Plan (Pier 17 thru 20)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

Waterway - San Francisco Bay

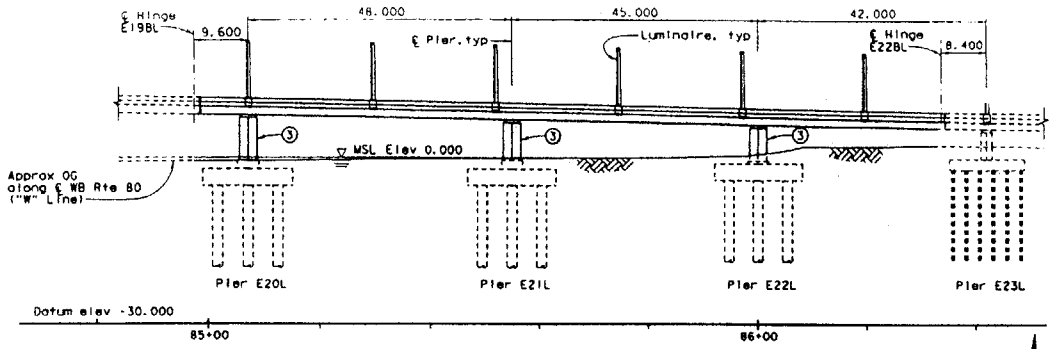
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

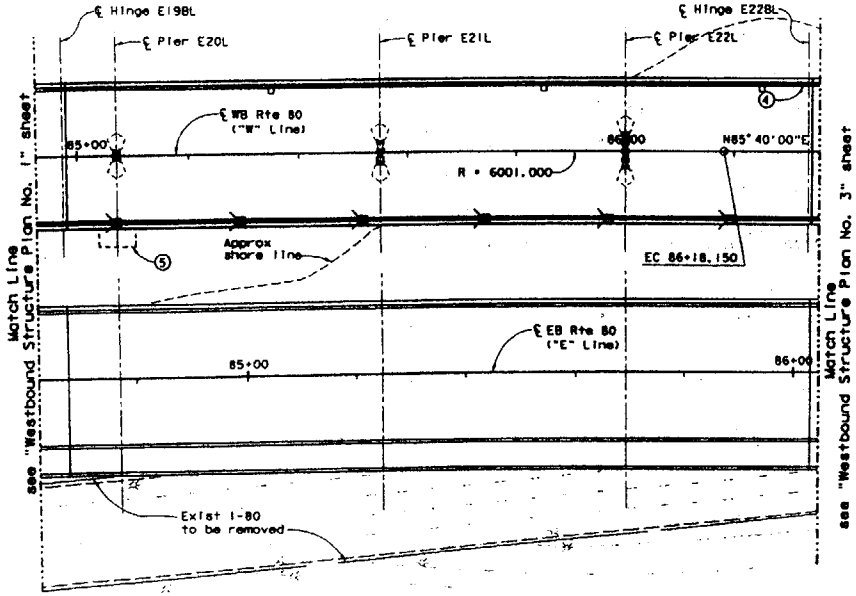
May 2001

FIGURE 4g

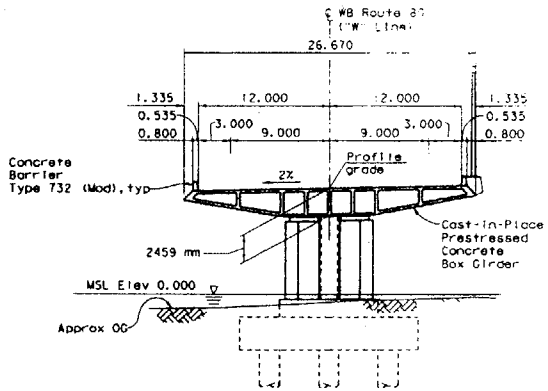
All dimensions are in meters unless otherwise shown.



ELEVATION
1:400



PLAN
1:400



TYPICAL SECTION-PIER E20L SHOWN
1:200

Notes:
1. Piers E21L & E22L similar.
2. For Eastbound structure, see "Eastbound Structure Plans" sheet.
3. For deck drain details, see "Deck Details No. 1" sheet.
4. For Luminaire Details & locations, see "Luminaire Details" sheet.
5. For deck drain locations, see "WB Structure Plan No. 2" sheet.
6. For exist I-80 removal, see "General Plan - Demolition" sheet.

LEGEND
- Indicates luminaire
- Indicates deck drain, Type D-2 (Mod)
- (3) Point pier number (NS & FS)
- (4) Point Hinge name "Hinge E16AL" or, "Hinge E22BL".
- (5) Type I electrical service platform, see "Platform Details" sheet.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

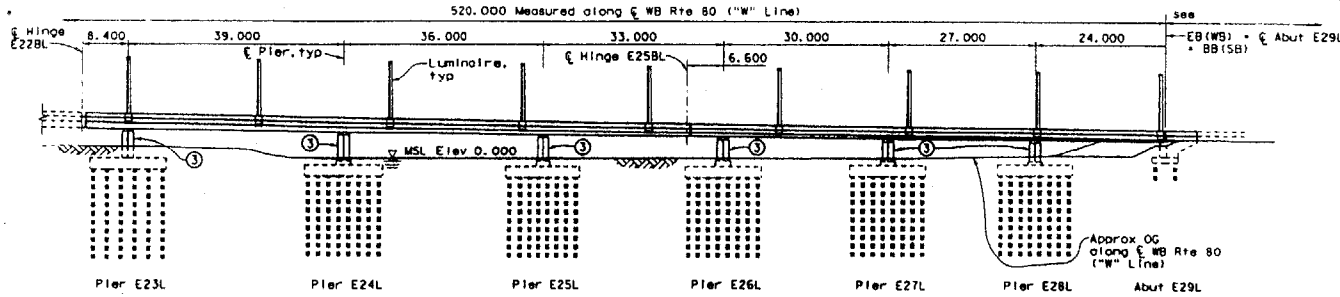
Caltrans

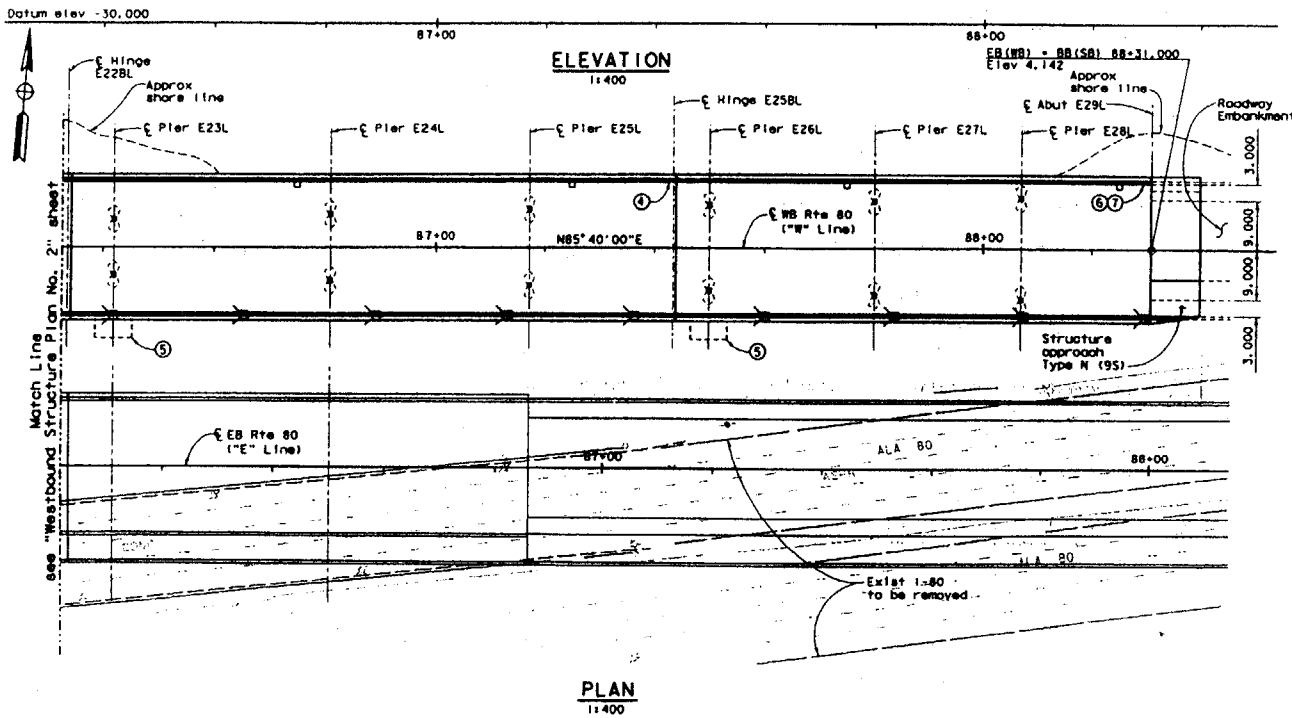
No Scale

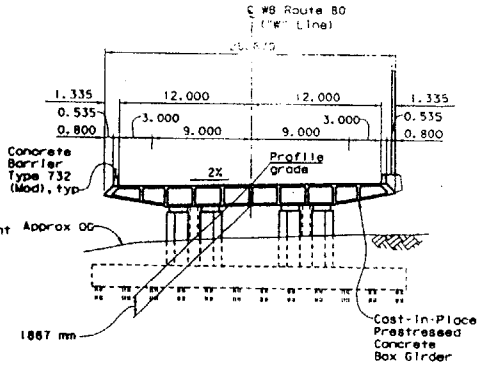
New Bridge Plan (Pier 20 thru 23)

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3 SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA Oakland, Alameda County, CA
May 2001
FIGURE 4h

All dimensions are in meters unless otherwise shown.







TYPICAL SECTION-PIER E23L SHOWN
1:200

Notes:
1. Piers E24L to E28L similar.
2. For Eastbound structure, see "Eastbound Structure Plans" sheet.
3. For deck drain details, see "Deck Details No. 1" sheet.
4. For Luminaire Details & locations, see "Luminaire Details" sheet.
5. For deck drain locations, see "WB Structure Plan No. 2" sheet.
6. For exist I-80 removal, see "General Plan - Demolition" sheet.

LEGEND
- Indicates luminaire
- Indicates deck drain, Type D-2 (Mod)
- (3) Paint pier number (NS & FS)
- (4) Paint hinge name, "Hinge E25BL"
- (5) Type I electrical service platform, see "Platform Details" sheet.
- (6) Paint "San Francisco Oakland Bay Bridge Westbound Approach" and year constructed.
- (7) Paint "Bridge No. 34-0006L"

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

New Bridge Plan
(Pier 23 thru 28, Abut 29)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

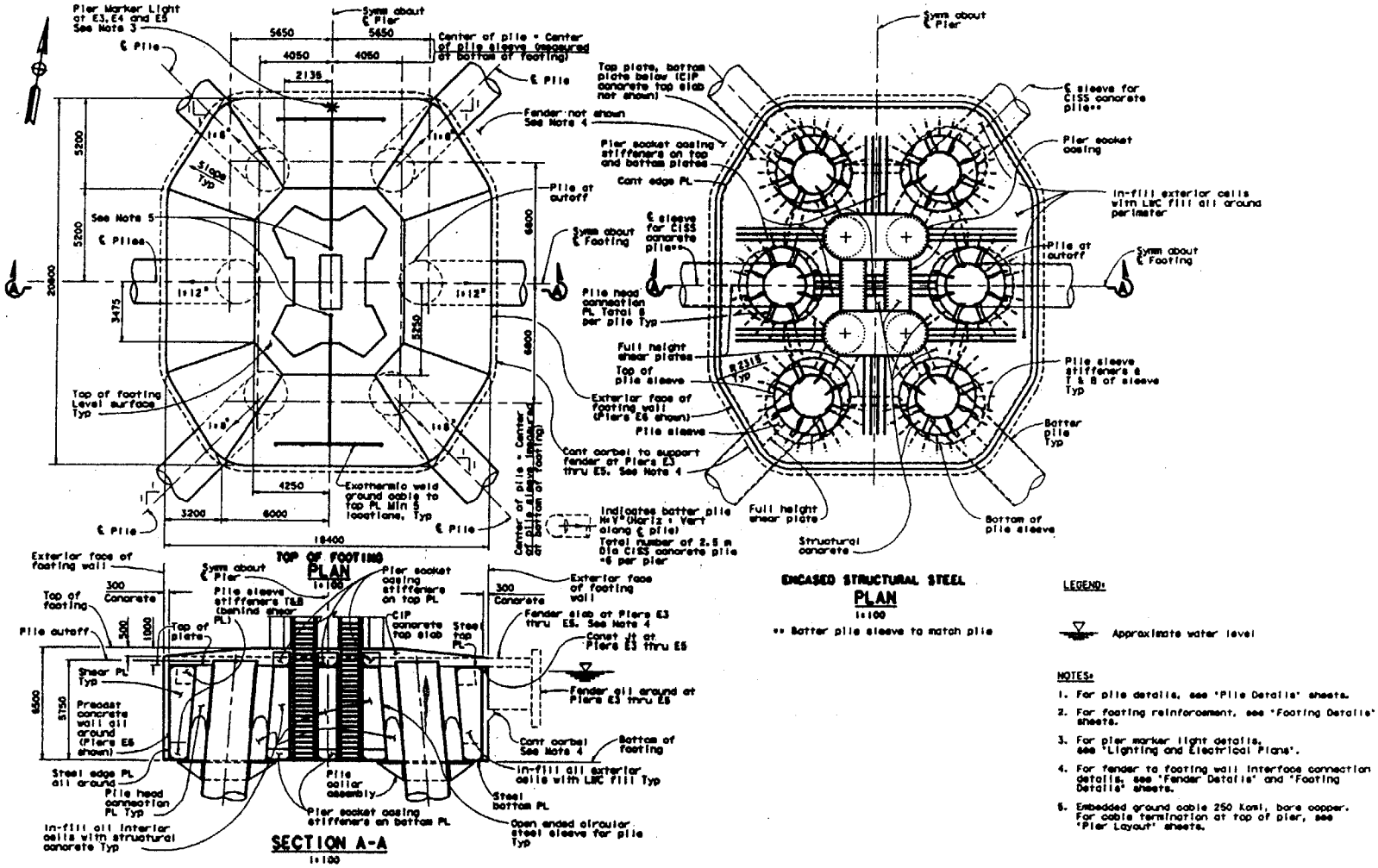
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 41



Footing Plan (Piers E3 thru E6)

All dimensions in millimeters unless otherwise noted.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Cap

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

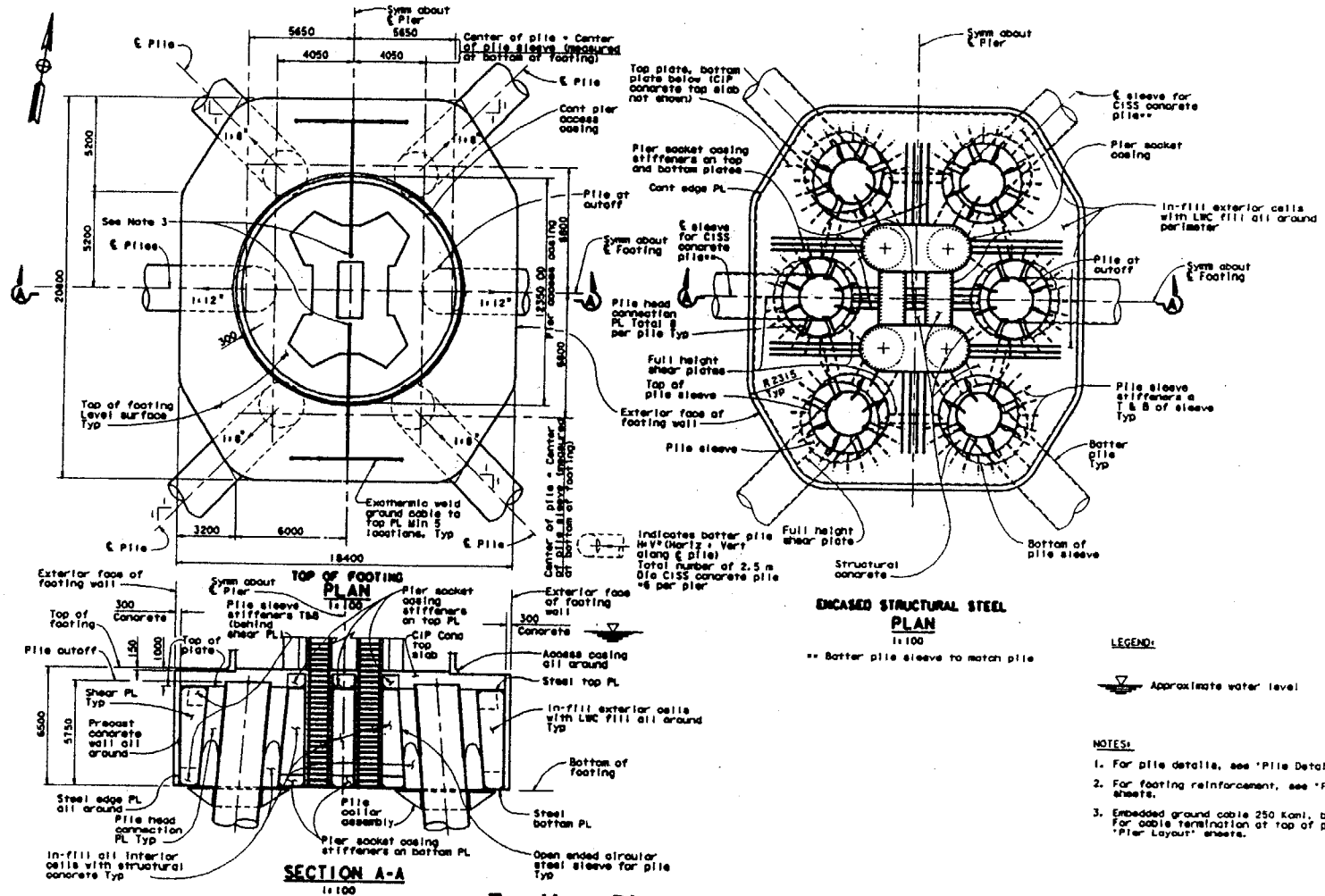
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4j



Footing Plan (Piers E7 thru E14

All dimensions in millimeters unless otherwise noted.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Cap

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

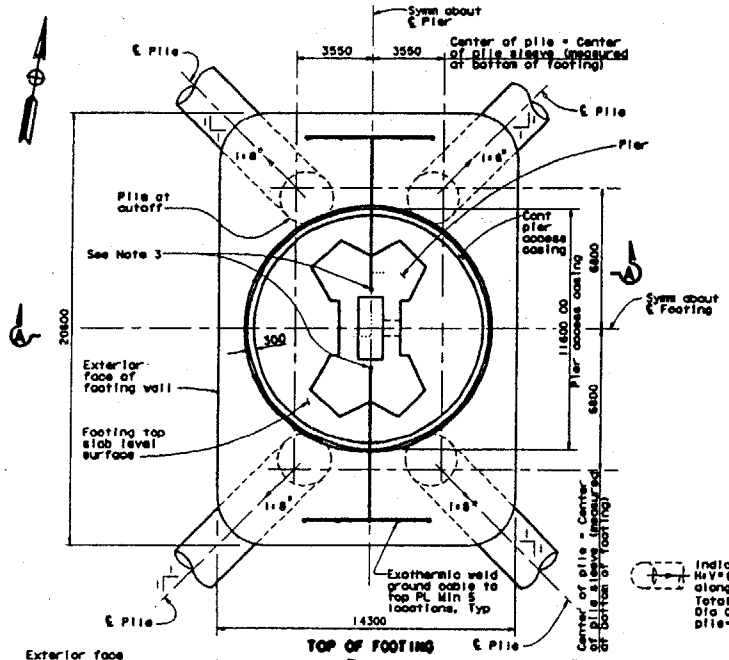
Waterway - San Francisco Bay

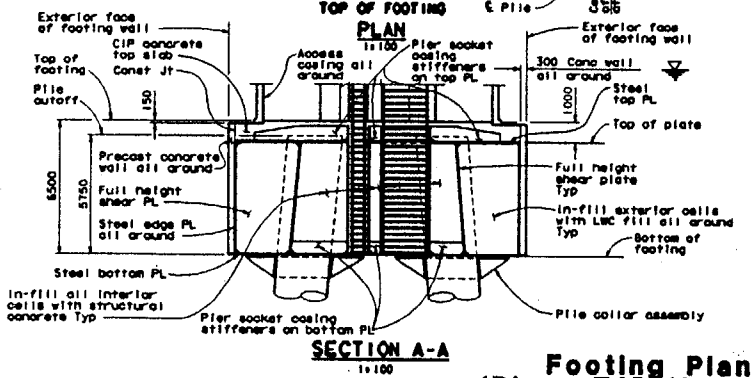
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

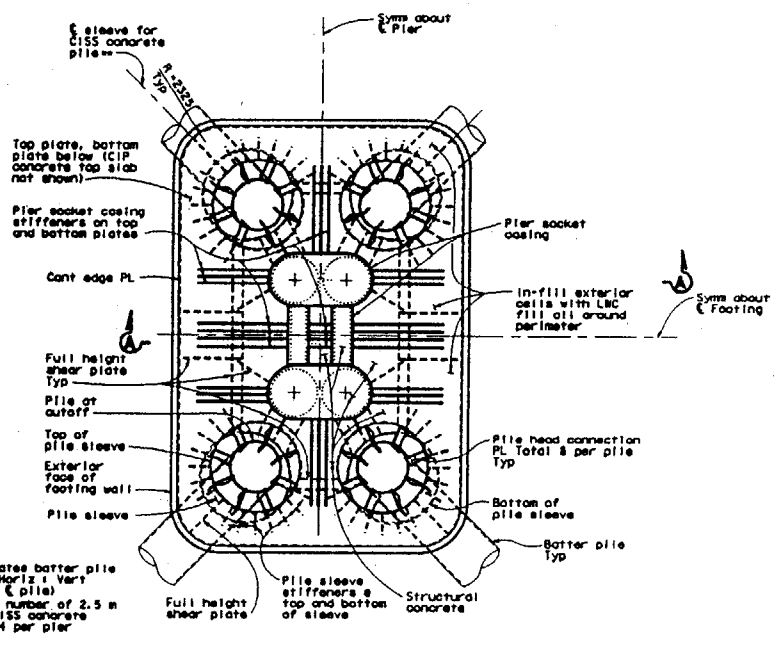
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4k







Indicates batter pile H:V*(Horiz : Vert along ℄ pile)
Total number of 2.5 m Dia CISS concrete pile-4 per pier

LEGEND:

Approximate water Level

NOTES:

1. For pile details, see 'Pile Details' sheets.
2. For footing reinforcement, see 'Footing Details' sheets.
3. Embedded ground cable 250 Kcmil, bare copper. For cable termination at top of pier, see 'Pier Layout' sheets.

Footing Plan (Piers E15 thru E16)

All dimensions in millimeters unless otherwise noted.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Cap

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

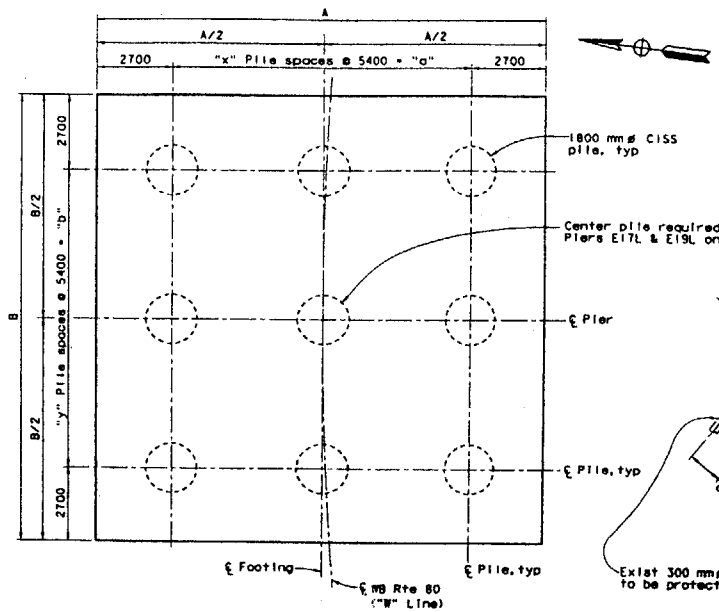
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

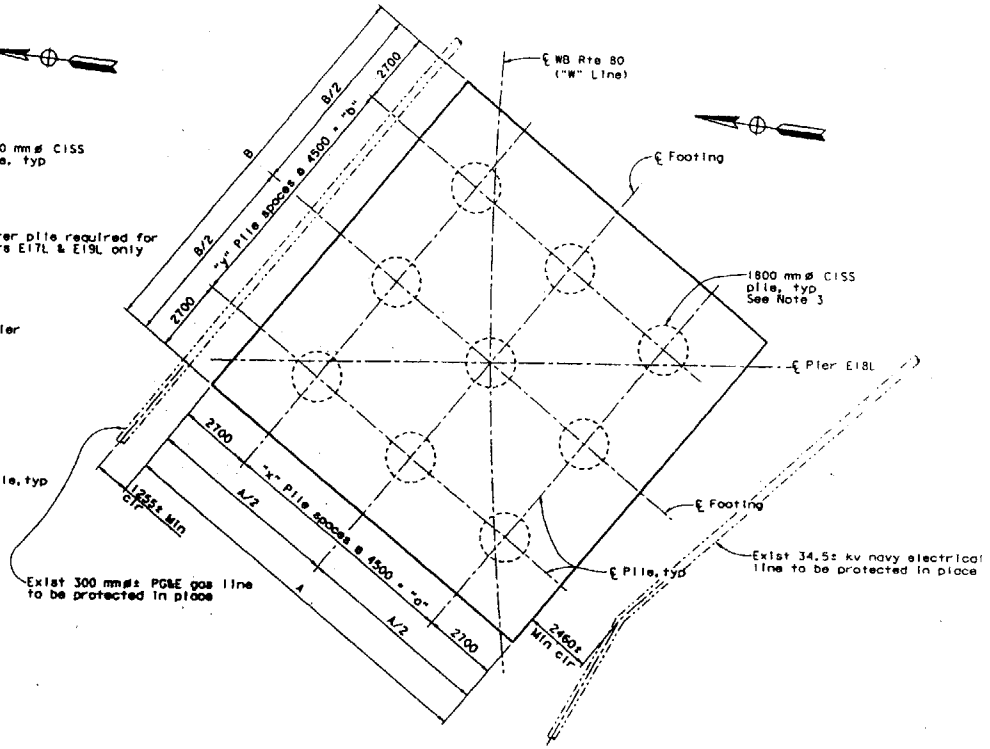
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 41



PIERS E17L, E19L & E20L
PILE LAYOUT
No Scale



PIER E18L PILE LAYOUT
No Scale

Notes:
1. For footing dimensions, see "Footing Dimensions Table" on "Westbound Footing Details No. 3" sheet.
2. For pile details, see "Pile Details No. 2 & 3" sheets.
3. Piles in Pier E18L shall be pre-drilled to elevation shown on the specification.

All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Cap

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

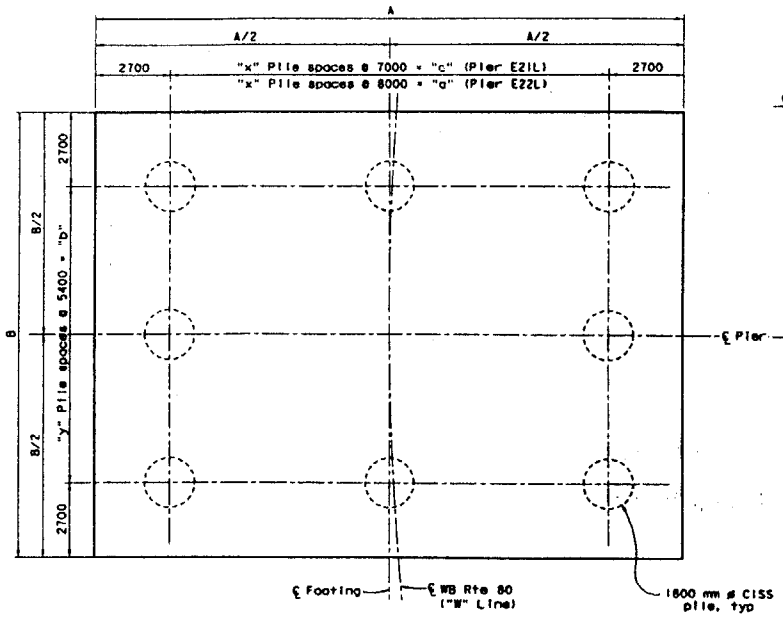
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

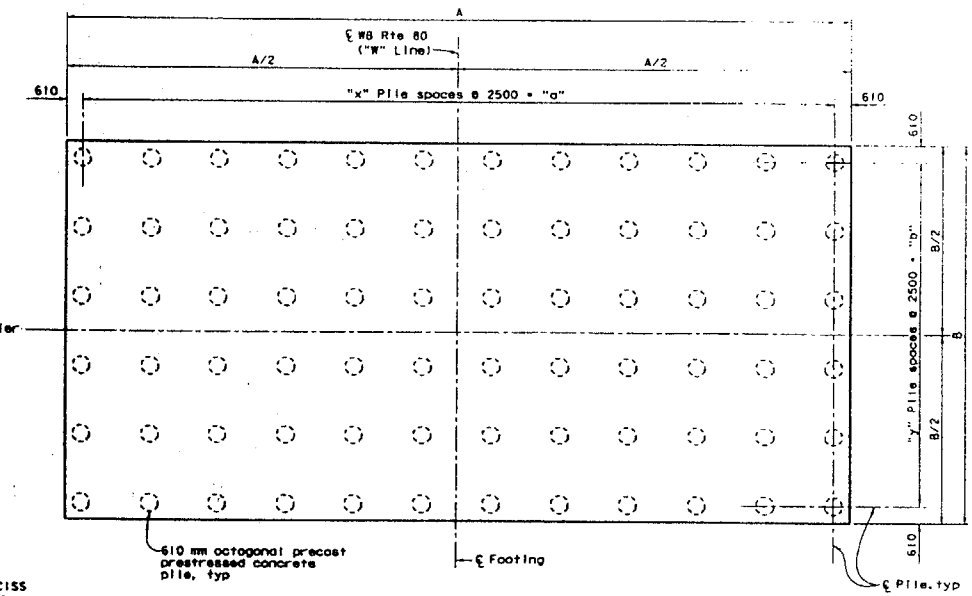
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4m



PIERS E21L & E22L PILE LAYOUT
No Scale



PIER E23L PILE LAYOUT
No Scale

Notes:
1. For footing dimensions, see "Footing Dimensions Table" on "Westbound Footing Details No. 3" sheet.
2. For pile details, see "Westbound Pile Details No. 1, 2 & 3" sheets.

All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Cap

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

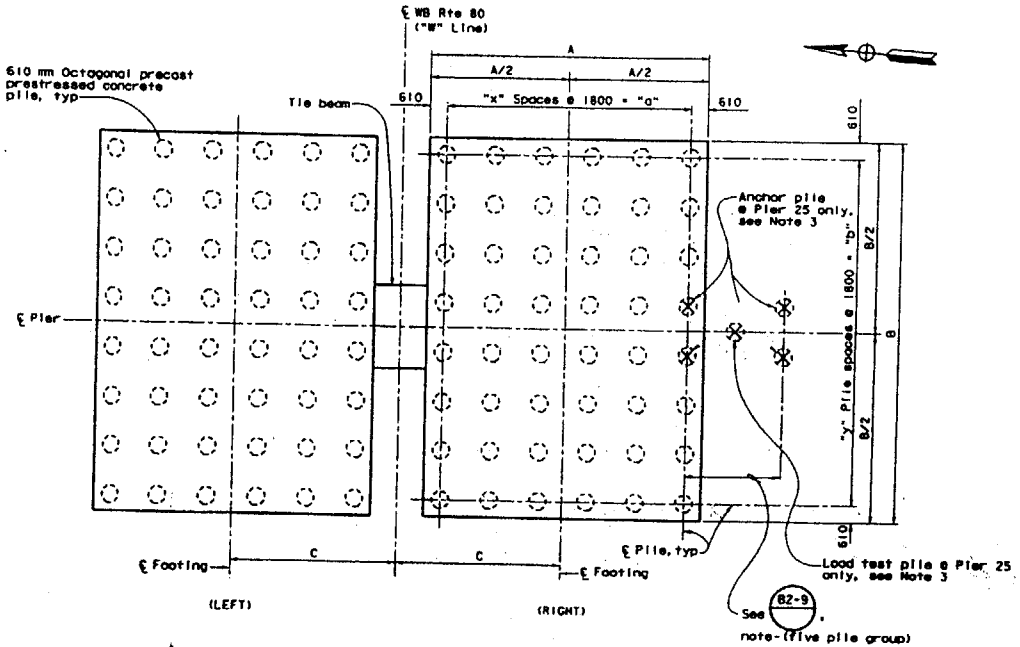
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4n



PIER E24L THRU E28L
PILE LAYOUT
No Scale

All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Cap

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

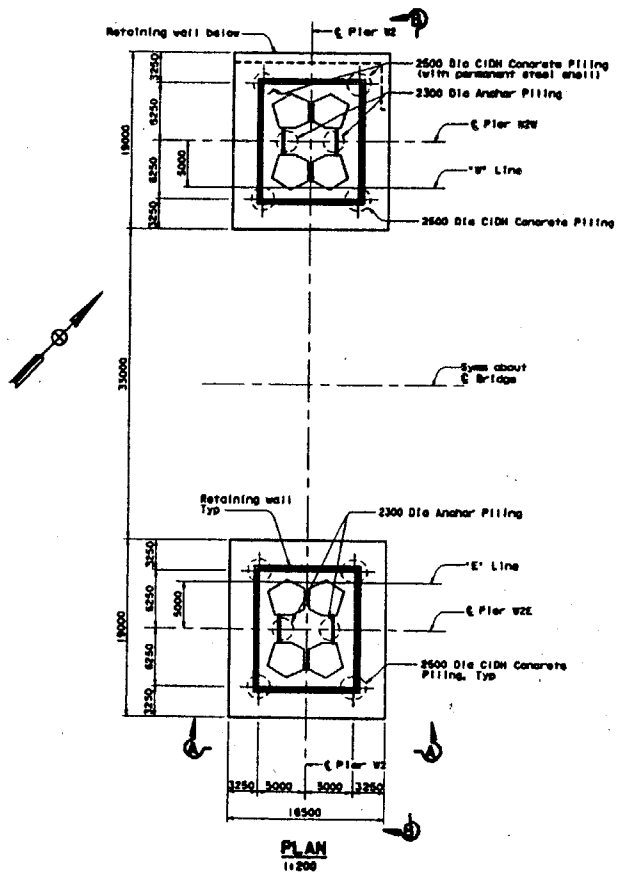
Waterway - San Francisco Bay

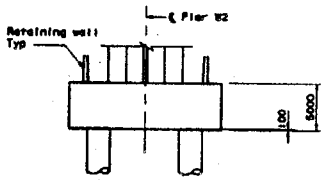
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

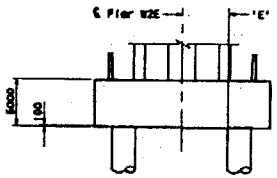
May 2001

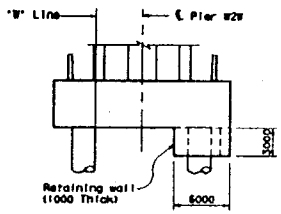
FIGURE 4o



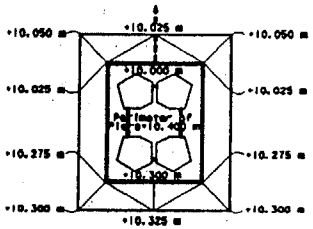


ELEVATION A-A
1:200





ELEVATION B-B
1:200



TYPICAL DRAINAGE PLAN
1:200

NOTES:

1. For 2300 Dia CIDH Concrete piling with permanent casing, see 'Pile Details No. 1' sheet.
2. For 2300 Dia Anchor Piling, see 'Pile Details No. 2' sheet.
3. For 2500 Dia CIDH Concrete piling, see 'Pile Details No. 3' sheet.

MAIN SPAN
SUSPENSION BRIDGE

All dimensions are in millimeters unless otherwise noted.

Footing Plan (Pier W2)

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Cap

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

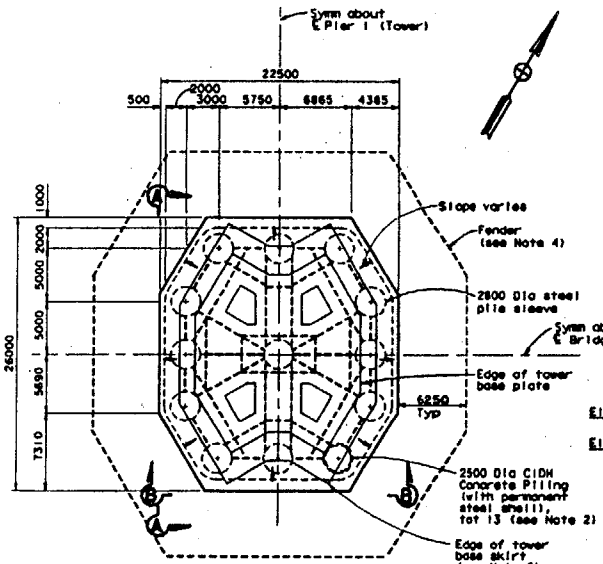
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

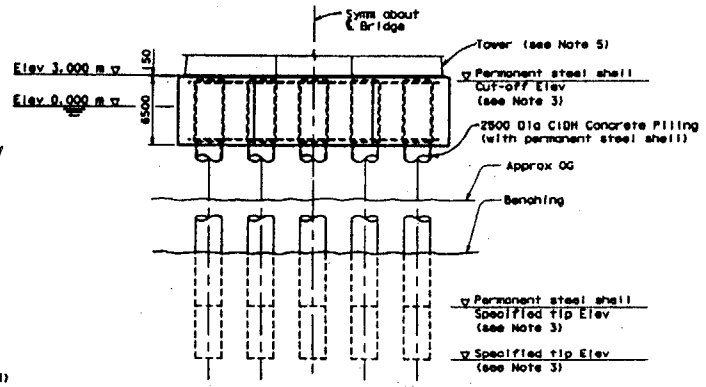
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

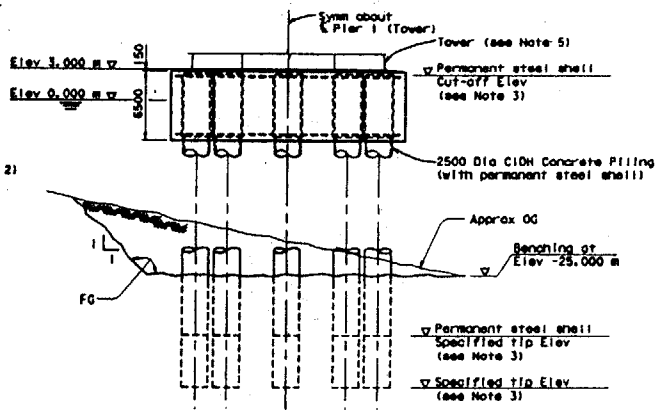
FIGURE 4p



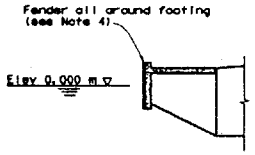
PLAN
1:200



ELEVATION A-A (Fender not shown)
1:200



ELEVATION B-B (Fender not shown)
1:200



FENDER
1:200

NOTES:

1. Work this sheet with "Tower Footing Details No.1" to "Tower Footing Details No.10" sheets.
2. For 2500 Dia CIDH Concrete Piling, see "Pile Details No.4" sheet.
3. For Specified tip Elev, see "Pile Data" sheet.
4. For fender details, see "Tower Fender Details" sheets.
5. For tower layout, see "Tower Layout" sheets.
6. For tower base skirt, see "Tower Base Skirt Details" sheets.

All dimensions in millimeters unless otherwise noted.

Footing Plan (Main Tower)

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Cap

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

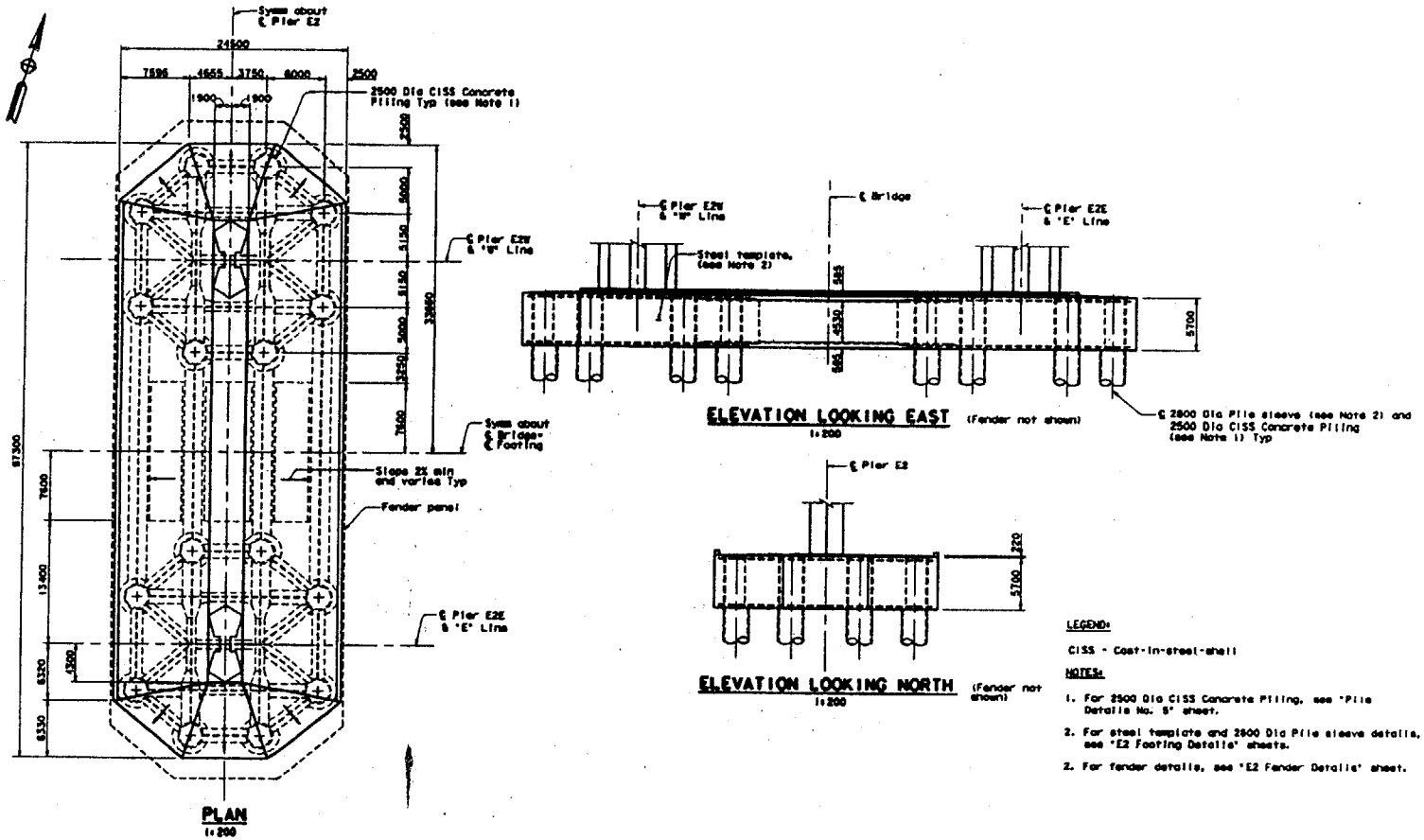
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4a



Footing Plan (Pier E2)

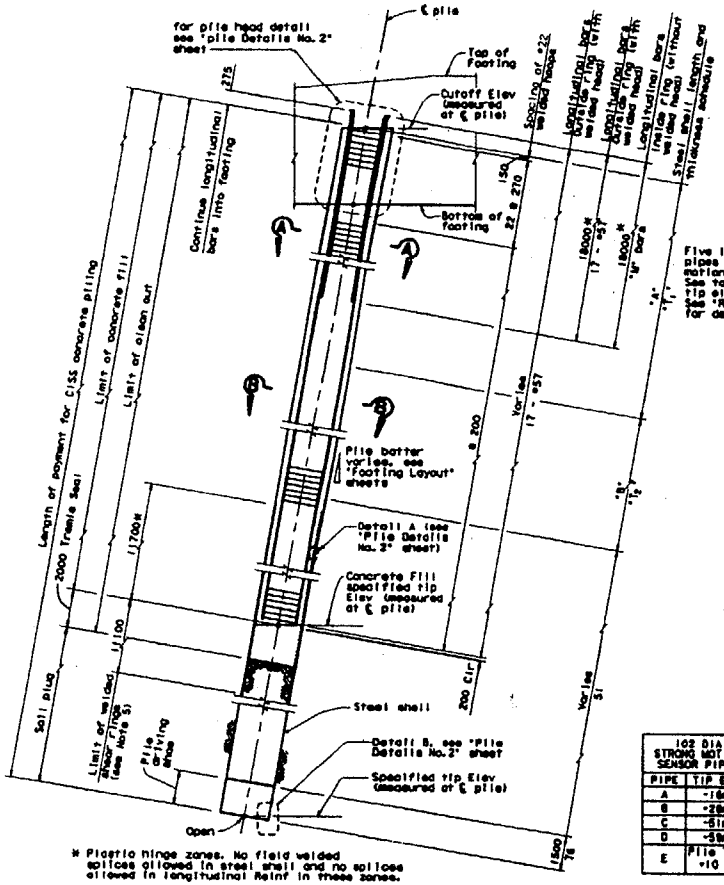
SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

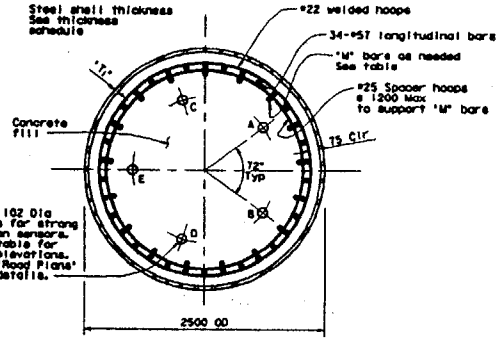
Pile Cap

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3 SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA Oakland, Alameda County, CA
May 2001
FIGURE 4r

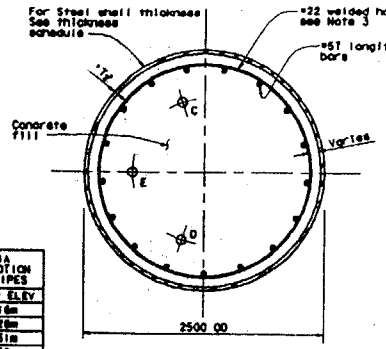


2.5 m DIA CISS CONCRETE PILING
NO SCALE

(Strong motion sensor pipes not shown for clarity)



SECTION A-A
1:20



SECTION B-B
1:20

102 DIA STRONG MOTION SENSOR PIPES	
PIPE	TIP ELEV
A	-16m
B	-28m
C	-51m
D	-58m
E	Pile Tip +10 m

LEGEND:
CISS - Cast-in steel shell.
⊢— indicates welded headed bar reinforcement.
OD - Outside diameter

NOTES:
1. For details not shown, see 'Pile Data' sheet.
2. For "Bar Spiral Splice & Spiral Anchor and Hoop Detail" see "Pier Details" sheets. All hoops with the exception of spacer hoops are to be "butt welded continuous hoops". Spacer hoops may be lap spliced.
3. Keep hoop diameter constant, inside diameter of shell will vary with changes in shell thickness.
4. Dimension A is referenced to the theoretical cut-off point when the specified tip elevation is achieved.
5. Welded shear rings are layed out based on the theoretical concrete fill specified tip elevation assuming the pile specified tip elevation is achieved.
6. At the pile containing the strong motion sensor pipes, the soil plug shall be removed to 7000 from the pile tip, and a 3000 long tremie shall be provided. Shear keys shall be provided over the length of the tremie seal (see Detail A).

100% PS&E

Cast in Steel Shell (CISS) (Piers E3 thru E16)

All dimensions in millimeters unless otherwise noted.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

CISS Concrete Pile

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

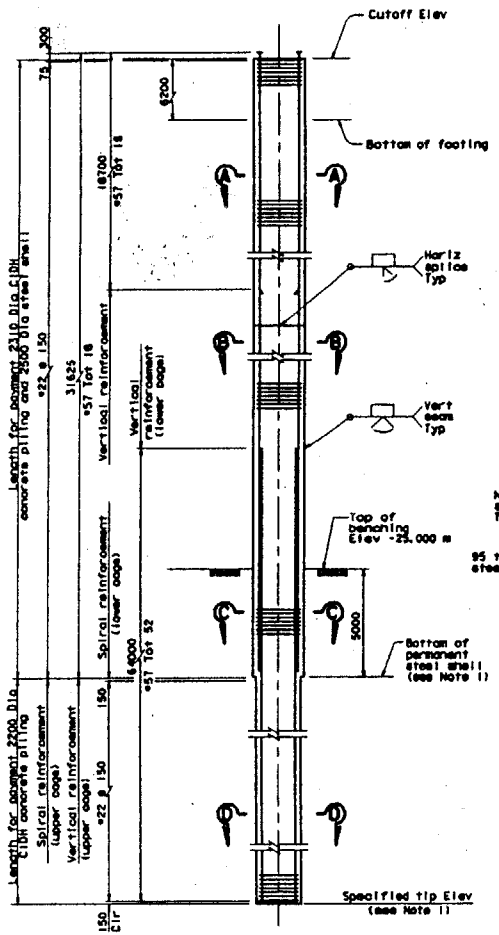
Waterway - San Francisco Bay

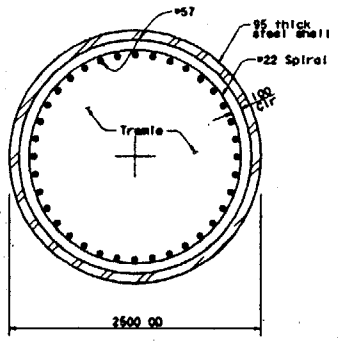
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

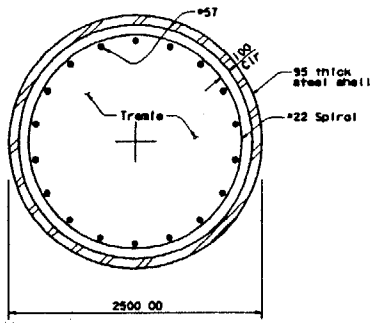
May 2001

FIGURE 4s

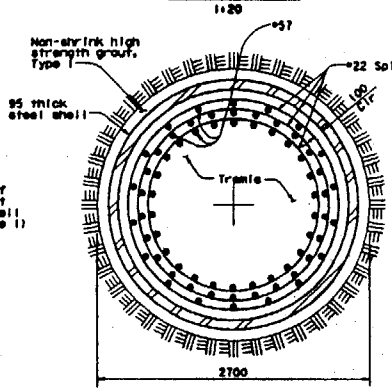




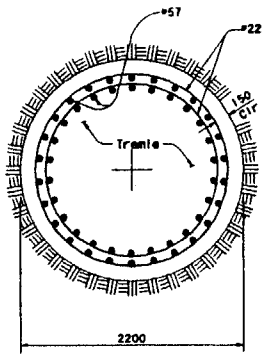
SECTION A-A
1:20



SECTION B-B
1:20



SECTION C-C
1:20



SECTION D-D
1:20

LEGEND:

⊢ Indicates bar reinforcement with welded head

NOTES:

1. For "Pile Data", see "Pile Data" sheet.
2. For "Bar Spiral Splice & Spiral Anchor and Hoop Detail", see "Pier W2 Details No. 5" sheet.

MAIN SPAN
SUSPENSION BRIDGE
PILE DETAILS NO. 4

All dimensions in millimeters unless otherwise noted.

Cast in drilled hole (CIDH)

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

CIDH Concrete Pile

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

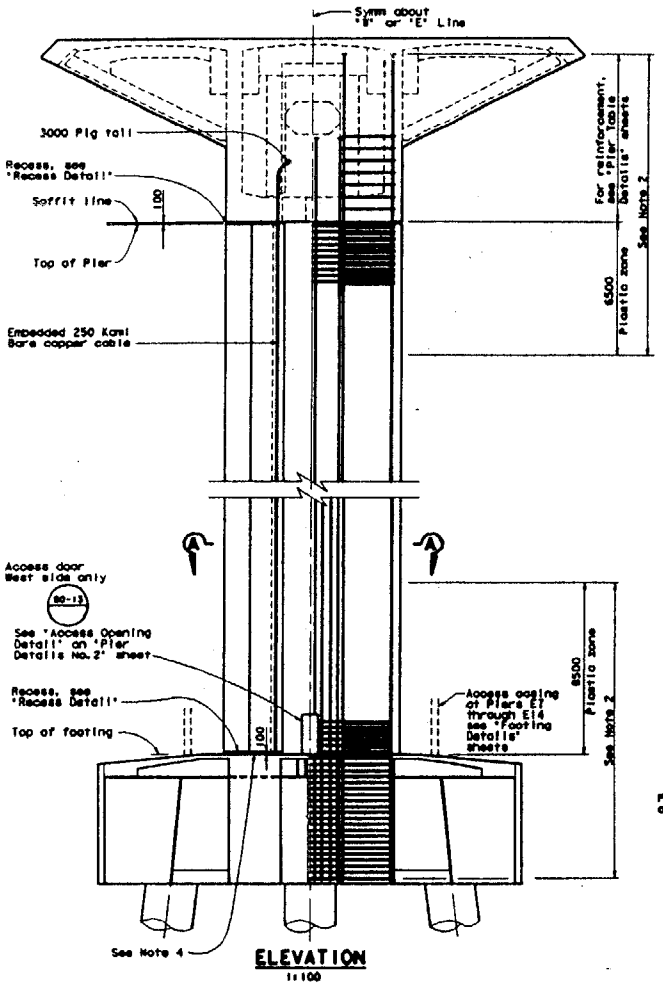
Waterway - San Francisco Bay

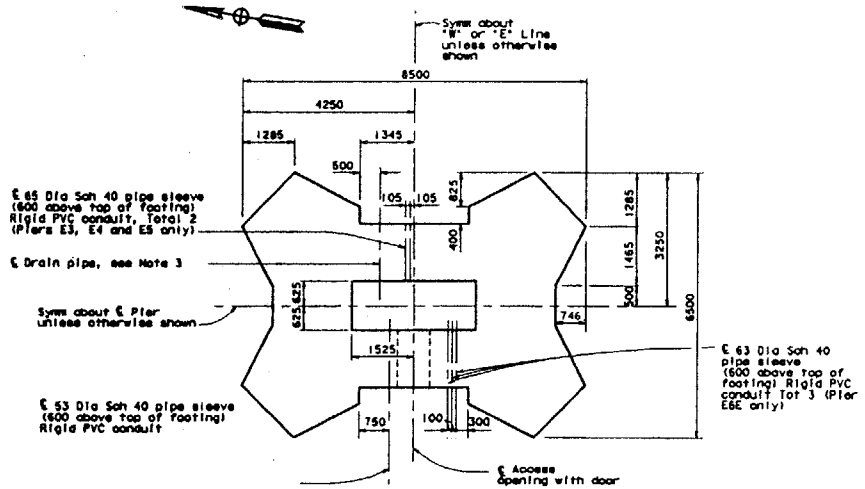
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

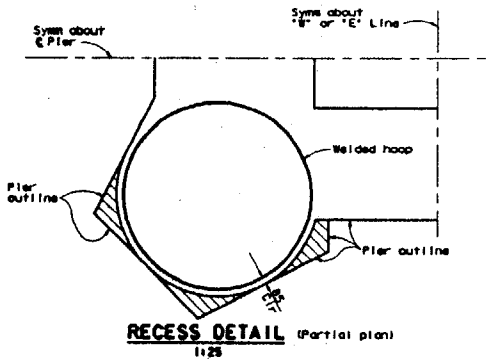
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4†







100 Polystyrene blockout. Polystyrene to be removed at top of pier.

NOTES:

1. For Section A-A reinforcement, see "Pier Details" sheets.
2. No splices allowed in main vert reinforcement. All other splices shall meet "Ultimate Splice" requirements.
3. For pipe size, see "Girder Layout" sheets. Locate pipe 200 above top of footings at piers E3 thru E6 and 200 above casing top slab at piers E7 thru E14. Extend 500 beyond face of the pier.
4. For ground cable connection to the footing, see "Footing Layout" sheets.

100 % PS&E

All dimensions in millimeters unless otherwise noted.

Piers E3 thru E14 Elevation

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pier Tower

(Piers E3 thru E14 Elevation)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

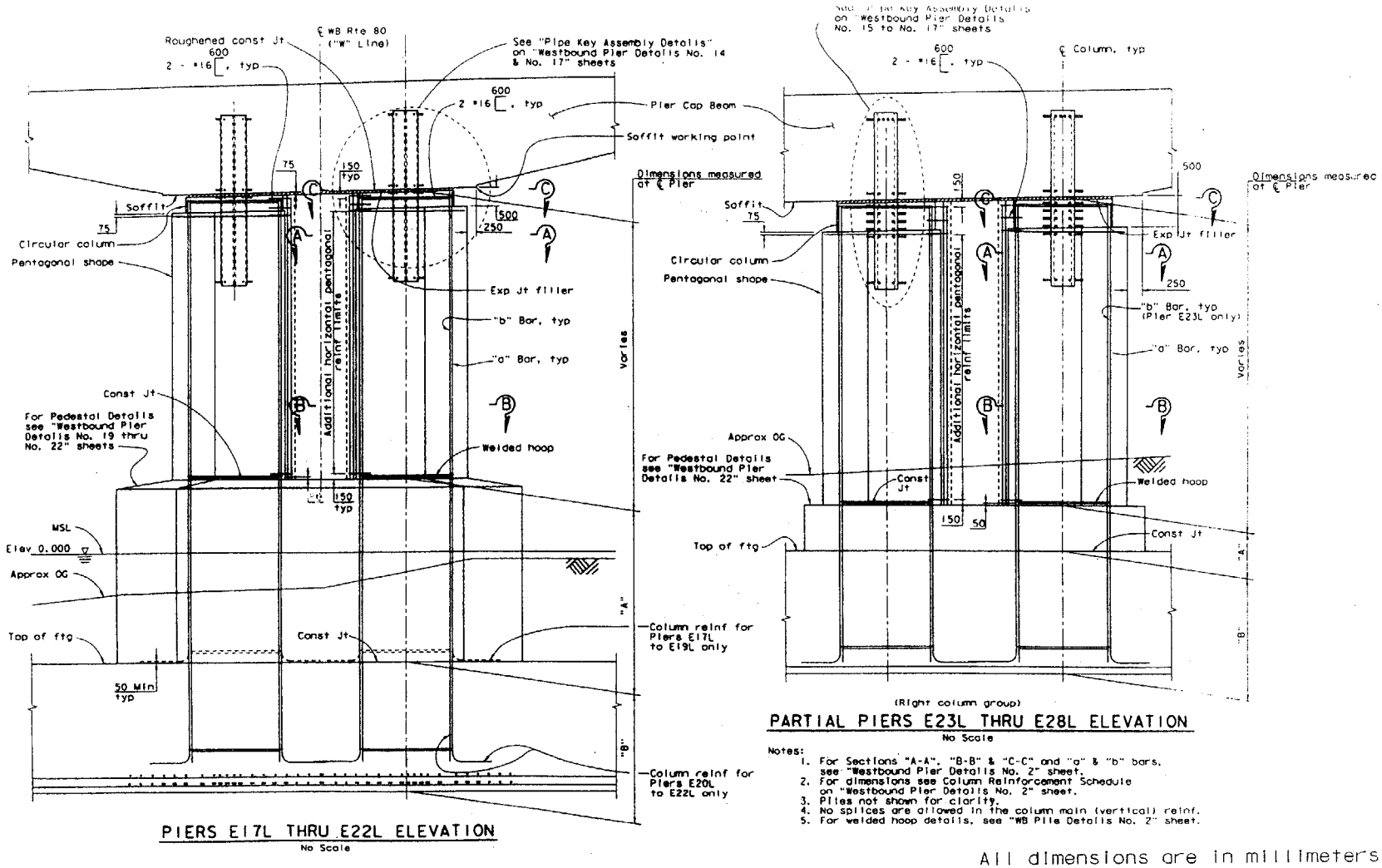
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4u



Notes:
1. For Sections "A-A", "B-B" & "C-C" and "a" & "b" bars, see "Westbound Pier Details No. 2" sheet.
2. For dimensions see Column Reinforcement Schedule on "Westbound Pier Details No. 2" sheet.
3. Piles not shown for clarity.
4. No splices are allowed in the column main (vertical) reinf.
5. For welded hoop details, see "WB Pile Details No. 2" sheet.

All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pile Tower

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

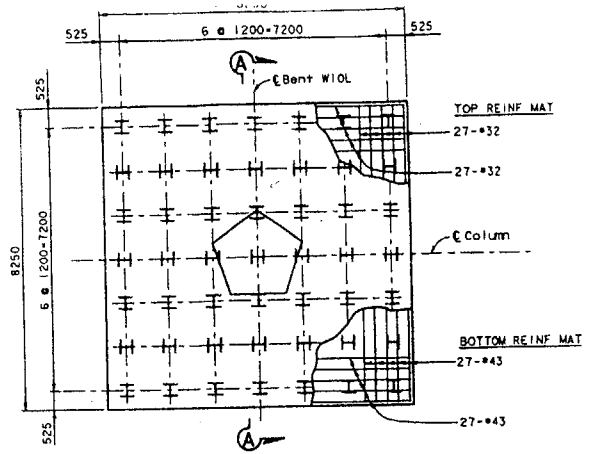
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4v

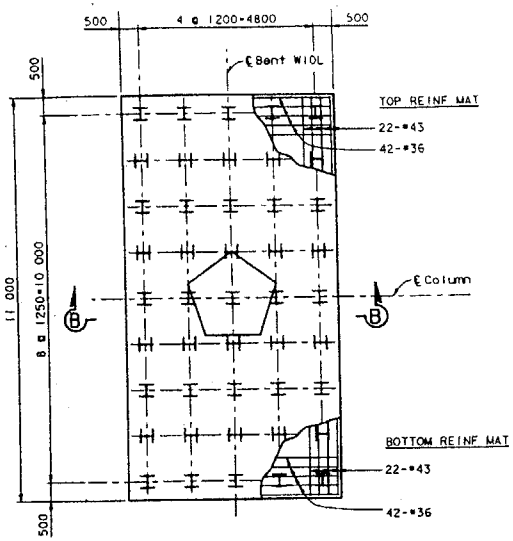


PLAN - BENT W10L NORTH & SOUTH COLUMNS

1:60

(Tot 49 piles)

NOTE: North footing shown, south footing similar

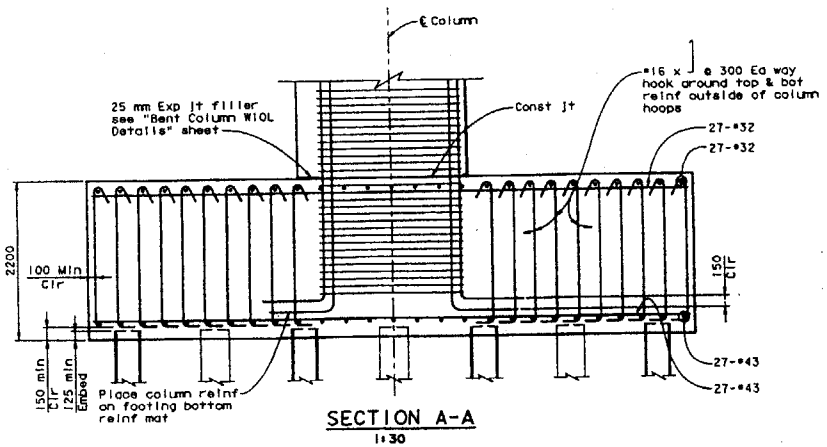


PLAN - BENT W10AL NORTH & SOUTH COLUMNS

1:60

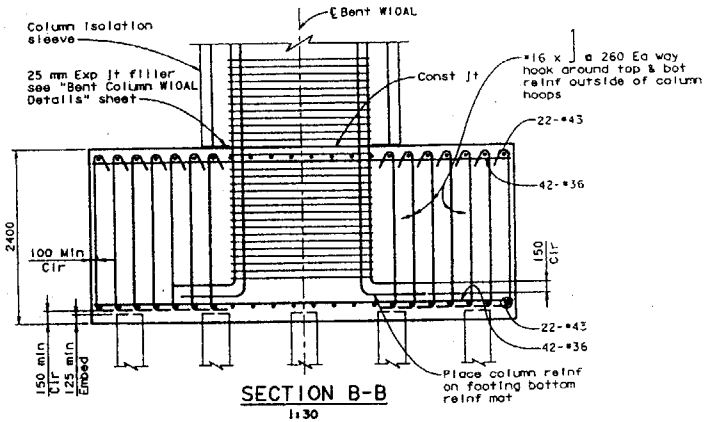
(Tot 45 piles)

NOTE: North footing shown, south footing similar



SECTION A-A

1:30



SECTION B-B

1:30

All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Bent Footings (W10L & W10AL)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

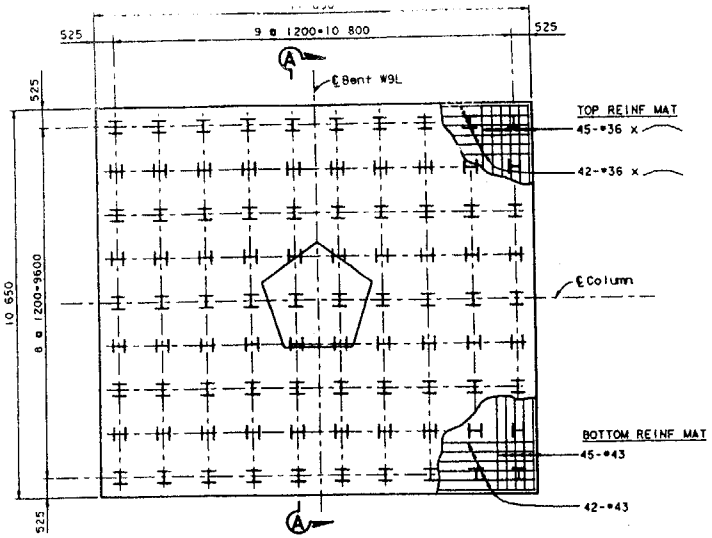
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

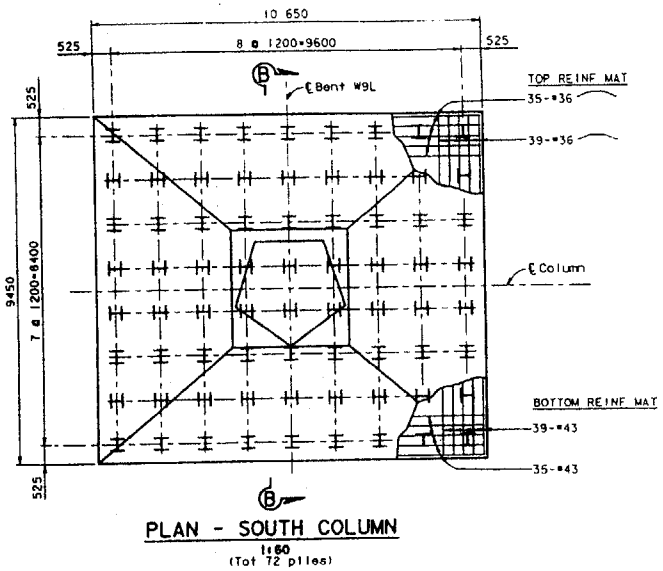
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

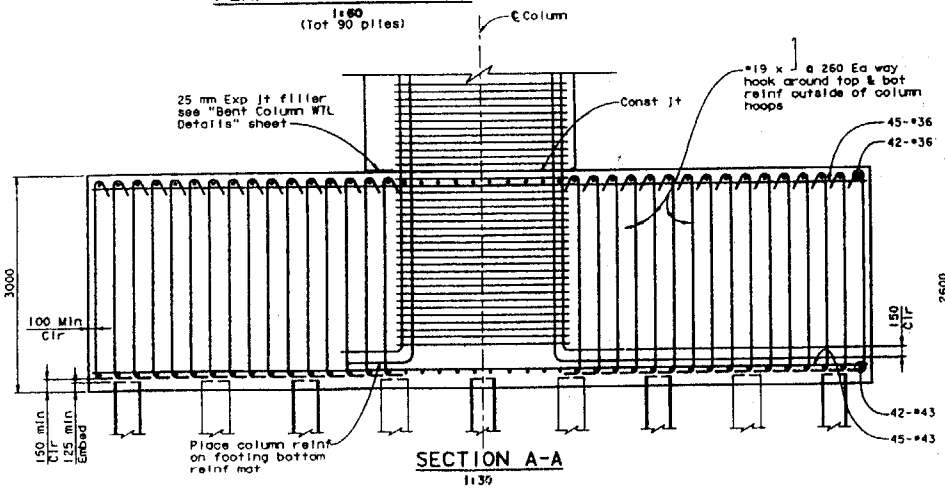
FIGURE 4w



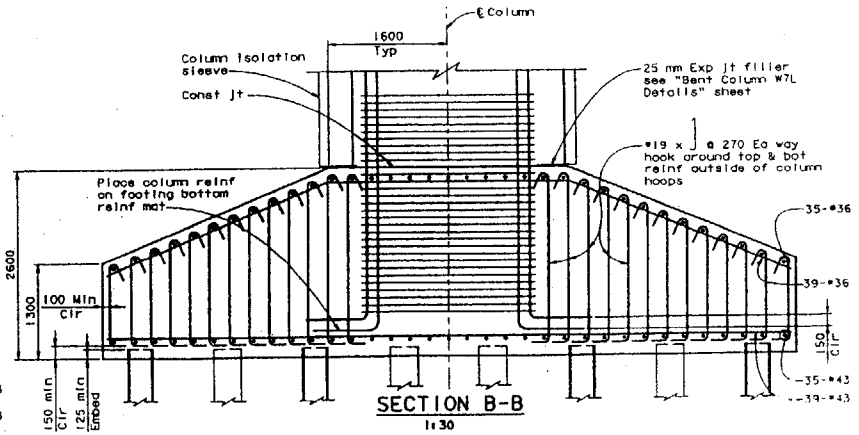
PLAN - NORTH COLUMN
1:60
(Tot 90 piles)



PLAN - SOUTH COLUMN
1:60
(Tot 72 piles)



SECTION A-A
1:30



SECTION B-B
1:30

All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Bent Footings (W9L)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

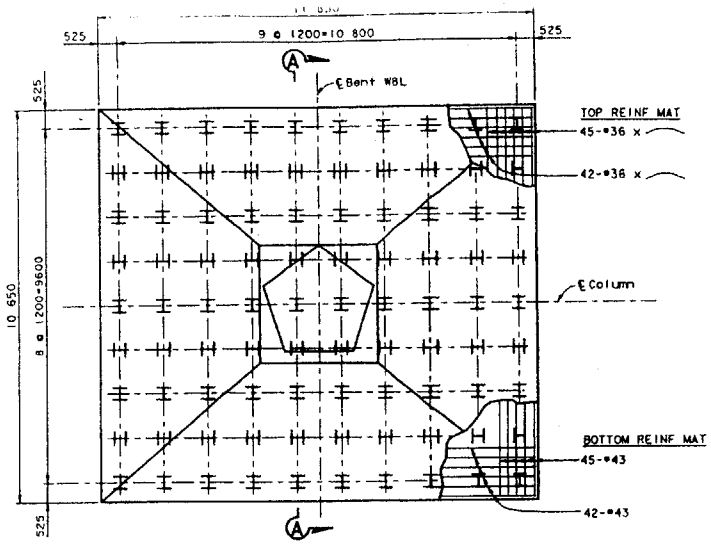
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

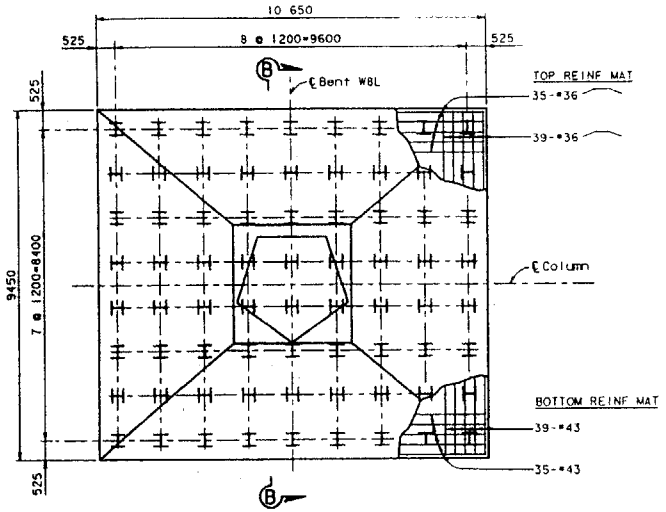
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

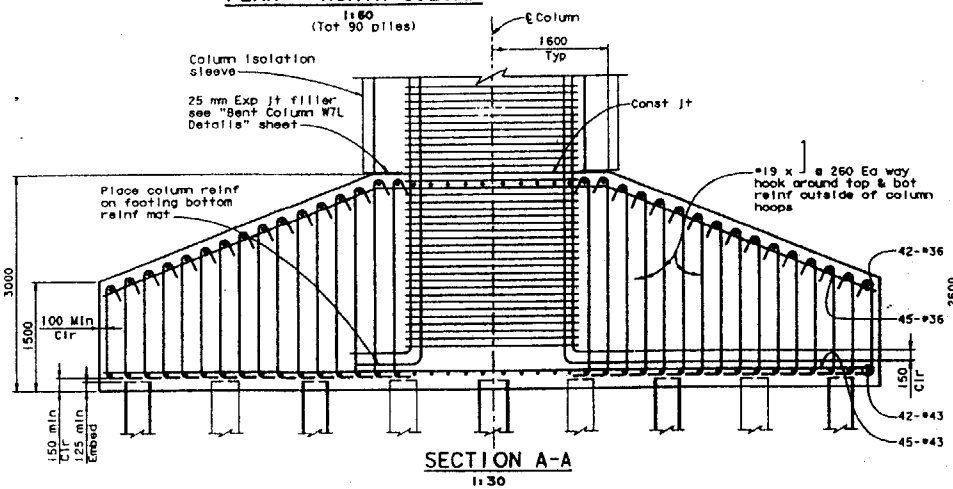
FIGURE 4x



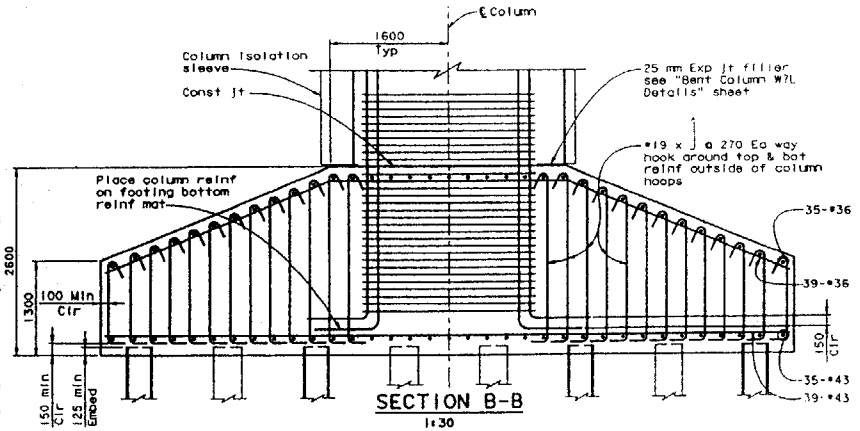
PLAN - NORTH COLUMN
1:60
(Tot 90 piles)



PLAN - SOUTH COLUMN
1:60
(Tot 72 piles)



SECTION A-A
1:30



SECTION B-B
1:30

All dimensions are in millimeters unless otherwise shown.

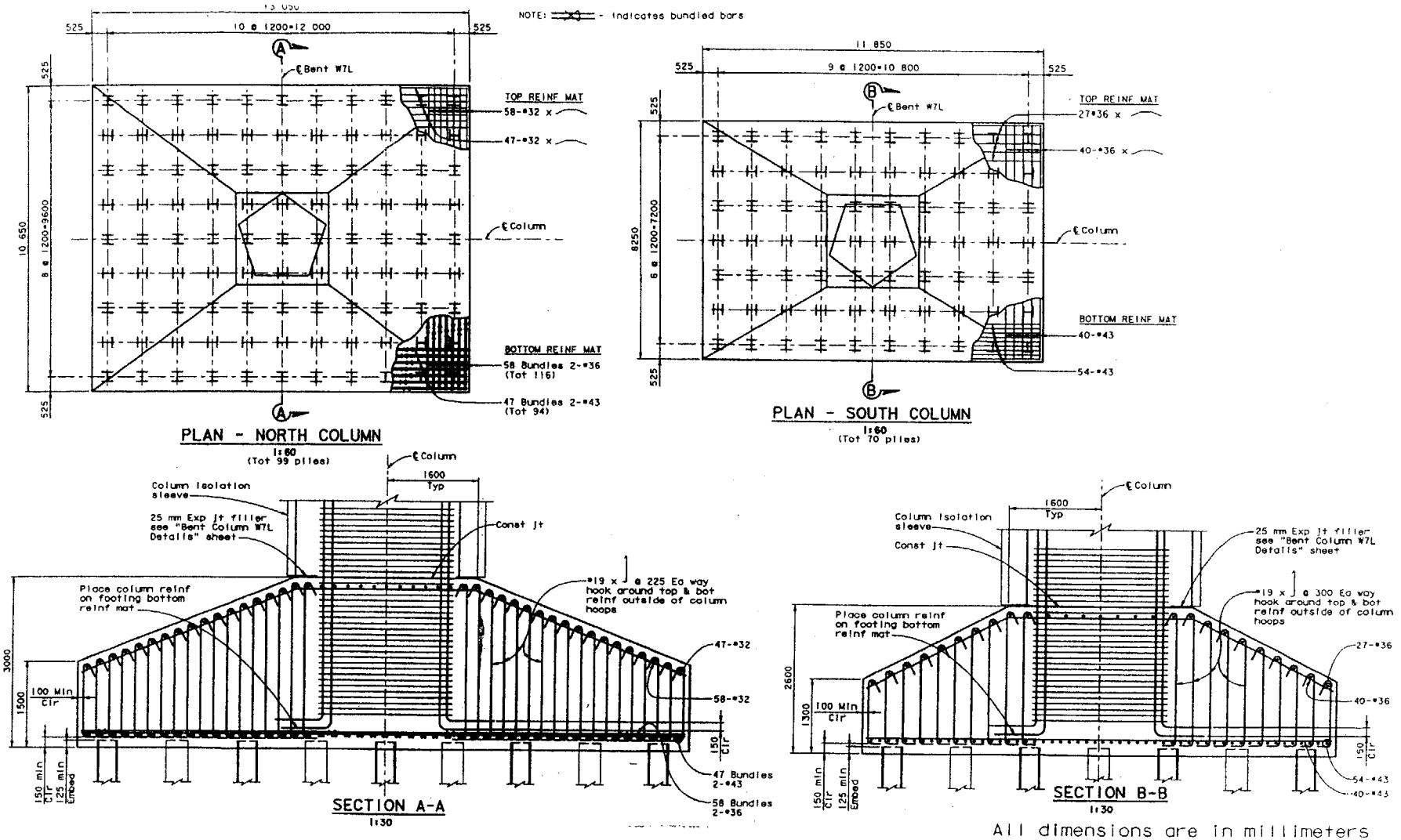
SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Bent Footings (W8L)

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3 SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA Oakland, Alameda County, CA
May 2001
FIGURE 4y



All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Bent Footings (W7L)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

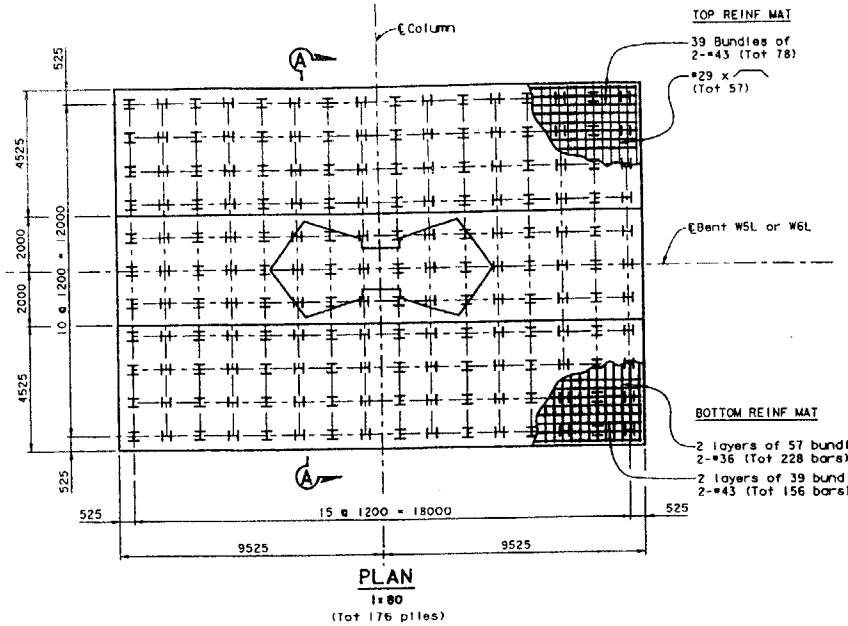
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

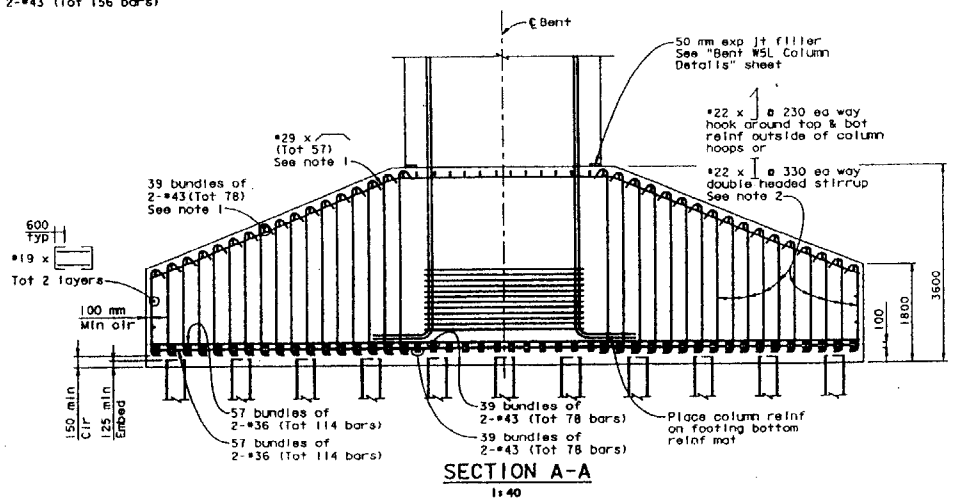
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4z



PLAN
1:80
(Tot 176 piles)



SECTION A-A
1:40

All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Bent Footings (W5L & W6L)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

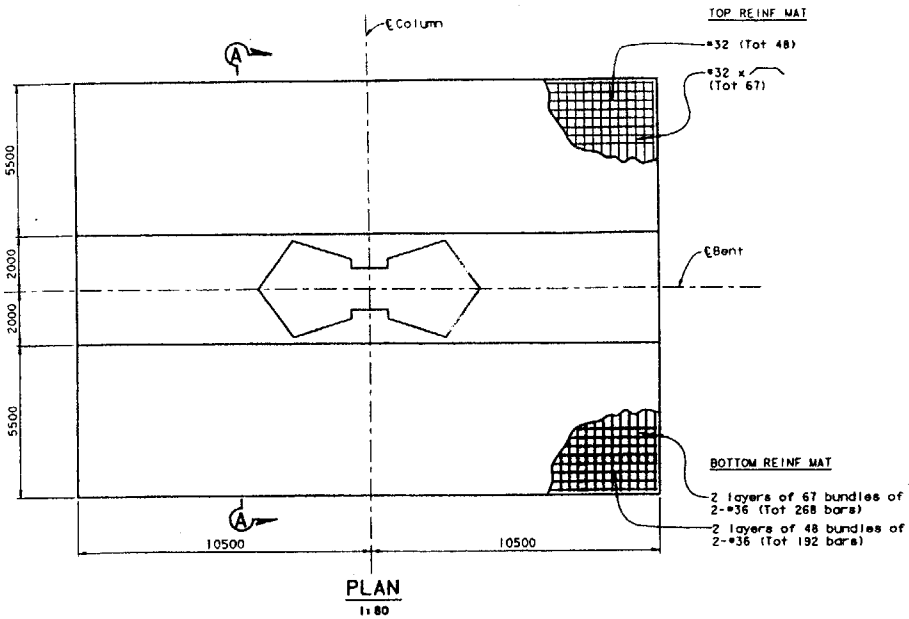
Waterway - San Francisco Bay

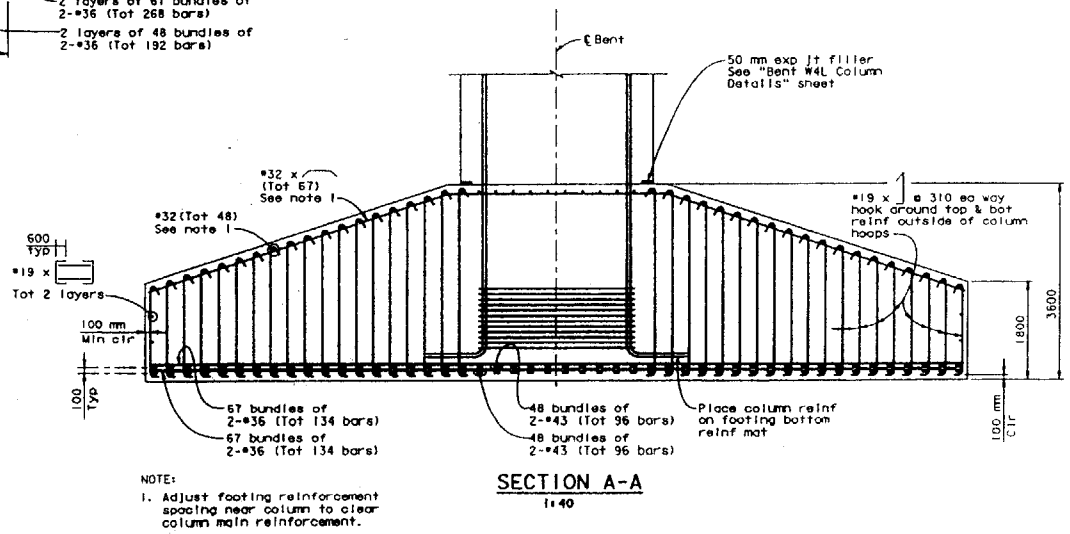
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4ai





NOTE:
1. Adjust footing reinforcement spacing near column to clear column main reinforcement.

All dimensions are in millimeters unless otherwise shown.

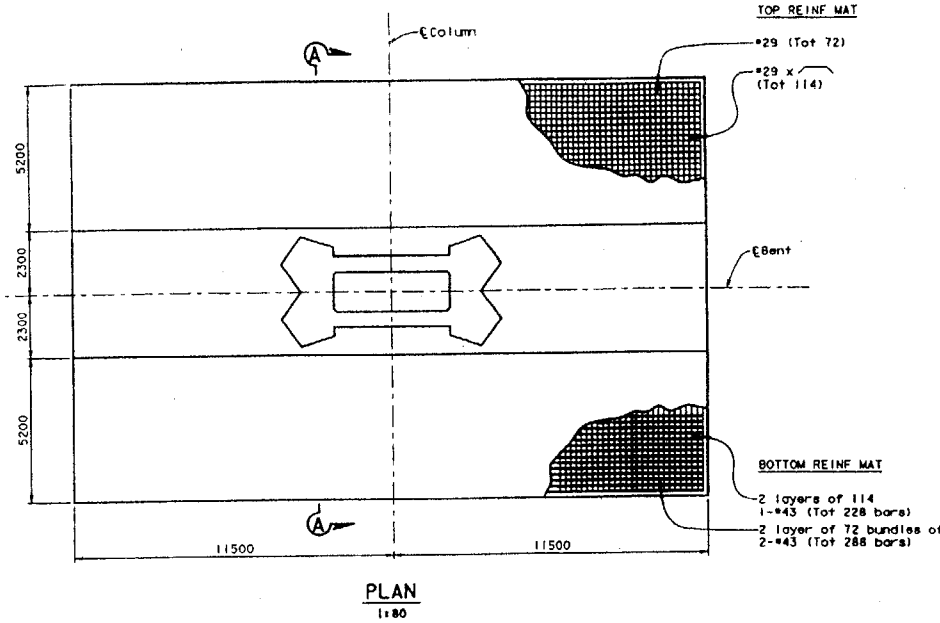
SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

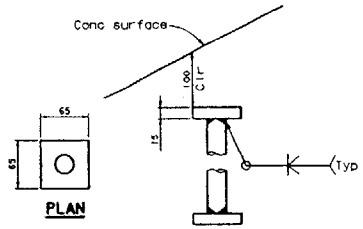
Bent Footings (W4L)

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3 SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA Oakland, Alameda County, CA
May 2001
FIGURE 4bi



PLAN
1:80

NOTE:
# indicates bundled bars



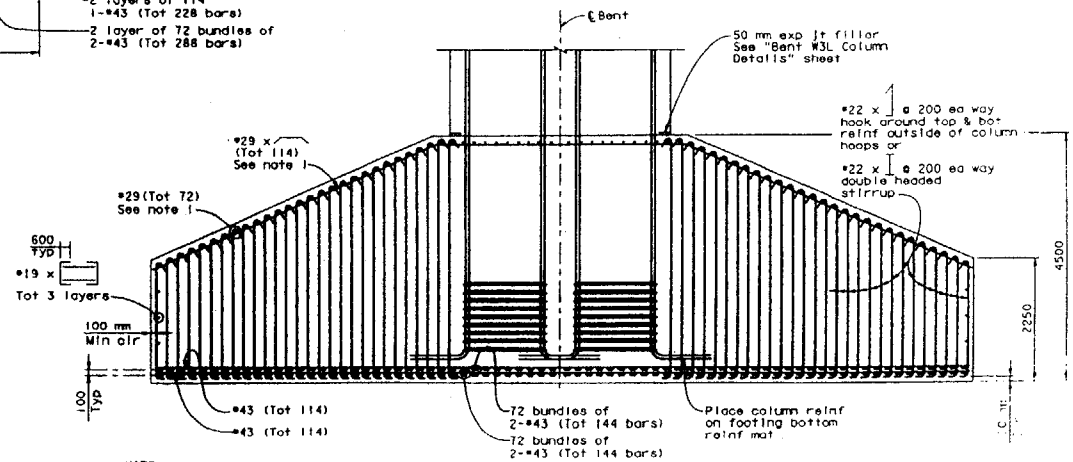
PLAN

ELEVATION

BAR TERMINATOR DETAILS

No Scale

Note: Threaded terminator may be used at contractor's option subject to the engineer's approval.



NOTE:
1. Adjust footing reinforcement spacing near column to clear column main reinforcement.

SECTION A-A
1:40

All dimensions are in millimeters unless otherwise shown.

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Bent Footings (W3L)

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

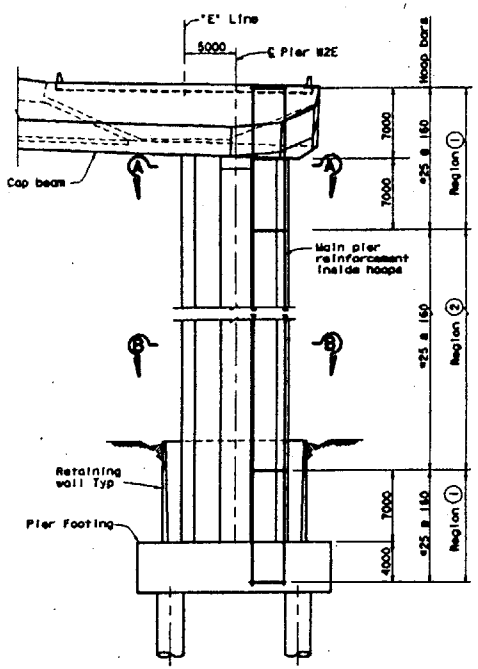
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

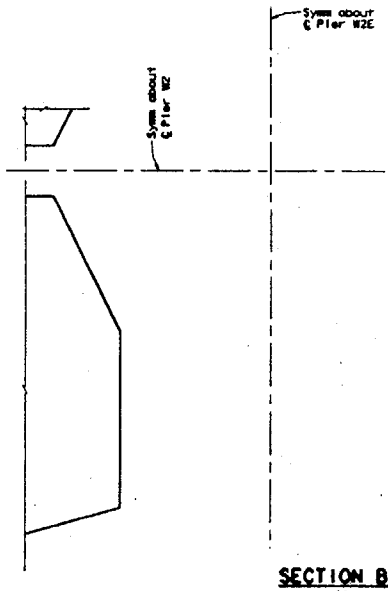
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

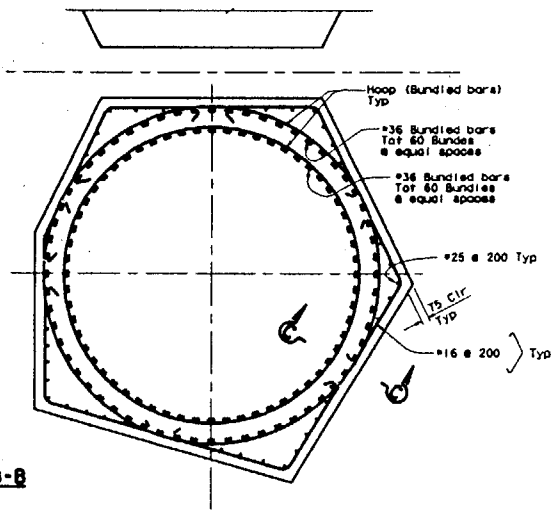
May 2001

FIGURE 4ci

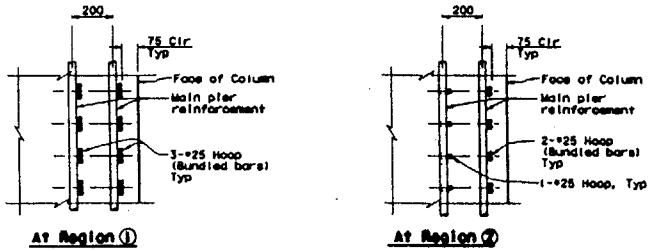


ELEVATION PIER W2
1:200





SECTION B-B
1:20



SECTION C-C
1:10

NOTES:

1. Work this sheet with "Pier W2 Details No. 1" sheet.
2. For Section A-A, see "Pier W2 Details No. 4" sheet.
3. For Cap beam reinforcement detail, see "Pier W2 Cap Beam Details No. 11" to "Pier W2 Cap Beam Details No. 21" sheets.
4. For Footing reinforcement detail, see "W2 Footing Details No. 1" to "W2 Footing Details No. 6" sheets.
5. For hoops and main bar splice details, see "Pier W2 Details No. 5" sheet.

MAIN SPAN
SUSPENSION BRIDGE
PIER W2 DETAILS NO. 3

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Pier Tower

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

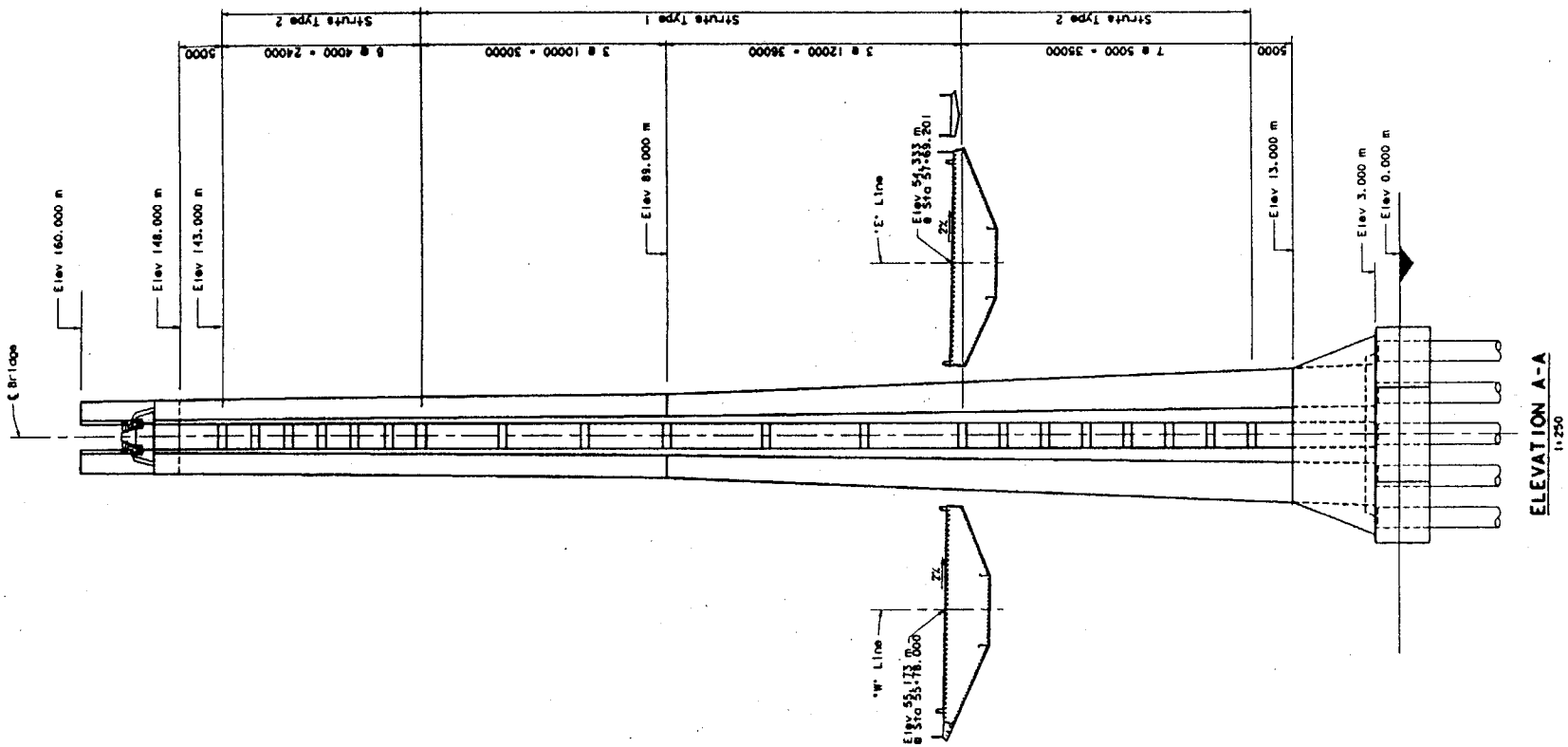
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4di



MAIN SPAN
SUSPENSION BRIDGE
TOWER LAYOUT NO. 1

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Main Tower

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

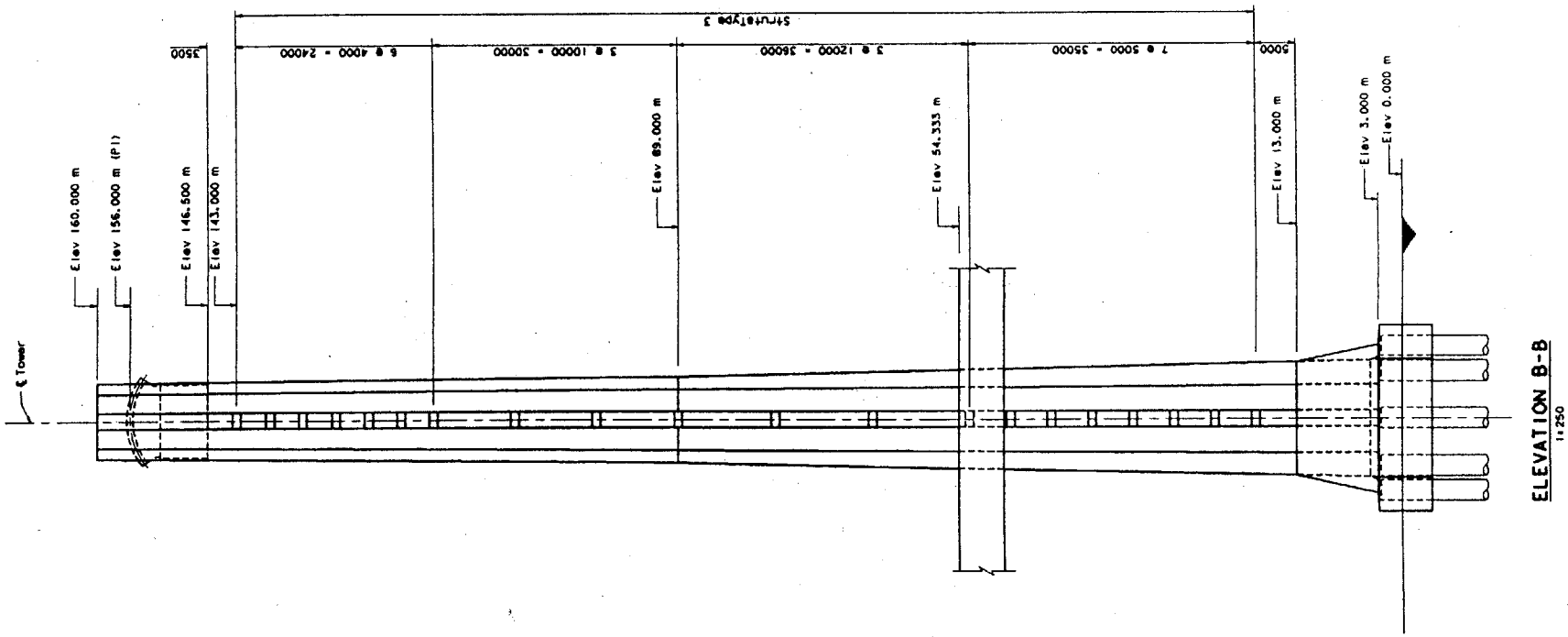
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4ei



MAIN SPAN
SUSPENSION BRIDGE
TOWER LAYOUT NO. 2

SAN FRANCISCO-OAKLAND BAY BRIDGE EAST SPAN SEISMIC SAFETY PROJECT

Caltrans

No Scale

Main Tower

Proposed
San Francisco-Oakland Bay Bridge
East Span Replacement

Name of Applicant - Caltrans

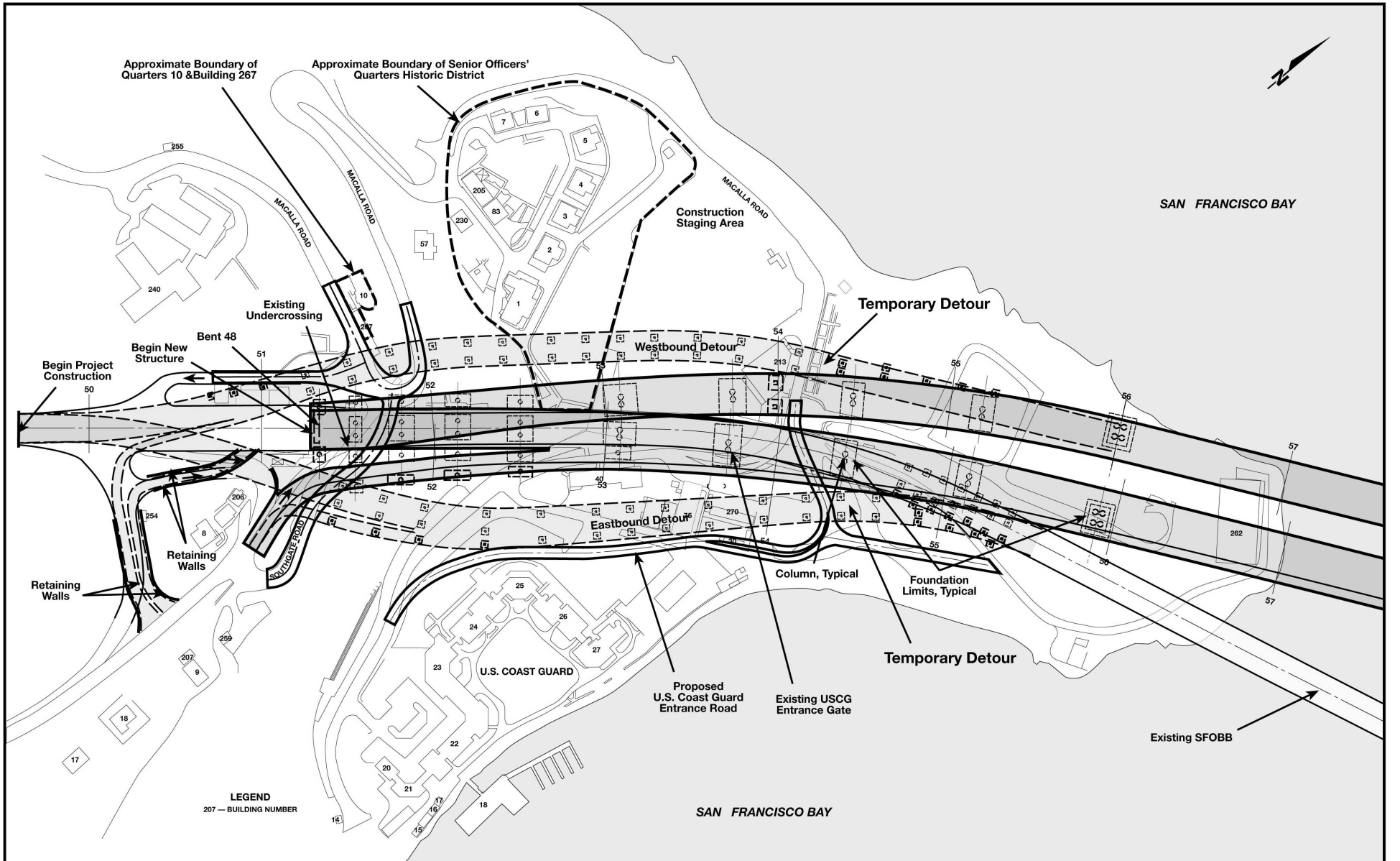
Waterway - San Francisco Bay

SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1

Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA

May 2001

FIGURE 4fi



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Temporary Detours at YBI

GRAPHIC SCALE 1:3,000

0 25 50 100 m

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
May 2001

Figure 5

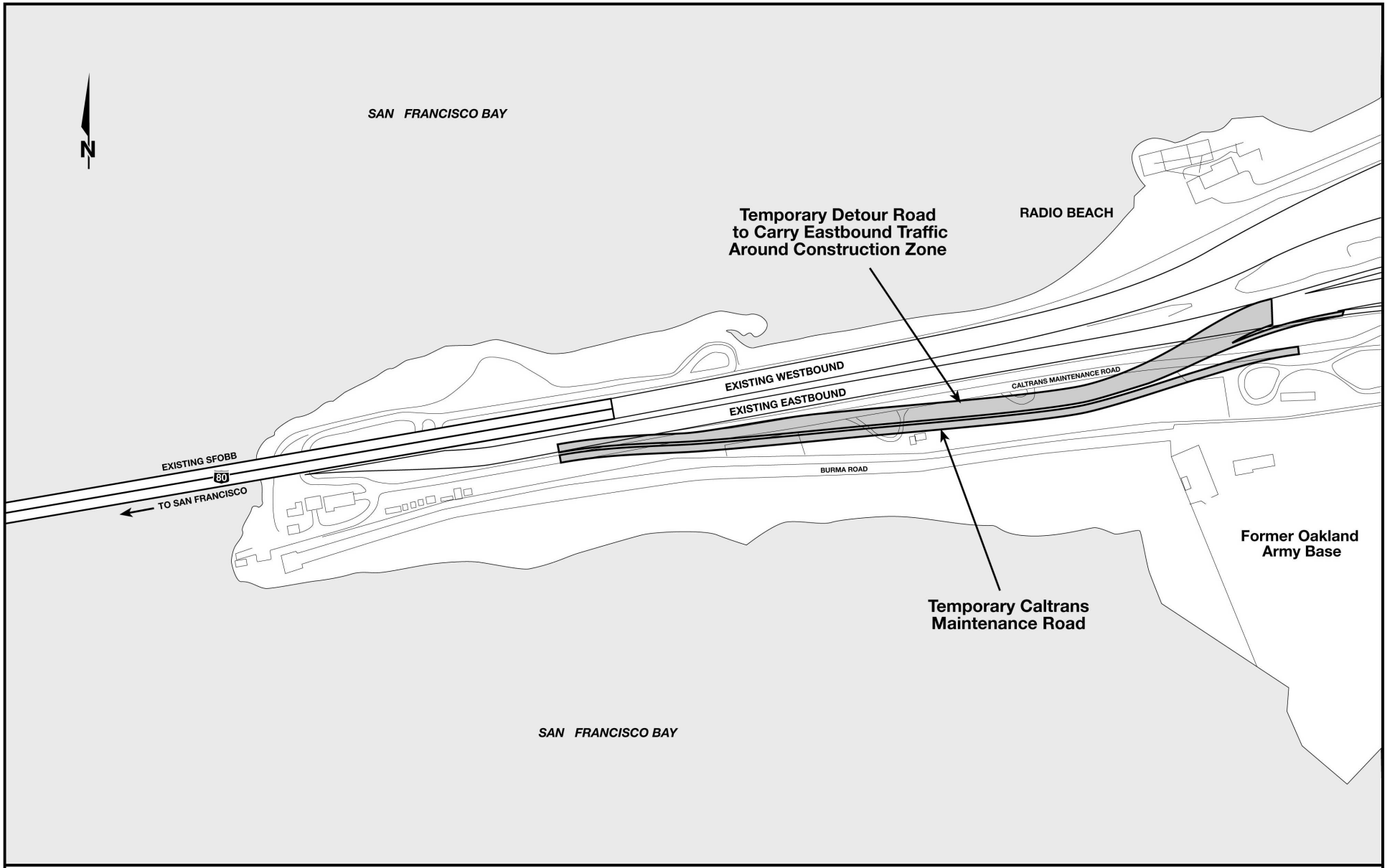
Photo Simulation of the Transition Structure Looking East

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Transition Structures at YBI

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
May 2001

Figure 5a



SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

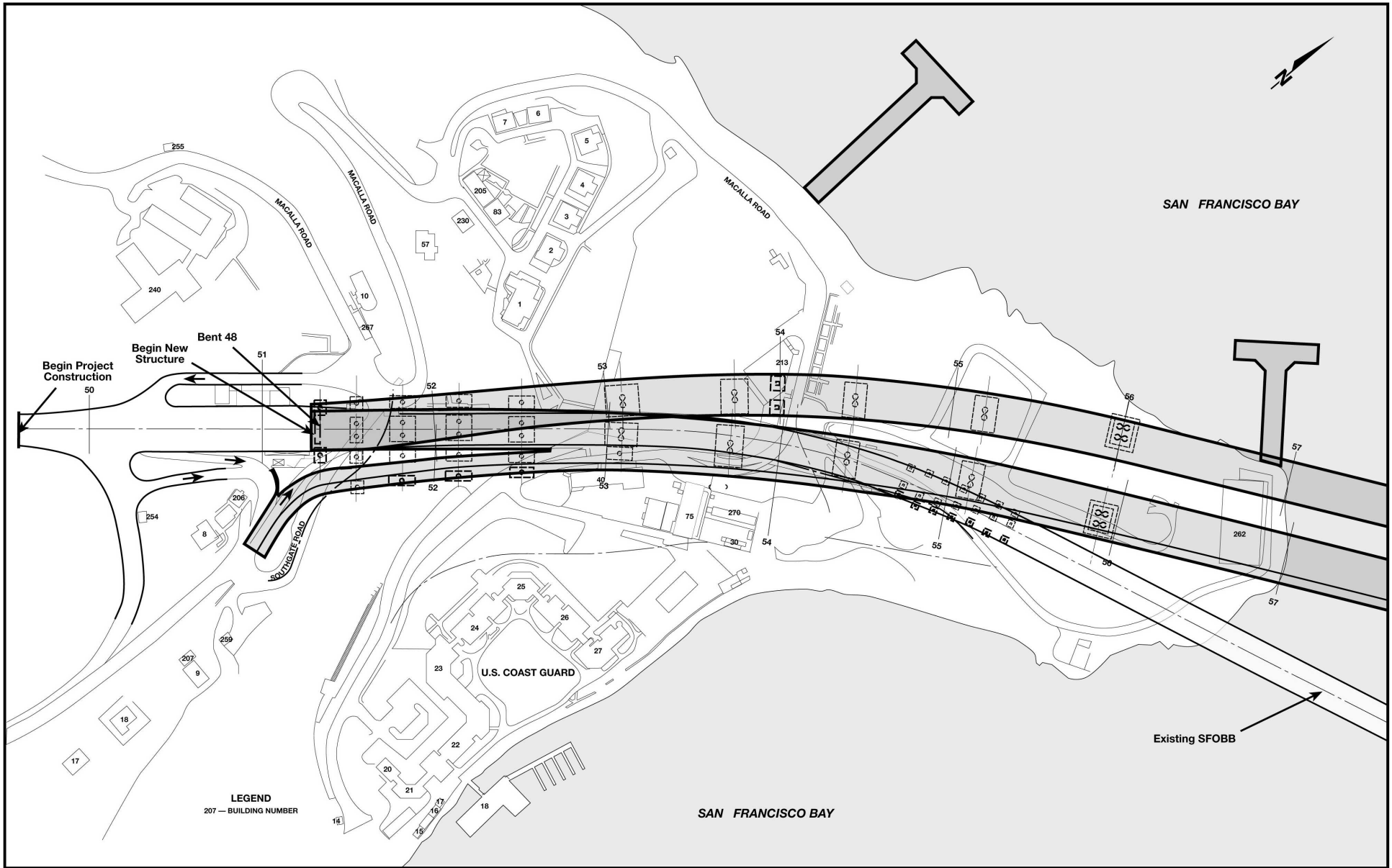
Temporary Roadways at the Oakland Touchdown Area

GRAPHIC SCALE 1:4,000

0 50 100 150 m

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
May 2001

Figure 6



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

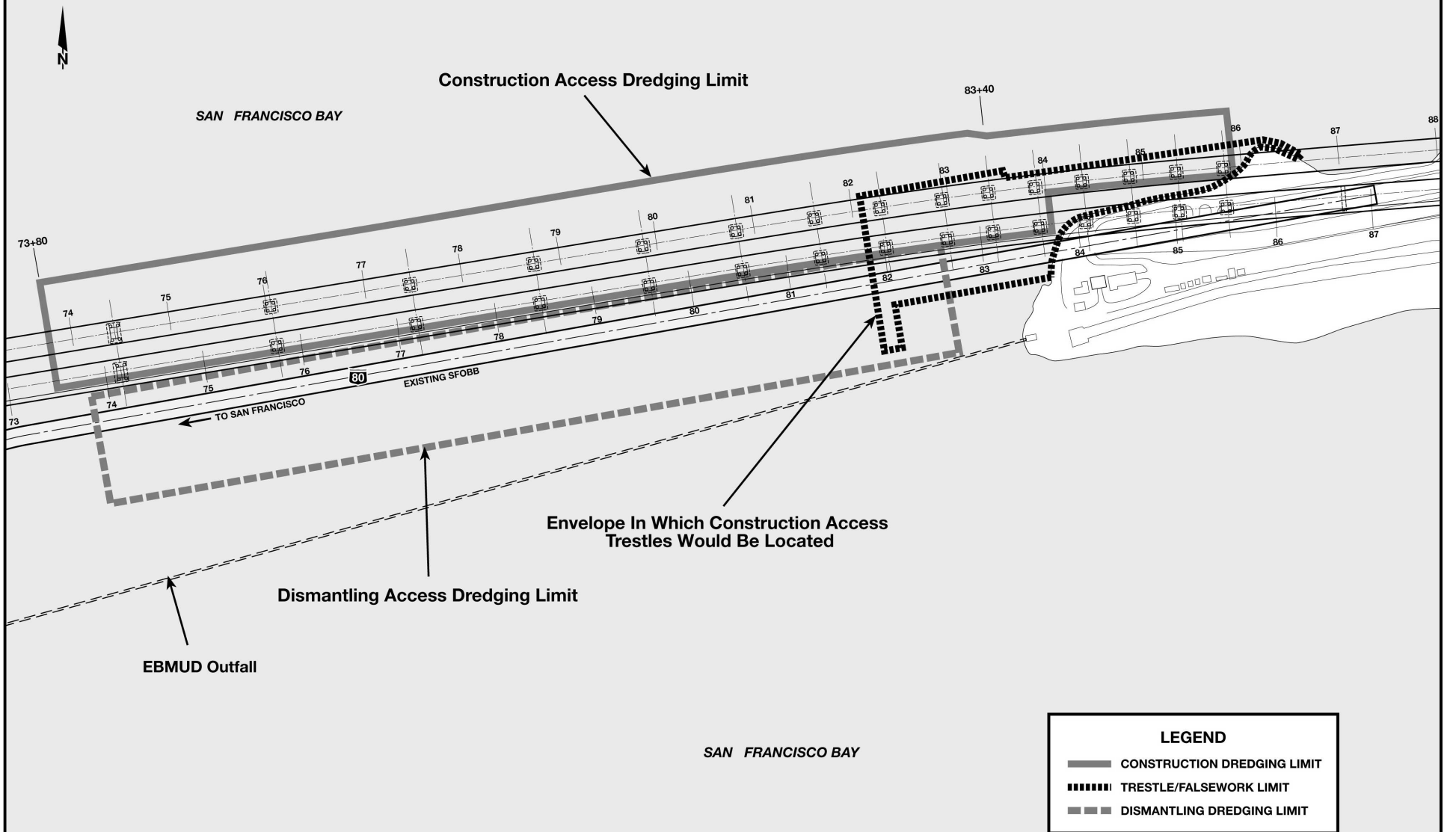
Conceptual Trestles at YBI

GRAPHIC SCALE 1:3,000

0 25 50 100 m

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
May 2001

Figure 7



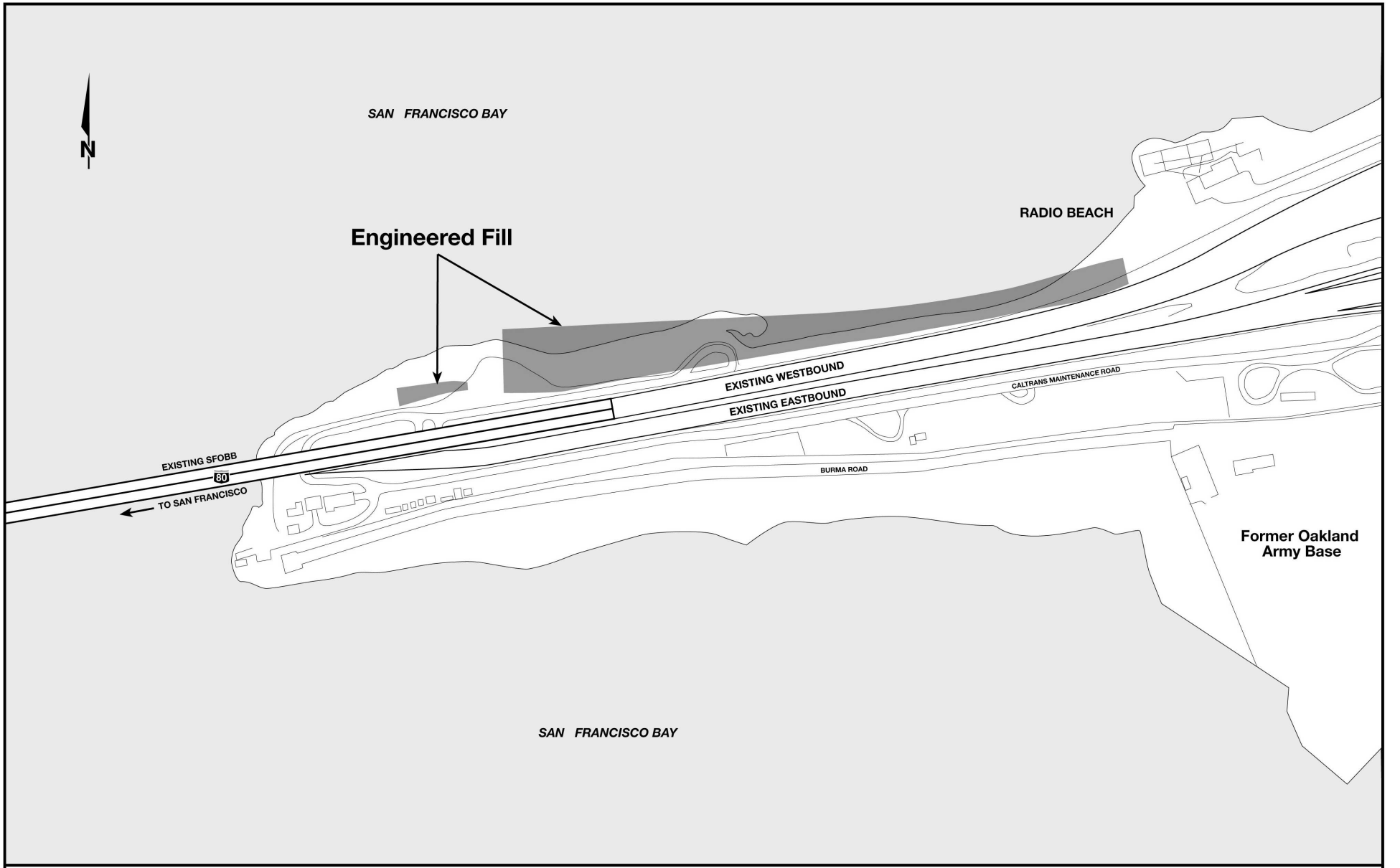
SFOBB EAST SPAN SEISMIC SAFETY PROJECT

Dredging Limits for Construction and Dismantling Access

GRAPHIC SCALE 1:8,000
0 50 100 150 m

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
June 2001

Figure 8



SFOBB EAST SPAN
SEISMIC SAFETY
PROJECT

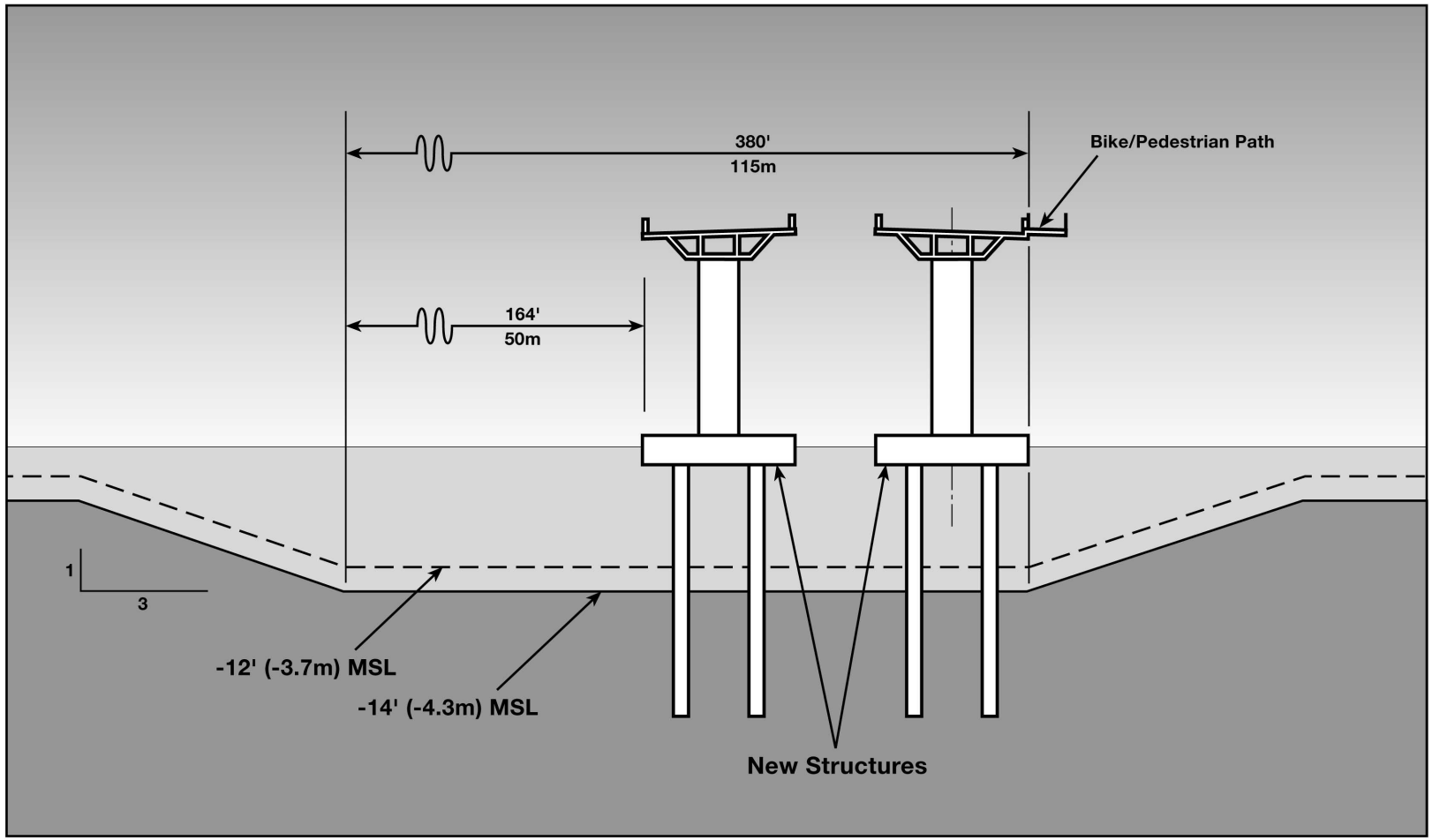
Engineered Fill at the Oakland Touchdown Area

GRAPHIC SCALE 1:4,000

0 50 100 150 m

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
June 2001

Figure 9



View: Looking East, North Side of Replacement Alternative N-6

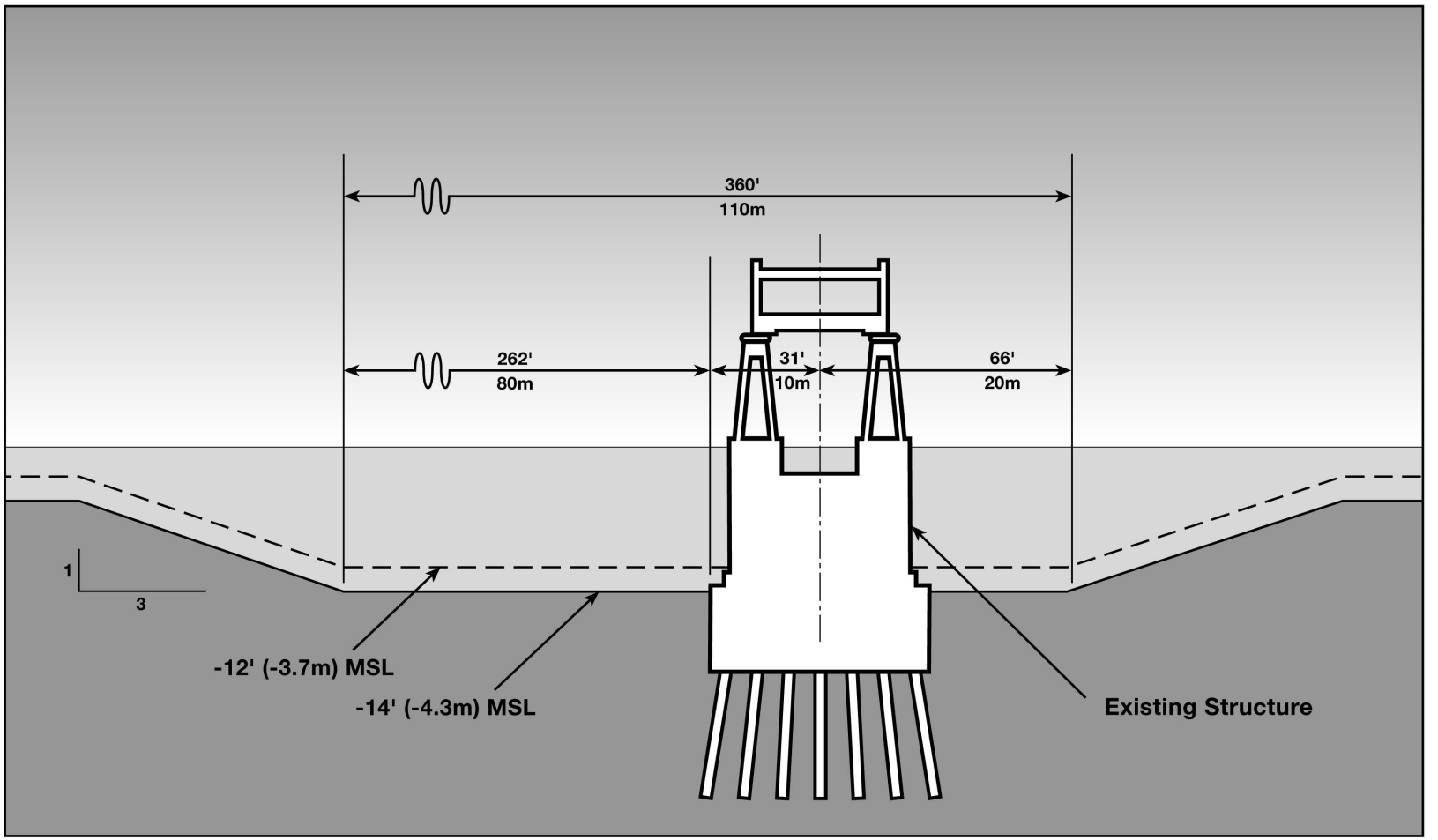
SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Dredged Construction Channel Cross-Section

NOT TO SCALE

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
May 2001

Figure 10



View: Looking West, South Side of Existing SFOBB

SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

Dredged Dismantling Channel Cross-Section

NOT TO SCALE

Proposed San Francisco-Oakland Bay Bridge East Span Replacement
Name of Applicant - Caltrans
Waterway - San Francisco Bay
SF PM 7.6-8.7, Alam. PM 0.0-1.3
SF KP 12.2-14.3, Alam. KP 0.0-2.1
Location - San Francisco, San Francisco County, CA
Oakland, Alameda County, CA
May 2001

Figure 11

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

AUG 17 2001

Regulatory Branch

SUBJECT: File Number 23013S

Ms. Mara Melandry
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Dear Ms. Melandry:

The U.S. Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, San Francisco Bay Regional Water Quality Control Board, and the Corps of Engineers, have completed their review of your August 15, 2001 letter (Subject: Amendment to Dredged Material Disposal Plan, Described in Caltrans Letter Dated June 19, 2001: San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project (East Span Project) on Interstate 80, crossing San Francisco Bay (04-SF-80 KP 12.2/Kp 14.3, 04-ALA-80 KP 0.0/KP 2.1); U.S. Army Corps of Engineers file #:23013) that provides minor corrections in the proposed disposal plan described in your California Department of Transportation letter dated June 19, 2001. Your June 19, 2001 provided proposed disposal locations for the dredged material from your San Francisco - Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project. The agencies provided concurrance to your June 19, 2001 letter in a letter from the U.S. Army Corps of Engineers addressed to the California Department of Transportation dated July 6, 2001.

The above inter-agency group concurs with the minor corrections detailed in your August 15, 2001 letter. Please note that although the agencies concur to your letter, actual approval of the disposal locations is only provided when you receive your various permits.

Please be advised that this letter does not constitute an authorization to proceed with your dredge project. You must first obtain Federal, State and local permits as appropriate.

Figure 12

Should you have any questions please call or write to Mr. David Dwinell of our Operations-Readiness Division (415-977-8471), and refer to the file number at the head of this letter.

Sincerely,

Max R. Blodgett
Chief, Operations-
Readiness Division

Copies Furnished:

US EPA, San Francisco, CA, Attn: Dadey
CA BCDC, San Francisco, CA, Attn: Goldbeck
CA RWQCB, Oakland, CA, Attn: Collis
CA SLC, Sacramento, CA, Attn: Howe
CA F&G, Menlo Park, CA, Attn: Ota
US NMFS, Santa Rosa, CA, Attn: Mulvey

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

August 15, 2001

Mr. David Dwinell, US Army Corps of Engineers
Mr. Jim Delorey, US Army Corps of Engineers
Mr. Larry Fade, US Army Corps of Engineers
Ms. Kathy Dadey, US Environmental Protection Agency
Mr. Brian Ross, US Environmental Protection Agency
Mr. Steve Goldbeck, SF Bay Conservation and Development Commission
Ms. Brenda Goeden, SF Bay Conservation and Development Commission
Ms. Glynnis Collins, Regional Water Quality Control Board
Ms. Becky Ota, California Department of Fish and Game
Ms. Mary Howe, State Lands Commission

Subject: Amendment to Dredged Material Disposal Plan, Described in Caltrans Letter Dated June 19, 2001
San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project (East Span Project) on Interstate 80, Crossing San Francisco Bay
(04-SF-80 KP 12.2/Kp 14.3, 04-ALA-80 KP 0.0/KP 2.1)

U.S. Army Corps of Engineers file #: 23013

Dear DMMO Members:

This is to inform you of a minor correction in the proposed disposal plan described in our letter of June 19, 2001. On page 2, paragraph 3 the letter stated that:

"The Department proposes to disperse all material dredged from within the piles at SF-11 except the upper 3.66 meters (12 feet) of Piers E20, E21, and E22 (SAP testing location: SFOBB N1 and SFOBB N2) as recommended by DMMO; these materials will be disposed of at appropriate upland facilities. (See Dredging Episode 2 Figure)."

In fact, the correct pier numbers and their locations are as follow:

E1 through E6 for Sediment Sampling Plan (SAP) testing locations SFOBB N1 & SFOBB N2
E15 through E18 for Sediment Sampling Plan (SAP) testing location SFOBB N5

The materials from these locations will be disposed of at appropriate upland facilities as recommended by DMMO.

Your concurrence with dredged material disposal plan as described will be appreciated. Please contact Allen Baradar, SFOBB Senior Environmental Engineer, at (510) 286-5636 if you have questions or need additional information.

Sincerely,

HARRY Y. YAHATA
District Director

by

for MARA MELANDRY
Environmental Manager, SFOBB

04 SF K12.2/KP14.3
04 Ala KP0.0/KP2.1
EA 012000
File title: dmmofinal

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

Regulatory Branch (1145b) JUL 2 6 2001

SUBJECT: File Number 23013S

Mr. Dennis Mulligan
California Department of Transportation
111 Grand Avenue
Oakland, California 94623--660

Dear Mr. Mulligan:

The U.S. Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, San Francisco Bay Regional Water Quality Control Board, and the Corps of Engineers, have completed their review of your June 19, 2001 letter that details your proposed disposal locations for the dredged material from your San Francisco - Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project.

The above inter-agency group concurs with your proposed disposal locations for the material from the San Francisco - Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project as detailed in the above letter and look forward to receiving your permit application. Please note that although the agencies concur to you letter, actual approval of the disposal locations is only provided when you receive your various permits.

Please be advised that this letter does not constitute an authorization to proceed with your dredge project. You must first obtain Federal, State and local permits as appropriate.

Should you have any questions please call or write to Mr. David Dwinell of our Operations-Readiness Division (415-977-8471), and refer to the file number at the head of this letter.

Sincerely,

ORIGINAL SIGNED
By
Max R. Blodgett

Max R. Blodgett
Chief, Operations-
Readiness Division

Copies Furnished:

US EPA, San Francisco, CA, Attn: Dadey
CA BCDC, San Francisco, CA, Attn: Goldbeck
CA RWQCB, Oakland, CA, Attn: Collins
CA SLC, Sacramento, CA, Attn: Howe
CA F&G, Menlo Park, CA, Attn: Ota
US NMFS, Santa Rosa, CA Attn: Mulvey

CF:

CESPN-OR Rdg File
CESPN-OR-R Rdg File
CESPN-OR-DM(DWINELL)

DWINELL
CESPN-OR-DM
7-8471
July 5, 2001

WIRTZ
CESPN-OR-R

FONG
CESPN-OR-R

BLODGETT
CESPN-OR