

INFORMATION HANDOUT

PERMITS

UNITED STATES ARMY CORPS OF ENGINEERS
NON-REPORTING NATIONWIDE 404 PERMIT (AMENDMENTS)

AGREEMENTS

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NOTIFICATION NO.1600-2013-005-3 (AMENDMENTS)

UNITED STATES FISH AND WILDLIFE SERVICE (Biological Opinion)_November 27, 2013

MATERIALS INFORMATION

WATER QUALITY INFORMATION HANDOUT

REVISED FINAL FOUNDATION REPORT FOR BRIDGE NO. 28-0171S, August 16, 2013

GEOTECHNICAL LABORATORY TEST RESULTS

ROUTE: 680-CC-22.7/24.8

ADDED PER ADDENDUM NO. 2 DATED JANUARY 31, 2014



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16TH FLOOR
SAN FRANCISCO, CALIFORNIA 94103-1398

Regulatory Division

DEC -4 2013

SUBJECT: File Number SPN-2010-00296S

Mr. Hardeep Takhar
Office of Biological Sciences and Permits
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Dear Mr. Takhar:

This correspondence is in reference to your submittal of December 21, 2012, amended on June 28, 2013 and again on September 26, 2013 concerning Department of the Army (DA) authorization to upgrade the existing overhead structure and improve safety of the off-ramp by providing seismic rehabilitation of Route 680 off-ramp to Marina Vista Road, in the town of Martinez, Contra Costa County, California (38.02528, -122.11164).

Work within U.S. Army Corps of Engineers' jurisdiction will include dewatering of the project site (3.823 acres), installation of timber mats, demolition of the current structure, and installation of cast-in-steel shell piles and new abutment, completion of the cast-in-place concrete box girder superstructure, and replacement of restrainer cables and cross bracing on the mainline, and restoration and revegetation of the construction site. The new overhead structure will require installation of 12 piles 5' in diameter and 20 piles 2' in diameter and new abutments constructed of 182 feet of steel sheet pile. Work will result in the permanent fill of 0.008 acre of wetland and 0.001 acre of Other Waters of the U.S. Work will also result in temporary affects to 3.823 acres of wetland and Other Waters of the U.S. All work will be completed in accordance with the plans and drawings titled "*USACE File #2010-002968, Contra Costa 680 Mococo Off-Ramp Seismic Retrofit Project, December 4, 2013, Figures 1 to 17*" (enclosure 1).

Section 404 of the Clean Water Act (CWA) generally regulates the discharge of dredged or fill material below the plane of ordinary high water in non-tidal waters of the United States, below the high tide line in tidal waters of the United States, and within the lateral extent of wetlands adjacent to these waters. Section 10 of the Rivers and Harbors Act generally regulates construction of structures and work, including excavation, dredging, and discharges of dredged or fill material, occurring below the plane of mean high water in tidal waters of the United States; in former diked baylands currently below mean high water; outside the limits of mean high water but affecting the navigable capacity of tidal waters; or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States. Navigable waters of the United States generally include all waters subject to the ebb and flow of the tide;

and/or all waters presently used, or have been used in the past, or may be susceptible for future use to transport interstate or foreign commerce. A Preliminary JD has been completed for your site on January 19, 2011.

Based on a review of the information in your submittal, the project qualifies for authorization under Department of the Army Nationwide Permit (NWP) 14 for Linear Transportation Projects, 77 Fed. Reg. 10,184, February 21, 2012, pursuant to Section 404 of the CWA of 1972, as amended (33 U.S.C. § 1344 *et seq.*) and Section 10 of the Rivers and Harbors Act (RHA) of 1899, as amended (33 U.S.C. § 403 *et seq.*). The project must be in compliance with the terms of the NWP, the general conditions of the Nationwide Permit Program, and the San Francisco District regional conditions cited in enclosure 2. You must also be in compliance with any special conditions specified in this letter for the NWP authorization to remain valid. Non-compliance with any term or condition could result in the revocation of the NWP authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps. This NWP authorization does not obviate the need to obtain other State or local approvals required by law.

This verification will remain valid until March 18, 2017, unless the NWP authorization is modified, suspended, or revoked. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon a NWP will remain authorized provided the activity is completed within 12 months of the date of a NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 C.F.R. § 330.4(e) and 33 C.F.R. §§ 330.5 (c) or (d). This verification will remain valid if, during the time period between now and March 18, 2017, the activity complies with any subsequent modification of the NWP authorization. The Chief of Engineers will periodically review NWPs and their conditions and will decide to either modify, reissue, or revoke the permits. If a NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. It is incumbent upon you to remain informed of any changes to the NWPs. Changes to the NWPs would be announced by Public Notice posted on our website (<http://www.spn.usace.army.mil/regulatory/index.html>). Upon completion of the project and all associated mitigation requirements, you shall sign and return the Certification of Compliance, enclosure 3, verifying that you have complied with the terms and conditions of the permit.

You shall comply with all terms and conditions set forth by the "*Water Quality Certification for the Mococo Overhead Seismic Rehabilitation Project, City of Martinez, Contra Costa County*" issued by the San Francisco Bay Regional Water Quality Control Board on May 3, 2013 (enclosure 4). You shall consider such conditions to be an integral part of the NWP authorization for your project.

General Condition 18 stipulates that project authorization under a NWP does not allow for the incidental take of any federally-listed species in the absence of a biological opinion (BO) with incidental take provisions. As the principal federal lead agency for this project, Caltrans initiated consultation with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to address project related impacts to list species, pursuant to Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*).

In order to ensure compliance with this NWP authorization, the following special conditions shall be implemented:

1. During dewatering for construction, appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable.
2. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary access to the marsh shall be constructed using timber mats. The filter fabric shall be sandwiched between wood layers in the timber mats to prevent fine debris from entering the wetland and reducing compaction within the wetland. In addition to timber matting, elevated access trestles may be installed, at the contractor's option, over the existing tidal channel and/or in select locations over the timber matting area, if required to access and perform the work (as depicted in figure 17 of enclosure 1).
3. Temporary fills must be removed in their entirety and the affected areas shall be returned to pre-construction elevations.
4. No gravel shall be used on the temporary access road and staging areas to prevent gravel from migrating into nearby wetlands and the channel. To protect low flow channel within the project footprint, Caltrans shall install an ESA fence along the temporary access and staging areas where the channel is located.
5. Removal of the existing off-ramp structure deck shall occur from the existing deck and ground. The existing 16" Raymond piles shall be cut 1' below grade. All spoils shall be hauled off from the project site and disposed outside of Corps jurisdiction.
6. The project will begin on February 1, 2015, and end on December 15, 2015 with a total of 220 work days. Work within the Jurisdictional waters to be completed by October 15, 2015. The start date of February 1, 2015 coincides with the annual closure of the Tidal Flood gate by the Mountain View Sanitary District during the months of February and March.

7. To establish pre-construction absolute vegetative cover, a survey of baseline conditions shall be completed prior to any impact to a jurisdictional feature to determine pre-construction absolute cover. A copy of the survey shall be provided to the Corps prior to the commencement of work.
8. Within 1-year of initiation of temporary impact to a jurisdictional feature, you shall re-contour the temporarily impacted area and replant it with appropriate soil-stabilizing native species. Planting shall occur as depicted in the enclosed figures titled, "*USACE File #2010-00296S, Contra Costa 680 Mococo Off-ramp Seismic Retrofit Project, December 4, 2013, Figure 17*" (enclosure 1). Planting shall occur using species outlined in the erosion control legend "*USACE File #2010-00296S, Contra Costa 680 Mococo Off-ramp Seismic Retrofit Project, December 4, 2013, Figure 16*" (enclosure 1).
9. The site shall be monitored for a 5-year period. Monitoring reports shall be submitted to the Corps by November 1 of each year. By the end of the fifth year, re-vegetated areas shall achieve absolute vegetative cover similar to pre-construction conditions. The reports shall include representative photos of the re-vegetated areas, observed species composition, documentation of any invasive weed establishment, and estimates of plant cover for each species. If the cover requirements for the re-vegetated areas are not met, the Corps may require further monitoring, re-vegetation, and/or off-site mitigation. Caltrans shall be responsible for implementation of recommended remediation measures and providing funds for such measures if necessary.
10. In the event that you are unable to implement the plan described in the above special conditions within 1-year of initiation of temporary impact to a jurisdictional feature, or the site does not recover to pre-construction conditions within 5 years, you must purchase credits at a Corps approved mitigation bank to compensate for the temporary impact at a 3:1 ratio. If no approved bank or in-lieu fee is available, you shall propose an alternative mitigation plan to be reviewed and approved by the Corps.
11. After removal of 62 of the existing off-ramp structure piles 0.002 acre of wetland shall be restored. The piles shall be cut 1' below grade, and filled with soil cultivated with compost to match the grade of the surrounding wetlands. The area shall be replanted with northern coastal salt marsh species outlined in the erosion control legend "*USACE File #2010-00296S, Contra Costa 680 Mococo Off-ramp Seismic Retrofit Project, December 4, 2013, Figure 16*" (enclosure 1). These areas shall also be monitored in accordance with special condition 9.

12. The NMFS concurred with the determination that the project was not likely to adversely affect Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, Central Valley steelhead, Central California coast steelhead, and green sturgeon, and designated critical habitat for this species. This concurrence was premised, in part, on project work restrictions outlined in enclosure 5. These work restrictions are incorporated as special conditions to the NWP authorization for your project to ensure unauthorized incidental take of species and loss of critical habitat does not occur.

13. To remain exempt from the prohibitions of Section 9 of the Endangered Species Act, the non-discretionary Terms and Conditions for incidental take of federally-listed Species shall be fully implemented as stipulated in the Biological Opinion dated August 19, 1996, (Service File No.: 1-1-96-F-40, enclosure 6) that was amended on January 9, 2001 (1-1-01-F-28), January 14, 2003 (1-1-02-F-0299), February 24, 2003 (1-103-F-0087), March 9, 2011 (81420-2011-F-0019-2), December 26, 2012 (81420-2011-F-0019-R001), and November 27, 2013 (81420-2001-F-0019-R002, enclosure 7). Project authorization under the NWP is conditional upon compliance with the mandatory terms and conditions associated with incidental take. Failure to comply with the terms and conditions for incidental take, where an 'incidental take' of a federally-listed species occurs, would constitute an unauthorized take and non-compliance with the NWP authorization for your project. The USFWS is, however, the authoritative federal agency for determining compliance with the incidental take statement and for initiating appropriate enforcement actions or penalties under the Endangered Species Act.

You may refer any questions on this matter to Paula Gill of my Regulatory staff by telephone at 415-503-6776 or by e-mail at Paula.C.Gill@usace.army.mil. All correspondence should be addressed to the Regulatory Division, South Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. My Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner, while preserving and protecting our nation's aquatic resources. If you would like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website: <http://www.spn.usace.army.mil/regulatory/>.

Sincerely,

A handwritten signature in black ink, appearing to read "Jane M. Hicks", written in a cursive style.

Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copies Furnished (w/o enclosures):

CA RWQCB, Oakland, CA
U.S. EPA, San Francisco, CA
CA SWRCB, Sacramento, CA
CDFW, Yountville, Ca
USFWS, Sacramento, Ca
NMFS, Santa Rosa, Ca



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
(707) 944-5500
www.wildlife.ca.gov

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director



November 14, 2013

Mr. Hardeep Takhar
California Department of Transportation
111 Grand Ave.
Oakland, Ca 94623

Subject: Amendment of Lake or Streambed Alteration Agreement
Notification No. 1600-2013-005-R3

Dear Mr. Takhar:

The California Department of Fish and Wildlife (Department) has received your request to amend Streambed Alteration Agreement #1600-2013-0005-3 (Agreement) and the required fee in the amount of \$560.2 for a major amendment. Your request to amend the Agreement includes the following changes:

Project Description:

The work will occur between post miles ~~24.26~~ **22.7** and **24.8**.

The slab section will be supported by 20 pile-driven cast-in-steel-shell (CISS) piles, 2 feet in diameter, arranged in **4 bents and one abutment** ~~5 bents~~.

To control flooding and water quality in the greater marsh area, Caltrans will temporarily isolate the Project site from tidal flows before and during construction operations by ~~closing tidal gates and installing a water diversion system~~ **installing a coffer dam system which will be placed 36 feet from the existing and proposed structure locations**. Temporary pumps, powered by generators, would be used to pump the remaining rainwater, seawater, and groundwater seepage from the Project site. ~~A gravel bag coffer dam will be placed east of the existing petroleum pipeline box culvert under the northbound Interstate 680 off-ramp, located approximately 700 feet northeast of the proposed structure, to prevent any water from entering the Project site from tidal sources. A 48-inch temporary high density polyethylene culvert will couple to a 48-inch culvert from the Shell Refinery treatment pond, and will divert Shell storm-water through the petroleum pipeline box culvert.~~ **The dewatering system will remain in place and active for the duration of construction, in order to pump any groundwater that accumulates during pile driving activities. Groundwater will receive treatment to meet watershed standards prior to being discharged.** This system will keep the Project site dry until construction is complete.

Removal of the existing off-ramp structure deck will occur from the existing deck and ground. The existing 16-inch piles will be cut 1-3 foot below grade.

Avoidance and Minimization Measure 2.1 shall read : Construction work shall occur within ~~wetland or channel areas~~ jurisdictional areas between February 1 ~~March 1~~ and October 15.

Avoidance and Minimization Measure 2.2 shall be deleted: ~~Channel dewatering and in-channel construction activities shall occur when the Peyton Slough tide gates are closed.~~

Avoidance and Minimization Measure 2.7 shall be deleted: ~~A Qualified Biologist shall install temporary block nets prior to the installation of the downstream cofferdam. The downstream cofferdam will then be installed. A Qualified Biologist will collect and relocate fish downstream of the lower cofferdam. The area between the two cofferdams will be dewatered using a pump with a 1/4 inch mesh fish screen.~~

Avoidance and Minimization Measure 2.14 shall be deleted: ~~Pile driving operations shall be limited to a maximum of 40 days to minimize impacts to sensitive species.~~

Avoidance and Minimization Measure 2.16 shall read: Timber mats will be installed under the entire existing structure and will extend ~~30~~ 36 feet on both sides to catch falling debris. Filter fabric and subgrade enhancement geotextile will then be installed on top and bottom of the mats followed by a plywood cover. Care will be taken around piles/columns to ensure that no holes are present. Permittee shall prevent all demolition material, including dust, from entering the marsh.

Compensatory Measure 3.1 shall read: Permittee shall submit to CDFW for review and approval, an Onsite Restoration Plan to address temporary impacts to Coastal Brackish Marsh (~~1.39~~ .06 acre), and temporary (~~2.58~~ 1.92 acre) permanent (.08 acre) impacts to Northern Coastal Salt Marsh, within 6 months of the issuance of this Agreement. The Onsite Restoration Plan shall include a plant/seed palette of native species to be used, success criteria, a monitoring a reporting schedule, and corrective actions to be taken if mitigation measures do not meet the approved success criteria. All plantings/seeds shall be derived from locally available genotypes. The Permittee shall monitor the survival and vigor of onsite plantings for a period of 5 years to ensure attainment of 75% survivorship. Permittee shall control invasive species as needed to ensure attainment of 75% survivorship at 5 years. Any onsite plans to convert uplands to wetlands to mitigate for permanent footing impacts shall adhere to the requirements of this condition. Permanent impacts shall be mitigated at a 3:1 mitigation to impact ratio.

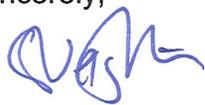
A temporary access road, extending 36 feet from both sides of the proposed and existing superstructures, would be required to complete the construction operations for removal and construction of the new off-ramp structure. Contractors will use a timber mat system for access roads and staging areas, to protect the original contour of all wetland areas that cannot be avoided during construction. In addition to timber matting, elevated access trestles may be installed over the existing channel and in locations over the timber matting area. An approximately 100-foot long temporary access ramp will lead from the Interstate 680 southbound onramp to the temporary access road. The access ramp will be constructed of embankment fill with steel sheet pile retaining walls and will be located in upland.

The Department hereby agrees to amend the agreement as requested. All conditions in the Agreement remain in effect.

Copies of the Agreement and this amendment must be readily available at project worksites and must be presented when requested by a Department representative or agency with inspection authority.

If you have any questions regarding this matter, please contact Melissa Escaron, Staff Environmental Scientist at (925)786-3045 or melissa.escaron@wildlife.ca.gov

Sincerely,



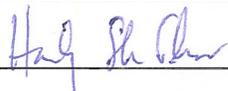
12/4/13

Craig Weightman
Environmental Program Manager

cc: Melissa Escaron, Staff Environmental Scientist

ACKNOWLEDGEMENT

I hereby agree to the above-referenced amendment.

Print Name: HARDEEP TAKHAR Date: 12.2.13
Signature: 



United States Department of the Interior



FISH AND WILDLIFE SERVICE

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

NOV 27 2013

In Reply Refer To:
81420-2011-F-0019-R002

Ms. Melanie Brent, Office Chief
Caltrans District 4 Environmental Analysis
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Subject: Reinitiation of Consultation on the Interstate 680 Mococo Overhead Seismic Restoration Project in Contra Costa County, California (Caltrans EA 3A8701)

Dear Ms. Brent:

This letter is a reinitiation of formal consultation to amend the Biological Opinion issued on August 19, 1996, (Service File No.: 1-1-96-F-40) for the Interstate 680 (I-680) Mococo Overhead Seismic Restoration located in Contra Costa County, California. Reinitiation was requested by the California Department of Transportation (Caltrans) on July 1, 2013, to address the effects of modifications to project design elements that will provide a more redundant and robust structural system, better able to withstand force effects from an earthquake on the endangered California clapper rail (*Rallus longirostris obsoletus*), endangered salt marsh harvest mouse (*Reithrodontomys raviventris*), threatened delta smelt (*Hypomesus transpacificus*) and designated critical habitat for delta smelt. The biological opinion was previously amended on January 9, 2001 (1-1-01-F-28), January 14, 2003 (1-1-02-F-0299), February 24, 2003 (1-1-03-F-0087), March 9, 2011 (81420-2011-F-0019-2) and December 26, 2012 (81420-2011-F-0019-R001). Reinitiation of consultation is exercised under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users legislation (23 U.S.C. 327) allows the Secretary of the U.S. Department of Transportation acting through the Federal Highway Administration (FHWA) to establish a Surface Transportation Project Delivery Pilot Program, whereby a State may assume the FHWA responsibilities under the National Environmental Policy Act (NEPA) for environmental review, agency consultation and other action pertaining to the review or approval of a specific project. Caltrans assumed these responsibilities for the FHWA on July 1, 2007 through a Memorandum of Understanding (MOU) within the State of California (http://www.dot.ca.gov/ser/downloads/MOUs/nepa_delegation/sec6005mou.pdf).

The following changes are made to the August 19, 1996, biological opinion:

1. Add the following to the **Consultation History** on page 1:

July 1, 2013	The Service received a request from Caltrans dated June 28, 2013, to reinstate formal consultation to address changes to the project description.
December 14, 2013 - September 10, 2013	Electronic and phone correspondence between Caltrans, California Department of Fish and Game (CDFG) and the Service.

2. Add the following to the **Description of the Proposed Action** on page 2 of the March 9, 2011 amendment:

Caltrans plans to isolate the work area by constructing a cofferdam in the form of a temporary berm constructed by gravel bags that will extend approximately 36 feet from the existing and proposed final structure locations as shown on the Stage Construction and Traffic Handling Plans. This will restrict the area of temporary effects to the marsh area from 6.25 acres to 4.50 acres.

3. Make the following changes to the **Description of the Proposed Action** on page 3 of the December 26, 2012 amendment:

The purpose of this project is to bring the Mococo off-ramp and mainline up to the current seismic standards set by Caltrans. Caltrans proposes to repair the deteriorated seismic deficiencies of the existing I-680 southbound off-ramp by replacing it with a new, seismically efficient, off-ramp. The replacement structure would comprise a combination of 20 ~~CISS cast-in-steel-shell (CISS)~~ **cast-in-steel-shell (CISS)** piles and 12 cast-in-drilled-hole (CIDH) piles. ~~The abutment design has remained unchanged as its design minimizes the amount of fill used in grading the abutment.~~ The CIDG piles will be arranged in groups of two piles per bent, for a total of six bents. The CISS piles will be arranged in groups of four piles per bent, for a total of ~~five~~ **four bents and one abutment**. ~~The final bent will be adjacent to the abutment retaining walls. A new abutment will also be constructed.~~ **A touchdown roadway section capped by a concrete slab contained by sheet pile retaining walls filled with lightweight cellular concrete will be added to close the gap between the new off-ramp structure and the existing roadway.** Corroded restrainer cables will be replaced on the mainline and ~~additional lateral bracings will be installed to span end diaphragms~~ **steel and concrete corbels will be placed on existing bents and abutment, respectively.**

Demolition of Existing Structure:

Removal of the existing off-ramp structure deck will occur in sections using heavy equipment and is scheduled for ~~March 2013~~ **February 2014 or later**. The deck will be removed from the ground, or above, including removing all existing substructure elements to a depth of ~~2~~ **one** feet below ground. The demolition plan will remove the off-ramp ~~in longitudinal sections, working from the mainline towards the abutment~~ **utilizing conventional demolition methods while capturing debris as outlined below**. All spoils will be hauled away from the project site. The following actions will be taken to ensure no debris enters the channel or wetland areas during demolition:

1. Timber mats will be installed under the entire existing and proposed off-ramp structures and will extend ~~30~~ **36** feet on both sides to catch falling debris. Filter fabric **and Subgrade Enhancement Geotextile** will then be installed on top **and bottom** of the mats followed by a plywood cover. Care will be taken around piles/columns to ensure that no holes are present.

Replacement of Off-ramp:

Pile driving activities will be scheduled to occur in short succession to minimize the temporal duration of effects on listed species. Pile driving **required for temporary and permanent foundations will be completed during the various stages of the work over an approximate two month time period** ~~is expected to last a maximum of 40 days to transport and stage the CISS piles, and to ensure the pile locations are sufficiently dewatered for stability of the final structure.~~ **Pile driving durations and overall effort will be kept to the absolute minimum necessary to complete the work.** For the range of diesel impact hammers proposed by Caltrans' Structure Design Team, time for pile driving, not including stoppages, is between 30-60 minutes per pile. Sound pressure level for the same proposed diesel impact hammers ranges from 99 dBA to 119 dBA at a distance of 23 feet from pile. Pile noise at peak intensity will attenuate to near-background highway noise (83 Lmax dB) at a distance of 1,500 feet. Consequently, traffic handling is necessary on the mainline and off-ramp until the new off-ramp construction on this area is completed. **Temporary construction accesses from Marina Vista Avenue and off-ramp are** ~~A temporary access road is required to complete the construction operations.~~ Alignment and construction of the new abutment will occur during this phase, **which will include sheet pile retaining walls.**

Mainline Repairs

Caltrans will retrofit the mainline by replacing the restrainer cables ~~and installing cross bracing.~~ The repairs will include installation of corbel catcher assemblies, to prevent girders from falling should they become loose during an earthquake. This will require partial closure of Marina Vista Avenue/Waterfront Road. Traffic will be re-routed first onto the northern half of the road, then the southern half, until repairs to the understructure are completed. ~~A temporary trestle 30 feet wide and approximately 25 feet long will be constructed over the existing drainage canal, to provide access for restoration. The location of the end supports for the trestle would be at hard points to prevent the bank from collapsing, as required, and ESA fencing will line the channel to prevent workers from disturbing the channel bank.~~ All groundwork required for restoration of mainline will occur between ~~March 1, 2013~~ **February 1, 2014**, and October 15, ~~2013~~ **2014**, with non-ground work, i.e. work on the roadway proper, occurring from ~~October 15, 2013~~ **up to December 15, 2013 2014.**

Staging and Access

Caltrans identified staging locations within the Caltrans right of way (ROW). Staging locations will be used for temporary storage of heavy construction equipment, various construction materials, stockpile areas, equipment maintenance shops, and field offices. Staging shall occur on the shoulder of Marina Vista Avenue, directly underneath the mainline north-northeast of the project site, as well as 50 feet east of the existing off-ramp. No vegetation is present at the shoulder location and under the mainline site. There is wetland vegetation located in the area proposed, approximately 50 feet east of existing structure. All staging in natural areas will be fitted with using a combination of

materials and techniques such as timber mats, geotextile reinforcing fabric, ~~crushed rock~~ and falsework pads to protect the wetland habitats. No gravel/~~geotech fabric~~ will be used at staging areas to fulfill Regional Water Quality Control Board recommendations.

Caltrans identified access roads within the Caltrans ROW. A 100-foot long temporary **construction** access ramp will be constructed from the southbound on-ramp to I-680 from Marina Vista Road, immediately east of the proposed off-ramp structure. The proposed temporary ramp will be **constructed of embankment fill material placed on subgrade enhancement geotextile** ~~located between two 100-foot long sheet pile walls, used to support the roadbed.~~ **The first existing access is a dirt roadway with direct access from the existing off-ramp. The second existing access is an unpaved roadway adjacent to an existing railroad track which is accessible from Mococo Road.** Access roads will be used for driving equipment to the project footprint. **In addition to timber matting, elevated access trestles may be installed, at the contractor's option over the existing tidal channel and/or in select locations over the timber matting area, if required to access and perform the work. In addition to piles for the new off-ramp structure, temporary piles may be required to support temporary falsework and /or temporary access trestles. The number of temporary piles necessary will be based on the contractor's selected means and methods, and could include steel or timber piling. It is estimated between 50 and 200 temporary piles could be utilized.**

~~Caltrans will completely avoid the existing channel, and will protect the channel by installing ESA fencing within the impact areas.~~ Contractors will use combination of materials and techniques including but not limited to: geotextile reinforcing fabric, ~~crushed rock~~ and falsework pads, for access roads and staging areas to protect the original contour of all wetland areas that cannot be avoided within identified affected areas. No gravel will be used at staging areas to fulfill Regional Water Quality Control Board recommendations. After construction is complete, all material will be removed, the area will be restored to original grade to the maximum extent practicable and all temporarily affected areas will be hydroseeded with native wetland or upland seed mix, with a one-year plant establishment period and five years of monitoring to ensure restored areas are returned to preconstruction condition.

The remainder of the August 19, 1996, biological opinion and January 9, 2001, January 14, 2003, February 24, 2003, March 9, 2011, and December 26, 2012, amendments are unchanged. This concludes the reinitiation of formal consultation on the I-680 Mococo Overhead Seismic Restoration Project located in Contra Costa County, California. If you have questions concerning this reinitiation of consultation on the I-680 Mococo Overhead Seismic Restoration Project, please contact Jerry Roe or Ryan Olah at (916) 414-6600.

Sincerely,



For Jennifer M. Norris
Field Supervisor

cc:
Melisa Escaron, California Department of Fish and Wildlife, Yountville, California

**WATER QUALITY INFORMATION HANDOUT
CONTRACT NO. 3A8704**

**Retrofit Mococo OH and Remove/Replace Southbound Loop
Ramp Structure
Contra Costa County on Interstate 680 at Mococo OH
04-CC-680-PM 24.2/24.4**

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

Disclaimer

A "Disclaimer" is required specifying that the information provided in the Storm Water Information Handout is just a guideline and is to be used for information purposes only and should not be considered a sole source document to adhere to the requirements of the new National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP), Number CAS000002, adopted on September 2, 2009. The contractor is required to provide water quality monitoring, sampling and implement best management practices (BMPs) based on standard industry operations, field conditions and conditions encountered based on the contractor's means and methods. The information in this handout is not to be construed in any way as a waiver of the provisions in the CGP. Bidders and contractors are cautioned to make independent investigations and examinations as they deem necessary to satisfy the conditions encountered in performance of work, with respect to the following: sampling and monitoring locations, distribution of watershed areas for sizing of BMPs, and selection of BMPs in order to conform to the requirement of the contract documents and the CGP.

Water Quality Information Handout includes:

- 1. Storm Water Information**
- 2. Non-Storm Water Information**

STORM WATER INFORMATION

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10. ESTIMATED DEWATERING VOLUME DURING A STORM EVENT
11. ESTIMATED DEWATERING VOLUME IN STRUCTURE EXCAVATIONS
12. ESTIMATED WATER VOLUME FOR WATER-FILLED COFFERDAMS
13. SAMPLING LOCATIONS
14. PERMITS

Project Vicinity

Project Vicinity



Figure 1



Figure 2

Risk Assessment

	A	B	C
1	Sediment Risk Factor Worksheet		Entry
2	A) R Factor		
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
5	R Factor Value		11.82
6	B) K Factor (weighted average, by area, for all site soils)		
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
8	Site-specific K factor guidance		
9	K Factor Value		0.37
10	C) LS Factor (weighted average, by area, for all slopes)		
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
12	LS Table		
13	LS Factor Value		1.82
14			
15	Watershed Erosion Estimate (=RxKxLS) in tons/acre		7.959588
16	Site Sediment Risk Factor		Low
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			

Receiving Water (RW) Risk Factor Worksheet

Entry

A. Watershed Characteristics

yes/no

A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment** (For help with impaired waterbodies please visit the link below) or has a **USEPA approved TMDL implementation plan for sediment**?:

http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

OR

A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? (For help please review the appropriate Regional Board Basin Plan)

http://www.waterboards.ca.gov/waterboards_map.shtml

yes

[Region 1 Basin Plan](#)

[Region 2 Basin Plan](#)

[Region 3 Basin Plan](#)

[Region 4 Basin Plan](#)

[Region 5 Basin Plan](#)

[Region 6 Basin Plan](#)

[Region 7 Basin Plan](#)

[Region 8 Basin Plan](#)

[Region 9 Basin Plan](#)

Combined Risk Level Matrix

		<u>Sediment Risk</u>		
		Low	Medium	High
<u>Receiving Water Risk</u>	Low	Level 1	Level 2	
	High	Level 2		Level 3

Project Sediment Risk: **Low**
Project RW Risk: **High**
Project Combined Risk: **Level 2**

The calculation of R value of the project with Latitude 38.02474, Longitude -122.11207

Figure 1-Erosivity Index Zone Map

The EI distribution zone is 24

Table 1-Erosivity Index Table

EI percentage (Feb 1, 2015 to Oct 15, 2015)

63-23.6= 39.4

Figure 4_ Isoerodent map of California =30

R factor is $39.4 \times 30\% = 11.82$

Use populate K and LS value provided by the SMARTs

K = 0.37

LS = 1.83

Major Source of Storm Water Run-ons

The project location receives run-on flows from adjacent roadways, freeway on- and off-ramps, a 48-in culvert outfall from the Shell refinery pond, inflow from a reinforced concrete box (RCB) utility casing and a 48-in reinforced concrete pipe (RCP) under the southbound (SB) on- and off-ramps, and an 18-in. culvert from I-680 (see Photo 1). There are a series of deck drains along edges of Mococo overhead that drains I-680 above the project site (see Photo 5). The run-on discharges downstream via a 66-in. reinforced concrete pipe (RCP) culvert underneath the northbound (NB) off-ramp to Marina Vista Avenue/Waterfront Road. However, the 66-in RCP culvert is subject to inundation and reverse flow during tidal cycles. This results in tidal waters ponding in the interchange area. During a site visit on August 28, 2009, the 66-in. RCP culvert was completely submerged by standing water (see Photo 2).

During periods of high water, ponding water can also be exchanged between the interchange area and the wetland marsh to the east through the RCB culvert installed under the NB on- and off-ramps, just south of the intersection with Waterfront Road.

This RCB culvert was installed as a casing for the above-grade petroleum lines running through the site (see Photo 3 and Photo 4). The petroleum lines were removed recently. The various inflow/outflow locations within the project location are shown in Figure 3.

When the adjacent wetland restoration opens up the tidal gate downstream of the project area, the tidal water will inundate the project area.

The project site receives release flow from the Shell refinery pond south of the project area. According to Shell's storm water release history between January 2004 and October 2009, provided by Shell in the meeting dated November 3, 2009, the historic high storm water release from the Shell refinery pond to the project area is 7.4 million gallons (22.7 ac-ft) on January 9, 2006.

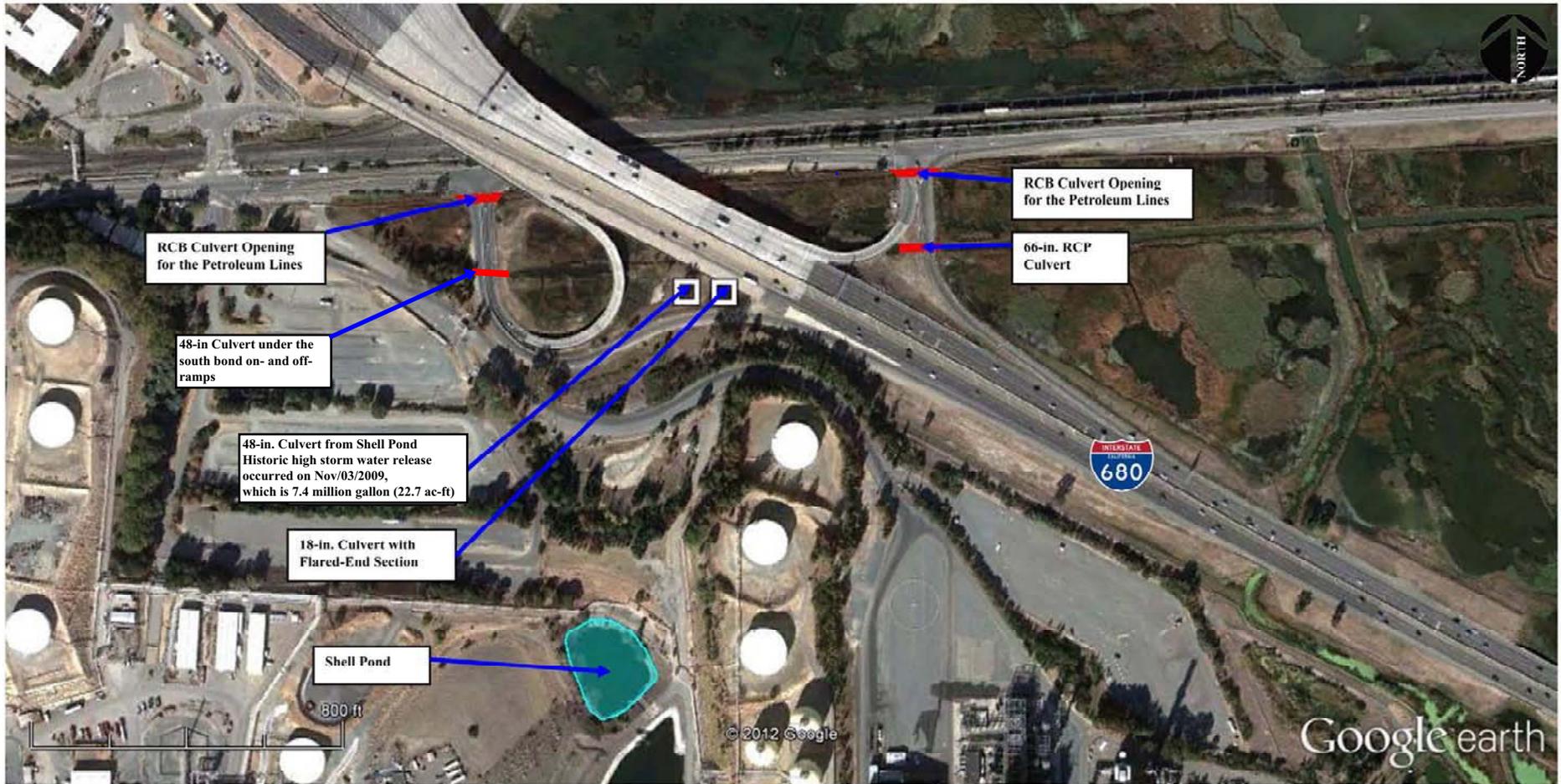


Figure 3. Project Location Inflow and Outflow Locations

Source: Google Earth



Photo 1. 18-in. Culvert with Flared End Section



Photo 2. Outlet Face of the 66-in. Culvert



Photo 3. Opening for the Petroleum Line, West Side



Photo 4. Opening for the Petroleum Line, East Side



Photo 5. Deck drains along edge of I-680 overhead

Rainfall Data

Rainfall Intensity can be obtained by the following link:

<http://www.wrcc.dri.edu/pcpnfreq/nca2y24.gif>

Refer to Chapters 800, Highway Drainage Design of Highway Design Manual for information on runoff coefficient and shed map.



NOAA Atlas 14, Volume 6, Version 2
Location name: Martinez, California, US*
Coordinates: 38.0246, -122.1120
Elevation: 2ft*



* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin,
 Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao,
 Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval(years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.106 (0.094-0.121)	0.132 (0.117-0.151)	0.168 (0.148-0.192)	0.198 (0.173-0.229)	0.242 (0.203-0.291)	0.277 (0.226-0.342)	0.313 (0.249-0.399)	0.353 (0.271-0.464)	0.409 (0.299-0.565)	0.454 (0.318-0.653)
10-min	0.152 (0.135-0.173)	0.189 (0.168-0.216)	0.241 (0.212-0.275)	0.284 (0.248-0.329)	0.346 (0.290-0.417)	0.396 (0.324-0.490)	0.449 (0.357-0.571)	0.506 (0.388-0.665)	0.586 (0.428-0.810)	0.650 (0.457-0.936)
15-min	0.184 (0.163-0.210)	0.229 (0.203-0.261)	0.291 (0.257-0.333)	0.344 (0.300-0.397)	0.419 (0.351-0.504)	0.479 (0.392-0.592)	0.543 (0.431-0.691)	0.612 (0.470-0.805)	0.709 (0.518-0.979)	0.787 (0.552-1.13)
30-min	0.252 (0.224-0.288)	0.314 (0.278-0.358)	0.399 (0.352-0.457)	0.471 (0.412-0.545)	0.574 (0.482-0.692)	0.657 (0.538-0.812)	0.745 (0.592-0.948)	0.839 (0.644-1.10)	0.972 (0.710-1.34)	1.08 (0.757-1.55)
60-min	0.355 (0.315-0.405)	0.442 (0.391-0.504)	0.562 (0.495-0.643)	0.663 (0.579-0.767)	0.808 (0.678-0.974)	0.925 (0.757-1.14)	1.05 (0.833-1.33)	1.18 (0.907-1.55)	1.37 (1.00-1.89)	1.52 (1.07-2.19)
2-hr	0.526 (0.467-0.600)	0.651 (0.577-0.743)	0.821 (0.725-0.940)	0.964 (0.842-1.12)	1.17 (0.977-1.40)	1.33 (1.08-1.64)	1.49 (1.19-1.90)	1.67 (1.28-2.20)	1.92 (1.40-2.65)	2.11 (1.48-3.04)
3-hr	0.661 (0.586-0.753)	0.819 (0.725-0.935)	1.03 (0.911-1.18)	1.21 (1.06-1.40)	1.46 (1.23-1.76)	1.66 (1.36-2.05)	1.86 (1.48-2.37)	2.08 (1.60-2.74)	2.38 (1.74-3.29)	2.62 (1.84-3.77)
6-hr	0.939 (0.833-1.07)	1.18 (1.04-1.34)	1.49 (1.32-1.71)	1.75 (1.53-2.03)	2.12 (1.78-2.55)	2.40 (1.97-2.97)	2.70 (2.14-3.43)	3.01 (2.31-3.95)	3.43 (2.51-4.74)	3.76 (2.64-5.42)
12-hr	1.22 (1.08-1.39)	1.57 (1.39-1.79)	2.03 (1.79-2.33)	2.42 (2.11-2.80)	2.95 (2.48-3.56)	3.37 (2.76-4.16)	3.80 (3.02-4.83)	4.25 (3.26-5.59)	4.87 (3.56-6.73)	5.36 (3.76-7.71)
24-hr	1.61 (1.45-1.81)	2.14 (1.93-2.41)	2.84 (2.56-3.22)	3.42 (3.05-3.90)	4.21 (3.66-4.95)	4.83 (4.12-5.78)	5.46 (4.56-6.68)	6.12 (4.98-7.67)	7.02 (5.51-9.13)	7.73 (5.88-10.4)
2-day	2.05 (1.85-2.31)	2.78 (2.51-3.15)	3.74 (3.37-4.24)	4.52 (4.04-5.15)	5.56 (4.83-6.53)	6.36 (5.42-7.61)	7.16 (5.98-8.75)	7.99 (6.50-10.0)	9.09 (7.14-11.8)	9.95 (7.57-13.3)

3-day	2.37 (2.14-2.68)	3.25 (2.93-3.67)	4.37 (3.94-4.96)	5.28 (4.72-6.02)	6.48 (5.63-7.61)	7.39 (6.30-8.84)	8.30 (6.92-10.1)	9.22 (7.51-11.6)	10.4 (8.20-13.6)	11.4 (8.66-15.3)
4-day	2.64 (2.39-2.98)	3.62 (3.27-4.09)	4.88 (4.39-5.53)	5.87 (5.25-6.70)	7.19 (6.25-8.45)	8.18 (6.98-9.79)	9.16 (7.65-11.2)	10.2 (8.27-12.7)	11.5 (8.99-14.9)	12.4 (9.47-16.7)
7-day	3.26 (2.95-3.69)	4.44 (4.01-5.02)	5.93 (5.34-6.72)	7.10 (6.35-8.10)	8.62 (7.49-10.1)	9.74 (8.31-11.7)	10.8 (9.05-13.3)	11.9 (9.72-15.0)	13.4 (10.5-17.4)	14.4 (11.0-19.3)
10-day	3.66 (3.31-4.13)	4.95 (4.47-5.60)	6.57 (5.92-7.44)	7.83 (7.00-8.93)	9.46 (8.21-11.1)	10.6 (9.08-12.7)	11.8 (9.85-14.4)	12.9 (10.5-16.2)	14.4 (11.3-18.7)	15.5 (11.8-20.8)
20-day	4.87 (4.40-5.50)	6.54 (5.90-7.39)	8.59 (7.74-9.73)	10.2 (9.09-11.6)	12.2 (10.6-14.3)	13.6 (11.6-16.3)	15.0 (12.5-18.3)	16.3 (13.3-20.5)	18.1 (14.2-23.5)	19.3 (14.7-25.9)
30-day	5.96 (5.39-6.73)	7.93 (7.16-8.97)	10.3 (9.31-11.7)	12.2 (10.9-13.9)	14.5 (12.6-17.0)	16.1 (13.8-19.3)	17.7 (14.8-21.7)	19.3 (15.7-24.1)	21.2 (16.6-27.5)	22.5 (17.2-30.2)
45-day	7.31 (6.61-8.25)	9.60 (8.67-10.8)	12.4 (11.1-14.0)	14.5 (12.9-16.5)	17.1 (14.9-20.1)	19.0 (16.2-22.7)	20.8 (17.3-25.4)	22.5 (18.3-28.1)	24.6 (19.3-32.0)	26.1 (19.9-35.0)
60-day	8.75 (7.91-9.88)	11.3 (10.2-12.8)	14.5 (13.0-16.4)	16.8 (15.1-19.2)	19.8 (17.2-23.3)	21.9 (18.7-26.2)	23.9 (19.9-29.2)	25.7 (21.0-32.3)	28.1 (22.0-36.5)	29.7 (22.6-39.8)

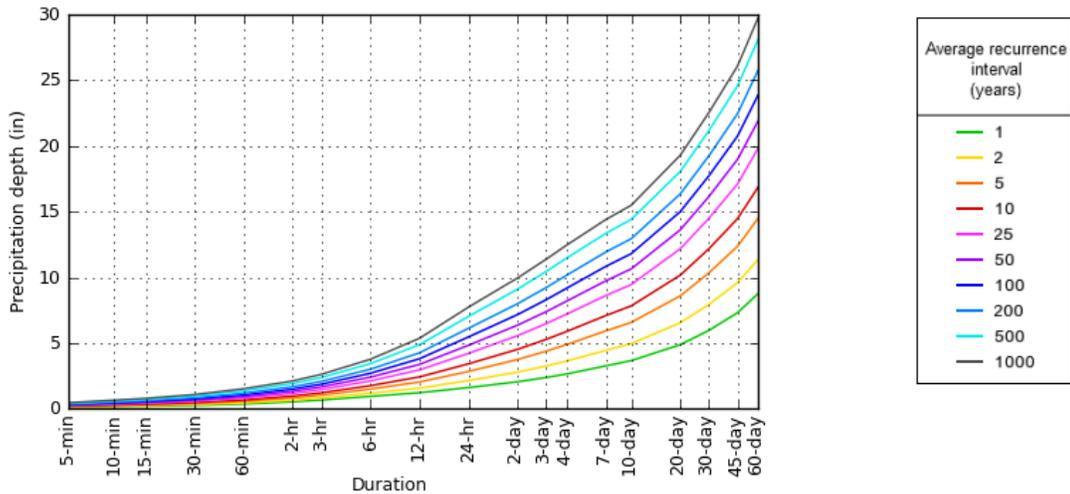
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

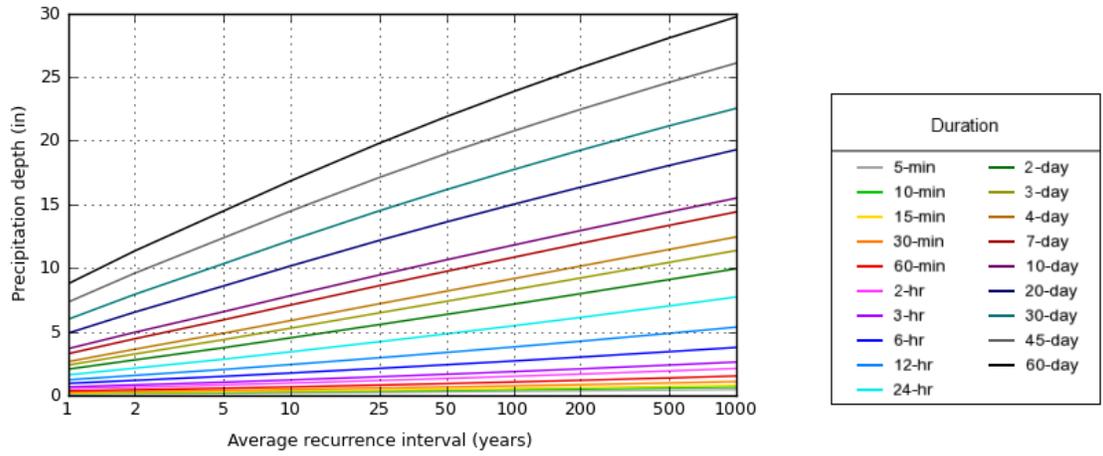
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Coordinates: 38.0246, -122.1120

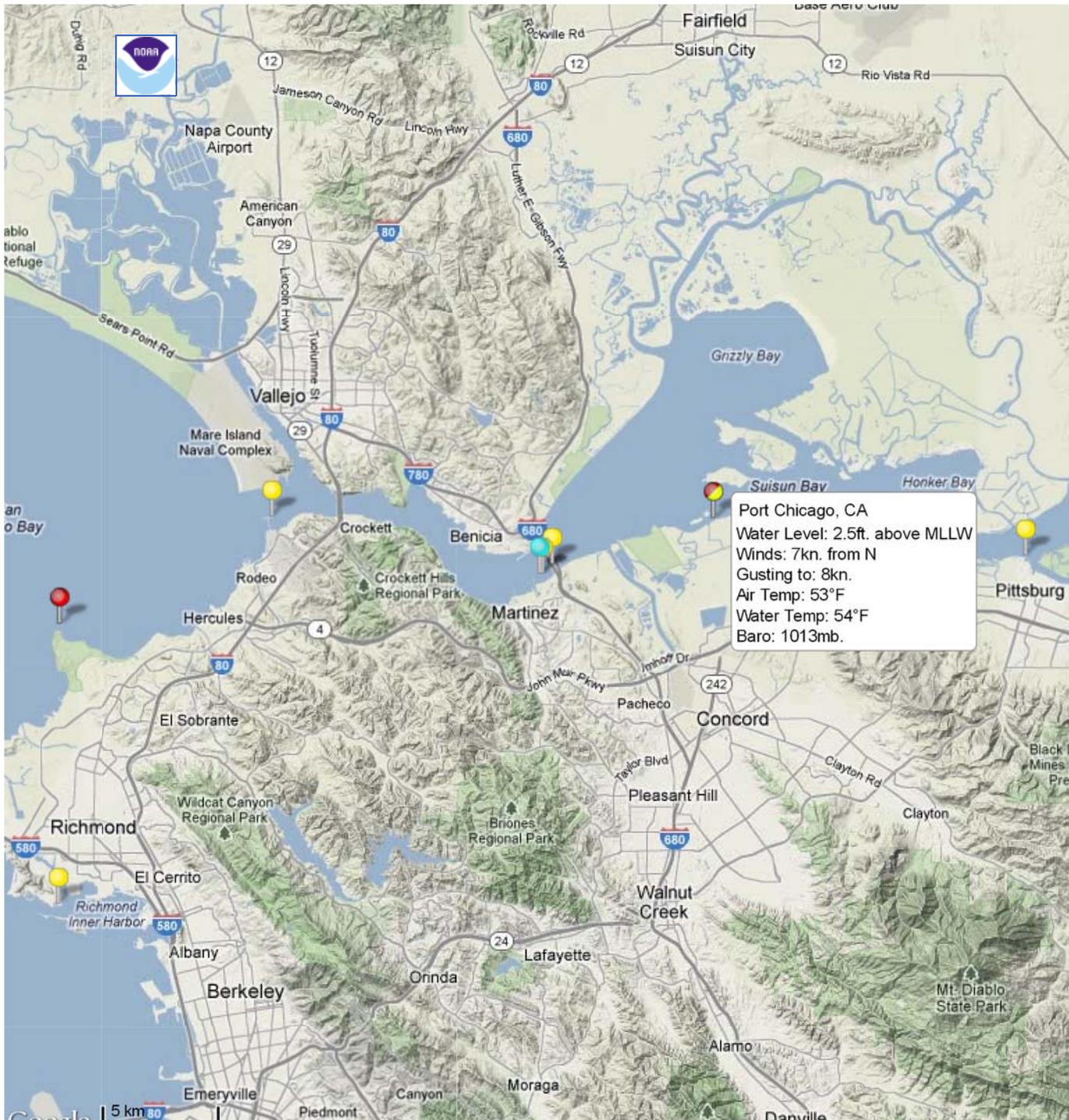




Large scale terrain



Historic Tidal Data



NOAA/NOS/CO-OPS - ODIN MAP

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Search for station (Active Stations)

Zoom to region: Show:

Require type: Plot Data Cloud Cover

- Water Levels Only
- Met Only
- Water Levels and Met
- Currents

WL	AT	WT	Wind	Baro
Point Pinole				9415056
Port Chicago				9415144
2.5ft.	53°F	54°F	7kn. from N	1013mb.
Martinez-amorco Pier				s06010
Point Potrero Richmond				9414847
55°F			3kn. from N	1013mb.
Martinez-amorco Pier				9415102
53°F			4kn. from N	1013mb.
Pittsburg, Suisun Bay				9415115
54°F			5kn. from N	1013mb.
Union Pacific Rail Road Bridge				9415118
			6kn. from N	
Davis Point, San Pablo Bay				9415141
53°F			6kn. from N	1013mb.

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 Station Information **ID: 9415144** [Page Help](#)

Historic Tide Data

Monthly Means

Tide / Water Level Data

Tide Predictions

Current Data **Monthly Means (W5) - 9415144 Port Chicago, CA**

- Meteorological Observations: Station -- Unique seven character identifier for the station
- Year -- Year of data
- Month -- Month of data
- Conductivity: Highest -- Highest Tide of the month
- PORTS: MHHW -- Mean Higher-High Water
- MHW -- Mean High Water Click [HERE](#) for printable version
- MSL -- Mean Sea Level with additional datums, tidal
- Operational Forecast System: MTL -- Mean of MHW and MLW ranges and Greenwich intervals
- MLW -- Mean Low Water (best viewed by printing landscape)
- Bench Mark Sheets: MLLW -- Mean Lower-Low Water
- Datums: NAVD -- North American Vertical Datum
- Lowest -- Lowest Tide of the month
- Inf -- Inferred data

Harmonic Constituents

Data is Feet on relative to MLLW

Sea Level Trends

Station	Year	Mon	Highest	MHHW	MHW	MSL	MTL	MLW	MLLW	Lowest	Inf
9415144	2008	1	6.62	5.07	4.39	2.66	2.66	0.94	0.11	-0.66	0
9415144	2008	2	5.50	4.90	4.33	2.55	2.57	0.80	0.02	-0.65	0
9415144	2008	3	5.08	4.35	3.89	2.10	2.14	0.38	-0.45	-0.96	0
9415144	2008	4	5.22	4.36	3.96	2.13	2.15	0.34	-0.52	-0.94	0
9415144	2008	5	5.68	4.77	4.21	2.41	2.43	0.65	-0.17	-0.63	0
9415144	2008	6	5.91	5.02	4.33	2.60	2.59	0.86	-0.05	-0.64	0
9415144	2008	7	6.02	5.34	4.63	2.93	2.92	1.20	0.36	-0.17	0
9415144	2008	8	5.78	5.21	4.63	2.93	2.92	1.20	0.57	0.04	0
9415144	2008	9	5.33	4.95	4.52	2.83	2.82	1.13	0.59	0.11	0
9415144	2008	10	5.30	4.55	4.12	2.42	2.44	0.75	0.10	-0.39	0
9415144	2008	11	5.42	4.67	4.13	2.42	2.44	0.75	-0.06	-0.68	0
9415144	2008	12	5.81	4.70	4.09	2.39	2.40	0.70	-0.16	-0.65	0

Time Zone: Local (LST/LDT) GMT LST

Begin Date: Jan 1 2008 **End Date:** Dec 31 2008
Interval: Monthly WL **Datum:** MLLW
Data Units: Feet Meters

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Historic Tide Data

Monthly Means

Tide / Water Level Data

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- MHW -- Mean High Water Click [HERE](#) for printable version
- MSL -- Mean Sea Level with additional datums, tidal
- Operational Forecast System: MTL -- Mean of MHW and MLW ranges and Greenwich intervals
- MLW -- Mean Low Water (best viewed by printing landscape)
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- Lowest -- Lowest Tide of the month
- Inf -- Inferred data

Harmonic Constituents

Data is Feet on relative to MLLW

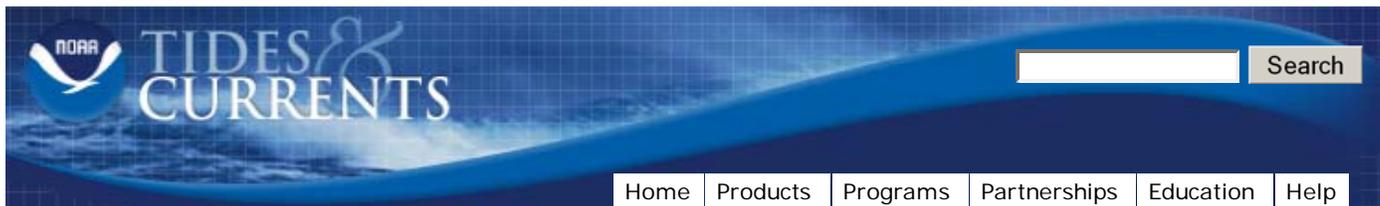
Sea Level Trends

Station	Year	Mon	Highest	MHHW	MHW	MSL	MTL	MLW	MLLW	Lowest	Inf
9415144	2009	1	5.30	4.50	3.88	2.15	2.14	0.40	-0.33	-1.11	0
9415144	2009	2	5.73	4.91	4.33	2.58	2.58	0.82	0.18	-0.26	0
9415144	2009	3	5.54	4.71	4.25	2.44	2.46	0.67	-0.07	-0.66	0
9415144	2009	4	5.43	4.48	4.02	2.20	2.22	0.43	-0.45	-0.93	0
9415144	2009	5	5.90	4.87	4.35	2.54	2.56	0.77	-0.14	-0.71	0
9415144	2009	6	6.13	5.25	4.60	2.83	2.83	1.05	0.20	-0.29	0
9415144	2009	7	5.99	5.17	4.48	2.79	2.78	1.08	0.28	-0.17	0
9415144	2009	8	5.81	5.11	4.50	2.80	2.79	1.08	0.42	0.05	0
9415144	2009	9	5.46	4.90	4.45	2.74	2.74	1.02	0.45	0.05	0
9415144	2009	10	5.68	4.80	4.43	2.71	2.72	1.00	0.40	-0.06	0
9415144	2009	11	5.67	4.71	4.17	2.43	2.44	0.71	-0.06	-0.52	0
9415144	2009	12	5.87	5.12	4.45	2.73	2.72	0.98	0.14	-0.35	0

Time Zone: Local (LST/LDT) GMT LST

Begin Date: Jan 1 2009 **End Date:** Dec 31 2009 **Interval:** Monthly WL **Datum:** MLLW **Data Units:** Feet Meters

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Station Home Page [Chicago, CA](#)[Port Chicago, CA: Data Inventory](#)Station Information [ID: 9415144](#)[Page Help](#)**Historic Tide Data**Tide / Water Level
Data**Monthly Means**

Tide Predictions

Current Data

Monthly Means (W5) - 9415144 Port Chicago, CA

Meteorological Observations	Station	--	Unique seven character identifier for the station
	Year	--	Year of data
	Mo	--	Month of data
Conductivity	Highest	--	Highest Tide of the month
	MHHW	--	Mean Higher-High Water
PORTS	MHW	--	Mean High Water
	MSL	--	Mean Sea Level
Operational Forecast System	MTL	--	Mean of MHW and MLW
	MLW	--	Mean Low Water
Bench Mark Sheets	MLLW	--	Mean Lower-Low Water
	NAVD	--	North American Vertical Datum
Datums	Lowest	--	Lowest Tide of the month
	Inf	--	Inferred data

Click [HERE](#) for printable version with additional datums, tidal ranges and Greenwich intervals (best viewed by printing landscape)

Harmonic Constituents

Data is Feet on relative to MLLW

Sea Level Trends

	Station	Year	Mon	Highest	MHHW	MHW	MSL	MTL	MLW	MLLW	Lowest	Inf
Measurement Specifications	415144	2010	1	6.28	5.40	4.78	3.01	3.01	1.24	0.47	-0.50	0
	415144	2010	2	6.24	5.33	4.79	3.01	3.01	1.23	0.48	-0.05	0
	415144	2010	3	5.78	4.76	4.38	2.51	2.52	0.66	0.01	-0.67	0
	9415144	2010	4	5.80	4.97	4.57	2.69	2.72	0.86	0.08	-0.65	0
	9415144	2010	5	5.64	4.78	4.24	2.38	2.41	0.57	-0.38	-0.82	0
	9415144	2010	6	5.73	5.02	4.38	2.58	2.59	0.80	-0.12	-0.68	0
	9415144	2010	7	5.91	5.11	4.50	2.76	2.74	0.99	0.23	-0.19	0
	9415144	2010	8	5.77	5.00	4.42	2.70	2.68	0.95	0.39	-0.12	0
	9415144	2010	9	5.28	4.78	4.34	2.59	2.59	0.83	0.24	-0.06	0
	9415144	2010	10	5.47	4.64	4.27	2.49	2.50	0.73	0.06	-0.42	0
	9415144	2010	11	5.70	4.64	4.16	2.37	2.37	0.58	-0.13	-0.80	0
	9415144	2010	12	6.50	5.20	4.57	2.80	2.80	1.02	0.16	-0.56	0

Begin Date:

Jan 1 2010

End Date:

Dec 31 2010

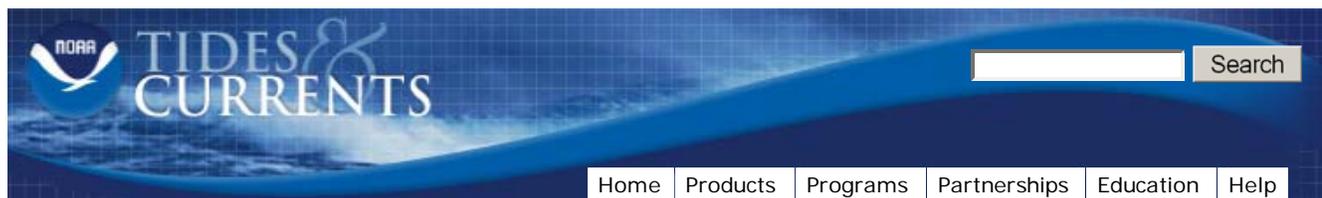
Interval:

Monthly WL

Datum:

MLLW

Data Units: Feet Meters**Time Zone:** Local (LST/LDT) GMT LST[View Plot](#)[View Data](#)[Reset](#)[home](#) | [products](#) | [programs](#) | [partnerships](#) | [education](#) | [help](#)

Station Home Page [Port Chicago, CA](#)Port Chicago, CA: [Data Inventory](#)Station Information [Station ID: 9415144](#)[Page Help](#)**Historic Tide Data**Tide / Water Level
Data**Monthly Means**

Tide Predictions

Current Data

Monthly Means (W5) - 9415144 Port Chicago, CA

Meteorological Observations	Station	--	Unique seven character identifier for the station	
	Year	--	Year of data	
	Mo	--	Month of data	
Conductivity	Highest	--	Highest Tide of the month	
	MHHW	--	Mean Higher-High Water	
PORTS	MHW	--	Mean High Water	Click HERE for printable version
	MSL	--	Mean Sea Level	with additional datums, tidal
Operational Forecast System	MTL	--	Mean of MHW and MLW	ranges and Greenwich intervals
	MLW	--	Mean Low Water	(best viewed by printing landscape)
Bench Mark Sheets	MLLW	--	Mean Lower-Low Water	
	NAVD	--	North American Vertical Datum	
Datums	Lowest	--	Lowest Tide of the month	
	Inf	--	Inferred data	

Harmonic Constituents

Data is Feet on relative to MLLW

Sea Level Trends

Measurement Specifications	Station	Year	Mon	Highest	MHHW	MHW	MSL	MTL	MLW	MLLW	Lowest	Inf
	9415144	2011	1	6.00	4.98	4.35	2.56	2.57	0.80	-0.11	-0.61	0
	9415144	2011	2	5.83	4.90	4.39	2.57	2.57	0.76	0.08	-0.48	0
	9415144	2011	3	6.70	5.06	4.71	2.93	2.96	1.22	0.59	-0.47	0
	9415144	2011	4	6.09	4.93	4.53	2.78	2.82	1.11	0.35	-0.18	0
	9415144	2011	5	6.56	5.11	4.58	2.74	2.76	0.95	0.01	-0.33	0
	9415144	2011	6	6.20	5.41	4.78	2.96	2.98	1.18	0.19	-0.50	0
	9415144	2011	7	6.07	5.48	4.85	3.02	3.02	1.19	0.31	-0.17	0
	9415144	2011	8	5.65	5.13	4.64	2.81	2.80	0.95	0.36	0.06	0
	9415144	2011	9	5.78	5.03	4.62	2.80	2.79	0.96	0.42	-0.02	0
	9415144	2011	10	5.57	4.84	4.48	2.64	2.64	0.81	0.12	-0.42	0
	9415144	2011	11	5.92	4.72	4.26	2.43	2.44	0.61	-0.14	-1.00	0
	9415144	2011	12	5.34	4.62	4.06	2.25	2.25	0.44	-0.31	-0.92	0

Begin Date: Jan 1 2011
End Date: Dec 31 2011
Interval: Monthly WL
 Datum: MLLW
 Data Units:
 Feet
 Meters
 Time Zone:
 Local (LST/LDT)
 GMT
 LST

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 Station Information **ID: 9415144** [Page Help](#)

Historic Tide Data

Monthly Means

Tide / Water Level Data

Tide Predictions

Current Data **Monthly Means (W5) - 9415144 Port Chicago, CA**

- Meteorological Observations: Station -- Unique seven character identifier for the station
- Year -- Year of data
- Month -- Month of data
- Conductivity: Highest -- Highest Tide of the month
- PORTS: MHHW -- Mean Higher-High Water
- MHW -- Mean High Water Click [HERE](#) for printable version
- MSL -- Mean Sea Level with additional datums, tidal
- Operational Forecast System: MTL -- Mean of MHW and MLW ranges and Greenwich intervals
- MLW -- Mean Low Water (best viewed by printing landscape)
- Bench Mark Sheets: MLLW -- Mean Lower-Low Water
- Datums: NAVD -- North American Vertical Datum
- Lowest -- Lowest Tide of the month
- Inf -- Inferred data

Harmonic Constituents

Data is Feet on relative to MLLW

Sea Level Trends

Station	Year	Mon	Highest	MHHW	MHW	MSL	MTL	MLW	MLLW	Lowest	Inf
9415144	2012	1	5.86	4.72	4.10	2.34	2.31	0.53	-0.14	-0.56	0
9415144	2012	2	5.50	4.68	4.14	2.30	2.29	0.43	-0.18	-0.70	0
9415144	2012	3	5.30	4.63	4.23	2.42	2.42	0.61	-0.06	-0.91	0
9415144	2012	4	5.78	4.77	4.42	2.51	2.53	0.64	-0.15	-0.65	0
9415144	2012	5	5.74	4.90	4.39	2.49	2.50	0.60	-0.21	-0.70	0
9415144	2012	6	5.81	5.16	4.52	2.67	2.65	0.77	-0.01	-0.92	0
9415144	2012	7	5.89	5.27	4.63	2.81	2.77	0.92	0.20	-0.36	0
9415144	2012	8	5.71	5.16	4.65	2.84	2.81	0.98	0.42	-0.02	0
9415144	2012	9	5.14	4.86	4.50	2.73	2.72	0.93	0.52	0.13	0
9415144	2012	10	5.44	4.75	4.40	2.63	2.63	0.85	0.29	-0.12	0
9415144	2012	11	5.93	4.80	4.34	2.56	2.56	0.78	0.05	-0.67	0
9415144	2012	12	6.29	5.30	4.75	2.96	2.96	1.18	0.34	-0.17	0

Begin Date:

End Date:

Interval:

Datum:

Data Units:

 Feet
 Meters

Time Zone:

 Local (LST/LDT)
 GMT
 LST

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Watershed Map

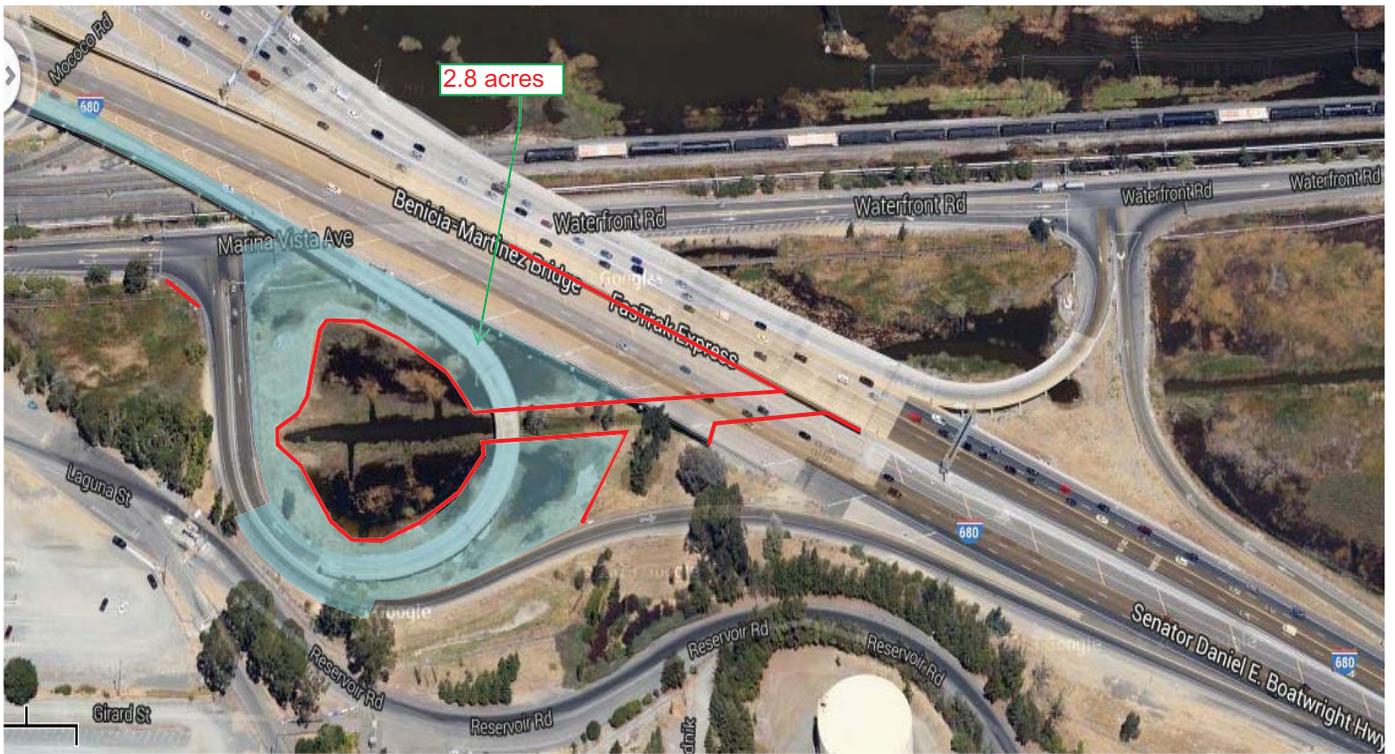


Figure 4 - Watershed to the cofferdam enclosure during a storm event

Storm Water Run-on Bypass and Dewatering Strategy

The dewatering strategy includes forming a water tight enclosure around work areas by installing water-filled cofferdams and bypassing all major run-ons entering the work areas. At some locations where spaces are limited, gravel-filled bag or plywood cofferdams may be used as alternatives if authorized by the Engineer.

All water accumulating inside the cofferdam during construction must be sent to the dewatering system for treatment and disposal as specified in section 13-12.03 of the special provision, except the water from initial dewatering and water from deflating the water-bladders.

Installation of cofferdams

During installation of water-filled cofferdams, a floating device must be attached to the suction end of the pump intake to suction only water from the top. This will prevent/minimize silt from being suctioned into the dam. Use wetland water only to inflate the water-filled cofferdams. Use other water sources is prohibited.

Prior to installing gravel-filled bag or plywood cofferdams, a small water-filled cofferdam must be installed to temporarily isolate the water so as to provide dry working environment for constructing gravel-filled bag or plywood cofferdams. The small temporary water-filled cofferdam can be removed once gravel-filled bag or plywood cofferdams are installed.

Initial dewatering

After constructing cofferdams, before any other construction activity starts, perform initial dewatering to remove the water initially ponding within the cofferdam enclosure. A suction pit as shown in detail 4 of the plan sheet DD-1 must be installed at suction end of pump intake to minimize suction of silt. The water must be delivered to a discharge pit as shown in detail 5 of the plan sheet DD-1 and released to a vegetated area slowly and gently. Water quality must be tested according to section 13-11 of the special provision. Background and receiving water samples must be collected concurrently within 50 ft up and down current of the discharge point at least four times daily. If water quality objectives in section 13-11 are not met, stop discharging and adjust Best Management Practices (BMPs) to bring the water quality objectives under limitation, or dispose properly to a publicly owned treatment work (POTW) facility at no additional cost to the Department.

Dewatering during construction

Once construction begins other than installation of cofferdams, all water accumulating inside the cofferdam must be delivered to the dewatering system for treatment and disposal as specified in section 13-12.03 of the special provision.

Deflating water-filled cofferdams after construction

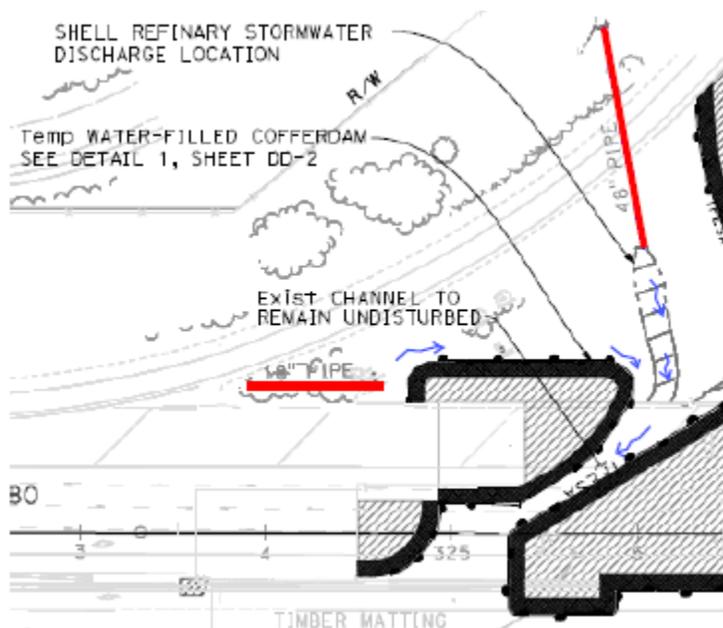
Upon completion of the project, water-filled cofferdams need to be deflated and water from bladders will be released back to the receiving water. Direct water coming from water bladders to a discharge pit as shown in detail 5 of the plan sheet DD-1, and release the water slowly and gently to a vegetated area. Water quality must be tested according to section 13-11 of the special provision. Background and receiving water samples must be collected concurrently within 50 ft up and down current of the discharge point at least four times daily. If water quality objectives in section 13-11 are not met, stop discharging and adjust Best Management Practices (BMPs) to bring the water quality objectives under limitation, or dispose properly to a publicly owned treatment work (POTW) facility at no additional cost to the Department.

Measures to Bypass Major Run-ons

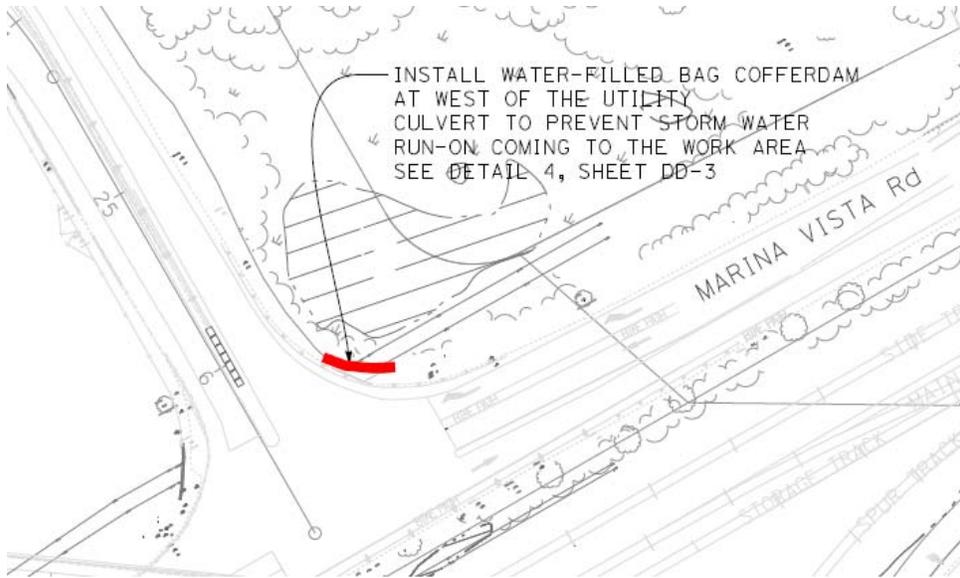
The information is for reference only. It is Contractor's responsibility to perform their own investigations to determine and bypass major run-on sources based on field conditions.

Measures to bypass major run-ons include but not limited to:

1. Construct water-filled cofferdam to form a water tight enclosure around work areas to prevent storm water run-on and tidal flows from entering to the work areas. At some locations where spaces are limited, gravel-filled bag or plywood cofferdams may be used as alternatives if authorized by the Engineer.
2. Monitor weather forecast daily. Stop all work and remove all pollutant sources if the 72-hour forecasts predict a 50 percent or greater chance of rain in the project area. If removal is infeasible, all pollutant sources must be stabilized.
3. The Shell Refinery discharge and the run-on flow from the existing 18" pipe will be excluded from the cofferdam enclosure so as to bypass the discharges around the work area and outfall to the channel directly.



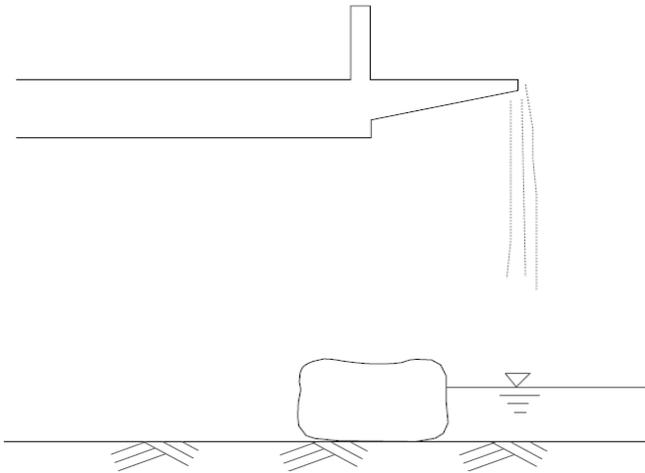
4. Install water-filled cofferdam to the west side of the utility culvert under 680 SB on- and off-ramps to prevent storm water coming to the work area.



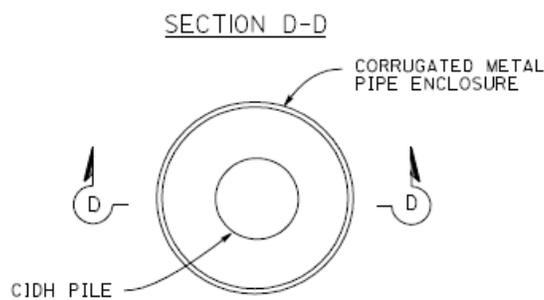
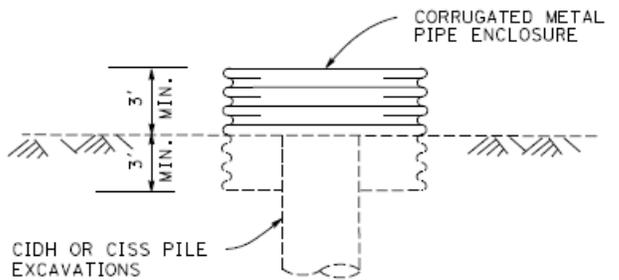
5. Connect all deck drains along the edge of Mococo Overhead with flexible pipes and discharge to outside of the cofferdam enclosure.



6. Locate cofferdam under the Mococo Overhead to avoid rain water entering to the work area.



7. Coordinate with Shell Refinery to regulate its storm water discharge and release discharge at low tide.
8. Coordinate with tidal gate operator downstream to open the gates during the low tide, and close the gates during high tide.
9. Install CMP pipe enclosure around excavations of CIDH piles and CISS piles at abutment 12 to prevent storm water from coming into contact with excavation groundwater to minimize amount of contaminants that need to be collected and treated.



CORRUGATED METAL PIPE ENCLOSURE

Estimated Initial Dewatering Volume

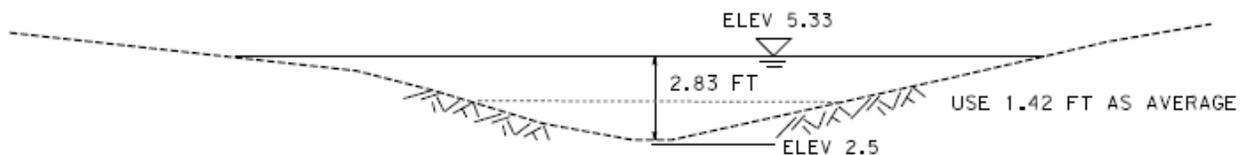
Note: The information is for reference only. The exact amount of the initial water must be determined by Contractor on the field based on the time of construction



Figure 5, Approximate surface area of the water initially ponding within the cofferdam enclosure

Source: Google Map

Mean Higher High Water (MHHW) in February for the Port Chicago Tidal Gaging Station in the past 5 years were: 5.33 (NAVD)



Approximate volume of initial water within the cofferdam enclosure is estimated as:

$$2.7 \text{ ac} \times 1.42 \text{ ft} = 3.8 \text{ ac-ft} = 167,009 \text{ cf} = 1,249,314 \text{ gallon}$$

After constructing cofferdams, before any other construction activity starts, perform initial dewatering to remove the water initially ponding within the cofferdam enclosure. A suction pit as shown in detail 4 of the plan sheet DD-1 must be installed at suction end of pump intake to minimize suction of silt. The water must be delivered to a discharge pit as shown in detail 5 of the plan sheet DD-1 and released to a vegetated area slowly and gently. Water quality must be tested according to section 13-11 of the special provision. Background and receiving water samples must be collected concurrently within 50 ft up and down current of the discharge point at least four times daily. If water quality objectives in section 13-11 are not met, stop discharging and adjust Best Management Practices (BMPs) to bring the water quality objectives under limitation, or dispose properly to a publicly owned treatment work (POTW) facility at no additional cost to the Department.

Estimated Dewatering Volume during a Storm Event

RAINFALL DEPTH OF 2-YR 24-HR STORM EVENT (2.2 INCHES)

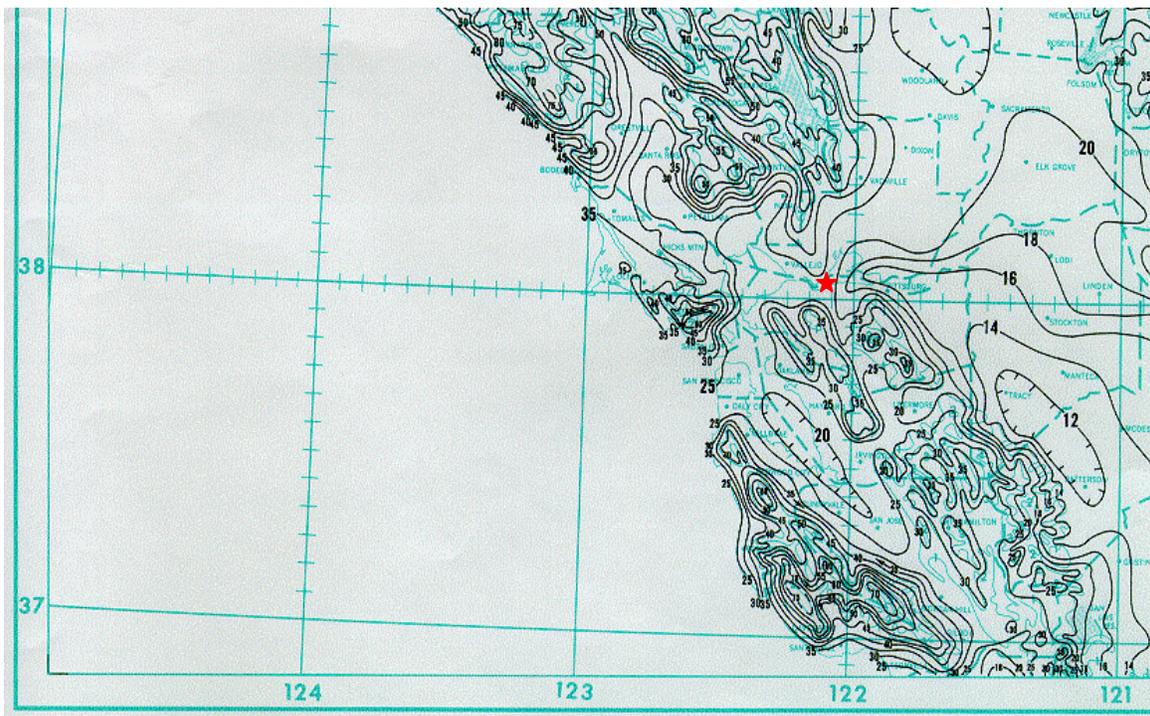
Figure 26

**ISOPLUVIALS OF 2-YR 24-HR PRECIPITATION
FOR NORTHERN HALF OF CALIFORNIA IN TENTHS
OF AN INCH**

NOAA ATLAS 2, Volume XI

Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Department of Agriculture,
Soil Conservation Service, Engineering Division



Catchment for a 2 Yr 24 Hr Storm Event

Design Criteria

The project only has one season working in the wetland area (2/1/15 to 10/15/15).

A storm frequency of 2 Yr 24 hr (which doubles the project length) is being used to estimate the volume of run-off that need to be handled.

Watershed Area

2.8 acres = 2.8 ac x 43,560 sf/ac = 121,968 sf

Precipitation

Rainfall data can be found at link below

<http://www.wrcc.dri.edu/pcpnfreq/nca2y24.gif>

2-year, 24 hour rainfall depth for the project area is 2.2 in

Volume of Run-off

2-year, 24 hour rainfall depth for the project area is 2.2 in

Area = 2.8 ac = 121,968 sf

Watershed run-off coefficient = 1 is used

Volume of Run-off = 121,968 sf x 2.2 in x 1 ft/12in x 1 = 22,360 cf = 167,264 gallon

Treatment Flow Rate

Treat within a 72-hour period

$Q = \text{Volume} / 72 \text{ hours} = 167,264 \text{ gallon} / 72 \text{ hrs} = 2,323 \text{ gallon/hr} = 39 \text{ gpm}$

Roundup to 100 gpm

Treatment System must be able to handle minimum flow of 100 gpm

For safety, use dual treatment system of two 100 gpm capacity. Total capacity will be 2x 100 gpm = 200 gpm

Volume of Storage needed

Holding time for treatment system usually between 2-6 hours, assume use 6 hour holding time, use dual treatment with total capacity of 200 gpm

$$200 \text{ gpm} \times 6 \text{ hrs} \times 60 \text{ min/hr} = 72,000 \text{ gallon}$$

Number of the Baker Tanks

Each tank holds up to 20,000 gallon

$$\text{Number of the tanks} = 72,000 \text{ gallon} / 20,000 \text{ gallon} = 3.6, \text{ round up to } 4$$

Minimum 4 tanks are required

Once construction begins other than installation of cofferdams, all water accumulating inside the cofferdam must be delivered to the dewatering system for treatment and disposal as specified in section 13-12.03 of the special provision.

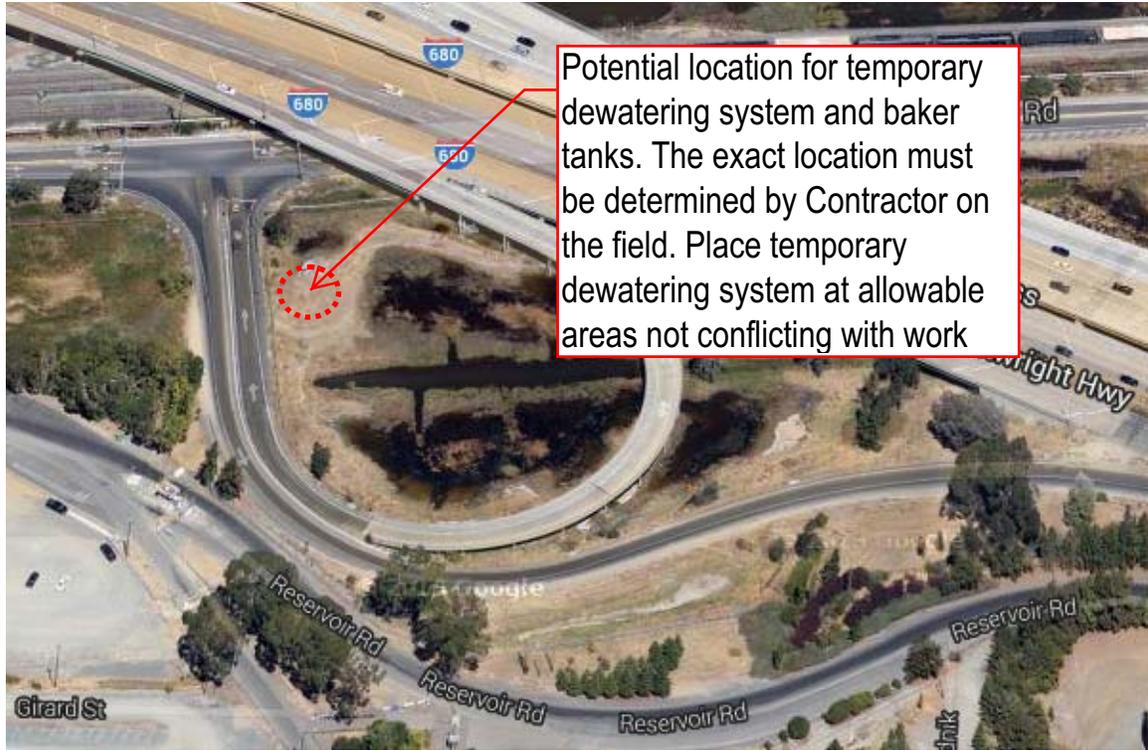


Figure 6 Potential Location for placing Temporary Dewatering System and Baker Tanks

Estimated Dewatering Volume in Structure Excavations

For estimation of groundwater generated from structure excavations, please see Attachment A "Estimated groundwater seepage rates in the project area" within the section of "Non-Storm Water Information" of this handout.

All groundwater or comingled water accumulating inside the structure excavations must be delivered to the dewatering system for treatment and disposal as specified in section 13-12.03 of the special provision.

Estimated Water Volume for Water-filled Cofferdam

Use wetland water only for inflating water-filled cofferdam. Use water from other sources is prohibited.

The capacity of a 4' water-fill cofferdam is approximately 240 gallon/ft. The project will use approximately 500 ft of 4' water-filled cofferdam. This will require approximately 120,000 gallon of wetland water.

The capacity of a 6' water-fill cofferdam is approximately 400 gallon/ft. The project will use approximately 1,000 ft of 6' water-filled cofferdam. This will require approximately 400,000 gallon of wetland water.

Total amount of water for inflating the water-filled cofferdam is about 520,000 gallon.

During installation of water-filled cofferdams, a floating device must be attached to the suction end of the pump intake to suction only water from the top. This will prevent/minimize silt from being suctioned into the dam. It is suggested to place pump suction in a deeper water area such as the deeper defined channel directly to the east of the project site to minimize the intake of sediment.

Upon completion of the project, water-filled cofferdams need to be deflated and water from bladders will be released back to the receiving water. Direct the water coming from bladders to a discharge pit as shown in detail 5 of the plan sheet DD-1, and release the water slowly and gently to a vegetated area. Water quality must be tested according to section 13-11 of the special provision. Background and receiving water samples must be collected concurrently within 50 ft up and down current of the discharge point at least four times daily. If water quality objectives in section 13-11 are not met, stop discharging and adjust Best Management Practices (BMPs) to bring the water quality objectives under limitation, or dispose properly to a publicly owned treatment work (POTW) facility at no additional cost to the Department.

Sampling Locations

- Suggested locations for water quality sampling and control sampling (backgrounds). Please notice that this area is subject to tidal influence. The control sample and water quality sample locations can be exchanged based on the direction of the current. The shown sampling locations are conceptual. The actual sampling locations must be determined by Contractor as approved by the Engineer based on field conditions and phase of work.



Figure 7 Conceptual Sampling Locations

For discharging the water from initial dewatering and water from water-filled cofferdam bladders, background and receiving water samples must be collected concurrently within 50 ft up and down current of the discharge point at least four times daily during the time of discharge.

Permits

Note: Due to page limits, only water quality certification is included in this section. For all other relevant permits, please see section 2-1.06B of the special provision

San Francisco Bay Regional Water Quality Control Board

May 3, 2013
CIWQS Place No. 754433

Sent via electronic mail--no hard copy to follow

California Department of Transportation
Attn: Yadollah Fathollahi
Hamid_fathollahi@dot.ca.gov
111 Grand Ave.
Oakland, CA 94612-3717

Subject: Water Quality Certification for the Mococo Overhead Seismic Rehabilitation Project, City of Martinez, Contra Costa County

Department Project No.: EA 04-3A8701

Dear Mr. Fathollahi:

We have reviewed and hereby issue water quality certification (Certification) to the California Department of Transportation (Department) for the Mococo Overhead Seismic Rehabilitation Project (Project). The Department is seeking a Nationwide Permit 14 for Linear Transportation Projects from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act (33 U.S.C. § 1344). As such, the Department has applied to the San Francisco Bay Regional Water Quality Control Board (Water Board) for a Clean Water Act Section 401 water quality certification that the Project will not violate State water quality standards.

Project: The Department proposes seismic rehabilitation for the Mococo Bridge Overhead along the I-680 main line and removal and replacement of the I-680 off-ramp structure at Marina Vista Boulevard.

The proposed project elements include:

- Seismic rehabilitation of the I-680 main line overhead structure.
- Demolition of the I-680 southbound off-ramp loop structure to Marina Vista Boulevard and removal of structure piles.
- Construction of a new off-ramp loop structure which will include an abutment supported by 182 linear feet of sheet pile retaining walls, a cast-in-place concrete

slab supported by 20 two foot diameter cast-in-steel-shell piles arranged in one abutment and four bents, and an elevated cast-in-place box girder supported by 12 five foot diameter cast-in-drilled-hole piles arranged in 6 bents.

- Construction of a single vehicular access lane in the I-680 main line median.
- Construction of a 100-foot long temporary access ramp for heavy equipment from the I-680 southbound on-ramp from Marina Vista Boulevard.
- Dewatering of stormwater and groundwater from the project site.

Impacts: Project implementation would permanently impact approximately 0.008 acres of brackish marsh and salt marsh and 0.001 acres of open waters of the State and the United States. Permanent impacts would occur due to pile, abutment, concrete slab, and box girder construction for the I-680 southbound off-ramp structure.

Project implementation would temporarily impact approximately 3.823 acres of brackish marsh, salt marsh and open waters.

Project implementation will affect salt marsh harvest mouse and California clapper rail.

Roadway Pollutant Impacts: Project implementation would result in approximately 0.12 acres of new and 0.46 acres of reworked impervious area. Stormwater runoff from impervious areas may contain hydrocarbons, metals, volatile organic compounds, trash, and sediment at levels that may significantly impact waters of the State if left untreated.

Hydromodification Impacts: Added impervious areas may result in alterations to existing hydrologic regimes, resulting in erosion and/or changes of sediment transport in receiving waters (hydromodification). Because stormwater runoff from the project area discharges to tidally influenced sloughs, hydromodification mitigation is not required for this Project.

Avoidance and Minimization: The Department has avoided and minimized impacts to brackish marsh, salt marsh and open waters by: isolating the work area with a cofferdam, which allows tidal flow around the work area; utilizing timber wetland protection mats to protect the original contour of all wetland areas that cannot be avoided by construction; using sediment and erosion control best management practices; performing construction in brackish marsh, salt marsh and open waters between February 1, 2014 and October 15, 2014, which coincides with the dry season and the annual closure of the tidal flood gate by the Mountain View Sanitary District during the months of February and March.

Mitigation: To mitigate for permanent impacts to brackish marsh, salt marsh and open waters the Department shall create 0.06 acres of northern coastal salt marsh within the Project limits (see Condition no. 2).

To mitigate for temporary impacts to brackish marsh, salt marsh and open waters, the Department shall restore temporarily impacted areas to previous or enhanced condition (see Condition no. 2).

To mitigate for impacts to the salt marsh harvest mouse and California clapper rail, the Department shall comply with the conditions in the United States Fish and Wildlife Service Biological Opinion and the Streambed Alteration Agreement issued by the California Department of Fish and Wildlife.

Roadway Pollutant Mitigation: As mitigation for increased pollutant loads associated with 0.58 acres of added and reworked impervious area for this Project, the Department shall construct a biofiltration strip as shown in the Attachment between station NEL2 22+70.36 and 24+32.95 to treat 0.05 acres of impervious area. The remaining 0.53 acres of required impervious runoff treatment shall be mitigated on a future project (see Condition no. 1).

CEQA Compliance: The Department evaluated the Project pursuant to the requirements of the California Environmental Quality Act (CEQA) in a Mitigated Negative Declaration. The Department filed a Notice of Determination on April 4, 2011 (SCH No. 201006029).

California Wetlands Portal: It has been determined through regional, state, and national studies that tracking of mitigation/restoration projects must be improved to better assess the performance of these projects. In addition, to effectively carry out the State's No Net Loss Policy for wetlands, the State needs to closely track wetland losses, gains, and mitigation/restoration project success. Therefore, we require the Department use the California Wetlands Standard Form to provide Project information related to impacts and mitigation/restoration measures (see Condition nos. 7 and 8 of this Certification). An electronic copy of the form and instructions may be downloaded at:

<http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml>

Project information concerning impacts and mitigation/restoration will be made available at the web link: <http://www.californiawetlands.net>

Certification: I hereby issue an order certifying that any discharge from the referenced Project will comply with the applicable provisions of sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act, and with other applicable requirements of State law. This discharge is also regulated under State Water Resources Control Board Order No. 2003 - 0017 – DWQ, "General Waste Discharge Requirements

for Dredge and Fill Discharges That Have Received State Water Quality Certification” which requires compliance with all conditions of this Certification. The following conditions are associated with this Certification:

1. The Department shall not commence any element of Project construction until a proposal to treat stormwater from 0.53 acres of impervious surface has been approved by the Executive Officer. The approved stormwater treatment shall be constructed and in operation in 2014. If there is any delay in constructing and operating the stormwater treatment for the 0.53 acres of impervious surface, the Department will be required to propose 20% additional treatment per year of delay.
2. As mitigation for the permanent and temporary impacts to brackish marsh, salt marsh and open waters of the State and the United States, the Department shall:
 - a. Create no less than 0.06 acres of northern coastal salt marsh within the project area;
 - b. Restore temporarily impacted brackish marsh, salt marsh and open waters to previous or enhanced condition;
 - c. Conduct marsh planting as shown in sheet EC-1 of the Attachment. The Department shall prioritize use of seeds developed from local seed sources to promote genetic integrity;
 - d. Control invasive species in the restored and created areas;
 - e. Prepare a plan for controlled herbicide use that includes use criteria (e.g., target invasive plants, weather condition criteria, herbicide types, and setback). All herbicide use shall be inventoried and reported in each mitigation site annual report. The type of herbicide, target species, frequency and duration of use and setback shall be reported;
 - f. Conduct monitoring for a period of no less than five years for restored and created areas;
 - g. Submit annual reports to the Water Board by January 1 each year. All monitoring reports shall include photo-documentation utilizing consistent photo vantage points. If the monitoring report includes management recommendations, then the report must express whether the Department shall implement those recommendations.
3. Annual reports shall be submitted to the Water Board by January 1 during each year of the initial five year monitoring period, summarizing each year’s monitoring results, including the need for any remedial actions. The annual reports shall compare data to previous years and detail progress towards meeting final success criteria. At the end of year 5, a comprehensive final report shall be prepared that includes summaries of the monitoring data, representative photos, and maps. The final report shall

document if the site meets final success criteria of 80% vegetative cover within the restored and created areas, or sufficient vegetative cover based on a reference location at the site agreed to by Water Board staff. If the criteria are not met, the report shall identify measures to be undertaken, including extension of the monitoring period until the criteria are met. Success of the mitigation program shall be determined by Water Board staff;

4. As mitigation for increased pollutant loads associated with impervious surface added and reworked with the Project, the Department shall provide treatment of stormwater runoff from no less than 0.05 acre of impervious area using a biofiltration strip. The biofiltration strip shall be installed by 2014 consistent with the plans in the Attachment of this Certification. Any revisions to the biofiltration strip design details shall be subject to the acceptance of Water Board staff.
5. All temporarily disturbed areas shall be re-vegetated using only native plant species. The Department shall not cause, through operation of heavy machinery, or any other construction activity, compaction of marshes or open waters in areas of temporary impact. Any compaction of marshes or open waters in areas of temporary impact shall require mitigation;
6. The Resident Engineer (or appropriately authorized agent) shall hold onsite water quality permit compliance meetings (similar to tailgate safety meetings) to discuss permit compliance, including instructions on violation avoidance and violation reporting procedures. The meetings shall be held at least every other week, before forecasted storm events, and when a new contractor or subcontractor arrives to begin work at the site. The contractors, subcontractors and their employees, as well as any inspectors or monitors assigned to the Project, shall be present at the meetings. The Department shall maintain dated sign-in sheets for attendees at these meetings, and shall make them available to the Water Board on request;
7. The Department is required to use the California Wetlands Standard Form to provide project information describing impacts and mitigation/restoration measures within 14 days from the date of this Certification. An electronic copy of the form can be downloaded at: <http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml>. The completed California Wetlands form shall be submitted electronically to habitatdata@waterboards.ca.gov or shall be submitted as a hard copy to both: 1) The Water Board, 1515 Clay St., Suite 1400, Oakland, CA 94612, to the attention of California Wetlands Portal; and 2) San Francisco Estuary Institute, 4911 Central Ave., Richmond, CA 94804, to the attention of California Wetlands Portal;
8. Mitigation and monitoring reports shall be submitted to the Water Board by January 1 of each year. Modification of this deadline is subject to the acceptance of Water Board staff. The reports may be submitted by upload to the California Wetlands Portal website at <http://www.californiawetlands.net/tracker/ba/list>. Select the Mococo

Overhead Seismic Rehabilitation from the Bay Area Project List and then use the “Files & Links” web-link on the mitigation site project page to upload the report. The Department shall immediately notify appropriate Water Board staff once the monitoring report has been uploaded. If the Department cannot, or chooses not to submit the report using the California Wetlands Portal, the report may be submitted directly to Water Board staff electronically, via e-mail;

9. Concrete shall be excluded from surface water for a period of 30 days after it is poured/sprayed. During that time the concrete shall be kept moist and runoff from the concrete shall not be allowed to enter State waters. Commercial sealants may be applied to the concrete surface in instances where 30 days of water exclusion is infeasible. If sealant is used, water shall be excluded from the site until the sealant is cured. If groundwater comes into contact with fresh concrete, it shall be prevented from flowing towards surface water;
10. The Project shall be constructed in conformance with the Project Description described in this Certification and certification application materials. Any change in the Project that could impact State waters may require compensatory mitigation and shall first be reported to and found acceptable by the Water Board Executive Officer;
11. If, at any time, an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, or any other water quality problem arises, the associated Project activities shall immediately cease until adequate BMPs are implemented. The Water Board shall be notified promptly within 24 hours after the unauthorized discharge or water quality problem arises;
12. The Department shall adhere to the conditions imposed by Nationwide Permit 14 issued to the Department by the U.S. Army Corps of Engineers, the Streambed Alteration Agreement issued to the Department by the California Department of Fish and Wildlife, and the Biological Opinion issued to the Department by the USFWS;
13. All activities and best management practices (BMPs) shall be implemented according to the submitted application materials and the findings and conditions of this Certification. BMPs for erosion, sediment, turbidity and pollutant control shall be implemented and in place at commencement of, during, and after any ground clearing activities, construction activities, or any other Project activities that could result in erosion, sediment, or other pollutant discharges to waters of the State. The BMPs shall be implemented in accordance with the Caltrans Construction Site Best Management Practice Manual (CCSBMPM) and all contractors and subcontractors shall comply with the CCSBMPM. BMPs for erosion and sediment control shall be utilized throughout all phases of construction, regardless of date, wherever sediment-laden runoff threatens to enter waters of the State. The Department shall stage erosion and sediment control materials at the work site. All BMPs shall be installed properly and in accordance with the manufacturer’s specifications. If the Project

JOHN MULLER, CHAIR | BRUCE H. WOLFE, EXECUTIVE OFFICER

Resident Engineer elects to install alternative BMPs for use on the project, the Department shall submit a proposal to Water Board staff for review and concurrence;

14. The Department shall not use or allow the use of erosion control products that contain synthetic materials within waters of the State at any time. The Department shall request approval from Water Board staff if an exception from this requirement is needed at a specific location. In upland and riparian areas, the Department shall prioritize the use of wildlife-friendly biodegradable (not photo-degradable) erosion control products. The Department shall not use or allow the use of erosion control products that contain synthetic netting for permanent erosion control (i.e. erosion control materials to be left in place for two years or after the completion date of the Project).

If the Department finds that erosion control netting or products have entrapped or harmed wildlife, personnel shall remove the netting or product and replace it with wildlife-friendly biodegradable products;

15. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall be prohibited within waters of the State. Fueling of individual equipment types within waters of the State may be authorized if the Department first prepares a fueling plan that:
 - a. Identifies the specific piece of machinery that may require fueling within waters of the State;
 - b. Provides justification for the need to refuel within State waters. The justification shall describe why fueling outside of jurisdictional waters is infeasible; and
 - c. Includes a narrative of specific BMPs that shall be employed to prevent and capture fuel releases.

Fueling of equipment within waters of the State shall be prohibited until the above mentioned plan has been approved by Water Board staff. The fueling plan may be submitted individually, included in the project Storm Water Pollution Prevention Plan (SWPPP), or submitted as a SWPPP amendment.

16. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall not result in a discharge or a threatened discharge to any waters of the State. At no time shall the Department use any vehicle or equipment which leaks any substance that may impact water quality;
17. Except as expressly allowed in this Certification, the Department is prohibited from discharging waste to waters of the State. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, welding slag, oil or petroleum products, or other organic or earthen material from any construction or

associated activity of whatever nature, other than that authorized by this Certification, shall be allowed to enter into waters of the State. Except for temporary stockpiling of waste generated during demolition operations (“temporary” in this instance means generated and removed during the same working day), waste materials shall not be placed where the materials may be washed by rainfall into waters of the State;

18. The Department shall provide analysis and verification that placement of non-hazardous waste or inert materials (which may include discarded product or recycled materials) will not result in degradation of water quality, human health, or the environment. All Project-generated waste shall be handled, transported, and disposed in strict compliance with all applicable State and Federal laws and regulations. When construction is complete, any excess material or debris shall be removed from the work area and disposed of properly and in accordance with the State and Federal laws and regulations, the Department is liable and responsible for the proper disposal of waste generated by their Project;
19. All imported fill material shall be clean and free of pollutants. All fill material shall be imported from a source that has the appropriate environmental clearances and permits. The reuse of low-level contaminated solids as fill onsite shall be performed in accordance with all State and Federal policies and established guidelines; a plan for such re-use must first be submitted to Water Board staff for review and concurrence;
20. Work in flowing or standing surface waters is prohibited;
21. Caltrans shall submit, subject to the acceptance of Water Board staff, a dewatering and/or diversion plan that appropriately describes the dewatered or diverted areas and how those areas will be handled during construction. The diversion/dewatering plans shall be submitted no later than 30 days prior to conducting the proposed activity. Diversion/dewatering activities shall be prohibited until Water Board staff has accepted the dewatering/diversion plan for that specific water. Information submitted shall include the area or work to be diverted or dewatered and method of the proposed activity. All diversion or dewatering activities shall be designed to minimize the impact to waters of the State, avoid fish entrainment, and maintain natural flows upstream and downstream. All dewatering or diversion structures shall be installed in a manner that does not cause sedimentation, siltation or erosion upstream or downstream. All dewatering or diversion structures shall be removed immediately upon completion of Project activities;
22. This Certification does not allow for the take, or incidental take, of any special status species. The Department shall use the appropriate protocols, as approved by the California Department of Fish and Wildlife and the USFWS, to ensure that Project activities do not impact the Beneficial Use of the Preservation of Rare and Endangered Species, as described in the San Francisco Bay Regional Water Quality Control Plan;

23. The Department shall maintain a copy of this Certification at the Project site to be available at all times to Project personnel. It is the responsibility of the Department to assure that all personnel (employees, contractors, and subcontractors) are adequately informed and trained regarding the conditions of this Certification;
24. The Water Board may add to or modify the conditions of this Certification, as appropriate, to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act;
25. This Certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Section 13330 of the California Water Code and Title 23 of the California Code of Regulations, Section 3867;
26. This Certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license, unless the pertinent certification application was filed pursuant to California Code of Regulations Title 23, Subsection 3855(b) and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought; and
27. This Certification is conditioned upon total payment of the full fee required in State regulations (23 CCR Section 3833). The Water Board has received the full fee for this Certification.

We anticipate your cooperation in implementing these conditions. However, please be advised that any violation of water quality certification conditions is a violation of State law and subject to administrative civil liability pursuant to California Water Code, Section 13350. Failure to respond, inadequate response, late response, or failure to meet any condition of this Certification may subject you to civil liability imposed by the Water Board to a maximum of \$5,000 per day per violation or \$10 for each gallon of waste discharged in violation of this Certification.

This Certification includes requirements for information and reports. Any requirement for a report made as a condition to this action is a formal requirement pursuant to CWC section 13267, and failure or refusal to provide, or falsification of such required report is subject to civil liability as described in California Water Code, Section 13268.

If you have any question, please contact Derek Beauduy at (510) 622-2348, or via e-mail to DBeauduy@waterboards.ca.gov.

Sincerely,

Bruce H. Wolfe
Executive Officer

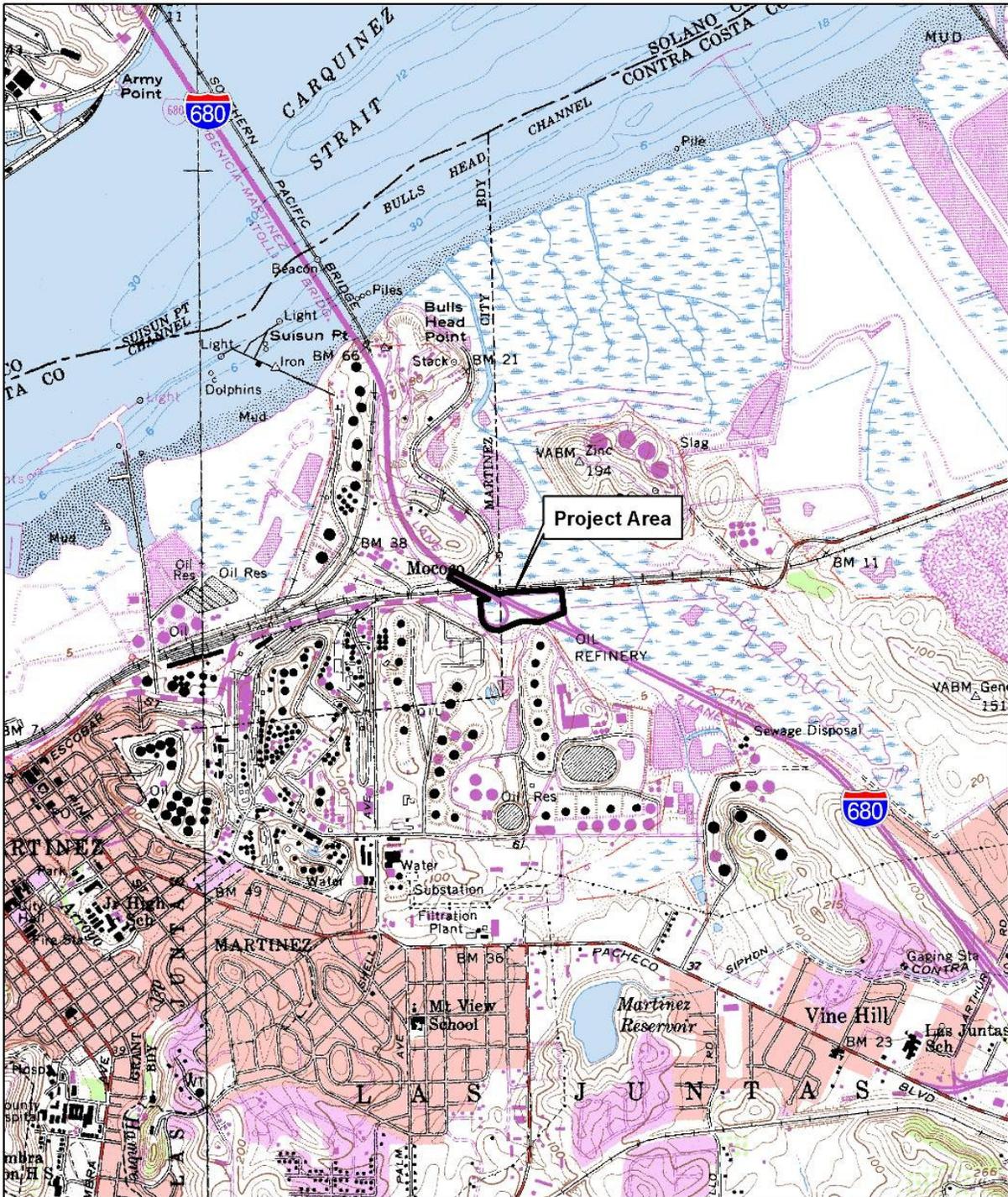
Attachment

cc (via e-mail):

Mr. Bill Orme SWRCB-DWQ	Mr. Dale Bowyer, Water Board
Mr. Cameron Johnson, USACE	Mr. Cyrus Vafai, Caltrans
Ms. Jane Hicks, Regulatory Branch, USACE	Mr. Hardeep Takhar, Caltrans
Ms. Melissa Escaron, CDFW	Mr. Jason Brush, USEPA
Ms. Paula Gill, USACE	Mr. Wilfung Martono, Caltrans
Mr. Ryan Olah, USFWS	

Attachment

Project Area Maps, Drainage Plan, and Biofiltration Strip Detail



	<p>1 inch = 2,000 feet</p> <p>0 1,000 2,000 Feet</p>			<p>Project Vicinity Map Mococo Overhead Replacement Project Contra Costa County, California November 2010 Vine Hill USGS 7.5' Quadrangle</p>
	<p>578009 E, 4208976 N</p> <p>UTM Zone 10N NAD 1983</p> <p>Sections 8 and 17, T2N R2W, MDBM</p>			

Figure 1. Project Area Map.



Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



1 inch = 300 feet
 0 140 280 Feet
 578009 E, 4208976 N
 UTM Zone 10N NAD 1983
 Sections 8 and 17, T2N R2W, MDBM



Project Area Map
Mococo Overhead Replacement Project
 Martinez,
 Contra Costa County, California

Figure 2. Project Area Map.

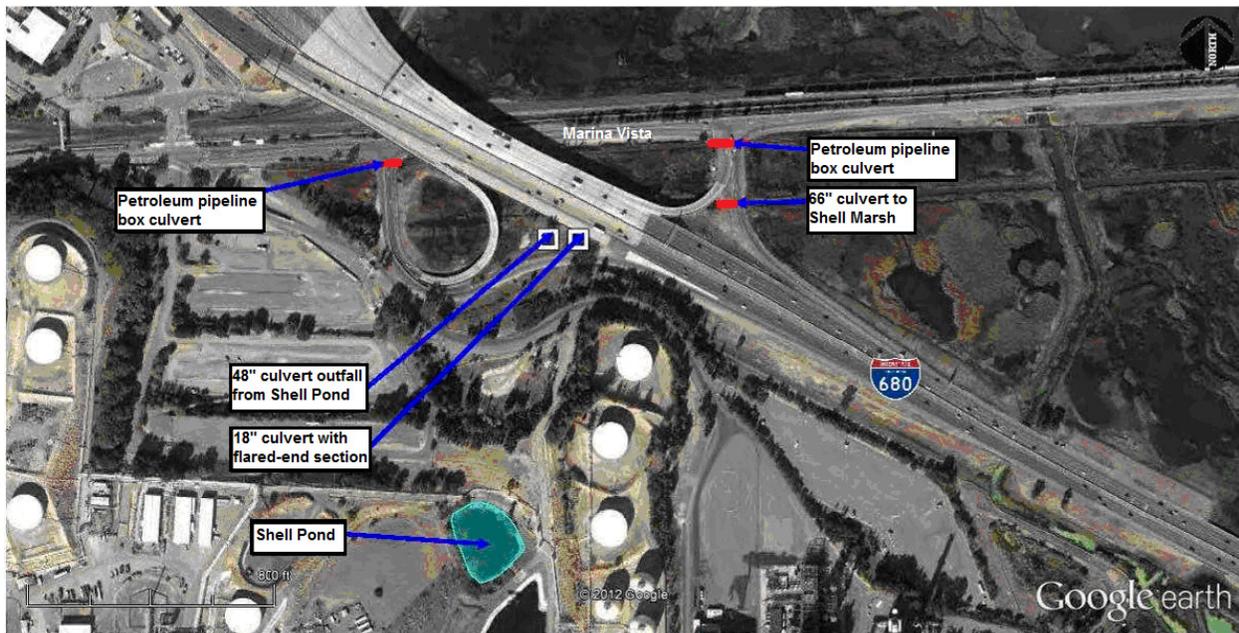


Figure 3. Project Site Inflow and Outflow Locations.

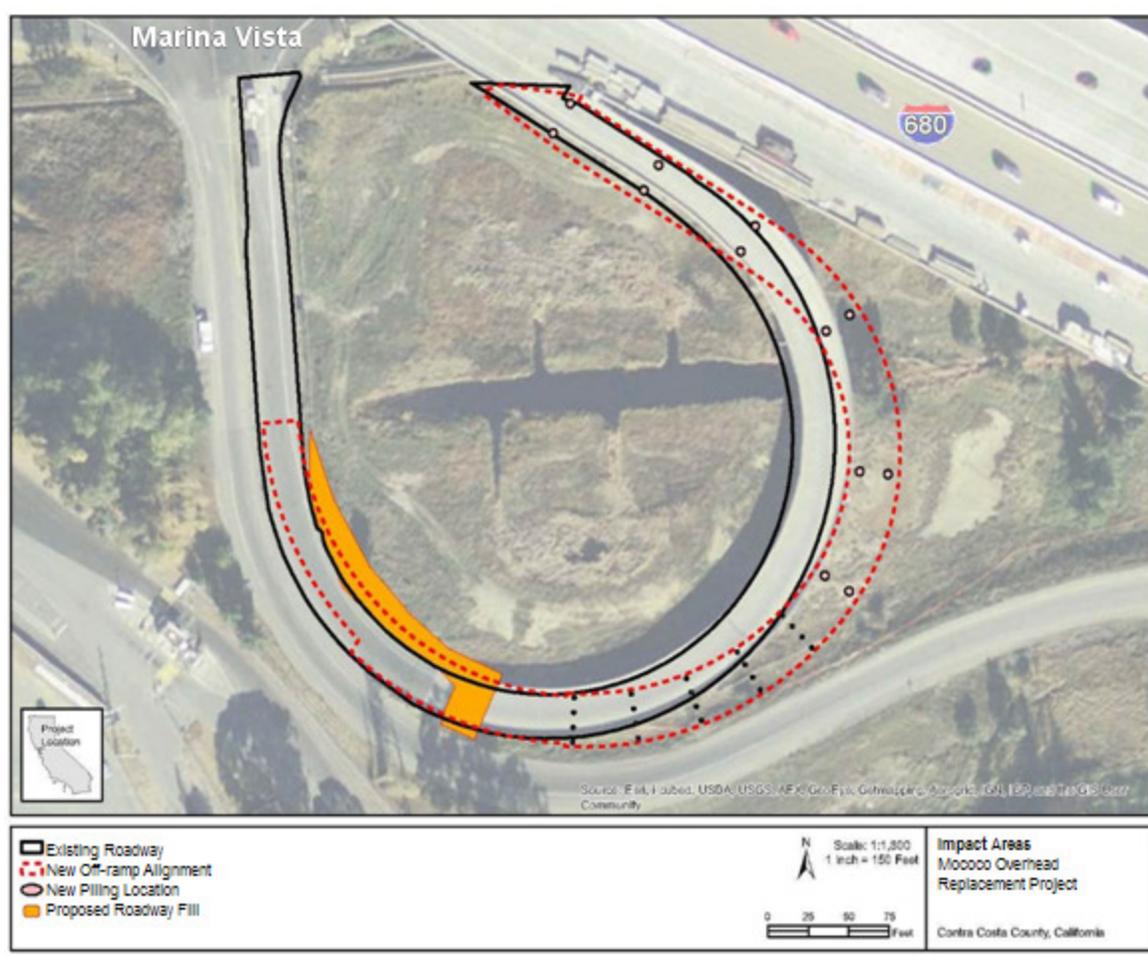


Figure 4. Permanent impact areas for the Mococo Overhead Replacement Project.

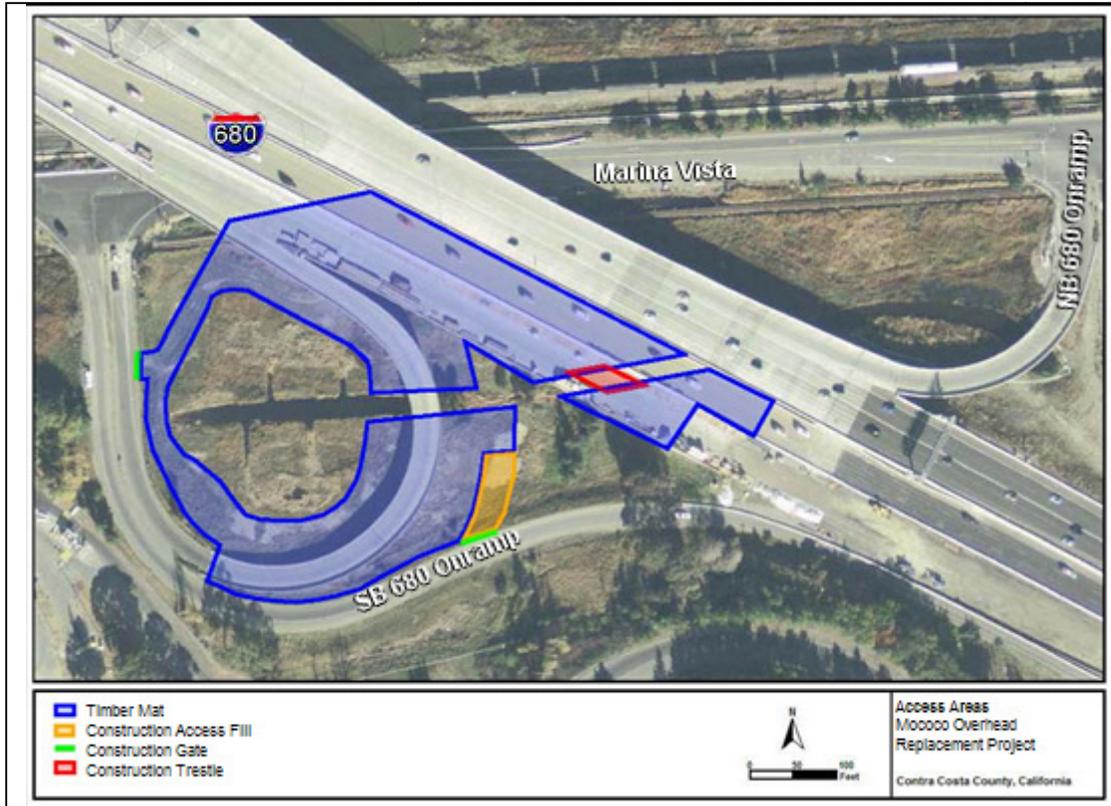


Figure 5a. Planned access and staging areas for the Mococo Overhead Replacement Project.

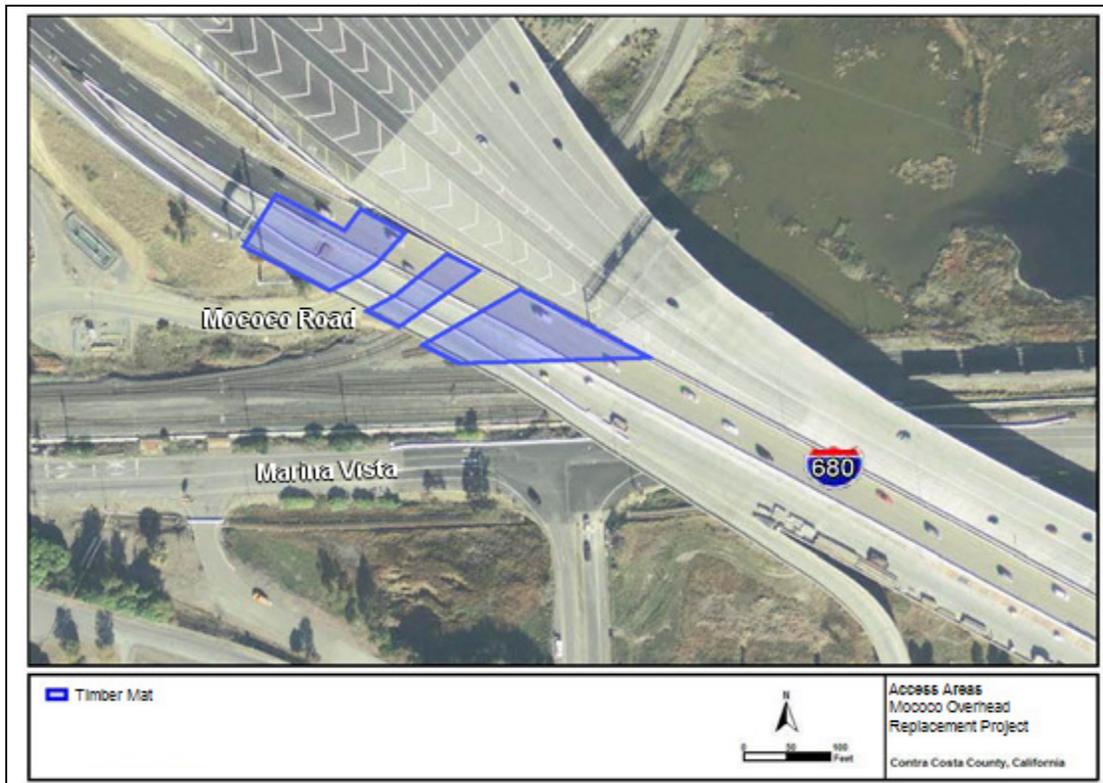


Figure 5b. Planned access and staging areas for the Mococo Overhead Replacement Project.

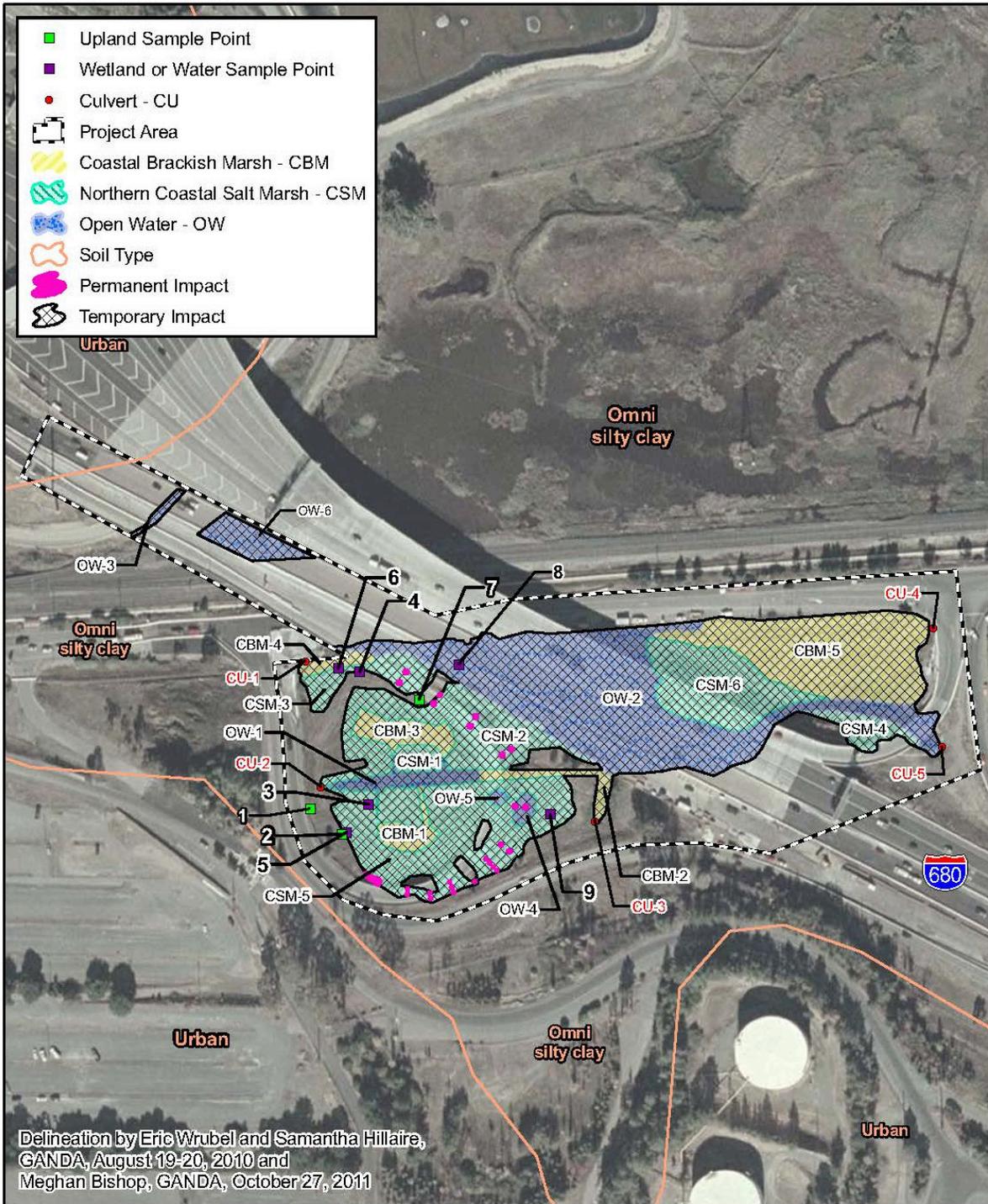


Figure 2: Wetlands and other Waters of the US Moco Overhead Replacement Project
 Contra Costa County, California
 November 2011
 Vine Hill USGS 7.5' Quadrangle

Figure 6. Temporary and permanent impacts to wetlands for the Moco Overhead Replacement Project.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
 DESIGN

FUNCTIONAL SUPERVISOR
 JASWINDER MANN

CALCULATED BY
 DESIGNED BY
 CHECKED BY

MANUEL CANTILAO JR.
 JASWINDER MANN

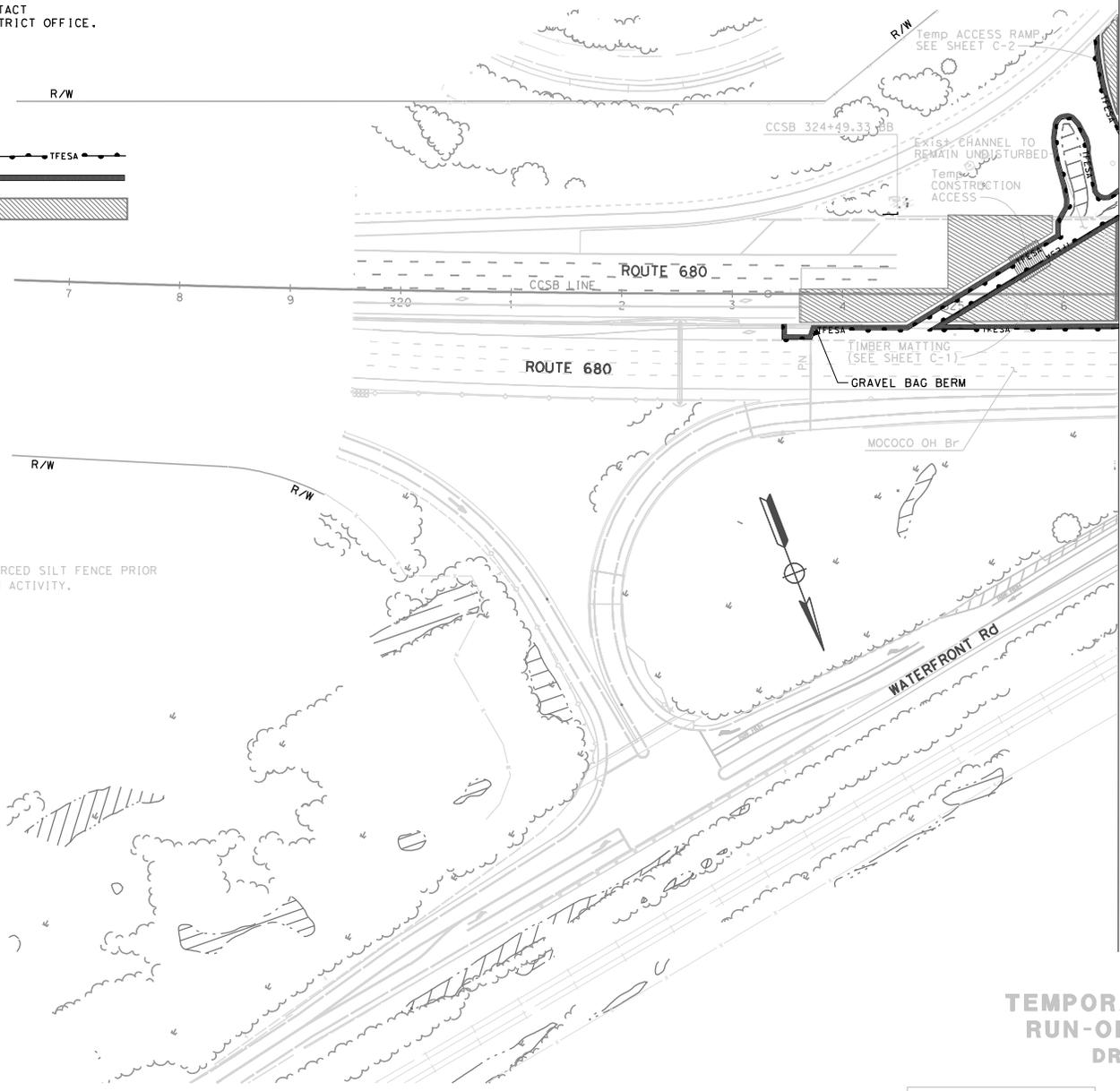
REVISOR BY
 DATE REVISED

MC
 10/15/12

NOTE:
 FOR ACCURATE RIGHT OF WAY DATA, CONTACT
 RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

LEGEND:
 TEMPORARY FENCE (TYPE ESA) 
 TEMPORARY GRAVEL BAG BERM 
 WORK AREA 

NOTE:
 1. INSTALL Temp REINFORCED SILT FENCE PRIOR
 TO ANY CONSTRUCTION ACTIVITY.



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	CC	680	23.9/24.8		

REGISTERED CIVIL ENGINEER DATE 11-29-12
 Manuel M Cantilao Jr.
 No. 58845
 Exp. 30-13
 CIVIL ENGINEER
 STATE OF CALIFORNIA

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**TEMPORARY STORM WATER
 RUN-ON BYPASS SYSTEM
 DRAINAGE DETAILS**
 SCALE: 1" = 50'

FOR NOTES, ABBREVIATIONS
 AND LEGEND, SEE SHEET SC-1

APPROVED FOR STAGE CONSTRUCTION AND TRAFFIC HANDLING WORK ONLY

BORDER LAST REVISED 7/2/2010

USERNAME => BUSER
 DGN FILE => SREQUEST

RELATIVE BORDER SCALE
 IS IN INCHES



UNIT 0743

PROJECT NUMBER & PHASE

04000009671

DD-1

LIST REVISION DATE PLOTTED => #DATE
 11-29-12 TIME PLOTTED => #TIME

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
 DESIGN

FUNCTIONAL SUPERVISOR
 JASWINDER MANN

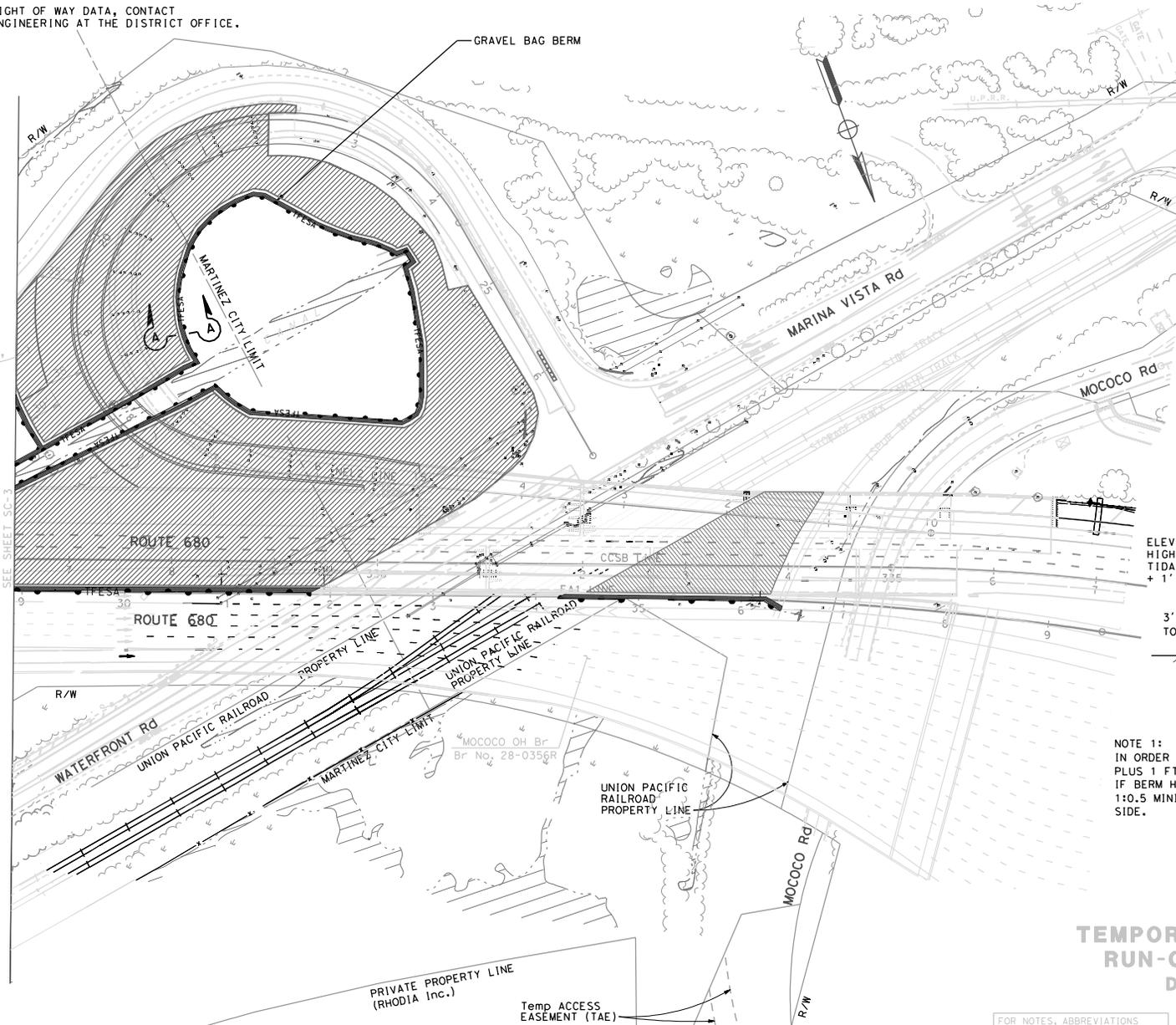
CALCULATED/DESIGNED BY
 JASWINDER MANN

REVISOR
 MANUEL CANTILAO JR.
 DATE
 10/15/12

CHECKED BY
 JASWINDER MANN

NOTE:
 FOR ACCURATE RIGHT OF WAY DATA, CONTACT
 RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Temp ACCESS RAMP,
 SEE SHEET C-2



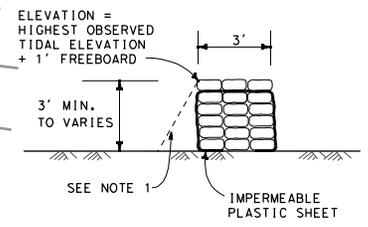
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	CC	680	23.9/24.8		

REGISTERED CIVIL ENGINEER DATE 11-29-12
 Manuel M. Cantilao Jr.
 No. 58845
 Exp. 6-30-17
 CIVIL ENGINEER
 STATE OF CALIFORNIA

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

- NOTE:**
1. FOR NEW & EXIST RAMP STRUCTURES, SEE SHEET L-3 & STRUCTURE PLANS.
 2. INSTALL Temp REINFORCED SILT FENCE PRIOR TO ANY CONSTRUCTION ACTIVITY.



NOTE 1:
 IN ORDER TO MAINTAIN HIGHEST OBSERVED TIDAL ELEVATION PLUS 1 FT FREEBOARD, GRAVEL BAG BERM HEIGHT WILL VARY. IF BERM HEIGHT IS MORE THAN 3 FT, TAPER THE SLOPE AT 1:0.5 MINIMUM (VERTICAL: HORIZONTAL) ON THE WORK AREA SIDE.

**SECTION A-A
 GRAVEL BAG BERM**

**TEMPORARY STORM WATER
 RUN-ON BYPASS SYSTEM
 DRAINAGE DETAILS**

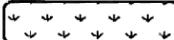
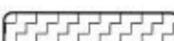
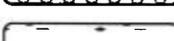
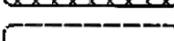
SCALE: 1" = 50'

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET SC-1

APPROVED FOR STAGE CONSTRUCTION AND TRAFFIC HANDLING WORK ONLY

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

LEGEND

-  EROSION CONTROL TYPE 1 (BIOFILTRATION STRIP)
-  EROSION CONTROL TYPE 2 (DISTURBED SOIL AREAS)
-  EROSION CONTROL TYPE 3 (DISTURBED SOIL AREAS STEEPER THAN 3:1)
-  EROSION CONTROL TYPE 4 (COASTAL BRACKISH MARSH)
-  EROSION CONTROL TYPE 5 (NORTHERN COASTAL SALT MARSH)
-  EROSION CONTROL TYPE 6 (OPEN WATER)
-  RECP (NETTING), TYPE C DECK DRAIN AND HMA CSD CUTLETS
-  # EROSION CONTROL LOCATION NUMBER
-  ▲ SPECIAL MARKER

ABBREVIATION

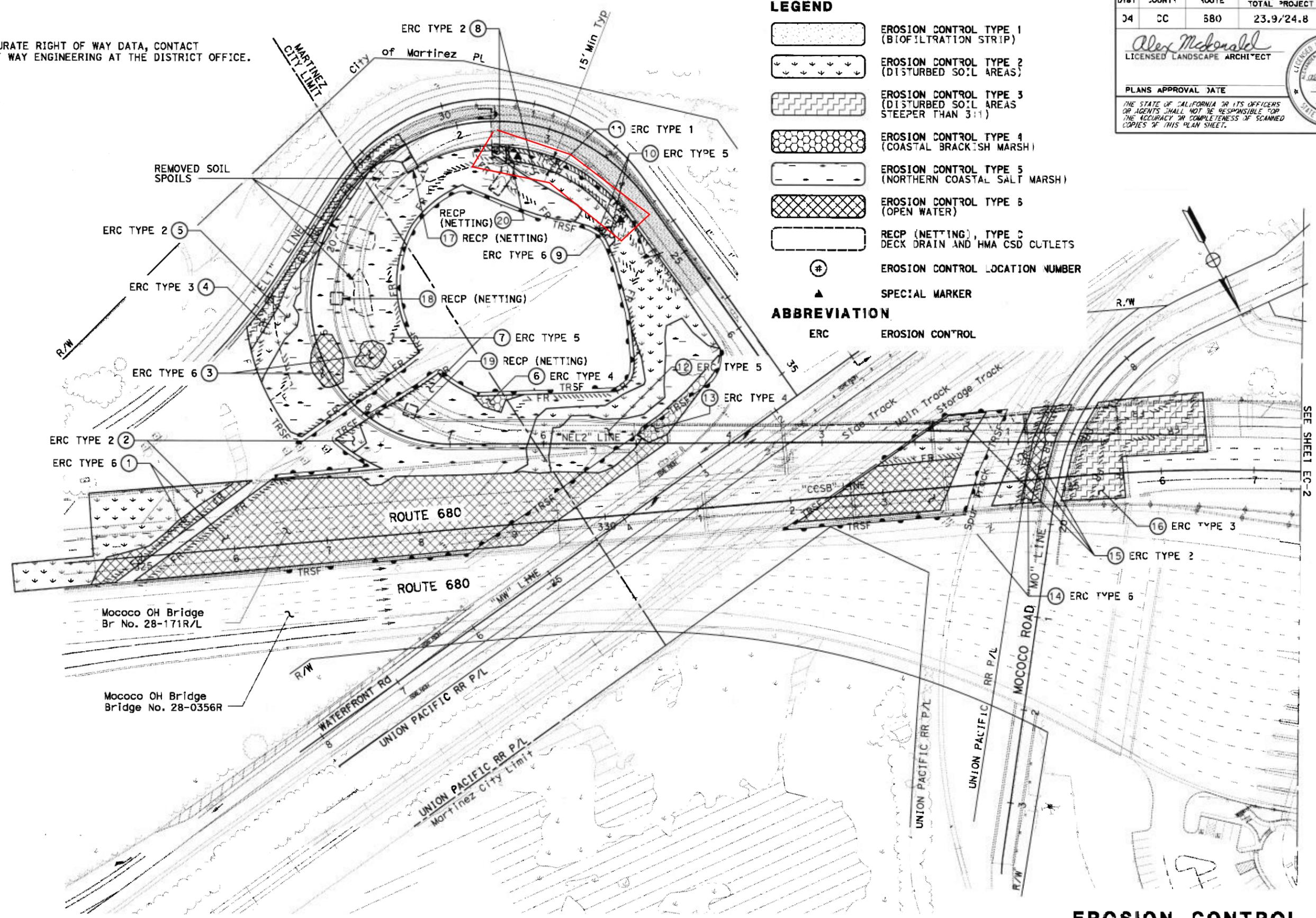
ERC EROSION CONTROL

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	CC	580	23.9/24.8		

Alex McDonald
LICENSED LANDSCAPE ARCHITECT

PLANS APPROVAL DATE
8-31-14
12-3-12

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EROSION CONTROL PLAN

SCALE: 1" = 50'

EC-1

APPROVED FOR EROSION CONTROL WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans WATER QUALITY

SENIOR LANDSCAPE ARCHITECT: DAVID W. YAM
DESIGNED BY: Alex McDonald
CHECKED BY: Chris Padick

REVISOR: AKM
DATE: 12/2/12

BORDER LAST REVISED 7/2/2010

USERNAME => s126849
DGN FILE => 0400000967tbc01.dgn

RELATIVE BORDER SCALE
15 IN INCHES

UNIT 0792

PROJECT NUMBER & PHASE

0400000967

12-03-12 DATE PLOTTED -> 03 DEC 2012
12-03-12 TIME PLOTTED -> 15:53

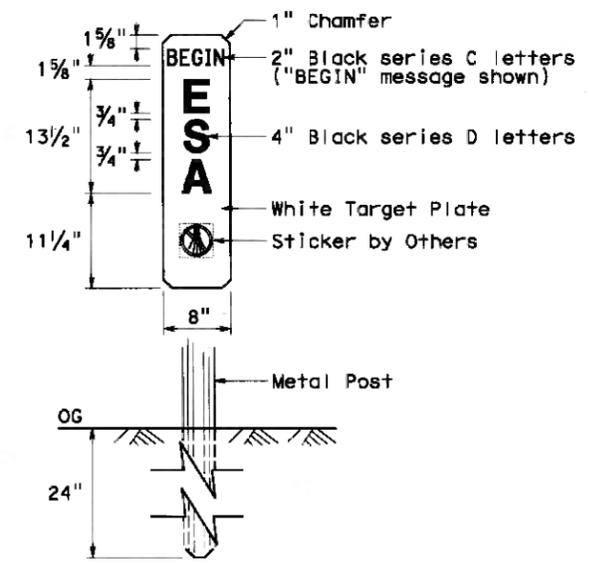
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL No. SHEETS
04	CC	680	23.9/24.8	

Alex McDonald
LICENSED LANDSCAPE ARCHITECT

PLANS APPROVAL DATE

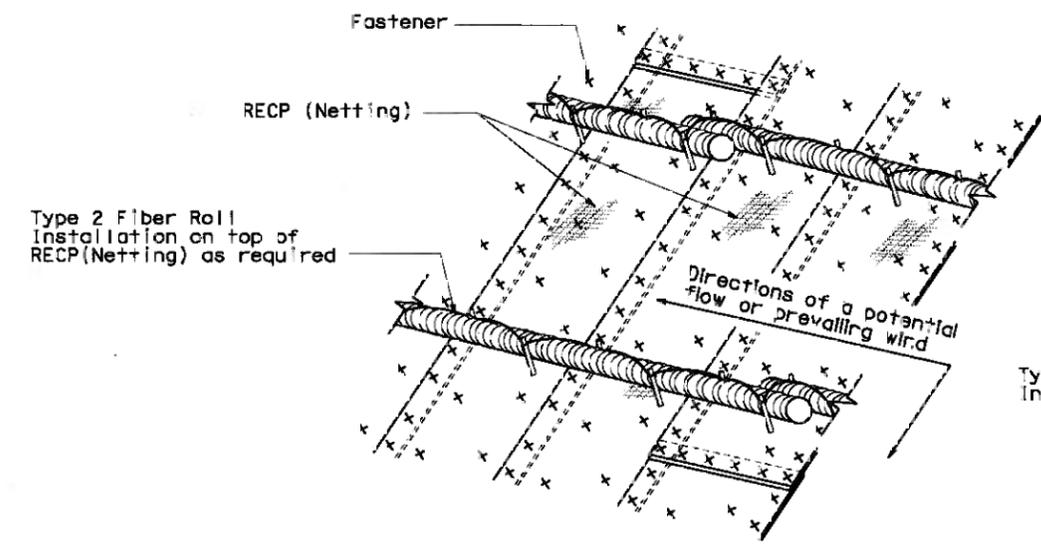
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

STATE OF CALIFORNIA
LICENSED LANDSCAPE ARCHITECT
ALEX McDONALD
8-31-14
12-3-12

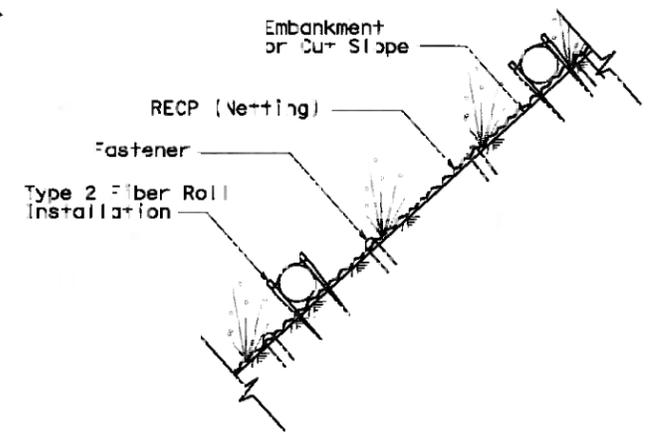


SPECIAL MARKER

See Std Plans A73A, A73B and MUTCD Sign Code G11-10 (CA) for additional details



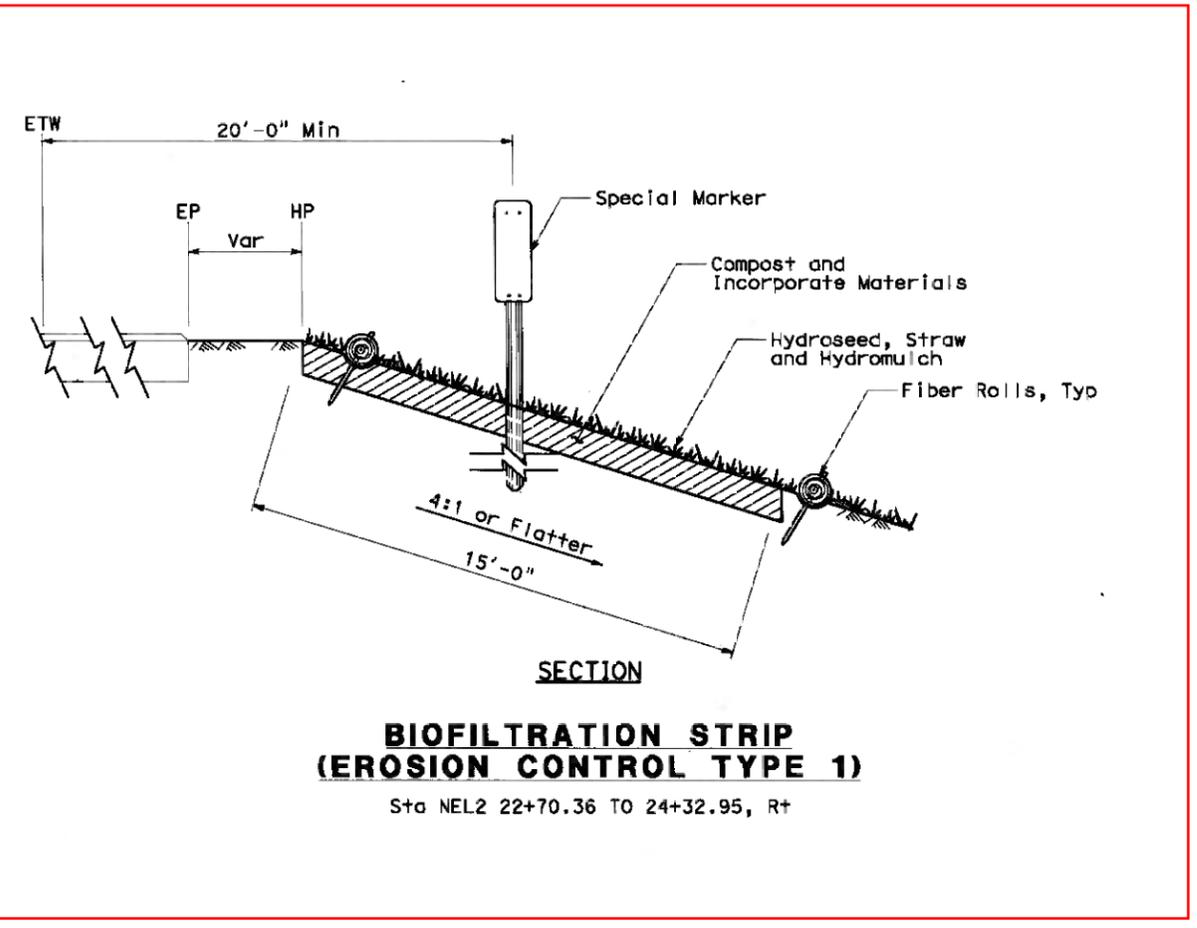
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SECTION

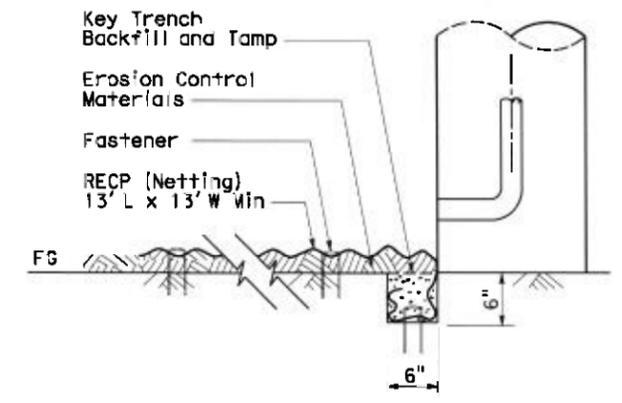
ROLLED EROSION CONTROL PRODUCT (NETTING) ON SLOPE WITH FIBER ROLLS

See Std Plan H51 and H52 for additional details



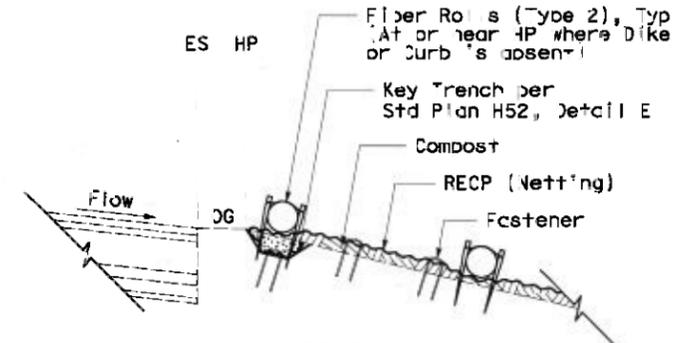
BIOFILTRATION STRIP (EROSION CONTROL TYPE 1)

Sta NEL2 22+70.36 TO 24+32.95, Rt



ROLLED EROSION CONTROL PRODUCT (NETTING) AT DECK DRAIN AND HMA OSD OUTLETS

(Deck drain outlet shown)
See Std Plans T55 for additional details similar in character



EROSION CONTROL (TYPE 3) AT LOCATION 4

Sta EL 26+60 TO 29+44, Rt

EROSION CONTROL DETAILS

NO SCALE

ECD-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - WATER QUALITY

SENIOR LANDSCAPE ARCHITECT DAVID W. YAM

REVISOR BY AKM DATE REVISED 12/2/12

DESIGNED BY Alex McDonald CHECKED BY Chris Padick

DATE PLOTTED 05-03-12 TIME PLOTTED 07:10:53

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	CC	58C	23.9/24.8		

Alex McDonald
LICENSED LANDSCAPE ARCHITECT

PLANS APPROVAL DATE _____

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

NOTE:
* SEE FIBER ROLLS SEQUENCE.

EROSION CONTROL TYPE 1

SEQUENCE	ITEM	MATERIAL		APPLICATION RATE	DEPTH
		DESCRIPTION	TYPE		
STEP 1	COMPOST	COMPOST	MEDIUM	538 CY/ACRE	
STEP 2	INCORPORATE MATERIALS	COMPOST			6"-10"
STEP 3	HYDROSEED *	SEED	MIX 1	60 LB/ACRE	
		FIBER	WOOD	285 LB/ACRE	
		FERTILIZER	ORGANIC	800 LB/ACRE	
STEP 4	STRAW	STRAW	RICE	2 TON/ACRE	
STEP 5	HYDROMULCH	FIBER	WOOD	285 LB/ACRE	
		TACKIFIER	PSYLLIUM	200 LB/ACRE	

EROSION CONTROL TYPE 2

SEQUENCE	ITEM	MATERIAL		APPLICATION RATE	DEPTH
		DESCRIPTION	TYPE		
STEP 1	COMPOST	COMPOST	MEDIUM	270 CY/ACRE	
STEP 2	INCORPORATE MATERIALS	COMPOST			8"-12"
STEP 3	HYDROSEED *	SEED	MIX 1	60 LB/ACRE	
		FIBER	WOOD	285 LB/ACRE	
		FERTILIZER	ORGANIC	800 LB/ACRE	
STEP 4	STRAW	STRAW	RICE	2 TON/ACRE	
STEP 5	HYDROMULCH	FIBER	WOOD	285 LB/ACRE	
		TACKIFIER	PSYLLIUM	200 LB/ACRE	

EROSION CONTROL TYPE 3

SEQUENCE	ITEM	MATERIAL		APPLICATION RATE
		DESCRIPTION	TYPE	
STEP 1	COMPOST	COMPOST	MEDIUM	135 CY/ACRE
STEP 2	ROLLED EROSION CONTROL PRODUCT (NETTING)	NETTING	TYPE A	
STEP 3	HYDROSEED *	SEED	MIX 1	60 LB/ACRE
		FIBER	CELLULOSE	2,000 LB/ACRE
		FERTILIZER	ORGANIC	800 LB/ACRE
STEP 4	HYDROMULCH	FIBER	CELLULOSE	2,000 LB/ACRE
		TACKIFIER	PSYLLIUM	200 LB/ACRE

EROSION CONTROL TYPE 4

SEQUENCE	ITEM	MATERIAL		APPLICATION RATE	DEPTH
		DESCRIPTION	TYPE		
STEP 1	COMPOST	COMPOST	MEDIUM	270 CY/ACRE	
STEP 2	INCORPORATE MATERIALS	COMPOST			8"-12"
STEP 3	WILDFLOWER SEEDING *	SEED	MIX 2	60 LB/ACRE	
		FERTILIZER	ORGANIC	800 LB/ACRE	
STEP 4	HYDROMULCH	FIBER	CELLULOSE	3,000 LB/ACRE	
		TACKIFIER	PSYLLIUM	200 LB/ACRE	

EROSION CONTROL TYPE 5

SEQUENCE	ITEM	MATERIAL		APPLICATION RATE	DEPTH
		DESCRIPTION	TYPE		
STEP 1	COMPOST	COMPOST	MEDIUM	270 CY/ACRE	
STEP 2	INCORPORATE MATERIALS	COMPOST			3"-12"
STEP 3	WILDFLOWER SEEDING *	SEED	MIX 3	60 LB/ACRE	
		FERTILIZER	ORGANIC	800 LB/ACRE	
STEP 4	HYDROMULCH	FIBER	CELLULOSE	3,000 LB/ACRE	
		TACKIFIER	PSYLLIUM	200 LB/ACRE	

EROSION CONTROL TYPE 6

SEQUENCE	ITEM	MATERIAL		APPLICATION RATE	DEPTH
		DESCRIPTION	TYPE		
STEP 1	COMPOST	COMPOST	MEDIUM	270 CY/ACRE	
STEP 2	INCORPORATE MATERIALS	COMPOST			3"-12"
STEP 3	HYDROSEED *	SEED	MIX 4	60 LB/ACRE	
		FIBER	CELLULOSE	2,000 LB/ACRE	
STEP 4	HYDROMULCH	FIBER	CELLULOSE	2,000 LB/ACRE	
		TACKIFIER	PSYLLIUM	200 LB/ACRE	

FIBER ROLLS

SEQUENCE	ITEM	MATERIAL		REMARKS
		DESCRIPTION	TYPE	
In erosion control Type 1, 2, 4, 5 and 6 areas Fiber Rolls must be installed before Hydroseed or Wildflower Seeding.	FIBER ROLLS	FIBER ROLL	TYPE B 8" TO 10" Dia	Type 1 Fiber Roll Installation
In erosion control Type 3 areas Fiber Rolls must be installed after RECP (Netting) and before Hydroseed.	FIBER ROLLS	FIBER ROLL	TYPE B 8" TO 10" Dia	Type 2 Fiber Roll Installation

ROLLED EROSION CONTROL PRODUCT (NETTING)

SEQUENCE	ITEM	MATERIAL		REMARKS
		DESCRIPTION	TYPE	
Install after all other erosion control materials in the same area	ROLLED EROSION CONTROL PRODUCT (NETTING)	NETTING	TYPE C	For installation details similar in character, See Std Plan T55

EROSION CONTROL LEGEND

NO SCALE

ECL-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - WATER QUALITY

SENIOR LANDSCAPE ARCHITECT: DAVID W. YAM

DESIGNED BY: Alex McDonald

CHECKED BY: Chr's Padick

REVISOR: AKM

DATE REVISED: 12/2/12

NON-STORM WATER INFORMATION

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- A. ESTIMATED GROUNDWATER SEEPAGE RATES IN THE PROJECT AREA
- B. DEWATERING LOCATION PLAN
- C. SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)
GENERAL WASTE DISCHARGE REQUIREMENTS, ORDER NO. R2-2012-0012
- D. PUBLICLY-OWNED TREATMENT WORKS (POTW) FACILITY INFORMATION
- E. SITE INVESTIGATION REPORT

1. Project Description

The project is proposing to rehabilitate Mococo Overhead (OH) (Bridge # 28-0171). The purpose of this Project is to correct the current mainline seismic vulnerabilities on the southbound Interstate 680 (I-680) from Post Mile (PM) 24.2 to PM 24.4 in the City of Martinez, Contra Costa County, California. In addition to the mainline retrofit, the Project also proposes to remove and replace the southbound loop off-ramp structure to Marina Vista Road.

Both groundwater and soil within the project limits contain pollutants from industrial and natural processes. Petroleum hydrocarbon contamination due to previous leaks and spills of oil from storage tanks and transmission pipelines is widespread throughout the water-bearing zone. The groundwater also contains other organic compounds resulting from accumulation of dead plants and marine organisms, a condition indigenous to a marsh environment. Heavy metal contamination due primarily to deposits of iron oxide cinders originating from the former Mountain Copper Company smelter is present in the vicinity of the deposits. Heavy metals also occur naturally in groundwater.

Based on analysis of the groundwater and performance of treatment systems used on previous contracts, it appears that the hydrocarbons are dissolved components, dispersed small diameter oil droplets, adsorbed to solids, or a combination of these conditions.

A granular activated carbon (GAC) filtration system that was initially installed to treat groundwater removed from excavations on a previous contract quickly experienced breakthrough of diesel range hydrocarbons. Subsequently, a standard gravity oil/water separator (OWS) was installed in an attempt to remove oil droplets that might be blinding the GAC filters. The OWS was not effective in preventing further breakthrough, indicating either any oil droplets were too small to be effectively removed by the OWS or the hydrocarbons were passing through the GAC adsorbed to other organic matter. A second system that included a filter media to remove solids ahead of several GAC filters was effective in meeting the performance standards of the discharge permit.

It can be concluded that an effective groundwater treatment system for the site should have a solids removal phase (settling tank, sand or synthetic media filter, etc.); a heavy molecular weight hydrocarbon and organic components removal phase (synthetic media filter, granular activated clay filter vessel, enhanced OWS, etc.); and a finishing phase (GAC filter vessels), to remove highly soluble, volatile components.

As experience from previous contract, corrugated metal pipe enclosures were needed to install along the perimeter of the CIDH pile excavations to prevent any excess standing water coming contact with groundwater in the excavation. Corrugated metal pipe must be large enough to provide clearance to perform the CIDH pile work.

2. Construction Activities Requiring Dewatering

Ground water will be encountered in the structure excavations while installing the CIDH and CISS pile foundations and retaining wall. The pile diameter varies from 24 to 60 inches, and the piles are to extend approximately 50 to 115 ft below the ground surface. The groundwater table in the project area is shallower than 5 feet and may vary with season and weather. The dewatering locations are depicted on the Dewatering Location Plan in Attachment B.

3. Treatment System Components

Treatment systems must be designed to remove turbidity-producing suspended solids, metals, and petroleum hydrocarbon constituents found in the groundwater. Primary and secondary treatment may be required, or the design of the treatment system may require combined use of the various treatment components in series to achieve effective treatment. Ensure that the treatment system components are steam cleaned to remove any residual contaminants. Treatment system components may include:

1. Desilting basins
2. Weir tanks
3. Settling tanks
4. Sediment traps
5. Gravity bag filters
6. Sand media filters
7. Pressurized bag filters
8. Cartridge filters
9. In-line chemical coagulants and flocculants
10. Activated clay filters
11. Activated carbon filters
12. A combination of these systems to provide primary and secondary treatment

4. Disposal of Treated Groundwater

Use discharged treated water or uncontaminated ground or surface water for dust control in active work areas when possible, or discharge the water to an inactive area where the grade prevents sheet flow and the soil will allow percolation. The discharge point in the inactive area must include a velocity dissipater. The discharge volume must not exceed the area's capacity for percolation.

Do not discharge into a body of water where erosion, scour, or sedimentary deposits could occur that impact natural bedding or aquatic life. Monitor the water at the discharge point using water quality measurements and visual observation in conformance with the regulatory permit and the special provisions. Storm water must be diverted away from excavations that would require dewatering.

5. Inspection, Monitoring, and Reporting

If treated groundwater is discharged to the storm drain system, perform compliance monitoring in conformance with the Monitoring and Reporting Program (MRP) included in Attachment E of the Order No. R2-2012-0012. If a batch discharge permit is obtained from a POTW, comply with the provisions contained in the batch discharge permit including all monitoring and reporting requirements.

During periods when the dewatering and non-storm water discharge operations occur, document the results in a Daily Inspection Report (DIR). The DIR form must include the discharge volume records and water quality monitoring records. In developing the DIR, refer to the Department's Dewatering Guide. The DIR form must be approved by the Engineer before use. The DIR must be provided weekly or as directed to the Engineer.

All information and recorded data collected or submitted as part of the DIR must be certified as true and accurate and signed by those who gather the information. During each day of discharge, perform daily inspection of the effluent at the discharge site and include, in the DIR, observations of:

1. Date and Time.
2. Weather conditions,
3. Wind direction and velocity,
4. The presence or absence of water fowl or aquatic wildlife,
5. The color and clarity of the effluent discharge, and
6. Erosion or ponding downstream of the discharge site.

The DIR must include photographs of the discharge point and areas downstream of the discharge location. These photographs must be labeled with the time, date, and location.

A flow meter that has been approved by the Engineer for exclusive use in dewatering during construction must be used to measure all excavation discharges. All calibrations must be done in conformance with the manufacturer's instructions in the presence of the Engineer. Record the flow-meter totalizer readings and compute average daily volumes for every day that dewatering is conducted.

ATTACHMENT A

ESTIMATED GROUNDWATER SEEPAGE RATES IN THE PROJECT AREA

Memorandum

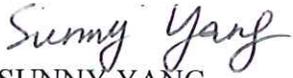
*Flex your power!
Be energy efficient!*

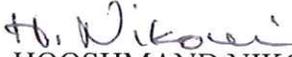
To: MR. HARDEEP TAKHAR
Chief
Office of Water Quality

Date: July 13, 2012

Attention: Kamran Nakhjiri/Jennifer Chen

File: 04-SON-12 PM 9.63
04-3A8701; E-FIS 0400000967
Mococo Off-ramp Replacement

From: 
SUNNY YANG
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services


HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Seepage Rate Estimate

This Memo is prepared in response to your email request dated July 11, 2012 for estimate of seepage rates of foundation soils, for the purposes of dewatering during foundation construction of piles. The proposed new off-ramp structure (Bridge No. 28-0171) is located at the southbound Marina Vista Road exit on Highway 680 (PM 24.26) in Contra Costa County.

The new Bridge has ten bents (Bent 2 through 11) and one abutment (Abutment 12). Bents 2 through 7 are founded on 60-inch CIDH piles. Bents 8 through 11 and Abutment 12 are founded on 24-inch CISS piles. Based on field exploration data, the groundwater table (GWT) is essentially at ground surface.

For piles, seepage rates were calculated using the theoretical well formula discussed in H.R. Cedergren 1989: Seepage, drainage, and flow nets (Equation 7.1). The soils at this site are predominantly fat clay (CH), silt (ML), and lean clay (CL). Bedrocks are mostly claystone, sandstone, and siltstone. For simplicity and to be conservative, permeability of silt (ML) was assumed for all soil and bedrock layers. The range of coefficient of permeability for ML soils was taken to be $1.0 \times 10^{-3} \sim 2.2 \times 10^{-3}$ ft/day (Moulton 1980, Table 3).

For CIDH piles, the estimated range of seepage rate is 160~360 gal/day per pile. For CISS piles, the estimated range of seepage rate is 120~260 gal/day per pile.

If you have any questions, please contact Sunny Yang at (510) 286-4808 or Hooshmand Nikoui, Branch Chief at (510) 286-4811.

c: TPokrywka, HNikoui, Daily File, Route File, J Stayton (DES Office Engineer)

SYang/mm

ATTACHMENT B

DEWATERING LOCATION PLAN

ATTACHMENT C

**SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)
GENERAL WASTE DISCHARGE REQUIREMENTS, ORDER NO. R2-2012-0012**



**California Regional Water Quality Control Board
San Francisco Bay Region**



Matthew Rodriguez
*Secretary for Environmental
Protection*

1515 Clay Street, Suite 1400, Oakland, California 94612
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<http://www.waterboards.ca.gov/sanfranciscobay>

Edmund G. Brown Jr.
Governor

**ORDER NO. R2-2012-0012
NPDES NO. CAG912002**

**GENERAL WASTE DISCHARGE REQUIREMENTS FOR:
Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of
Groundwater Polluted by Volatile Organic Compounds (VOC), Fuel Leaks and Other Related
Wastes (VOC and Fuel General Permit)**

Table 1. Administrative Information

This Order was adopted by the Regional Water Quality Control Board on:	February 8, 2012
This Order shall become effective on:	March 15, 2012
This Order shall expire on:	March 15, 2017
CIWQS Regulatory Measure Number:	383087
The U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board have classified the discharges under this General National Pollutant Discharge Elimination System (NPDES) Permit as minor discharges based on the discharges' impacts to receiving water bodies.	
To obtain coverage under this General Permit, dischargers must submit a Notice of Intent (NOI) Form as described in Attachment B and a filing fee equivalent to the first year's annual fee. If the NOI is complete, Authorization to Discharge will be issued by the Regional Water Quality Control Board Executive Officer.	
Authorized dischargers who need to continue discharging after the expiration date of this Order shall file a completed NOI form no later than 180 days in advance of this Order's expiration date. Such dischargers for whom coverage is extended will become subject to the new Order upon authorization by the Executive Officer.	

I, Bruce H. Wolfe, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on the date indicated above.

Bruce H. Wolfe, Executive Officer

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- Attachment A – Definitions
- Attachment B – Notice of Intent Application Form and Instructions
- Attachment C – Notice of Termination
- Attachment D – Standard Provisions
- Attachment E – Monitoring and Reporting Program
- Attachment F – Fact Sheet

I. SCOPE OF GENERAL PERMIT

Facilities that may be covered under this Order are groundwater treatment facilities located at active or closed sites, such as service stations or construction sites. These groundwater treatment facilities are in operation to extract and treat groundwater polluted by volatile organic compounds (VOC), fuel, and fuel additives. This Order covers discharges from these facilities to all surface waters such as creeks, streams, rivers including flood control channels, lakes, or San Francisco Bay. Such discharges may occur directly to surface waters or through constructed storm drain systems.

II. FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter, the Regional Water Board), finds:

A. Background. There are 20 permittees authorized (as of November 2011) to discharge pursuant to Order No. R2-2006-0075, NPDES Permit No. CAG912002 (General Waste Discharge Requirements for Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Fuel Leaks and Other Related Waste at Service Stations and Similar Sites). Of this group, 18 submitted Notices of Intent (NOI) applications and applied for an NPDES permit to continue their discharge of treated wastewater from their groundwater extraction and treatment facilities (hereinafter Facility or Facilities).

In addition, there are 56 permittees currently authorized to discharge pursuant to Order No. R2-2009-0059, NPDES Permit No. CAG912003 (General Waste Discharge for Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by VOC). Order No. R2-2009-0059 will not be reissued upon expiration on September 30, 2014, and permittees with a continued need to discharge shall seek coverage under this General Permit.

For the purposes of this Order, references to the “Discharger” or “permittee” in applicable federal and State laws, regulations, plans, or policy are held to be equivalent to references to the Discharger(s) herein. A discharger who is authorized under this Order is hereinafter a Discharger.

B. Facility Description. Dischargers typically use aeration and/or granular activated carbon (GAC) systems to treat their groundwater prior to discharge. Facilities that use other types of treatment systems that are effective at removal of VOC or fuel pollutants may be covered by this Order subject to the approval of the Executive Officer. Treated wastewaters are typically discharged through storm drain systems, rivers, and/or creeks to San Francisco Bay. To obtain coverage under this Order, a discharger must include a complete description of the treatment system installed at its facility in the Notice of Intent (NOI) application form (Attachment B).

C. Regional Water Board Preference for Reuse or Discharge to POTW: The Regional Water Board adopted Resolution No. 88-160 on October 19, 1988. The Resolution urges dischargers of extracted groundwater from site cleanup projects to reuse their treated groundwater. When reuse is not technically and/or economically feasible, to discharge to a publicly owned treatment works (POTW). Only if neither reuse nor discharge to a POTW is technically or economically feasible, and if beneficial uses of the receiving water are not adversely affected, the Regional Water

Board may authorize the discharge of treated extracted groundwater in accordance with the requirements of this Order.

D. Legal Authorities. This Order is issued pursuant to Clean Water Act (CWA) section 402 and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the California Water Code (CWC) (commencing with section 13370). It shall serve as an NPDES permit for point source discharges from each Facility, regulated under this Order, to surface waters. This Order also serves as General Waste Discharge Requirements (GWDRs) pursuant to CWC article 4, chapter 4, division 7 (commencing with section 13260).

States may request authority to issue general NPDES permits pursuant to title 40 of the Code of Federal Regulations (40 CFR) section 122.28. On June 8, 1989, the State Water Resources Control Board (State Water Board) submitted an application to USEPA requesting revisions to its NPDES Program in accordance with 40 CFR 122.28, 123.62, and 403.10. The application included a request to add general permit authority to its approved NPDES Program. On September 22, 1989, USEPA Region 9 approved the State Water Board's request and granted authorization for the State to issue general NPDES permits.

E. Background and Rationale for Requirements. The Regional Water Board developed the requirements in this Order based on information submitted as part of NOIs, through monitoring and reporting programs, and other available environmental information. The Fact Sheet (Attachment F), which contains background information and rationale for Order requirements, is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through F are also incorporated into this Order.

F. California Environmental Quality Act (CEQA). Under CWC section 13389, this action to adopt an NPDES permit is exempt from Chapter 3 of CEQA.

G. Technology-based Effluent Limitations. CWA section 301(b) and NPDES regulations at 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements, at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. Discharges authorized by this Order must meet technology-based effluent limitations based on Best Professional Judgment (BPJ) in accordance with 40 CFR 125.3. A detailed discussion of the technology-based effluent limitations development and BPJ is included in the Fact Sheet (Attachment F).

H. Water Quality-Based Effluent Limitations. CWA section 301(b) and NPDES regulations at 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. NPDES regulations at 40 CFR 122.44(d)(1)(i) mandate that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) on an indicator parameter for the pollutant of concern; or (3)

using a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

- I. Water Quality Control Plans.** The *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan) is the Regional Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives (WQOs) for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve WQOs. The Basin Plan was duly adopted by the Regional Water Board and approved by the State Water Board, Office of Administrative Law, and USEPA.

The Basin Plan states that the beneficial uses of any specifically identified water body generally apply to its tributary streams. The Basin Plan may not specifically identify beneficial uses for every receiving water regulated under this permit, but may identify present and potential uses for the downstream water body, to which the receiving water, via an intermediate water body, is tributary. These potential and existing beneficial uses are municipal and domestic supply, fish migration and fish spawning, industrial service supply, navigation, industrial process supply, marine habitat, agricultural supply, estuarine habitat, groundwater recharge, shellfish harvesting, water contact and non-contact recreation, ocean, commercial, and sport fishing, wildlife habitat, areas of special biological significance, cold freshwater and warm freshwater habitat, and preservation of rare and endangered species for surface waters and municipal and domestic supply, industrial service supply, industrial process supply, agricultural supply, and freshwater replenishment for groundwaters. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Requirements of this Order implement the Basin Plan.

On September 18, 1975, the State Water Board adopted the *Water Quality Control Plan for Control of Temperature in the Coastal Interstate Waters and Enclosed Bays and Estuaries of California* (hereinafter the Thermal Plan). The Thermal Plan contains objectives governing cooling water discharges, providing different and specific numeric and narrative water quality objectives for new and existing discharges.

The State Water Board's *Water Quality Control Plan for Enclosed Bays and Estuaries—Part 1, Sediment Quality* became effective on August 25, 2009. This plan supersedes other narrative sediment quality objectives and establishes new sediment quality objectives and related implementation provisions for specifically defined sediments in most bays and estuaries.

- J. National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, and later amended it on May 4, 1995, and November 9, 1999. About 40 criteria in the NTR apply in California. On May 18, 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the State. The CTR was amended on February 13, 2001. These rules contain water quality criteria (WQC) for priority pollutants.
- K. State Implementation Policy.** On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of*

California (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria promulgated for California by USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Board in the Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria promulgated by USEPA through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

- L. Recycled Water Policy.** The State Water Board adopted Resolution No. 2009-0011 (*Policy for Water Quality Control for Recycled Water*) on February 3, 2009. The policy is intended to promote sustainable local water supplies by increasing the acceptance and promoting the use of recycled water. It sets a goal of increasing recycled water use statewide by at least one million acre feet per year by 2030. The policy also requires Regional Water Boards to exercise their authority to the fullest extent possible to encourage recycled water use and to develop watershed-based salt and nutrient management plans to ensure that groundwater resources are not degraded by recycled water use.
- M. Alaska Rule.** On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes. [40 CFR 131.21; 65 Fed. Reg. 24641 (April 27, 2000)] Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.
- N. Stringency of Requirements for Individual Pollutants.** This Order contains both technology-based and water quality-based effluent limitations (WQBELs) for individual pollutants. Derivation of these limitations is discussed in the Fact Sheet (Attachment F.) This Order's technology-based pollutant restrictions on benzene, carbon tetrachloride, chloroform, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, ethylbenzene, methylene chloride, tetrachloroethylene, toluene, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, vinyl chloride, total xylenes, methyl tertiary butyl ether, total petroleum hydrocarbons, and trichlorotrifluoroethane implement the minimum applicable federal technology-based requirements and meet requirements of the Basin Plan.

WQBELs have been derived to implement WQOs that protect beneficial uses. Both the beneficial uses and the WQOs have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant WQBELs were derived from the CTR, the CTR is the applicable standard pursuant to 40 CFR 131.38. The procedure for calculating individual WQBELs for priority pollutants is based on the SIP. Most beneficial uses and WQOs contained in the Basin Plan were approved under State law and submitted to and approved by USEPA. Any WQOs and beneficial uses submitted to USEPA prior to May 30, 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for the purposes of the CWA" pursuant to 40 CFR 131.21(c)(1).

- O. Antidegradation Policy.** NPDES regulations at 40 CFR 131.12 require that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16, which incorporates the federal antidegradation policy where the federal policy applies under federal law and requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies.
- P. Anti-Backsliding Requirements.** CWA sections 402(o)(2) and 303(d)(4) and 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. This Order retains effluent limitations no less stringent than those established by previous orders.
- Q. Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the State. Dischargers are responsible for meeting all requirements of applicable State and federal law pertaining to threatened and endangered species.
- R. Monitoring and Reporting.** NPDES regulations at 40 CFR 122.48 require that all NPDES permits specify requirements for recording and reporting monitoring results. CWC sections 13267 and 13383 authorize the Regional Water Board to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. This Monitoring and Reporting Program is provided in Attachment E.
- S. Standard and Special Provisions.** Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR section 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42 and as modified for this General Permit, are provided in Attachment D. Dischargers must comply with all standard provisions and with those additional conditions that are applicable under 40 CFR 122.42. The Regional Water Board has also included in this Order special provisions applicable to the Dischargers. The attached Fact Sheet (Attachment F) provides rationale for the special provisions contained in this Order.
- T. Provisions and Requirements Implementing State Law.** The provisions/requirements in subsections IV.B (Reclamation Specifications) and V.B (Groundwater Limitations) of this Order are included to implement State law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations.
- U. Notification of Interested Parties.** The Regional Water Board notified the Dischargers and interested agencies and persons of its intent to prescribe GWDRs for the discharge and has

provided them with an opportunity to submit their written comments and recommendations. The Fact Sheet (Attachment F) provides details of the notification.

- V. Consideration of Public Comment.** The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. The Fact Sheet (Attachment F) provides details of the public hearing.

IT IS HEREBY ORDERED, that this Order supersedes Order No. R2-2006-0075 and, effective September 30, 2014, Order No. R2-2009-0059, except for enforcement purposes, and in order to meet the provisions contained in CWC Division 7 (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the following requirements in this Order.

III. DISCHARGE PROHIBITIONS

- A.** The discharge of extracted and treated groundwater polluted by fuel, fuel components, VOC, and related wastes to surface waters from service stations, construction sites, and similar sites, is prohibited unless an NOI application for proposed discharge has been submitted, and the Executive Officer has provided the Discharger with an Authorization to Discharge.
- B.** Discharges other than the following are prohibited: extracted groundwater treated only with treatment chemicals approved by the Executive Officer and added in a manner consistent with the proper operation and maintenance of the treatment facility.
- C.** The discharge of extracted and treated groundwater from a specific site in excess of the flow rate specified by the Executive Officer in the Authorization to Discharge is prohibited.
- D.** Discharges to a storm drain shall not cause scouring or erosion at the point where the storm drain discharges into the receiving water and shall not cause or contribute to scouring of banks, excessive sedimentation, or flooding of the storm drain system or receiving water downstream of the point of discharge.
- E.** Neither the treatment nor the discharge of pollutants shall create a pollution, contamination, or nuisance, as defined by CWC section 13050.
- F.** Bypass or overflow of untreated or partially treated groundwater polluted by fuel, fuel components, VOC, or other related wastes to waters of the State either at the treatment system or from any of the collection or transport systems or pump stations tributary to the treatment system is prohibited, except as provided for in the conditions stated in section I.G.2 and I.G.4 of Attachment D.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations (For Dischargers to Surface Water Only)

1. **Toxic Pollutants:** The discharge of treated groundwater shall maintain compliance with the following effluent limitations at Monitoring Location EFF-001 as specified in the Authorization to Discharge:

Table 2. Effluent Limitations for Toxic Pollutants

No.	Compound	CAS Number	Column A: Discharge to Drinking Water Areas ^[1]		Column B: Discharge to Other Surface Water Areas	
			Average Monthly Effluent Limitation (µg/L)	Maximum Daily Effluent Limitation (µg/L)	Average Monthly Effluent Limitation (µg/L)	Maximum Daily Effluent Limitation (µg/L)
1	Benzene	71432	---	1	---	5
2	Carbon Tetrachloride	56235	0.25 ^[2]	0.50	4.4	5
3	Chloroform	67663	---	5	---	5
4	1,1-Dichloroethane	75343	---	5	---	5
5	1,2-Dichloroethane	107062	0.38 ^[2]	0.5	---	5
6	1,1-Dichloroethylene	75354	0.057 ^[2]	0.11 ^[2]	3.2	5
7	Ethylbenzene	100414	---	5	---	5
8	Methylene Chloride	75092	4.7	5	---	5
9	Tetrachloroethylene (PCE)	127184	0.8	1.6	---	5
10	Toluene	108883	---	5	---	5
11	Cis 1,2-Dichloroethylene	156592	---	5	---	5
12	Trans 1,2-Dichloroethylene	156605	---	5	---	5
13	1,1,1-Trichloroethane	71556	---	5	---	5
14	1,1,2-Trichloroethane	79005	0.6	1.2	---	5
15	Trichloroethylene (TCE)	79016	2.7	5	---	5
16	Vinyl Chloride	75014	---	0.5	---	1
17	Total Xylenes	1330207	---	5	---	5
18	Methyl Tertiary Butyl Ether (MTBE)	1634044	---	5	---	5
19	Total Petroleum Hydrocarbons[TPHs (as gasoline or as diesel)]	---	---	50	---	50

No.	Compound	CAS Number	Column A: Discharge to Drinking Water Areas ^[1]		Column B: Discharge to Other Surface Water Areas	
			Average Monthly Effluent Limitation (µg/L)	Maximum Daily Effluent Limitation (µg/L)	Average Monthly Effluent Limitation (µg/L)	Maximum Daily Effluent Limitation (µg/L)
20	Ethylene Dibromide (1,2-Dibromoethane)	106934	---	0.05 ^[2]	---	5
21	Trichloro-trifluoroethane	76131	---	5	---	5
22	Total Chlorine Residual	---	---	0.0 ^[3]	---	0.0 ^[3]

Table Notes:

[1] Drinking water areas are defined as surface waters with the existing or potential beneficial uses of "Municipal and Domestic Supply" and "Groundwater Recharge" (the latter includes recharge areas to maintain salt balance or to halt salt water intrusion into fresh water aquifers).

[2] If reported detection level is greater than effluent limit, then a non-detect result using a 0.5 µg/L detection level will not be deemed to be out of compliance.

[3] There shall be no detectable levels of residual chlorine in the effluent (a non-detect result using a detection level equal or less than 0.08 milligram per liter (mg/L) will not be deemed to be out of compliance). This limit only applies to Dischargers that chlorinate their extracted groundwater.

2. pH: The pH of the discharge shall not exceed 8.5 nor be less than 6.5.

3. Acute Toxicity:

- a.** Representative samples of the discharge, with compliance measured at Monitoring Location EFF-001 as described in the Authorization to Discharge, shall meet the following limits for acute toxicity. Bioassays shall be conducted in compliance with Section V.A of the Monitoring and Reporting Program (Attachment E).

The survival of test fish in 96-hour static renewal bioassays with the discharge shall be not less than a three sample moving median of 90% survival and a single test value of not less than 70% survival.

- b.** These acute toxicity limitations are further defined as follows:

- (1) 3-sample median. A bioassay test showing survival of less than 90 percent represents a violation of this limitation, if one or more of the past two or less bioassay tests show less than 90 percent survival.
- (2) Single sample. A bioassay test showing survival of less than 70 percent represents a violation of this limitation.

- c.** Bioassays shall be performed using the most up-to-date USEPA protocol. Bioassays shall be conducted using rainbow trout as the test species in compliance with *Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms*, currently 5th Edition (EPA-821-R-02-012), with exceptions granted

to the Discharger by the Executive Officer and the Environmental Laboratory Accreditation Program (ELAP) upon the Discharger's request with justification.

B. Groundwater Reuse Specifications (For Dischargers that Reuse All or a Portion of Treated Groundwater)

- 1. Reuse Policy:** As noted in the findings, the Regional Water Board adopted Resolution No. 88-160 on October 19, 1988. The Resolution urges dischargers of extracted groundwater from site cleanup projects to reuse their effluent and that when reuse is not technically and/or economically feasible, to discharge to a POTW.
- 2. Reuse Allowed:** This Order permits reuse of extracted treated groundwater in conjunction with the discharge to surface water. Reuse of extracted treated groundwater can take many forms, such as irrigation of landscaping or agriculture, dust control or soil compaction on construction sites, and industrial water supply.
- 3. Water Reuse Specifications (Water Reuse Only)**
 - a.** Water for beneficial reuse shall meet the requirements in Section IV.A - Effluent Limitations.
 - b.** Water reuse activities shall be described in the Discharger's NOI, including the method of any additional treatment and the location and type of water reuse.
 - c.** The reuse of treated groundwater shall not impair the quality of waters of the State, nor shall it create a nuisance as defined by CWC section 13050(m).
 - d.** Adequate measures shall be taken to minimize public contact with the reused groundwater and to prevent the breeding of flies, mosquitoes, and other vectors of public health significance during or after the process of reuse.
 - e.** Appropriate public warnings must be posted to advise the public that the water is not suitable for drinking. Signs must be posted in the area, and all reused water valves and outlets appropriately labeled.
 - f.** There shall be no cross-connection between the potable water supply and piping containing treated groundwater intended for reuse.
 - g.** Water reuse consisting of recharge or reinjection is not authorized under this Order. Any reinjection must be performed in accordance with a cleanup order approved by the Regional Water Board, or another lead oversight agency.

V. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

Discharges shall not cause the following in surface receiving waters:

- c. pH: The pH shall not be depressed below 6.5 nor raised above 8.5, nor caused to vary from normal ambient pH by more than 0.5 pH units.
 - d. Un-ionized Ammonia 0.025 mg/L as an annual median; 0.16 mg/L as a maximum for Central Bay and upstream; 0.4 mg/L as a maximum for Lower Bay.
 - e. Nutrients Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.
3. Discharges shall not cause or contribute to a violation of any applicable water quality standard for receiving waters adopted by the Regional Water Board or the State Water Board as required by the CWA and regulations adopted there under. If more stringent applicable water quality standards are promulgated or approved pursuant to CWA section 303, or amendments thereto, the Regional Water Board will revise and modify this Order in accordance with such more stringent standards.

B. Groundwater Limitations – No discharges to groundwater authorized by this Order

VI. PROVISIONS

A. Standard Provisions

Dischargers shall comply with federal Standard Provisions included in Attachment D of this Order.

B. Monitoring and Reporting Program Requirements

1. Dischargers shall comply with the Monitoring and Reporting Program (Attachment E), and future revisions thereto, including applicable sampling and reporting requirements in the standard provisions listed in VI.A, above.
2. Dischargers authorized under this Order, especially those Dischargers with flow rates exceeding 10 gallons per minute, may be required to comply with additional monitoring requirements. The Executive Officer will specify such additional monitoring requirements in the Authorization to Discharge letter. Examples of additional monitoring that may be required are listed below:
 - a. Monitoring in response to a complaint received about a facility authorized to discharge under this permit,
 - b. Storm water monitoring,
 - c. Dioxins and furans monitoring,
 - d. Regional Monitoring Program (RMP) monitoring,
 - e. Additional discharge observations, and
 - f. Additional effluent and ambient priority pollutant scans.

C. Special Provisions

1. Reopener Provisions

The Regional Water Board may modify or reopen this Order prior to its expiration date in any of the following circumstances as allowed by law:

- a. If present or future investigations demonstrate that the discharges governed by this Order have or will have a reasonable potential to cause or contribute to, or will cease to have, adverse impacts on water quality or beneficial uses of the receiving waters.
 - b. If new or revised WQOs or total maximum daily loads (TMDLs) come into effect for the San Francisco Bay Estuary and contiguous water bodies (whether statewide, regional, or site-specific). In such cases, effluent limitations in this Order will be modified as necessary to reflect updated WQOs and waste load allocations in TMDLs. Adoption of effluent limitations contained in this Order is not intended to restrict in any way future modifications based on legally adopted WQOs or TMDLs, or as otherwise permitted under federal regulations governing NPDES permit modifications.
 - c. If State Water Board precedential decisions, new policies, new laws, or new regulations on chronic toxicity or total chlorine residual become available.
 - d. If an administrative or judicial decision on a separate NPDES permit or WDRs addresses requirements similar to this discharge.
 - e. The Discharger may request permit modification based on any of the circumstances described above. In any such request, the Discharger shall include an antidegradation and anti-backsliding analysis.
 - f. The California Department of Public Health established a notification level for 1, 4-dioxane in November 2010 and has determined that it is reasonably anticipated to be a human carcinogen. Although this Order does not provide an effluent limit for 1,4-dioxane, the Regional Water Board may reopen this Order prior to its expiration to revise permit provisions pertaining to 1,4-dioxane.
 - g. Or as otherwise authorized by law.
- 2. NOI or Modified NOI Application.** The NOI or Modified NOI application for each point of proposed discharge to a storm drain system shall contain the information required in the NOI Application as explained in Attachment B of this Order and as may be amended by the Executive Officer.
- 3. NOI Review.** Upon receipt of a complete NOI application package for proposed discharge, the Executive Officer will review the application to determine whether the proposed Discharger is eligible to discharge waste under this Order. The application package shall document that:
- a. The proposed discharge results from the cleanup of groundwater polluted by fuel leaks,

VOC leaks, and other related wastes;

- b. The proposed Discharger has met the provisions of Regional Water Board Resolution No. 88-160 (*Regional Water Board Position on the Disposal of Extracted Groundwater from Groundwater Cleanup Projects*); and
 - c. The proposed treatment system and associated operation, maintenance, and monitoring plans are capable of ensuring that the discharge will meet the provisions, prohibitions, effluent limitations, and receiving water limitations of this Order.
4. **Discharge Authorization.** If the Regional Water Board Executive Officer determines that the proposed Discharger is eligible to discharge waste under this Order, the Executive Officer will issue an Authorization to Discharge. This Authorization to Discharge may be terminated by the Executive Officer at any time.
 5. **Non-Compliance Is A Violation.** Upon receipt of the Regional Water Board Executive Officer's Authorization to Discharge, the Discharger shall comply with all applicable conditions and limitations of this Order and its Attachments. Any noncompliance (violations of requirements in this Order or Monitoring Program) constitutes a violation of the CWA and the CWC and is grounds for enforcement action and/or termination or modification of authorization to discharge.
 6. **Triggers.** The following triggers are not effluent limitations and must not be construed as such. Instead, the triggers are levels above which additional investigation is required to determine further action. If any constituent in the discharge exceeds the corresponding trigger as listed in Table 3, below, the Discharger shall take monthly influent and effluent samples for three consecutive months for each exceeded constituent and conduct activities as required in Provisions VI.C.7 or VI.C.8. If additional monitoring has already been completed, the Discharger shall summarize the results including a description of plans underway to address the previous exceedance, such as details of source elimination, changes in operation of existing treatment units, or the re-design of any treatment unit.

Table 3. Trigger Pollutants

Pollutant	Chemical Abstract Service (CAS) Number	Trigger (µg/L) ^{[1],[2]}
Antimony	7440360	6
Arsenic	7440382	10
Beryllium	7440417	4
Cadmium	7440439	1.1
Chromium (VI)	18540299	11 ^[3]
Copper ^[4]	7440508	5.9
Copper ^[5]	7440508	3.4
Copper ^[6]	7440508	4.7
Lead	7439921	3.2
Mercury	7439976	0.025
Nickel ^[4]	7440020	30
Nickel ^[5]	7440020	13
Nickel ^[6]	7440020	19
Selenium	7782492	5
Silver	7440224	2.2
Thallium	7440280	1.7
Zinc	7440666	86
Cyanide	57125	2.9

Pollutant	Chemical Abstract Service (CAS) Number	Trigger ($\mu\text{g/L}$) ^{[1],[2]}
Acrylonitrile	107131	0.059
Bromoform	75252	4.3
Chlorodibromomethane	124481	0.401
Dichlorobromomethane	75274	0.56
1,2-Dichloropropane	78875	0.52
1,3-Dichloropropylene	542756	0.5
1,1,2,2-Tetrachloroethane	79345	0.17
Pentachlorophenol	87865	0.28
2,4,6-Trichlorophenol	88062	2.1
Benzidine	92875	0.00012
Benzo(a)anthracene	56553	0.0044
Benzo(a)pyrene	50328	0.0044
Benzo(b)fluoranthene	205992	0.0044
Benzo(k)fluoranthene	207089	0.0044
Bis(2-chloroethyl)ether	111444	0.031
Bis(2-ethylhexyl)phthalate	117817	1.8
Chrysene	218019	0.044
Dibenzo(a,h)anthracene	53703	0.0044
3,3'-Dichlorobenzidine	91941	0.04
2,4-Dinitrotoluene	121142	0.11
1,2-Diphenylhydrazine	122667	0.040
Hexachlorobenzene	118741	0.00075
Hexachlorobutadiene	87683	0.44
Hexachloroethane	67721	1.9
Indeno(1,2,3-c,d)pyrene	193395	0.0044
N-nitrosodimethylamine	62759	0.00069
N-nitrosodi-n-propylamine	621647	0.005
Aldrin	309002	0.00013
alpha-BHC	319846	0.0039
beta-BHC	319857	0.014
gamma-BHC	58899	0.019
Chlordane	57749	0.00057
4,4-DDT	50393	0.00059
4,4-DDE	72559	0.00059
4,4-DDD	72548	0.00083
Dieldrin	60571	0.00014
alpha-Endosulfan	959988	0.0087
beta-Endosulfan	33213659	0.0087
Endrin	72208	0.0023
Endrin aldehyde	7421934	0.76
Heptachlor	76448	0.00021
Heptachlor epoxide	1024573	0.00010
PCBs, sum	1336363	0.00017
Toxaphene	8001352	0.0002
1,4-dioxane	123911	3
Turbidity (NTU)	---	5
Odor-Threshold (Units)	---	3
Oxygenates Other than MTBE	---	5
TPHs (other than gasoline and diesel)	---	50 ^[7]
Sulfate	---	250,000
Foaming agents	---	500
Color (Units)	-	15
Table Notes:		
[1] Units are in $\mu\text{g/L}$ unless noted otherwise right after the name of pollutant		
[2] If a discharger is reporting non-detect monitoring data with a reporting level higher than the trigger, the reason for the higher detection level shall be consistent with Appendix 4 of the SIP (Minimum Levels) and must be explained within the monitoring report. Please refer to the Regional Water Board web site for the latest version of SIP.		
[3] If total chromium concentration exceeds 11 $\mu\text{g/L}$, then analysis for chromium (VI) shall also be conducted.		
[4] Applicable to Suisun Bay and San Pablo Bay segments of San Francisco Bay.		
[5] Applicable to Central Bay and Lower Bay segments of San Francisco Bay		
[6] Applicable to South San Francisco Bay, south of Hayward Shoals.		
[7] If a discharger is reporting monitoring data with a detection level higher than 50 $\mu\text{g/L}$, the reason for the higher		

Pollutant	Chemical Abstract Service (CAS) Number	Trigger (µg/L) ^{[1],[2]}
detection level shall be explained within the monitoring report. In case of Bunker C Fuel, any non-detect result with reporting levels not exceeding 100 µg/L will not be deemed to be out of compliance with the 50 ug/L trigger level.		

7. **Trigger Case 1:** If the results of all three additional discharge samples **do not** exceed the triggers, the Discharger shall report the results in the next Monitoring Report and shall return to the schedule of sampling and analysis in the attached Monitoring and Reporting Program (Attachment E).

8. **Trigger Case 2:** If the results of **at least one of the three** additional discharge samples show exceedance of the same trigger, the Discharger shall investigate the source (e.g., comparing influent and discharge sample results) and investigate source control and/or treatment options for each triggered pollutant. The Discharger shall document its progress on these efforts in the Annual Self-Monitoring Report required by section IX.B of the Monitoring and Reporting Program (Attachment E). Until the Executive Officer determines that the “triggered pollutants” investigation is complete, the Discharger must implement the following monitoring schedule for the triggered pollutants:
 - a. In case of a triggered inorganic pollutant, the Discharger shall accelerate monitoring of the discharge to quarterly and provide information, updated annually, confirming that pollutant source is background and explain the reasons why treatment of that pollutant is not feasible. Specifically, the annual monitoring reports shall include site-specific background groundwater concentrations, types of treatment available, and costs of treatment systems for each triggered inorganic pollutant, and
 - b. In case of a triggered organic pollutant, the Discharger shall accelerate monitoring of the discharge to every two weeks and provide information, updated annually, confirming the reason(s) why that pollutant could not be treated to the level not exceeding the trigger for that pollutant.

9. The Executive Officer may require the Discharger to perform additional investigations or take additional actions if the Discharger: (1) exceeds a trigger value for the same pollutant and confirms (Trigger Case 2 above) the exceedance greater than two times in one calendar year; and (2) is not pursuing resolution of trigger exceedances in a timely fashion in the judgment of the Executive Officer. These two trigger exceedances do not include the data collected to verify the trigger (i.e., effluent data collected to confirm the trigger exceedance). These conditions are also grounds for termination of the Authorization to Discharge.

10. **Individual NPDES Permit May Be Required.** The USEPA Administrator may request the Regional Water Board Executive Officer to require any Discharger authorized to discharge waste by the General Permit to apply for and obtain an individual NPDES permit. The Executive Officer may require any Discharger authorized to discharge waste by the General Permit to apply for and obtain an individual NPDES permit. Cases where an individual NPDES permit may be required include the following:

- a. The Discharger is not in compliance with the conditions of this Order or as authorized by the Executive Officer;
- b. A change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the point source;
- c. Effluent limitation guidelines are promulgated for point sources covered by the General NPDES Permit; or
- d. A water quality control plan containing requirements applicable to such point sources is approved.

11. Treatment Reliability. Dischargers shall, at all times, retain a professional engineer certified in the State of California to oversee the design and operation and maintenance of the treatment system to properly operate and maintain all facilities that are used by the Dischargers to achieve compliance with this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. All of these procedures shall be described in an Operation and Maintenance (O&M) Manual. The Discharger shall keep in a state of readiness all systems necessary to achieve compliance with the conditions of this Order. All systems, both those in service and reserve, shall be inspected and maintained on a regular basis. Records shall be kept of the tests (e.g., analytical or treatment system tests) and made available to the Regional Water Board for at least five years. Additional requirements for compliance with this provision are explained in Attachments B and C of the Order.

12. No Preemption. This Order permits the discharge of treated groundwater to waters of the State subject to the prohibitions, effluent limitations, and provisions of this Order. It does not preempt or supersede the authority of municipalities, flood control agencies, or other local agencies to prohibit, restrict, or control discharges of waste to storm drain systems or other watercourses subject to their jurisdiction. For example, this Order provides no water or groundwater rights and does not preempt the authority of any local or State agency as relates to water rights.

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in Section IV of this Order will be determined as specified below:

A. General

Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined in the Monitoring and Reporting Program and Attachment A of this Order. For purposes of reporting and administrative enforcement by the Regional and State Water Boards, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).

B. Multiple Sample Data

When determining compliance with an Average Monthly Effluent Limitation (AMEL) or Maximum Daily Effluent Limitation (MDEL) for priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of “Detected, but Not Quantified” (DNQ) or “Not Detected” (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.
2. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

ATTACHMENT A – ACRONYMS AND DEFINITIONS**Acronyms**

CIWQS	California Integrated Water Quality System
AMEL	Average Monthly Effluent Limitation
Basin Plan	Water Quality Control Plan for the San Francisco Bay Basin
BPJ	Best Professional Judgment
CFR	Code of Federal Regulations
CTR	California Toxics Rule
CV	Coefficient of Variation
CWA	Federal Clean Water Act
DNQ	Detected, but Not Quantified
DO	Dissolved oxygen
ECA	Effluent Concentration Allowance
EFF	Effluent
MDEL	Maximum Daily Effluent Limitation
MDL	Method Detection Limit
ML	Minimum Level
MTBE	Methyl Tertiary Butyl Ether
ND	Not Detected
NTR	National Toxics Rule
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
PCE	Tetrachloroethylene
POTW	Publicly Owned Treatment Work
RL	Reporting Level
RPA	Reasonable Potential Analysis
SIP	State Implementation Policy
SSTs	Site-Specific Translators
TCE	Trichloroethylene
TPHG	Total Petroleum Hydrocarbons as Gasoline
TPHD	Total Petroleum Hydrocarbons as Diesel
µg/L	Microgram per Liter
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds

Definitions

Arithmetic Mean (μ), also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

$$\text{Arithmetic mean} = \mu = \Sigma x / n \quad \text{where: } \Sigma x \text{ is the sum of the measured ambient water concentrations, and } n \text{ is the number of samples.}$$

Average Monthly Effluent Limitation (AMEL) is the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Bioaccumulative pollutants are those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Carcinogenic pollutants are substances that are known to cause cancer in living organisms.

Coefficient of Variation (CV) is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

Detected, but Not Quantified (DNQ) are those sample results less than the RL, but greater than or equal to the laboratory's MDL.

Dilution Credit is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

Duly Authorized Representative is one whose:

- a. Authorization is made in writing by a principal executive officer or ranking elected official;
- b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as general partner in a partnership, sole proprietor in a sole proprietorship, the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

Effluent Concentration Allowance (ECA) is a value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the coefficient of variation for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in USEPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

Estimated Chemical Concentration is the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

Field Blank is defined as an individual sample demonstrated to be free from the contaminants of interest and other potentially interfering substances, and treated as a sample in all respects, including exposure to grab-sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the field blank is to determine if the field or sample transporting procedures and

environments have contaminated the sample.

Flow Sample is defined as the accurate measurement of the average daily flow volume using a properly calibrated and maintained flow-measuring device.

Grab Sample is defined as an individual sample collected in a short period of time not exceeding 15 minutes. Grab samples shall be collected during normal peak loading conditions for the parameter of interest, which may or may not be during hydraulic peaks. It is used primarily in determining compliance with maximum daily limits and average monthly limits. Grab samples represent only the condition that exists at the time the wastewater is collected.

Instantaneous Maximum Effluent Limitation is the highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation is the lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Maximum Daily Effluent Limitation (MDEL) means the highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Median is the middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements (n) is odd, then the median = $X_{(n+1)/2}$. If n is even, then the median = $(X_{n/2} + X_{(n/2)+1})/2$ (i.e., the midpoint between the $n/2$ and $n/2+1$).

Method Detection Limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in title 40 of the Code of Federal Regulations, Part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (ML) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Not Detected (ND) are those sample results less than the laboratory's MDL.

Ocean Waters are the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Water Board's California Ocean Plan.

Quality Assurance Officer is a qualified individual who was not otherwise involved in sample collection, transport, or analysis (please refer to the following web site for a more detailed description: http://www.waterboards.ca.gov/swamp/docs/swampqapp_template032404.doc) to investigate the cause of data error.

Persistent Pollutants are substances for which degradation or decomposition in the environment is nonexistent or very slow.

Reporting Level (RL) is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from Appendix 4 of the SIP in accordance with section 2.4.2 of the SIP or established in accordance with section 2.4.3 of the SIP. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

Source of Drinking Water is any water designated as municipal or domestic supply (MUN) in a Regional Water Board Basin Plan.

Standard Deviation (σ) is a measure of variability that is calculated as follows:

$$\sigma = (\sum[(x - \mu)^2]/(n - 1))^{0.5}$$

where:

x is the observed value;

μ is the arithmetic mean of the observed values; and

n is the number of samples.

Toxicity Reduction Evaluation (TRE) is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

ATTACHMENT B – NOTICE OF INTENT (NOI) APPLICATION FORM AND INSTRUCTIONS

Complete and submit this NOI to apply for Authorization or Reauthorization to Discharge and/or reuse extracted and treated groundwater resulting from the cleanup of groundwater polluted by volatile organic compounds (VOC), fuel leaks, and other related waste under the requirements of NPDES Permit No. CAG912002 (VOC and Fuel General Permit)

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the design engineer whose signature and engineering license number is documented in this notice, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

 Name (print)

 Signature and Date

 Title/Organization

 Address of Responsible Official

This Application is for the Groundwater Treatment Facility located at (provide street address):

This NOI form and all required attachment shall be uploaded to Geo-Tracker, http://www.waterboards.ca.gov/ust/electronic_submittal/index.shtml (contact Lourdes Gonzales at (510) 622-2365 or lgonzales@waterboards.ca.gov if you have any questions). If electronic submittal is not possible, applicants may submit the NOI package to the following address: California Regional Water Quality Control Board, San Francisco Bay Region, 1515 Clay Street, Suite 1400, Oakland, California 94612. Please include a check for \$11,195 (as of December 2011), or the most current fee amount, payable to the State Water Resources Control Board.

Table B-1. Mark only one as applicable

1	This is a new discharge.	
2	This discharge is currently authorized under Order No. R2-2009-0059 (VOC General Permit), which requires authorized dischargers, who need to continue discharging after September 30, 2014, to file a completed NOI form no later than April 3, 2014.	
3	This discharge is currently authorized under this Order (VOC and Fuel General Permit), which requires authorized dischargers who need to continue discharging after January 11, 2017, to file a completed NOI form no later than July 15, 2016.	
4	This discharge is currently authorized under this Order (VOC and Fuel General Permit) and this Form is submitted for modification of the current Authorization to Discharge.	

Table B-2. Mark or provide information as applicable

1	I have contacted the local sanitary sewer agency serving the above address and determined that discharging to the local sanitary sewer system is not a feasible option.	
2	I have contacted the local agencies having jurisdiction over the use of the storm drain system or watercourse and inform them about this proposed discharge.	
3	Approximately, what percentage of the total effluent is reused or will be reused?	%

Table B-3. Facility and Professional Engineer(s) information

1	Facility Name Discharger Name Discharger’s Contact Person Name, Mail Address, Phone number, and Email Address	
2	Authorized Person to Sign & Submit Reports	
3	Billing Information Contact Person Name, Mail Address, Phone number, and Email Address	
4	Design Professional Engineer’s Name, California License Number, Mail Address, Phone Number, and Email Address	
5	Operation and Maintenance Professional Engineer’s Name, California License Number, Mail Address, Phone Number, and Email Address	
6	Groundwater treatment system design capacity as certified by Professional Engineer in gallons per minute (gpm).	_____ gpm
7	Attach design capacity certification report including flow schematics showing every components of the treatment system to this application. The Professional Engineer shall affix his/her stamp including signature and engineering license number to the certification report.	
8	Type of Site or Project. For example: active service station, closed service station, solvent spills/leaks active or closed groundwater cleanup sites, short term dewatering project, long term dewatering Project, or other (please explain if “other”)	

9	Watershed. To determine the watershed, refer to the State of California Watershed Browser located online at www.conservation.ca.gov/dlrp/watershedportal/WatershedBrowser/Pages/WatershedBrowser.aspx or the Guide to San Francisco Bay Area Creeks located online at http://museumca.org/creeks/index.html .	
10	Discharge path to Receiving Water. Please list the complete path of the discharge and attach an aerial map [e.g., the discharge would travel about a quarter of a mile inside a storm drain system before reaching a river (provide the name of the river), and then would travel two miles in the river before reaching the bay].	
11	Project Brief Description and Tentative Completion Date	

Table B-4. Treatment System Description

	Unit	Number	Size or capacity (e.g. pounds of GAC) and Further Description (If Applicable)
1	Total number of extraction well(s) on site		
2	Extraction Wells with Dedicated Treatment Unit(s)		
3	Wellhead Treatment Unit(s)		
4	Settling Tank(s) in series		
5	Settling Tank(s) in parallel		
6	Oil/Water Separator(s)		
7	Filter(s) for particulates in groundwater		
8	Air Strippers with Air Filters		
9	Air Strippers without Air Filters		
10	Other Treatment Unit(s) (e.g. units installed for removing 1,4-dioxane)		
11	Granular Activated Carbon (GAC) Vessel(s) in Series		
12	GAC Vessel(s) in Parallel		
13	Chemical Additives		
14	Effluent Reuse Tank(s)		

Table B-5. Discharge location information

Discharge Point Location	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
Storm Drain Location where discharge enters:	° ' "	° ' "	Not applicable (complete the row below)
Location where discharge enters receiving water either directly or via storm drain system:	° ' "	° ' "	

Table B-6. List of pollutants (For new and existing discharges. For existing discharges, complete one table for influent and one for effluent)

Monitoring data since effective date of the initial discharge authorization letter, or estimated from groundwater monitoring data for new discharges	Pollutant 1	Pollutant 2	Pollutant 3	Add Columns and/or tables as needed (all detected pollutants with effluent limitations and all triggered pollutants exceeding the triggers shall be listed in this table)
Number of Samples				
Maximum Concentration				
Average Concentration (average of detected pollutants only)				
Number of times the effluent limitation was exceeded				
Median Concentration				
Minimum Concentration				
Number of Non-Detects				
Lowest Reporting Limit				
Highest Reporting Limit				
Number of Samples with Lowest Reporting Limit				
Most recent sample Date, Method Number				

Note: The Regional Water Board may modify this form at any time to reflect any new fees and other needed improvements as applicable.

ATTACHMENT C – NOTICE OF TERMINATION

**Complete and Submit to Request Termination of Coverage Under Requirements of General Waste Discharge Requirements for Discharge or Reuse of Extracted and Treated Groundwater resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds (VOC), Fuel Leaks, and Other Related Wastes
NPDES Permit No. CAG912002 (VOC and Fuel General Permit)**

For the Groundwater Treatment Facility located at:

Facility Street Address, City, Zip Code

CIWQS Place Identification Number

A PDF electronic copy of this form shall be uploaded on GeoTracker and a confirmation email shall be sent to the responsible staff member at this office, currently Lourdes Gonzales, at lgonzales@waterboards.ca.gov.

Table C-1. Mark only one as applicable

1	Temporary groundwater dewatering project, e.g., during a construction project, has been completed.	
2	Groundwater cleanup work has been completed.	
3	Method of groundwater cleanup has been changed with no need to discharge treated groundwater.	
4	Extract and treat method of groundwater cleanup will be stopped for a while and only monitoring of groundwater will occur at this site. Please attach documentation that the agency overseeing cleanup has no objection to cessation of groundwater extraction and treatment.	
5	Other reason. Please specify below (e.g., discharge to POTW has been granted):	

Table C-2. Agency Approval (applicable if Table C-1 row 2, 3, or 4 marked)

	Name, address, email, and phone number of the agency and agency staff overseeing the cleanup work	Have you provided a copy of this termination notice to this staff? (Yes/No. If No, please explain the reason)
1		

I, the Discharger, certify under penalty of law that this notice is prepared under my direction or supervision and last/final date of this discharge was _____. I am aware that discharging without a discharge authorization is in violation of California Water Code.

Name (print)

Signature and Date

Title/Organization (Discharger’s Organization)

Address, email, and phone number

Note: The Regional Water Board may modify this form at any time to reflect new requirements and other needed improvements.

ATTACHMENT D –STANDARD PROVISIONS

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ATTACHMENT D –STANDARD PROVISIONS**I. STANDARD PROVISIONS – PERMIT COMPLIANCE****A. Duty to Comply**

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 CFR § 122.41(a).)
2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 CFR § 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 CFR § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 CFR § 122.41(d).)

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 CFR § 122.41(e).)

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 CFR § 122.41(g).)
2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations (40 CFR § 122.5(c)).

F. Inspection and Entry

The Discharger shall allow the Regional Water Board, State Water Board, United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 CFR § 122.41(i); Wat. Code, § 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 CFR § 122.41(i)(1));
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 CFR § 122.41(i)(2));
3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 CFR § 122.41(i)(3)); and
4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (40 CFR § 122.41(i)(4).)

G. Bypass

1. Definitions
 - a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 CFR § 122.41(m)(1)(i).)
 - b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 CFR § 122.41(m)(1)(ii).)
2. Bypass of extracted groundwater. During a dewatering project, the Discharger may allow any bypass of uncontaminated extracted groundwater to occur which originates from uncontaminated extraction well(s). The Discharger shall monitor the water quality of these extractions wells to confirm that the extracted water remains uncontaminated. The Discharger may also allow any bypass to occur which does not cause exceedances of effluent limitation, but only if it is for essential maintenance to assure efficient operation. In this case, weekly monitoring results of pollutants of concern shall be reported in the quarterly monitoring reports.
3. Prohibition of bypass. Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless (40 CFR § 122.41(m)(4)(i)):

- a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 CFR § 122.41(m)(4)(i)(A));
 - b. There were no feasible alternatives to the bypass, such as turning off the extraction wells pump(s), discharge to a POTW, retention of untreated wastes, maintenance during normal periods of equipment downtime, or the use of auxiliary treatment facilities. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 CFR § 122.41(m)(4)(i)(B)); and
 - c. The Discharger submitted notice to the Regional Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR § 122.41(m)(4)(i)(C).)
4. The Regional Water Board may not take enforcement action against a Discharger for bypass, if the Regional Water Board determines that the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above have been met. (40 CFR § 122.41(m)(4)(ii).)
5. Notice
 - a. Anticipated bypass of uncontaminated extracted groundwater. If the Discharger knows in advance of the need for a bypass of uncontaminated extracted groundwater, it shall submit the necessary information in the initial or modified Notice of Intent, if possible at least 45 days before the date of the bypass. The necessary information includes but not limited to the name and number of extraction wells, flow rates for each well, the distance to other contaminated wells, and monitoring data such as turbidity, color, conductivity, pH, temperature, metals, TPH, VOC, SVOC, PAHs, Oxygenates.
 - b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 CFR § 122.41(m)(3)(ii).)

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 CFR § 122.41(n)(1).)

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 CFR § 122.41(n)(2)).

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 CFR § 122.41(n)(3)):
 - a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 CFR § 122.41(n)(3)(i));
 - b. The permitted facility was, at the time, being properly operated (40 CFR § 122.41(n)(3)(ii));
 - c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 CFR § 122.41(n)(3)(iii)); and
 - d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 CFR § 122.41(n)(3)(iv).)
3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 CFR § 122.41(n)(4).)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 CFR § 122.41(f).)

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must submit a completed Notice of Intent form (see Attachment B), 180 days in advance of the Order expiration date, **to** obtain a new permit. (40 CFR § 122.41(b).)

C. Transfers

Any authorization to discharge issued under this Order is not transferable to any person except after filing a modified Notice of Intent with the Regional Water Board. If the new Discharger has a different professional engineer, the modified Notice of Intent shall be revised accordingly.\

III. STANDARD PROVISIONS – MONITORING

- A.** Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 CFR § 122.41(j)(1).)
- B.** Monitoring results must be conducted according to test procedures under 40 CFR Part 136 or other test procedures specified in this Order. (40 CFR § 122.41(j)(4); § 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS – RECORDS

A. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time (40 CFR § 122.41(j)(2).)

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements (40 CFR § 122.41(j)(3)(i));
2. The individual(s) who performed the sampling or measurements (40 CFR § 122.41(j)(3)(ii));
3. The date(s) analyses were performed (40 CFR § 122.41(j)(3)(iii));
4. The individual(s) who performed the analyses (40 CFR § 122.41(j)(3)(iv));
5. The analytical techniques or methods used (40 CFR § 122.41(j)(3)(v)); and
6. The results of such analyses. (40 CFR § 122.41(j)(3)(vi).)

C. Claims of confidentiality for the following information will be denied (40 CFR § 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 CFR § 122.7(b)(1)); and
2. Permit applications and attachments, permits and effluent data. (40 CFR § 122.7(b)(2).)

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, State Water Board, or USEPA within a reasonable time, any information which the Regional Water Board, State Water Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, State Water Board, or USEPA copies of records required to be kept by this Order. (40 CFR § 122.41(h); California Water Code (CWC), § 13267.)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 CFR § 122.41(k).)
2. All permit applications shall be signed by a responsible person as explained below:
 - a. **For a corporation.** All permit applications shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a

- principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. (40 CFR § 122.22(a)(1).)
- b. **For a partnership or sole proprietorship.** All permit applications shall be signed by a general partner or the proprietor, respectively. (40 CFR § 122.22(a)(2).)
- c. **For a municipality, State, federal, or other public agency.** All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA). (40 CFR § 122.22(a)(3).)
3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
- a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 CFR § 122.22(b)(1));
- b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 CFR § 122.22(b)(2)); and
- c. The written authorization is submitted to the Regional Water Board. (40 CFR § 122.22(b)(3).)
4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 CFR § 122.22(c).)

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.” (40 CFR § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 CFR § 122.22(l)(4).)
2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form (40 CFR § 122.41(l)(4)(i).) or paper or electronic forms provided or specified by the Regional Water Board or State Water Board.
3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under Part 136 or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or other reporting form specified by the Regional Water Board. (40 CFR § 122.41(l)(4)(ii).)
4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 CFR § 122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 CFR § 122.41(l)(5).)

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be uploaded on GeoTracker (http://www.waterboards.ca.gov/ust/electronic_submittal/index.shtml) within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to

reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 CFR § 122.41(l)(6)(i).)

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 CFR § 122.41(l)(6)(ii)):
 - a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 CFR § 122.41(l)(6)(ii)(A).)
 - b. Any upset that exceeds any effluent limitation in this Order. (40 CFR § 122.41(l)(6)(ii)(B).)
3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 CFR § 122.41(l)(6)(iii).)

F. Planned Changes

The discharger shall file with the Executive Officer an amended Notice of Intent at least 60 days before making any material change in the character, location, or volume of the discharge. In case of proposing any change of treatment system or operation and maintenance procedures, a professional engineer certified in State of California shall certify the adequacy of the design and/or the procedures. A modified Notice of Intent is required under this provision only when (40 CFR § 122.41(l)(1)) the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged (pollutants regulated or not regulated by this Order). Three examples of significant changes are a change in discharge location, a change of the engineer responsible for the design and/or operation and maintenance of the treatment system, and an increase in discharge flow rates.

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with the requirements in this Order. (40 CFR § 122.41(l)(2).)

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. (40 CFR § 122.41(l)(7).)

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information. (40 CFR § 122.41(l)(8).)

VI. STANDARD PROVISIONS – ENFORCEMENT

The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Non-Municipal Facilities

Existing manufacturing, commercial, mining, and silvicultural Dischargers shall notify the Regional Water Board as soon as they know or have reason to believe (40 C.F.R. § 122.42(a)):

1. That any activity has occurred or will occur that would result in the discharge, on a routine or frequent basis, of any toxic pollutant that is not limited in this Order, if that discharge will exceed the highest of the following "notification levels" (40 C.F.R. § 122.42(a)(1)):
 - a. 100 micrograms per liter ($\mu\text{g/L}$) (40 C.F.R. § 122.42(a)(1)(i));
 - b. 200 $\mu\text{g/L}$ for acrolein and acrylonitrile; 500 $\mu\text{g/L}$ for 2,4-dinitrophenol and 2-methyl-4,6-dinitrophenol; and 1 milligram per liter (mg/L) for antimony (40 C.F.R. § 122.42(a)(1)(ii));
 - c. Five (5) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge (40 C.F.R. § 122.42(a)(1)(iii)); or
 - d. The level established by the Regional Water Board in accordance with section 122.44(f). (40 C.F.R. § 122.42(a)(1)(iv).)
2. That any activity has occurred or will occur that would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant that is not limited in this Order, if that discharge will exceed the highest of the following "notification levels" (40 C.F.R. § 122.42(a)(2)):
 - a. 500 micrograms per liter ($\mu\text{g/L}$) (40 C.F.R. § 122.42(a)(2)(i));
 - b. 1 milligram per liter (mg/L) for antimony (40 C.F.R. § 122.42(a)(2)(ii));
 - c. Ten (10) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge (40 C.F.R. § 122.42(a)(2)(iii)); or
 - d. The level established by the Regional Water Board in accordance with section 122.44(f). (40 C.F.R. § 122.42(a)(2)(iv).)

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM

National Pollutant Discharge Elimination System (NPDES) regulations at 40 CFR 122.48 require that all NPDES permits specify monitoring and reporting requirements. California Water Code (CWC) Sections 13267 and 13383 also authorize the Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program establishes monitoring and reporting requirements that implement the federal and State regulations.

I. GENERAL MONITORING PROVISIONS

- A.** The Discharger shall comply with this Monitoring and Reporting Program. The Executive Officer may amend this Monitoring and Reporting Program pursuant to 40 CFR 122.62, 122.63, and 124.5.
- B.** The Discharger shall conduct all monitoring in accordance with Attachment D, section III, and all tests must be performed by laboratories certified for the analyses in accordance with the California Water Code Section 13176. Equivalent test methods must be more sensitive than those specified in 40 CFR 136 and must be specified in the permit or in the related discharge authorization letter.
- C.** Monthly discharge flow volume, total quarterly flow, and annual flow shall be recorded.
- D.** The number and frequency of bypasses and accidental spills shall be recorded.
- E.** A copy of this Order, a complete copy of the Notice of Intent (NOI) filed, documentation of the Authorization to Initiate Discharge received from the Regional Water Board, a full copy of the Operation and Maintenance (O&M) Manual, and any other documents relevant to the operation and maintenance of the treatment facility shall be stored at or near the treatment facility, and made available to Regional Water Board staff, USEPA staff, or their contractors upon request. The Discharger shall inspect its facility as frequently as required by the O&M Manual.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E-1. Monitoring Station Locations

Discharge Point Name (if applicable)	Monitoring Location Name	Monitoring Location Description (include Latitude and Longitude when available)
---	INF-001	At a point in the extraction system immediately prior to inflow to the treatment unit.
001	EFF-001	At a point in the discharge line immediately following treatment and before it joins or is diluted by any other waste stream, body of water, or substance.
---	RSW-001U	At a point 50 feet upstream from the point of discharge into the receiving water, or if access is limited, at the first point upstream which is accessible.
---	RSW-001D	At a point 50 feet downstream from the point of discharge into the receiving water, or if access is limited, at the first point downstream which is accessible.

Discharge Point Name (if applicable)	Monitoring Location Name	Monitoring Location Description (include Latitude and Longitude when available)
---	REU-001	At a point immediately prior to reuse location. Not applicable if effluent is not reused or reclaimed.

III. INFLUENT MONITORING REQUIREMENTS

The Discharger shall monitor influent to the facility at Monitoring Location INF-001 in accordance with the schedule shown on Column 1 of Table E.2.

IV. EFFLUENT MONITORING REQUIREMENTS

Dischargers shall monitor discharges of treated wastewater from the facility at Monitoring Location EFF-001, in accordance with the schedule shown on Column 2 of Table E.2. Effluent sampling shall occur concurrently (within 30 minutes) with influent sampling.

- A. **Monitoring during bypass.** When any type of bypass occurs, grab samples shall be collected on a daily basis for all constituents at all affected discharge points that have effluent limits for the duration of the bypass.
- B. **Required Actions After Any Effluent Violation.** If the analytical results show violation of any effluent limitation, the Discharger shall take a confirmation effluent sample, together with receiving water samples (see Column 3 of Table E-2) within 24 hours of becoming aware of the violation of effluent limit. The Discharger must have the confirmation sample analyzed by expedited methods and obtain results within 24 hours of sample collection. If the analytical results are also in violation of the effluent limit, the Discharger shall terminate the discharge until it has corrected the cause of violation. In this case, both the initial and confirmed results are violations. However, if the confirmation effluent sampling shows compliance, the Regional Water Board will consider only the initial exceedance as a violation.

V. WHOLE EFFLUENT ACUTE TOXICITY TESTING REQUIREMENTS

The Discharger shall monitor acute toxicity at EFF-001 as follows:

- A. Compliance with the acute toxicity effluent limitations of this Order shall be evaluated by measuring survival of test organisms to 96-hour static renewal bioassays at Monitoring Location EFF-001.
- B. Test organisms shall be rainbow trout unless the Executive Officer specifies otherwise in writing.
- C. All bioassays shall be performed according to the most up-to-date protocols in 40 CFR 136m currently in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms*, 5th Edition.
- D. If specific identifiable substances in the discharge can be demonstrated by the Discharger as being rapidly rendered harmless upon discharge to the receiving water, compliance with the acute toxicity limitation may be determined after the test samples are adjusted to remove the influence of those substances. Written approval from the Executive Officer must be obtained to authorize such an adjustment.

- E. The sample may be taken from effluent prior to chlorination. Monitoring of the bioassay water shall include, on a daily basis, the following parameters: pH, dissolved oxygen, ammonia, (if toxicity is observed), temperature, hardness, and alkalinity. These results shall be reported. If a violation of acute toxicity requirements occurs, the bioassay test shall be repeated with new fish as soon as practical and shall be repeated until a test fish survival rate of 90 percent or greater is observed. If the control fish survival rate is less than 90 percent, the bioassay test shall be restarted with new fish and shall continue as soon as practical until an acceptable test is completed (i.e., control fish survival rate is 90 percent or greater).

VI. RECLAMATION MONITORING REQUIREMENTS

The Discharger shall monitor reuse effluent at Monitoring Location REU-001 as shown on Column 2 of Table E.2.

VII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER AND GROUNDWATER

The Discharger shall monitor receiving water at Monitoring Locations RSW-001U and RSW-001D as shown on Column 3 of Table E.2.

- A. Receiving water sampling shall occur concurrently with effluent sampling.
- B. Receiving water samples shall be collected at each station on each sampling day during the period within 1 hour following low slack water, if relevant. Where sampling at lower slack water period is not practical, sampling shall be performed during higher slack water period. Samples shall be collected within the discharge plume and 50 feet down current of the discharge point so as to be representative, unless otherwise stipulated.
- C. Samples should be collected within one foot below the surface of the receiving water body. Explanation shall be provided in the monitoring report if this specification could not be met.

Table E-2. Schedule for Sampling, Measurements, and Analysis

Required Analytical Test Method Number, Technique, Standard Methods (SM), USEPA Method Number (EPA), 40 CFR Part (or equivalent)/Sampling Station	Column 1 Minimum Sampling Frequency for Influent INF-001	Column 2 Minimum Sampling Frequency for Effluent EFF-001 or Effluent for Reuse REU-001	Column 3 Minimum Sampling Frequency for Receiving Surface Water RSW-001U and RSW-001D
Unit is “µg/L” and Type of Sample is “Grab” unless noted otherwise	Grab	Grab	Grab
Discharge Flow (gpm & gpd)	-	Continuous	-
Reclamation Flow Rate (gpm & gpd or gallons reclaimed during the calendar quarter if reclamation is not continuous)	-	Continuous	-
Fish Toxicity, 96-hr (% survival), EPA-821-R-02-012 Test, Method 2019.0	-	Q/Y	-
All Applicable Standard Observations (No Unit)	D/M	D/M	V
Volatile Organic Compounds, EPA 8260b for discharges from sites contaminated with fuel leaks and other related wastes	Y	Y	V
Volatile Organic Compounds, EPA 8260b for dischargers from sites contaminated with VOC	2/Y	D/M	V
1,4-Dioxane (See Note 3), EPA 8270c	-	2/Y	-

Required Analytical Test Method Number, Technique, Standard Methods (SM), USEPA Method Number (EPA), 40 CFR Part (or equivalent)/Sampling Station	Column 1 Minimum Sampling Frequency for Influent INF-001	Column 2 Minimum Sampling Frequency for Effluent EFF-001 or Effluent for Reuse REU-001	Column 3 Minimum Sampling Frequency for Receiving Surface Water RSW-001U and RSW-001D
Unit is “µg/L” and Type of Sample is “Grab” unless noted otherwise	Grab	Grab	Grab
Semi Volatile Organic Compounds except PAHs (See Note 1), EPA 8270c	D/Q	D/M	-
Turbidity	-	D/Q/Y	-
pH	D/M/Q/Y	D/M/Q/Y	V
Dissolved Oxygen (mg/L)	-	-	V
Total Dissolved Solids (mg/L) (construction and dewatering projects)	-	D/M	-
Temperature (°C)	-	D/M/Q/Y	-
Electrical Conductivity	-	D/M/Q/Y	-
Hardness (mg/L as CaCO ₃)	-	-	T
Salinity (parts per thousand)	-	-	T
Ethylene Dibromide (EDB) (See Note 1), 504	D/Q	D/M	V
Benzene, Toluene, Ethylbenzene, and/or Total Xylenes (See Note 1), EPA 8020	D/Q	D/M	V
Methyl Tertiary Butyl Ether (MTBE) (See Note 1), EPA 8020	D/Q	D/M	V
Total Petroleum Hydrocarbons as Gasoline (See Note 1), EPA 8015 Modified	D/Q	D/M	V
Total Petroleum Hydrocarbons as Diesel (See Note 1), EPA 8015 Modified	D/Q	D/M	V
Total Petroleum Hydrocarbons other than Gasoline and Diesel (required if Petroleum Hydrocarbons other than Gasoline and Diesel present in the soil and groundwater) (See Note 1), EPA 8015 Modified	D/Q	D/M	V
Polynuclear Aromatic Hydrocarbons (PAHs) (See Note 1), 8310	D/Q	D/M	V
Tertiary Amyl Methyl Ether (TAME), Diisopropyl Ether (DIPE), Ethyl Tertiary Butyl Ether (ETBE), Tertiary Butyl Alcohol (TBA), Ethanol, and/or Methanol (See Note 1)	D/Y	D/Y	-
Total Chlorine Residual (See Note 1), (Field Kit, EPA 330 or SM 4500-Cl)	D/Q	D/M	V
Antimony (EPA 204.2), Arsenic (EPA 206.3), Beryllium (GFAA or ICPMS), Cadmium (GFAA or ICPMS), Hexavalent and Total Chromium (SM 3500), Copper (EPA 200.9), Cyanide (SM 4500-CN C or I), Lead (EPA 200.9), Mercury (EPA 1631), Nickel (EPA 249.2), Selenium (SM 3114B OR C), Silver (EPA 272.2), Thallium (EPA 279.2), and Zinc (EPA 200.8) (See Note 2) for dischargers from sites contaminated with VOC		3Y	
Antimony (EPA 204.2), Arsenic (EPA 206.3), Beryllium (GFAA or ICPMS), Cadmium (GFAA or ICPMS), Hexavalent and Total Chromium (SM 3500), Copper (EPA 200.9), Cyanide (SM 4500-CN C or I), Lead (EPA 200.9), Mercury (EPA 1631), Nickel (EPA 249.2), Selenium (SM 3114B OR C), Silver (EPA 272.2), Thallium (EPA 279.2), and Zinc (EPA 200.8) (See Note 2) for discharges from sites contaminated with fuel leaks and other related wastes	-	D/Y	-
Other pollutants such as non VOC-related odor, sulfate and foaming agents (See Note 1), SM	D/Q/Q/Y	D/M/Q/Y	V

Notes:

Note 1: if known to be present in the influent.

Note 2: Inorganic compounds samples shall be analyzed for total (unfiltered) constituents with the reporting levels not exceeding the following: 0.002 ug/L for Mercury; 0.25 ug/L for Cadmium and Silver; 1 ug/L for Nickel, Thallium, and Zinc; 2.0 ug/L for Arsenic and Selenium; 1 ug/L for Cyanide; and 0.5 ug/L for Antimony, Beryllium, Total Chromium, Copper, and Lead (SIP Appendix 4 Minimum Levels)

<http://www.waterboards.ca.gov/iswp/docs/final.pdf>). If the Discharger cannot attain the reporting levels for Zinc, Arsenic, or Total Chromium, the reason(s) along with any supporting documentation shall be documented in the monitoring reports. Water Board staff shall make a compliance determination based on data provided. If the Discharger exceeds the trigger for mercury of 0.025, the Discharger may consider re-sampling and re-analyzing another sample using ultra-clean techniques as described in USEPA methods 1669 and 1631 to eliminate the possibility of artifactual contamination of the sample. For pollutants not listed in Appendix 4 of the SIP, the Discharger shall provide the reason for the higher detection level along with any supporting documentation in the monitoring reports. Water Board staff shall make a compliance determination based on data provided.

Note 3: Use techniques such as selective ion mode or isotope dilution to achieve reporting levels not exceeding 1 ug/l.

Definitions: ug/L = microgram per liter or parts per billion (ppb); g/day = grams per day; gpm = gallons per minute; mg/L = milligram per liter or parts per million (ppm); gpd = gallons per day; MFL = million fibers per liter
GC = Gas Chromatography; GCMS = Gas Chromatography/Mass Spectrometry; FAA = Flame Atomic Absorption; GFAA = Graphite Furnace Atomic Absorption; Hydride = Gaseous Hydride Atomic Absorption; ICP = Inductively Coupled Plasma; and ICPMS = Inductively Coupled Plasma/Mass Spectrometry.

Legends:

D/M Once during the first and fifth day of startup; monthly thereafter. For VOC, if a discharger has no VOC detected in the influent or the effluent other than Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylenes, Tertiary Amyl Methyl Ether (TAME), Diisopropyl Ether (DIPE), Ethyl Tertiary Butyl Ether (ETBE), Tertiary Butyl Alcohol (TBA), Ethanol, or Methanol then frequency of VOC monitoring may be reduced to once a year.

D/Q Once during the first and fifth day of startup; quarterly thereafter.

Y Once during the first week of startup; annually thereafter.

3Y Once during the first week of startup; every three years thereafter.

2/Y Once during the first week of startup; twice per year thereafter.

D/Y Once during the first and fifth day of startup; annually thereafter.

Q/Y Quarterly for first year of operation, annually thereafter.

D/Q/Y Once during the first and fifth day of startup; quarterly for first year of operation, annually thereafter.

D/M/Q/Y Once during the first and fifth day of startup; monthly for first year of operation, quarterly for the second year, and annually thereafter. In case of pH analysis, this monitoring requirement is only for facilities with a treatment process that would cause no pH variances in the effluent. If any chemical used in the treatment process may cause pH variances in the effluent, the frequency of pH monitoring in the effluent shall be increased to twice per week for the first month of operation and weekly thereafter if pH monitoring data for the first month of operation demonstrate compliance with pH effluent limits.

V Receiving Waters sampling must be performed together (on the same calendar day) with the required effluent confirmation sampling that is required when a violation of an effluent limit is known, and the sample analyzed for that specific violated parameter and the Dissolved Oxygen level. In no case, should a Discharger continue discharging in known violation of effluent limits just to comply with this receiving water sampling requirement.

T Sampling shall be performed when Cadmium, Chromium (total), Copper, Lead, Nickel, Silver, or Zinc triggers are exceeded.

VIII. OTHER MONITORING REQUIREMENTS

A. Startup Phase Monitoring. During the original startup for the treatment system, sampling of the effluent must occur on the first day and fifth day of operation (weekend days may be excluded).

1. On the first day of the original startup, the system shall be allowed to run until at least three to five well volumes are removed and until three consecutive readings for pH, conductivity, and temperature are within five percent of each other; then, the influent and effluent shall be sampled and submitted for analyses. Prior to receipt of the results of the initial samples, all effluent shall be discharged into a holding tank (that is contained, not discharged to the receiving water) or discharged to the sanitary sewer until the results of the analyses show the discharge to be within the effluent limits established in this Order and/or as authorized by the Executive Officer. The treatment system may be shut down after the first day's sampling to await the analyses results and thereby reduce the amount of storage needed. If the treatment system is shut down more than 120 hours during the original startup (awaiting analyses results, etc.), the original startup procedures and sampling must be repeated. For the stored effluent, if the results of the analyses show the discharge to be in violation, the effluent shall: (1) be retreated until the retreated effluent is in compliance, or (2) be disposed of in accordance with the applicable provisions of California Code of Regulations.
2. If the first day's sampling shows compliance, the treatment system shall be operated for a total of five days with the discharge to the storm sewer or other conveyance system leading to the receiving water, and be sampled again during the fifth day. While the fifth day's

samples are being analyzed, the effluent may be discharged to the receiving water as long as the analyses are received within 120 hours of sampling, and then, continue to be discharged to the receiving water if the analyses show compliance. Otherwise, the original startup procedures and sampling must be repeated. In case of a temporary shutdown, if the facility reported effluent limit violation(s) during the previous three years, then any re-startup shall follow the original startup procedures.

B. Chemical Additives Monitoring: If applicable, monitoring related to chemical usage shall be conducted by the Discharger as required in its treatment system design specification and Operation and Maintenance Manual.

C. Standard Observations for Receiving Water

1. Floating and suspended materials (e.g., oil, grease, algae, and other macroscopic particulate matter): presence or absence, source, and size of affected area.
2. Discoloration and turbidity: description of color, source, and size of affected area.
3. Odor: presence or absence, characterization, source, distance of travel, and wind direction.
4. Beneficial water use: presence of water-associated waterfowl or wildlife, fisherperson, and other recreational activities in the vicinity of each sampling station.
5. Hydrographic condition, if relevant:
 - a. Time and height of corrected high and low tides (corrected to nearest National Oceanic and Atmospheric Administration location for the sampling date and time of sample and collection).
 - b. Depth of water columns and sampling depths.
6. Weather condition:
 - a. Air temperature.
 - b. Wind direction and estimated velocity.
 - c. Total precipitation during the five days prior to observation.

D. Standard Observations for Onsite Usage of Reclaimed Water

1. Floating and suspended materials of waste origin (to include oil, grease, algae, and other macroscopic particulate matter): presence or absence, source, and size of affected area.
2. Discoloration and turbidity: description of color, source, and size of affected area.
3. Odor: presence or absence, characterization, source, distance of travel, and wind direction.
4. Weather condition:

- a. Air temperature.
 - b. Wind direction and estimated velocity.
 - c. Total precipitation during the previous five days and on the day of observation.
5. Deposits, discolorations, and/or plugging in the conveyance system that could adversely affect the system reliability and performance.
 6. Operation of the valves, outlets, sprinkler heads, and/or pressure shutoff valves in conveyance system.

E. Standard Observations for Groundwater Treatment System

1. Odor: presence or absence, characterization, source, distance of travel, and wind direction.
2. Weather condition: wind direction and estimated velocity.
3. Deposits, discolorations, and/or plugging in the treatment system (stripping tower, carbon filters, etc.) that could adversely affect the system reliability and performance.
4. Operation of the float and/or pressure shutoff valves installed to prevent system overflow or bypass.

IX. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

The Discharger shall comply with all Standard Provisions (Attachment D) and in this document related to monitoring, reporting, non-compliance reporting, and record keeping.

B. Self Monitoring Reports (SMRs)

1. **SMR Format.** At any time during the term of this Order, the State or Regional Water Board may notify the Discharger to electronically submit SMRs using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (<http://www.waterboards.ca.gov/ciwqs/index.html>). The CIWQS website will provide additional directions for SMR submittal. In the interim, Dischargers shall submit SMRs using the submittal method specified in the Authorization to Discharge letter.
2. **SMR Due Dates and Contents.** The Discharger shall submit SMRs by the due dates, and with the contents, specified below:
 - a. The Discharger shall submit quarterly SMRs no later than 45 days after the end of each calendar quarter, including the results of all required monitoring.
 - b. The Discharger shall submit annual reports by February 15 of each year, covering the previous calendar year. The annual report shall contain all data required for the fourth quarter in addition to summary data required for annual reporting. This report may be submitted in lieu of the report for the fourth quarter of a calendar year.

- c. The Discharger shall report in the SMR the results for all monitoring specified in this Monitoring and Reporting Program under sections III through VIII. If there has been no discharge during the entire reporting period, quarterly and annual reports must still be submitted to report that has been the case.
- d. The Discharger shall attach a cover letter to the monitoring reports. The information contained in the cover letter shall clearly identify number of permit violations; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation. In the cover letter, the Discharger shall also document the volume of the effluent reused during that reporting period.
- e. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with the effluent limitations. The Discharger shall not include laboratory reports unless requested.
- f. Monitoring reports must be submitted to the Regional Water Board signed, certified, and using the submittal method specified by the Authorization to Discharge letter.
- g. The monitoring reports shall also include a description of operation and maintenance (O&M) of the groundwater extraction and treatment system consistent with the O&M manual, which shall be available to all personnel who are responsible for operation and maintenance activities.
- h. The monitoring reports shall include the results of analyses and observations as follows:
 - (1) Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.
 - (2) A table identifying by method number the analytical procedures used for analyses. Any special methods shall be identified and should have prior approval of the Regional Water Board's Executive Officer.
 - (3) Laboratory results shall be summarized in tabular form but actual laboratory reports do not need to be included in the report. A summary of quality assurance/quality control activities data such as field, travel, and laboratory blanks shall be reported for each analyzed constituent or group of constituents.
 - (4) A summary of the monitoring data to include information such as source of the sample (influent, effluent, or receiving water); the constituents; the methods of analysis used; the laboratory reporting limits in $\mu\text{g/L}$; the sample results ($\mu\text{g/L}$); the date sampled; and the date sample was analyzed.
 - (5) Flow (in gpm) and mass removal data (in kilograms).
 - (6) Summary of treatment system status during the reporting period (e.g., in operation/on standby) and reason(s) for non-routine treatment system shut down.

- (7) The annual reports shall contain tabular summary of the monitoring data obtained during the previous year. In addition, the annual reports shall contain a comprehensive discussion of the compliance record and the corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements including any trigger study required by Special Provision VI.C.6 and the progress in satisfaction of Special Provisions VI.C.7 and VI.C.8 of this Order. The annual report shall document that the annual fee has been paid.
- (8) If, during any calendar quarter, a Discharger becomes aware that any monitoring data obtained for compliance with this Order may be invalid, the Discharger shall submit a claim of invalid monitoring data, as uploaded on GeoTracker, with a confirmation email to the Regional Water Board staff in charge of this permit, within 45 days after end of that calendar quarter. The Discharger shall include with this claim, the name, phone number, and email of its assigned staff to investigate the cause(s) of errors and the corrective actions taken, or date when actions will be completed to eliminate or reduce future data errors. The Discharger shall also provide, in this claim, a date that the O&M manual will be updated to include errors prevention measures. These preventive measures shall include but not be limited to accelerated monitoring (e.g., twice a month monitoring for at least one month) to provide valid monitoring data indicating the effectiveness of the proposed preventive measures.
- i. Additional Specifications for Submitting SMRs to CIWQS — If the Discharger submits SMRs to CIWQS, it shall submit analytical results and other information using one of the following methods:

Table E-3. SMR Reporting for CIWQS

Parameter	Method of Reporting	
	EDF/CDF data upload or manual entry	Attached File
All parameters identified in influent, effluent, and receiving water monitoring tables (except Dissolved Oxygen and Temperature)	Required for All Results	
Dissolved Oxygen Temperature	Required for Monthly Maximum and Minimum Results Only ⁽¹⁾	Discharger may use this method for all results or keep records
Cyanide Arsenic Cadmium Chromium Copper Lead Mercury Nickel Selenium Silver Zinc Dioxins and Furans (by U.S. EPA Method 1613)	Required for All Results ⁽²⁾	

Antimony Beryllium Thallium Pollutants by U.S. EPA Methods 601, 602, 608, 610, 614, 624, and 625	Not Required (unless identified in influent, effluent, or receiving water monitoring tables), But Encouraged ⁽¹⁾	Discharger may use this method and submit results with application for permit reissuance, unless data submitted by CDF/EDF upload
Analytical Method	Not Required (Discharger may select “data unavailable”) ⁽¹⁾	
Collection Time Analysis Time	Not Required (Discharger may select “0:00”) ⁽¹⁾	

Notes for Table E-3:

- [1] The Discharger shall continue to monitor at the minimum frequency specified in the monitoring tables, keep records of the measurements, and make the records available upon request.
- [2] These parameters require EDF/CDF data upload or manual entry regardless of whether monitoring is required by this Monitoring and Reporting Program or other provisions of this Order (except for biosolids, sludge, or ash provisions).

3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Table E-4. Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period
Continuous	Effective startup date	All
Daily	Effective startup date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.
Weekly	Effective startup date	Effective startup day through one week after Effective startup date
Monthly	First day of calendar month following the last day of the startup date	1 st day of calendar month through last day of calendar month
Quarterly	Closest of January 1, April 1, July 1, or October 1 following (or on) the last day of the startup date	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31
Semiannually	Closest of January 1 or July 1 following (or on) the last day of the startup date	January 1 through June 30 July 1 through December 31
Annually	January 1 following (or on) the last day of the start -up date	January 1 through December 31

- 4. The Discharger shall report with each sample result the applicable Reporting Level (RL) and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR Part 136. The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:
 - a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).
 - b. Sample results less than the RL, but greater than or equal to the laboratory’s MDL, shall

- be reported as “Detected, but Not Quantified,” or DNQ. The estimated chemical concentration of the sample shall also be reported. For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words “Estimated Concentration” (may be shortened to “Est. Conc.”). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (\pm a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.
- c. Sample results less than the laboratory’s MDL shall be reported as “Not Detected,” or ND.
 - d. Dischargers are to instruct laboratories to establish calibration standards so that the Minimum Level (ML) value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from *extrapolation* beyond the lowest point of the calibration curve.

C. Discharge Monitoring Reports (DMRs) - Not Applicable

D. Other Reports

1. **Startup Report:** A report on the startup phase shall be included in the first quarterly monitoring report. This report shall include a certification that a professional engineer certified in the State of California oversees the treatment system operation and maintenance activities including the startup work.
2. **Spill Reports:** If any hazardous substance is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of the state, the Discharger shall report such a discharge to this Regional Water Board, at (510) 622-2369, and to the California Emergency Management Agency, at (800) 852-7550, within 24 hours of becoming aware of the spill. A written report shall be uploaded on GeoTracker, with an confirmation email to staff, within five working days and shall contain information relative to:
 - a. Nature of waste or pollutant,
 - b. Quantity involved,
 - c. Duration of incident,
 - d. Cause of spilling,
 - e. Spill Prevention, Control, and Countermeasure Plan (SPCC) in effect, if any,
 - f. Estimated size of affected area,
 - g. Nature of effects (i.e., fish kill, discoloration of receiving water, etc.),
 - h. Corrective measures that have been taken or planned, and a schedule of these activities, and

- i. Persons/agencies notified.
3. **Reports of Treatment Unit Bypass and Permit Violation:** In the event the Discharger violates or threatens to violate the conditions of the waste discharge requirements and prohibitions or intends to permit a treatment unit bypass, the Discharger shall notify the Regional Water Board within 24 hours of when the Discharger or Discharger's agent has knowledge of the incident and confirm this notification in writing and uploaded on GeoTracker with a confirmation email to Regional Water Board staff, within 5 working days of the initial notification. The written report shall include time, date, duration and estimated volume of waste bypassed, method used in estimating volume and person notified of the incident. The report shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps were taken to prevent the problem from recurring.

A treatment unit bypass may occur due to:

- a. Maintenance work, power failures, or breakdown of waste treatment equipment,
 - b. Accidents caused by human error or negligence,
 - c. The self-monitoring program results exceeding effluent limitations,
 - d. Any activity that would result in a frequent or routine discharge of any toxic pollutant not limited by this Order, or
 - e. Other causes, such as acts of nature.
4. **Additional Reporting:** If a violation of the effluent limitations should occur, the Discharger shall direct the effluent to a holding tank and contained, or the extraction and treatment system shall be shut down. The confirmation sampling shall be conducted when the discharge is directed to a holding tank and contained or right before the extraction and treatment system is shut down. The content of the holding tank shall be retreated until the retreated effluent is in compliance, be discharged to a publicly owned treatment works (POTW), or be disposed in accord with the provisions of applicable California Code of Regulations. The Discharger shall obtain permission from the POTW for any temporary or permanent discharges to the sanitary sewer. All confirmation sampling results shall be reported.

ATTACHMENT F – FACT SHEET

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ATTACHMENT F – FACT SHEET

As described in Section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order. This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for dischargers in California. Except where identified as “not applicable”, all sections or subsections are applicable to the discharges regulated under this Order.

This Order is intended to cover discharges of extracted and treated groundwater resulting from the cleanup of groundwater polluted by volatile organic compounds (VOC), fuel leaks, and other related wastes. This Order combines two previously issued Regional Water Board orders:

- a. R2-2006-0075, NPDES General Permit for the discharge of extracted and treated groundwater resulting from the cleanup of groundwater polluted by fuel leaks and other related wastes at service stations and similar sites (**Fuel General Permit**), and
- b. R2-2009-0059, NPDES General Permit for the discharge of extracted and treated groundwater resulting from the cleanup of groundwater polluted by volatile organic compounds (**VOC General Permit**). The VOC General Permit remains in effect and the dischargers authorized under this permit will need to seek coverage under this Order no later than April 3, 2014.

I. PERMIT INFORMATION

From 1980 to date, approximately 11,000 sites with underground fuel or VOC storage tanks in the San Francisco Bay Region are known to be leaking or to have leaked. Historically, a number of these sites were cleaned-up by extracting and treating contaminated groundwater and discharging treated groundwater to surface water. Because the number of such applications exceeded the capacity of available Regional Water Board staff to develop and bring individual waste discharge requirements to the Regional Water Board for adoption, in the early 1990s, the Regional Water Board issued National Pollutant Discharge Elimination System (NPDES) General Permits to cover such discharges.

In 1991, the Regional Water Board issued the Fuel General Permit. This permit was reissued in 1996, 2001, and 2006. The 2006 permit (Regional Water Board Order No. R2-2006-0075) expired on January 12, 2012. There are 20 current Dischargers covered under this permit. In 2011, 18 Dischargers submitted Notice of Intent (NOI) applications to either continue discharging or initiate the discharge of treated groundwater to surface water under the Fuel General Permit after it expires.

In 1994, the Regional Water Board issued the VOC General Permit. This permit was reissued in 1999, 2004, and 2009. The current VOC General Permit (Regional Water Board Order No. R2-2009-0059) was adopted on August 12, 2009, became effective October 1, 2009, and expires September 30, 2014. There are 56 current Dischargers covered under this permit.

The Fuel General Permit needs to be reissued because 18 Dischargers have submitted NOI applications to either continue discharging or initiate the discharge of treated groundwater to surface water. In addition, within the next five years, it is anticipated that a number of fuel-contaminated sites will be conducting cleanup by extracting contaminated groundwater, treating, and discharging

treated groundwater. Some Publicly Owned Treatment Works (POTWs) do not accept new discharges from groundwater clean-up, and, therefore, a number of sites conducting groundwater cleanup will require waste discharge requirements from the Regional Water Board for discharge to surface water. The number of cleanups anticipated exceeds the capacity of available Regional Water Board staff to develop and bring individual waste discharge requirements to the Regional Water Board for adoption. These circumstances create the need for an expedited system to process the anticipated requests. The reissuance of the Fuel General Permit will expedite the processing of requirements, enable the Regional Water Board to better utilize limited staff resources, and permit cleanups to begin promptly.

What is New in this Permit Reissuance - Because the nature and treatment of pollutants present in fuel-contaminated groundwater and VOC-contaminated groundwater is similar, the Regional Water Board expects to cover both types of discharges under this General Permit. It is also anticipated that the total number of VOC and fuel-contaminated sites that will be conducting cleanup by extracting contaminated groundwater, and treating and discharging treated groundwater to surface water will decline. This decline is the result of several factors:

- (i) Fewer open cases as the Regional Water Board closes cases but finds not as many new cases to take their place,
- (ii) Significant shift in groundwater cleanup technology away from "pump and treat" and towards in-situ methods, due to the latter's greater effectiveness, and
- (iii) Wider use of the Regional Water Board low-threat closure tool for both fuel and VOC cleanup sites.

For the above reasons, two separate general NPDES permits will not be needed when the VOC General Permit expires in 2014. Those requiring continued permit coverage and new dischargers are expected to submit NOI applications for coverage under this Order.

The following VOC and fuel clean-up discharges are normally not eligible for coverage: discharges from cleanups involving significant contamination by metals, pesticides, or other conservative pollutants and discharges from sites with other NPDES discharges (e.g., process waste). Dischargers that combine extracted groundwater with stormwater before treatment are normally not eligible for coverage under this Order because the amount of rainwater varies and may exceed the treatment system capacity.

The following table (Table F-1) is a standard template primarily useful for individual permits. For this General Permit, it provides cross-references to the specific sections of the Notice of Intent (NOI) Form, in Attachment B, that each Discharger enrolled under this Order must initially complete and submit as part of the NOI.

Table F-1. Facility Information

California Integrated Water Quality System (CIWQS) Regulatory measure and Place ID	A CIWQS Place ID and Regulatory measure identification number will be assigned to a facility when the Executive Officer issues the Authorization to Initiate Discharge
Discharger	NOI Form in Attachment B
Name of Facility	
Facility Address	
Facility Contact, Title, Phone, and email address	
Consultant Name, Phone, and email address	
Authorized Person to Sign and Submit Reports	
Mailing Address and Contact Person Name, Phone, and email address	
Billing Address and Contact Person Name, Phone, and email address	
Type of Project	
Major or Minor Facility	
Pretreatment Program	Not Applicable
Reclamation Requirements	Producer (See NOI in Attachment B)
Facility Permitted Flow	NOI Form in Attachment B
Facility Design Flow	
Watershed	
Receiving Water Type	

- A. Site Owners or Operators who apply for an authorization to discharge under this Order and who are granted such authorization are hereinafter called Discharger(s). The groundwater treatment facility is considered the facility regulated under this Order (hereinafter Facility). For the purposes of this Order, references to the “Discharger(s)” or “permittee(s)” in applicable federal and State laws, regulations, plans, or policy are held to be equivalent to references to the Discharger(s) herein.
- B. The Facilities regulated under the previously issued Fuel and VOC General NPDES permits discharge wastewater to multiple receiving waters of the State and/or the United States, mainly in Santa Clara County. The Fuel General Permit was adopted on November 13, 2006, became effective on January 12, 2007, and expired on January 12, 2012. The terms and conditions of Order No. R2-2006-0075 were automatically continued in effect until new Waste Discharge Requirements and NPDES permit are adopted pursuant to this Order. During the term of Order No. R2-2006-0075, 78 facilities were authorized to discharge treated groundwater to the receiving water documented in the NOI submitted for each discharge. Out of 78 facilities, 60 completed groundwater cleanup or changed to different cleanup methods that obviate the need to discharge any treated groundwater.
- C. As of November 2011, 18 Dischargers had filed a report of waste discharge by submitting an NOI to continue their discharge authorization under this NPDES General Permit. In the process of reviewing and approving NOIs, supplemental information may be requested from a subset of these facilities. It may also be necessary to visit facilities for which an NOI has been submitted, to observe operations and collect additional data to determine the eligibility of authorizing those discharges

under this Order. This Order requires Dischargers to submit monitoring data according to the requirements contained in the Monitoring and Reporting Program (Attachment E). If monitoring data indicate significant contamination by metals, pesticides, or other conservative pollutants, Dischargers authorized under this Order may be required to apply for an individual NPDES permit.

II. FACILITY DESCRIPTION

The facilities that may be covered under this Order are groundwater treatment facilities located at active or closed sites with solvent and/or fuel leaks. These groundwater treatment facilities are in operation to extract and treat groundwater polluted mainly by VOC and/or fuel components. This Order covers discharges from these facilities to all surface waters such as creeks, streams, rivers including flood control channels, lakes, or San Francisco Bay. Such discharges may occur directly to surface waters or through constructed storm drain systems.

A. Description of Wastewater Treatment

Dischargers authorized under this Order typically use aeration and/or granular activated carbon (GAC) systems to treat their groundwater prior to discharge. Facilities that use other types of treatment systems that are effective at removal of VOC pollutants may be covered by this Order subject to the approval of the Executive Officer. The most common VOC pollutants contained in the influent of these treatment systems are tetrachloroethylene and trichloroethylene. The most common pollutants contained in groundwater influent that has been contaminated by fuel leaks are benzene, ethylbenzene, toluene, total xylenes, methyl tertiary butyl ether (MTBE), and other petroleum hydrocarbons collectively called total petroleum hydrocarbons (TPHs). Other volatile or semi-volatile organic compounds may also be present in the influent of a subset of facilities regulated under this permit. Less commonly, inorganic pollutants, such as metals, are present in the influent and effluent and may be naturally occurring.

Except for some inorganic compounds and some other organic compounds such as 1,4 dioxane, the concentrations of organic pollutants in the effluents of the discharges are usually below detectable levels. The Fuel and VOC Dischargers reported design flow rates ranging from 5 gpm to 840 gpm, and discharge flow rates ranging from 2.5 gpm to 605 gpm.

The reported detection limit for benzene, ethylbenzene, toluene, total xylenes, and most VOC is 0.5 microgram per liter (ug/L); for MTBE, the reported detection limit ranges from 0.5 to 5.0 ug/L; for TPH, the reported detection limit is mostly 50.0 ug/L; and the reported detection limits for semi volatile organic compounds are mostly 5.0 or 10.0 ug/L.

B. Discharge Points and Receiving Waters

The NOI Form (Attachment B) requires every Discharger to provide the discharge location and a map highlighting the discharge path to surface waters.

C. Summary of Existing Requirements

The effluent limitation contained in the previously issued Fuel (Order No. R2-2006-0075) and VOC (Order No. R2-2009-0059) General Permits is summarized in Table F-2. Except the residual chlorine effluent limit in the VOC General NPDES permit, the effluent limitations contained in the previously issued Fuel and VOC General Permits were the same.

Table F-2. Historic Effluent Limitations

No.	Compound	CAS Number	Column A: Discharge to Drinking Water Areas ^[2]		Column B: Discharge to Other Surface Water Areas	
			Average Monthly Effluent Limitation (µg/L)	Maximum Daily Effluent Limitation (µg/L)	Average Monthly Effluent Limitation (µg/L)	Maximum Daily Effluent Limitation (µg/L)
1	Benzene	71432		1		5
2	Carbon Tetrachloride	56235	0.25 ^[1]	0.50	4.4	5
3	Chloroform	67663		5		5
4	1,1-Dichloroethane	75343		5		5
5	1,2-Dichloroethane	107062	0.38 ^[1]	0.5		5
6	1,1-Dichloroethylene	75354	0.057 ^[1]	0.11 ^[1]	3.2	5
7	Ethylbenzene	100414		5		5
8	Methylene Chloride (Dichloromethane)	75092	4.7	5		5
9	Tetrachloroethylene	127184	0.8	1.6		5
10	Toluene	108883		5		5
11	Cis 1,2-Dichloroethylene	156592		5		5
12	Trans 1,2-Dichloroethylene	156605		5		5
13	1,1,1-Trichloroethane	71556		5		5
14	1,1,2-Trichloroethane	79005	0.6	1.2		5
15	Trichloroethylene	79016	2.7	5		5
16	Vinyl Chloride	75014		0.5		1
17	Total Xylenes	1330207		5		5
18	Methyl Tertiary Butyl Ether (MTBE)	1634044		5		5
19	Total Petroleum Hydrocarbons (as Gasoline or as Diesel)			50		50
20	Ethylene Dibromide (1,2-Dibromoethane)	106934		0.05 ^[1]		5
21	Trichlorotrifluoroethane	76131		5		5
22	Total Chlorine Residual	---	---	0.0 ^[3]	---	0.0 ^[3]

Notes for Table F-2:

[1] If reported detection level is greater than effluent limit, then a non-detect result using a 0.5 µg/L detection level will not be deemed to be out of compliance.

- [2] Drinking water areas are defined as surface waters with the existing or potential beneficial uses of “municipal and domestic supply” and “groundwater recharge” (the latter includes recharge areas to maintain salt balance or to halt salt water intrusion into fresh water aquifers).
- [3] There shall be no detectable levels of residual chlorine in the effluent (a non-detect result using a detection level equal or less than 0.08 milligram per liter (mg/L) will not be deemed to be out of compliance). This limit only applies to Dischargers that chlorinate their extracted groundwater.

D. Compliance Summary

Forty-four effluent limit and 17 late reporting violations (for a total of 61 violations) are reported in CIWQS during the term of the Fuel General Permit. On average, the Dischargers reported effluent limit compliance rates of about 99% for TPHd, TPHg, and on-time report submittal, and almost 100% for the remaining pollutants with effluent limits in Table F-2. Regional Water Board enforcement staff completed enforcement actions for 53 of these violations, and continues to review the remaining 8 violations. The VOC General Permit compliance summary is on page F-4 of Order No. R2-2009-0059.

E. Planned Changes

As required in Attachment D, a Discharger authorized under this Order shall submit a modified NOI before making any material change in the character, location, or volume of the discharge.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the California Water Code [(CWC), commencing with section 13370]. It shall serve as a NPDES permit for point source discharges from these facilities to surface waters. This Order also serves as General Waste Discharge Requirements (GWDRs) pursuant to CWC article 4, chapter 4, division 7 (commencing with section 13260). States may request authority to issue general NPDES permits pursuant to Code of Federal Regulations, Title 40, Chapter 1, Subchapter D, part 122.28 (40 CFR 122.28). 40 CFR 122.28 provides for the issuance of general permits to regulate discharges of waste which result from similar operations, are the same types of waste, require the same effluent limitations, require similar monitoring, and are more appropriately regulated under a general permit rather than individual permits. This general permit meets the requirements of 40 CFR 122.28 because the discharges and proposed discharges:

- result from similar operations (all involve extraction, treatment, and discharge of groundwater);
- are the same types of waste (all are groundwater containing VOC, fuel components, and other related wastes due to leaks and spills);
- require similar effluent limitations for the protection of the beneficial uses of surface waters in the San Francisco Bay Region (this general permit does not cover direct discharges to the Pacific Ocean);

- require similar monitoring; and
- are more appropriately regulated under a general permit rather than individual permits.

B. California Environmental Quality Act (CEQA)

Under CWC section 13389, this action to issue an NPDES permit is exempt from the provisions of CEQA.

C. State and Federal Regulations, Policies, and Plans

- 1. Water Quality Control Plans.** *The Water Quality Control Plan for the San Francisco Bay Basin* (the Basin Plan) is the Regional Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives (WQOs) for waters of the State, including surface and groundwater. It also includes implementation programs to achieve WQOs. The Basin Plan was duly adopted by the Regional Water Board and approved by the State Water Resources Control Board (State Water Board), the Office of Administrative Law, and USEPA. Requirements of this Order implement the Basin Plan.

The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. The Basin Plan states that the beneficial uses of any specifically identified water body generally apply to its tributary streams. The Basin Plan may not specifically identify beneficial uses for every receiving water regulated under this permit, but identifies present and potential uses for the downstream water body, to which the receiving water, via an intermediate water body, is tributary. These potential and existing beneficial uses are: municipal and domestic supply, fish migration and fish spawning, industrial service supply, navigation, industrial process supply, marine habitat, agricultural supply, estuarine habitat, groundwater recharge, shellfish harvesting, water contact and non-contact recreation, ocean, commercial, and sport fishing, wildlife habitat, areas of special biological significance, cold freshwater and warm freshwater habitat, and preservation of rare and endangered species for surface waters and municipal and domestic supply, industrial service supply, industrial process supply, agricultural supply, and freshwater replenishment for groundwaters. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Requirements of this Order implement the Basin Plan.

On September 18, 1975, the State Water Board adopted the *Water Quality Control Plan for Control of Temperature in the Coastal Interstate Waters and Enclosed Bays and Estuaries of California* (hereinafter the Thermal Plan). The Thermal Plan contains objectives governing cooling water discharges, providing different and specific numeric and narrative water quality objectives for new and existing discharges.

The State Water Board's *Water Quality Control Plan for Enclosed Bays and Estuaries—Part I, Sediment Quality* became effective on August 25, 2009. This plan supersedes other narrative sediment quality objectives and establishes new sediment quality objectives and

related implementation provisions for specifically defined sediments in most bays and estuaries.

- 2. National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, and amended it on May 4, 1995, and November 9, 1999. About 40 criteria in the NTR and apply in California. On May 18, 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that applied in the State. The CTR was amended on February 13, 2001. These rules contain water quality criteria (WQC) for priority toxic pollutants.
- 3. State Implementation Policy.** On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria promulgated through the NTR and to the WQOs established in the Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria promulgated through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, which became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.
- 4. Alaska Rule.** On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes [65 Fed. Reg. 24641 (April 27, 2000), codified at 40 CFR 131.21]. Under the revised regulation (also known as the Alaska Rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.
- 5. Antidegradation Policy.** 40 CFR 131.12 requires that state WQS include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16, which incorporates the federal antidegradation policy where the federal policy applies under federal law and requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies.
- 6. Anti-Backsliding Requirements.** CWA Sections 402(o)(2) and 303(d)(4) and 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. This Order retains effluent limitations no less stringent than those established by previous orders.

D. Impaired Water Bodies on CWA 303(d) List

In November 2006, USEPA approved a revised list of impaired water bodies prepared pursuant to CWA section 303(d), which requires identification of specific waterbodies where it is expected that water quality standards will not be met after implementation of technology-based effluent limitations on point sources. In November 2010, USEPA partially approved an updated 303(d) list. Where it has not already done so, the Regional Water Board plans to adopt Total Maximum Daily Loads (TMDLs) for pollutants on the 303(d) list. TMDLs establish wasteload allocations for point sources and load allocations for non-point source and are established to achieve the water quality standards for the impaired waterbodies. The SIP requires final effluent limitations for all 303(d)-listed pollutants to be based on total maximum daily loads and associated waste load allocations.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in 40CFR: Section 122.44(a) requires that permits include applicable technology-based limitations and standards; and Section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water.

Several specific factors affecting the development of limitations and requirements in this Order are discussed as follows:

A. Discharge Prohibitions

- 1. Prohibition III.A (Unauthorized discharges of extracted and treated groundwater are prohibited):** This discharge prohibition is retained from the previously issued Fuel and VOC General Permits and is based on CWC section 13260, which requires filing of a report of waste discharge (ROWD) before discharges can occur. Discharges which have not been described in a Discharger's NOI are prohibited.
- 2. Prohibition III.B (Discharges of effluent other than extracted groundwater treated only with approved chemicals are prohibited):** This prohibition is retained from the previously issued Fuel and VOC General Permits and is based on the fact that the requirements in the Order were developed for discharges of treated groundwater from VOC or fuel-contaminated groundwater sites so only discharges associated with this type of activity can be permitted under this Order.
- 3. Prohibition III.C (Discharges in excess of the authorized flow rate are prohibited):** This prohibition is retained from the previously issued Fuel and VOC General Permits. The basis for the prohibition is the same rationale documented for Prohibition III.A. Dischargers have submitted NOIs that included a description of treatment facility design and the maximum

design flow rate, certified by a professional engineer. Flows in excess of the design flow rate may result in lowering the reliability of achieving compliance with water quality requirements.

- 4. Prohibition III.D (No scouring or erosion due to discharge of extracted and treated groundwater at the point where a storm drain discharges to a receiving water):** This prohibition is retained from the previously issued Fuel and VOC General Permits, with slight revisions for consistency with similar provisions of the Municipal Regional Stormwater NPDES Permit (Order No. R2-2009-0074), and is based on the sediment and erosion control goals of section 4.19 of the Basin Plan.
- 5. Prohibition III.E (No pollution, contamination, or nuisance):** This prohibition is based on CWC section 13050, and has been retained from the previously issued Fuel and VOC General Permits.
- 6. Prohibition III.F (No bypass or overflow of untreated or partially treated polluted groundwater):** This prohibition is retained from the previously issued Fuel and VOC General Permits and is based on 40 CFR 122.41(m).

B. Shallow Water Discharges and Basin Plan Discharge Prohibition 1

The Basin Plan (Chapter 4, Table 4-1, Discharge Prohibition 1) prohibits discharges not receiving a minimum 10:1 initial dilution or to dead end sloughs. In accordance with the Basin Plan, this Order continues to grant Dischargers an exception to the discharge prohibition for discharges to shallow waters. The exception is based on section 4.2 of the Basin Plan, which states that an exception to Prohibition 1 will be considered where:

- A discharge is approved as part of a reclamation project; or
- It can be demonstrated that net environmental benefits will be derived as a result of the discharge; or
- A discharge is approved as part of a groundwater cleanup project and, in accordance with Resolution No. 88-160 'Regional Board Position on the Disposal of Extracted Groundwater from Groundwater Clean-Up Projects', it has been demonstrated that neither reclamation nor discharge to a publicly owned treatment works is technically and economically feasible, and the discharger has provided certification of the adequacy and reliability of treatment facilities and a plan that describes procedures for proper operation and maintenance of all treatment facilities.

The Basin Plan further states:

Significant factors to be considered by the Regional Water Board in reviewing requests for exceptions will be the reliability of the discharger's system in preventing inadequately treated wastewater from being discharged to the receiving water and the environmental consequences of such discharges.

To comply with the exception, this Order requires Dischargers to document in the NOI application that neither reclamation nor discharge to a POTW is technically and economically

feasible. In addition, to prevent inadequately treated wastewater from being discharged to receiving waters, Dischargers are required to document in the NOI that the discharge of inadequately treated waste will be reliably prevented.

C. Technology-Based Effluent Limitations

If any extracted and treated groundwater receives less than proper treatment, the pollutants listed in Table F-2 may be discharged at levels that have a reasonable potential to cause or contribute to an exceedance of any applicable criterion established by the USEPA pursuant to CWA section 303.

1. Scope and Authority

The CWA requires technology-based effluent limitations (TBELs) based on several levels of controls:

- Best practicable treatment control technology (BPT) represents the average of the best performance by plants within an industrial category or subcategory. BPT standards apply to toxic, conventional, and non-conventional pollutants.
- Best available technology economically achievable (BAT) represents the best existing performance of treatment technologies that are economically achievable within an industrial point source category. BAT standards apply to toxic and non-conventional pollutants.
- Best conventional pollutant control technology (BCT) represents the control from existing point sources of conventional pollutants including BOD, TSS, fecal coliform, pH, and oil and grease. The BCT standard is established after considering the “cost reasonableness” of the relationship between the cost of attaining a reduction in effluent discharge and the benefits that would result, and also the cost effectiveness of additional industrial treatment beyond BPT.
- New source performance standards (NSPS) represent the best available demonstrated control technology standards. The intent of NSPS guidelines is to set limitations that represent state-of-the-art treatment technology for new sources.

The CWA requires USEPA to develop effluent limitations, guidelines, and standards (ELGs) representing application of BPT, BAT, BCT, and NSPS. Section 402(a)(1) of the CWA and 40 CFR 125.3 authorize the use of Best Professional Judgment (BPJ) to derive TBELs on a case-by-case basis where ELGs are not available for certain industrial categories and/or pollutants of concern. Where BPJ is used, the permit writer must consider specific factors outlined in 40 CFR 125.3.

2. Applicable Technology-Based Effluent Limitations

Regional Water Board staff used BPJ in developing TBELs in this Order. BPJ is defined as the highest quality technical opinion developed by a permit writer after consideration of all reasonably available and pertinent data or information that forms the basis for the terms and conditions of a NPDES permit. The authority for BPJ is contained in CWA section 402(a)(1).

In the treatment systems regulated by this Order, organic compounds, including VOC and petroleum compounds, are removed from contaminated groundwater using such technologies as air stripping and activated carbon. Treated groundwater is then discharged to surface waters. When properly designed and operated, these treatment systems can lower the concentration of such pollutants to levels below analytical detection limits.

USEPA Region 9 issued a document titled *NPDES Permit Limitations for Discharge of Contaminated Groundwater: Guidance Document* (USEPA, 1986) in which USEPA concluded that the cost of reducing concentrations of most organic compounds commonly detected in contaminated groundwater to a non-detect concentration of 5 µg/L, and to a non-detect concentration for vinyl chloride of 1 µg/L, is considered economically achievable.

Based on an understanding that available treatment technologies can economically remove organic pollutants from contaminated groundwater, the Regional Water Board has established TBELs using BPJ at 5.0 µg/L for benzene, carbon tetrachloride, chloroform, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, ethylbenzene, methylene chloride, tetrachloroethylene, Toluene, Cis 1,2-Dichloroethylene, Trans 1,2-Dichloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, and total xylenes, and at 1.0 µg/L for vinyl chloride.

Petroleum-based compounds and fuel additives are commonly found at sites with fuel or fuel VOC commingled plumes. This Order therefore retains TBELs for TPHs, ethylene dibromide, and MTBE from the previous Fuel General Permit. Limitations for TPH are 50 µg/L and for ethylene dibromide and MTBE are 5 µg/L, which reflect a level of treated wastewater quality that is economically achievable by the treatment technologies contemplated by this Order.

Because a number of facilities covered under the Fuel General Permit are former semiconductor manufacturing operations, which used trichlorotrifluoroethane (Freon 113) in a manufacturing process and have detected concentrations of this compound in contaminated groundwater, this Order retains the effluent limitation from the previous Fuel General Permit for Freon. The effluent limitation of 5 µg/L reflects a level of treated wastewater quality that is economically achievable by the treatment technologies contemplated by this Order.

Table F-3, below, summarizes the TBELs established by this Order.

Table F-3. Summary of Technology-Based Effluent Limitations

No.	Compound	Limitations Established by BPJ	
		USEPA	RWB
1	Benzene	5	---
2	Carbon Tetrachloride	5	---
3	Chloroform	5	---
4	1,1-Dichloroethane	5	---
5	1,2-Dichloroethane	5	---
6	1,1-Dichloroethylene	5	---
7	Ethylbenzene	5	---

No.	Compound	Limitations Established by BPJ	
		USEPA	RWB
8	Methylene Chloride	5	---
9	Tetrachloroethylene	5	---
10	Toluene	5	---
11	Cis-1,2-Dichloroethylene	5	---
12	Trans-1,2-Dichloroethylene	5	---
13	1,1,1-Trichloroethane	5	---
14	1,1,2-Trichloroethane	5	---
15	Trichloroethylene	5	---
16	Vinyl Chloride	1	---
17	Total Xylenes	5	---
18	Methyl Tertiary Butyl Ether (MTBE)	5	5
19	Total Petroleum Hydrocarbons (TPH)	---	50
20	Ethylene Dibromide (1,2-Dibromoethane)	---	5
21	Trichlorotrifluoroethane	---	5

D. Water Quality-Based Effluent Limitations (WQBELs)

WQBELs have been derived to implement WQOs that protect beneficial uses. Both the beneficial uses and the WQOs have been approved pursuant to federal law. The procedures for calculating individual WQBELs are based on the SIP and the Basin Plan. Most Basin Plan beneficial uses and WQOs were approved under State law and submitted to and approved by USEPA prior to May 30, 2000. Any WQOs and beneficial uses submitted to USEPA prior to May 30, 2000, but not approved by USEPA before that date, are nonetheless “applicable water quality standards for purposes of the [Clean Water] Act” pursuant to 40 CFR 131.21(c)(1). Collectively, this Order’s restrictions on individual pollutants are no more stringent than those required by CWA water quality standards.

1. Scope and Authority

- a. 40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have reasonable potential to cause or contribute to an excursion of a water quality standard, including numeric and narrative objectives within a standard. As specified in 40 CFR 122.44(d)(1)(i), permits are required to include WQBELs for all pollutants “which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard.”

The process for determining “reasonable potential” and calculating WQBELs when necessary is intended to protect the designated beneficial uses of the receiving water as

specified in the Basin Plan, and achieve applicable WQOs contained in other state plans and policies, and applicable WQC contained in the CTR and NTR.

- b. NPDES regulations and the SIP provide the basis to establish Maximum Daily Effluent Limitations (MDELs).
 - (1) NPDES regulations at 40 CFR 122.45(d) state, “For continuous discharges all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall *unless impracticable* be stated as maximum daily and average monthly discharge limitations for all discharges other than publicly owned treatment works.”
 - (2) SIP section 1.4 requires WQBELs to be expressed as MDELs and average monthly effluent limitations (AMELs).
- c. MDELs are used in this Order to protect against acute water quality effects. MDELs are necessary for preventing fish kills or mortality to aquatic organisms.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The WQOs applicable to the receiving waters for these discharges are from the Basin Plan; the CTR, established by USEPA at 40 CFR 131.38; and the NTR, established by USEPA at 40 CFR 131.36. Some pollutants have WQOs established by more than one of these three sources.

- a. **Basin Plan.** The Basin Plan specifies numeric WQOs for 10 priority toxic pollutants, as well as narrative WQOs for toxicity and bioaccumulation in order to protect beneficial uses. The pollutants for which the Basin Plan specifies numeric objectives are arsenic, cadmium, chromium (VI), copper in fresh and marine water, lead, mercury, nickel, silver, zinc, and cyanide. The narrative toxicity objective states, “All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms.” The bioaccumulation objective states, “Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.” Effluent limitations and provisions contained in this Order are designed to implement these objectives, based on available information.

The Basin Plan also contains a narrative objective for surface waters designated for use as a domestic or municipal supply (MUN) which states that these surface waters shall not contain concentrations of constituents in excess of the maximum contaminant levels (MCLs) or secondary MCLs specified in Title 22 of the California Code of Regulations. Effluent limitations and provisions contained in this Order are designed to implement these objectives, based on available information.

- b. **CTR.** The CTR specifies numeric aquatic life criteria for 23 priority toxic pollutants and numeric human health criteria for 57 priority toxic pollutants. These criteria apply to all

inland surface waters and enclosed bays and estuaries of the San Francisco Bay Region, although Tables 3-3 and 3-4 of the Basin Plan include numeric objectives for certain of these priority toxic pollutants, which supersede criteria of the CTR (except in the South Bay south of the Dumbarton Bridge).

Human health criteria are further identified as “water and organisms” and “organisms only.” The CTR criteria applicable to “water and organisms” are applied in the Reasonable Potential Analysis (RPA) for discharges to receiving waters with a MUN designation, and criteria applicable to “organisms only” were used in the RPA for discharges to receiving waters that are not MUN-designated.

- c. **NTR.** The NTR establishes numeric aquatic life criteria for selenium and numeric “organisms only” human health criteria for 33 toxic pollutants for waters of San Francisco Bay upstream to, and including Suisun Bay and the San Joaquin-Sacramento River Delta.
- d. **Sediment Quality Objectives.** The *Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1, Sediment Quality* contains a narrative WQO, “Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities in bays and estuaries of California.” This WQO is to be implemented by integrating three lines of evidence: sediment toxicity, benthic community condition, and sediment chemistry. The policy requires that is the Regional Water Board determines that a discharge has reasonable potential to cause or contribute to an exceedance of this WQO, it is to impose the WQO as a receiving water limit.
- e. **Basin Plan Receiving Water Salinity Policy.** The Basin Plan (like the CTR and the NTR) states that the salinity characteristics (i.e., freshwater vs. saltwater) of the receiving water are to be considered in determining the applicable WQOs. Freshwater criteria apply to discharges to waters with salinities equal to or less than one part per thousand (ppt) at least 95 percent of the time. Saltwater criteria apply to discharges to waters with salinities equal to or greater than 10 ppt at least 95 percent of the time in a normal water year. For discharges to water with salinities between these two categories, or tidally influenced freshwaters that support estuarine beneficial uses, the WQOs are the lower of the salt or freshwater WQOs (the latter calculated based on ambient hardness) for each substance.

Receiving waters considered by for this permit are the San Francisco Bay and other estuarine and tidally influences waters, and inland freshwaters. The Basin Plan implements State Water Board Resolution No. 88-63, which establishes State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply (MUN). Because of marine influence on all reaches of San Francisco Bay and other tidally influenced waters, total dissolved solids levels exceed 3,000 mg/L and thereby meet an exception to State Water Board Resolution No. 88-63. The RPA therefore separately considered criteria that were applicable to receiving waters with a MUN designation and to receiving waters that are not MUN-designated.

Aquatic life criteria were based on the most stringent of the fresh and salt water criteria, to be fully protective of all receiving waters.

- f. Receiving Water Hardness.** Ambient hardness values are used to calculate freshwater WQOs that are hardness dependent. In determining the WQOs for this Order, Regional Water Board staff used a hardness value of 100 mg/L as CaCO₃, which is a conservative value and generally protective of aquatic life in all circumstances contemplated by the General Permit.
- g. Site-Specific Translators (SSTs).** NPDES regulations at 40 CFR 122.45(c) require that effluent limitations for metals be expressed as total recoverable metal. Since applicable WQOs for metals are typically expressed as dissolved metal, translators must be used to convert metals concentrations from dissolved to total recoverable and vice versa. The CTR includes default translators; however, site-specific conditions, such as water temperature, pH, suspended solids, and organic carbon greatly affect the form of metal (dissolved, non-filterable, or otherwise) present in the water and therefore available to cause toxicity. In general, the dissolved form of the metal is more available and more toxic to aquatic life than non-filterable forms. Site-specific translators can be developed to account for site-specific conditions, thereby preventing exceedingly stringent or under protective WQOs.

Receiving waters for discharges from the facilities covered under the General Permit are varied, and, therefore, site specific conditions are varied. In determining the need for and calculating WQBELs for all metals except for copper and nickel, the Regional Water Board has used default translators established by the USEPA in the CTR at 40 CFR 131.38 (b) (2), Table 2 to be protective in all circumstances. Most discharges are anticipated to eventually enter San Francisco Bay, and, therefore, the site specific translators were applied in determining criteria for copper and nickel. For copper, the Regional Water Board applied the SSTs adopted by Regional Water Board Resolution No. R2-2007-0042 for North and Central San Francisco Bay, and the SST contained in the Basin Plan Table 7.2.1-1 for South San Francisco Bay. For nickel, the Regional Water Board applied the translators for North and Central San Francisco Bay based on the recommendation of the Clean Estuary Partnership’s *North of Dumbarton Bridge Copper and Nickel Development and Selection of Final Translators* (2005), and applied the translators contained in Table 7.2.1-1 of the Basin Plan for South San Francisco Bay. These translators for copper and nickel are summarized below.

Table F-4. SSTs for Copper and Nickel for San Francisco Bay

<i>San Francisco Bay Segment</i>	Copper		Nickel	
	AMEL Translator	MDEL Translator	AMEL Translator	MDEL Translator
North	0.38	0.66	0.27	0.57
Central	0.73	0.87	0.65	0.85
South	0.53	0.53	0.44	0.44

3. Determining the Need for WQBELs

Assessing whether a pollutant has Reasonable Potential is the fundamental step in determining whether or not a WQBEL is required.

a. Reasonable Potential Methodology

For priority pollutants and most other toxic pollutants, the RPA identifies the observed maximum effluent concentration (MEC) for each pollutant based on effluent concentration data. There are three triggers in determining Reasonable Potential according to SIP Section 1.3.

- (1) The first trigger (Trigger 1) is activated if the MEC is greater than or equal to the lowest applicable WQO ($MEC \geq WQO$), which has been adjusted, if appropriate, for pH, hardness, and translator data. If the MEC is greater than or equal to the adjusted WQO, then that pollutant has Reasonable Potential, and a WQBEL is required.
- (2) The second trigger (Trigger 2) is activated if the observed maximum ambient background concentration (B) is greater than the adjusted WQO ($B > WQO$), and the pollutant is detected in any of the effluent samples ($MEC > ND$).
- (3) The third trigger (Trigger 3) is activated if a review of other information determines that a WQBEL is required to protect beneficial uses, even though both MEC and B are less than the WQO/WQC.

b. Effluent Data

Each Discharger currently covered under the Fuel General Permit was required to conduct effluent monitoring pursuant to the Self-Monitoring Program for Order No. R2-2006-0075. The Regional Water Board analyzed the Dischargers' priority pollutant data and the nature of the discharges to determine if discharges have Reasonable Potential. Effluent data used to conduct this RPA consisted of data submitted as part of each Fuel General Permit facility's NOI which was combined with data submitted by facilities as part of the NOI application for coverage under the VOC General Permit. The Regional Water Board analyzed effluent quality data collected from 2004 to 2011 for a total of 55 facilities (43 from the VOC General Permit and 12 from the Fuel General Permit) in the San Francisco Bay Region. Effluent monitoring data from three NOIs received after the July 15, 2011, due date were not included in this RPA.

From this analysis, it was concluded that the data for metals would be excluded for use in RPA pursuant to SIP 1.2. The reason is that the metals were detected only occasionally and at low levels likely from natural background in the groundwater.

c. Ambient Background Data

The SIP states that, for calculating WQBELs, ambient background concentrations are either the observed maximum ambient water column concentrations or, for objectives

intended to protect human health from carcinogenic effects, the arithmetic mean of observed ambient water concentrations. Ambient background concentrations are the observed maximum detected water column concentrations for aquatic life protection.

Because the receiving waters for discharges from the facilities covered under this Order are varied, receiving water background concentrations were not considered for this RPA.

d. Reasonable Potential Determination for Priority Pollutants

The MECs and the most stringent applicable WQC used in the RPA are presented in the following table, along with the RPA results (yes or no) for each pollutant. Reasonable Potential was not determined for all pollutants because there are not applicable WQC for all pollutants, or monitoring data are not available for others. Based on a review of the effluent data, the pollutants that demonstrate reasonable potential by Trigger 1 are benzene, bromoform, chlorodibromomethane, 1,2-dichloroethane, 1,1-dichloroethylene, methylene chloride, trichloroethylene, vinyl chloride, and bis(2-ethylhexyl)phthalate.

The Regional Water Board has also determined that Reasonable Potential exists to exceed water quality objectives, by Trigger 3, for the organic pollutants that have been identified as pollutants that are commonly present in VOC and fuel-contaminated groundwater (i.e., those pollutants for which TBELs have been established.) As these TBELs limitations are achievable dependent on the proper design and operation of treatment systems, there is Reasonable Potential for excursions above applicable water quality criteria for these pollutants if the system is not designed or operated correctly.

Total residual chlorine is also identified as a pollutant with Reasonable Potential to exceed the Basin Plan narrative toxicity objective, as determined by Trigger 3. The Regional Water Board has identified that chlorine may be used in conjunction with air stripping and/or activated carbon treatment systems to control biological growth, and therefore Reasonable Potential exists for total residual chlorine for those facilities that use it.

Table F-5. Summary of RPA Results

CTR #	Priority Pollutants	MEC or Minimum DL ^{[1][2]} (µg/L)	Governing Applicable Criteria (µg/L)				RPA Results ^[3]
			Aquatic Life	Human Health			
			(Most stringent of salt and fresh water)	CTR Water + Organisms	Basin Plan Title 22 MCLs	CTR Organisms Only	
1	Antimony	21	---	14	6	4300	Ud
2	Arsenic	140	36	---	10	---	Ud
3	Beryllium	0.00053	---	---	4	---	Ud
4	Cadmium	0.36	1.1	---	5	---	Ud
5a	Chromium (III)	NA	207	---	50	---	Ud
5b	Chromium (VI)	14	11	---	---	---	Ud
6	Copper	24	4.7 ^[4]	---	1000	---	Ud

CTR #	Priority Pollutants	MEC or Minimum DL ^{[1][2]} (µg/L)	Governing Applicable Criteria (µg/L)				RPA Results ^[3]
			Aquatic Life	Human Health			
			(Most stringent of salt and fresh water)	CTR Water + Organisms	Basin Plan Title 22 MCLs	CTR Organisms Only	
	Copper	24	3.4 ^[5]	---	1000	---	Ud
	Copper	24	5.9 ^[6]	---	1000	---	Ud
7	Lead	0.048	3.2	---	---	---	Ud
8	Mercury (303d listed)	0.00082	0.025	0.050	2	0.051	Ud
9	Nickel	49	19 ^[7]	610	100	4600	Ud
	Nickel	49	13 ^[8]	610	100	4600	Ud
	Nickel	49	30 ^[9]	610	100	4600	Ud
10	Selenium (303d listed)	25	5.0	---	---	---	Ud
11	Silver	<0.25	2.2	---	---	---	Ud
12	Thallium	7.3	---	1.7	2.0	6.3	Ud
13	Zinc	150	86	---	5000	---	Ud
14	Cyanide	30	2.9 ^[10]	700	150	220,000	Ud
19	Benzene	1.2	---	1.2	1	71	Yes
20	Bromoform	5.2	---	4.3	---	360	Yes
23	Chlorodibromomethane	2.8	---	0.401	---	34	Yes
26	Chloroform	7.1	---	No Criteria			Yes
28	1,1-Dichloroethane	4.1	---	---	5	---	Yes
29	1,2-Dichloroethane	0.6	---	0.38	0.5	99	Yes
30	1,1-Dichloroethylene	5.7	---	0.057	6	3.2	Yes
33	Ethylbenzene	<0.5	---	3100	300	29,000	Yes
36	Methylene Chloride	23	---	4.7	5	1600	Yes
38	Tetrachloroethylene	25	---	0.8	5	8.85	Yes
39	Toluene	3.07	---	6800	150	200,000	Yes
---	1,2-Cis-Dichloroethylene	20	---	---	6	---	Yes
40	1,2-Trans-Dichloroethylene	4.2	---	700	10	140,000	Yes
41	1,1,1-Trichloroethane	15	---	---	200	---	Yes
42	1,1,2-Trichloroethane	0.5	---	0.60	5	42	Yes
43	Trichloroethylene	460	---	2.7	5	81	Yes
44	Vinyl Chloride	2.1	---	2	0.5	525	Yes
68	Bis-2(ethylhexyl)phthalate	100	---	1.8	4	5.9	Yes
70	Butylbenzyl Phthalate	22	---	3000	---	5200	No
---	Total Xylenes	3	---	---	1750	---	Yes
---	Methyl Tertiary Butyl Ether (MTBE)	2.7	---	---	13	---	Yes
---	Total Petroleum Hydrocarbons (TPH)	1600	No Criteria				Ud
---	Ethylene Dibromide	<0.05	---	---	0.05	---	Yes
---	Trichlorotrifluoroethane	5.4	---	---	1200	---	Yes
---	Total Residual Chlorine ^[11]	NA	---	---	---	---	Yes

Notes for Table F-5:

- [1] The Maximum Effluent Concentration (MEC) and maximum background concentration are the actual detected concentrations unless preceded by a “<” sign, in which case the value shown is the minimum detection level (DL).
- [2] The MEC or maximum background concentration is “Not Available” (NA) when there are no monitoring data for the constituent.
- [3] RPA Results = Yes, if MEC > WQO/WQC, B > WQO/WQC and MEC is detected, or Trigger 3;
= No, if MEC and B are < WQO/WQC or all effluent data are undetected;
= Undetermined (Ud), if no criteria have been promulgated or there are insufficient data. For metals and cyanide, Ud was determined because as noted previously the reported discharge data were excluded for use in RPA pursuant to SIP 1.2. Though the detected levels are high as shown in the MECs above, these were in just a few samples. Metals and cyanide were detected only occasionally and generally at low levels likely from

natural background in the groundwater extracted for cleanup. Because this Order would exclude coverage for sites where there is persistent metals contamination, and the relative small load of background metals to the Bay from all the discharges, a finding of undetermined is appropriate.

- [4] Criterion based on the Basin Plan marine SSO for copper, and the site-specific translators (0.53 acute and chronic) for the Lower and South Bay.
- [5] Criterion based on the Basin Plan marine SSO for copper, and the site-specific translators (0.87 acute, 0.73 chronic) for the Central Bay.
- [6] Criterion based on the Basin Plan marine SSO for copper, and the site-specific translators (0.66 acute, 0.38 chronic) for Suisun and San Pablo Bay.
- [7] Criterion based on the Basin Plan marine SSO for nickel and the site-specific translators (0.44 acute and chronic) for the Lower and South Bay.
- [8] Criterion based on the Basin Plan marine WQO for nickel, and the site-specific translators (0.85 acute, 0.65 chronic) for the Central Bay.
- [9] Criterion based on the Basin Plan marine WQO for nickel, and the site-specific translators (0.57 acute, 0.27 chronic) for Suisun and San Pablo Bay.
- [10] Criterion based on the Basin Plan marine SSO for cyanide.
- [11] Total Residual Chlorine: The water quality objective applicable to total residual chlorine is the Basin Plan narrative objective for toxicity which states “[a]ll waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms.”

e. Constituents with limited data

In some cases, Reasonable Potential cannot be determined because effluent data are limited, or ambient background concentrations are unavailable. When additional data become available, further RPA will be conducted to determine whether numeric effluent limitations are necessary.

f. Pollutants with No Reasonable Potential

WQBELs are not included in this Order for constituents that do not demonstrate Reasonable Potential; however, monitoring for those pollutants is still required. If concentrations of these constituents are found to have increased significantly, the Discharger will be required to investigate the sources of the increases. Remedial measures are required if the increases pose a threat to receiving water quality.

g. RPA Determination for Sediment Quality Objectives

To date there is no evidence directly linking compromised sediment conditions to the discharges subject to this Order; therefore the Regional Water Board cannot draw a conclusion about Reasonable Potential for the discharges to cause or contribute to exceedances of the sediment quality objectives. However, due to the relatively small discharge volumes and the type and level of treatment, it is unlikely that the discharges would contribute to exceedance of sediment objectives.

4. WQBEL Calculations

- a. Pollutants with Reasonable Potential.** WQBELs were developed for the toxic and priority pollutants that were determined to have Reasonable Potential to cause or contribute to exceedances of the WQOs or WQC. The WQBELs were calculated based on WQOs and the appropriate procedures specified in Section 1.4 of the SIP. The WQOs used for each pollutant with Reasonable Potential are discussed below.
- b. Shallow/Deep Water Discharge.** The Basin Plan defines a deep water discharge as a discharge through an outfall equipped with a diffuser that achieves a minimum initial dilution of 10:1. Because the General Permit authorizes discharges to many types of receiving waters, Dischargers covered under the General Permit are classified by the

Regional Water Board as shallow water discharges, so that the General Permit is protective under all circumstances.

- c. **Dilution Credit.** The General Permit assumes minimal dilution is available for discharges that it authorizes, and therefore no dilution credit is granted in calculating WQBELs. No dilution credit is granted because almost all discharges of treated groundwater regulated under this Order are to storm drain systems that discharge to rivers, creeks, and streams. Many of these creeks and streams are dry during the summer months. Therefore, for a few months of the year, these discharges may represent all or nearly all of the flow in some portions of the receiving creeks or streams. These discharges therefore also have the potential to recharge groundwaters protected as drinking waters.
- d. **Development of WQBELs for Specific Pollutants.** To develop WQBELs for pollutants that demonstrate reasonable potential based on CTR human health criteria (benzene, bromoform, chlorodibromomethane, 1,2-dichloroethane, and bis(2-ethylhexyl)phthalate), the average monthly effluent limitation (AMEL) is established as the most stringent WQC because the WQC are based on applicable human health criteria. To calculate the maximum daily effluent limitation (MDEL), the AMEL is multiplied by a MDEL/AMEL multiplier of 2.01, which assumes a coefficient of variation (CV) of effluent data of 0.60, because not enough data were available to calculate a CV.

For pollutants with criteria based on Title 22 MCLs (benzene, vinyl chloride), where the MUN designation is applicable to the receiving water, MDELs are set equal to the MCL, because the MCLs are levels that shall not be exceeded in the receiving water, and no credit for dilution is granted.

WQBELs for total residual chlorine are based in Table 4-2 of the Basin Plan.

For the CTR metals and cyanide, WQBELs are not being established at this time. Instead, trigger values will be set for these inorganic pollutants as a backstop to ensuring that sites with metals or cyanide contamination are appropriately identified and addressed. Exceedance of these trigger values in the discharge would trigger actions specified Provision VI.C.6, which if warranted may also lead to termination of discharge authorization under this Order.

Table F-6. Summary of WQBELs

No.	Compound	Discharge to Receiving Waters used as Drinking Water Source ⁽¹⁾		Discharge to Other Receiving Waters	
		AMEL (µg/L)	MDEL (µg/L)	AMEL (µg/L)	MDEL (µg/L)
1	Benzene	---	1	71	142
2	Carbon Tetrachloride	0.25	0.5	4.4	8.8
3	Chloroform	---	---	---	---
4	1,1-Dichloroethane	---	5	---	---

No.	Compound	Discharge to Receiving Waters used as Drinking Water Source ^[1]		Discharge to Other Receiving Waters	
		AMEL (µg/L)	MDEL (µg/L)	AMEL (µg/L)	MDEL (µg/L)
5	1,2-Dichloroethane	0.38	0.5	99	199
6	1,1-Dichloroethylene	0.057	0.11	3.2	6.4
7	Ethylbenzene	---	300	29,000	58,000
8	Methylene Chloride	4.7	9.4	1600	3200
9	Tetrachloroethylene	0.8	1.6	8.85	17.8
10	Toluene	---	150	200,000	400,000
11	Cis-1,2-Dichloroethylene	---	6	---	---
12	Trans-1,2-Dichloroethylene	---	10	140,000	280,000
13	1,1,1-Trichloroethane	---	200	---	---
14	1,1,2-Trichloroethane	0.60	1.2	42	84
15	Trichloroethylene	2.7	5.4	81	160
16	Vinyl Chloride	---	0.5	525	1060
17	Total Xylenes	---	1750	---	---
18	Methyl Tertiary Butyl Ether (MTBE)	---	13	---	---
19	Total Petroleum Hydrocarbons (TPH)	---	---	---	---
20	Ethylene Dibromide (1,2-Dibromoethane)	---	0.05	---	---
21	Trichlorotrifluoroethane	---	1200	---	---
22	Total Residual Chlorine ^[2]	---	0.0	---	0.0

Notes for Table F-6:

- [1] Receiving waters which are sources of drinking water are surface waters with the existing or potential beneficial use of Municipal and Domestic Supply, and/or Groundwater Recharge.
- [2] The total residual chlorine requirement is defined as below the limit of detection in standard test methods defined in the latest USEPA approved edition of *Standard Methods for the Examination of Waste and Wastewater*.

5. Whole Effluent Toxicity (WET)

The Basin Plan requires dischargers to either conduct flow-through effluent toxicity tests or perform static renewal bioassays (Chapter 4, Acute Toxicity) to measure the toxicity of wastewaters and to assess negative impacts upon water quality and beneficial uses caused by the aggregate toxic effect of the discharge of pollutants. This Order retains the effluent limitation for whole effluent acute toxicity. Compliance evaluation with these limitations is based on 96-hour static-renewal bioassays. All bioassays shall be performed according to the USEPA-approved method in 40 CFR Part 136, currently “*Methods for Measuring the Acute Toxicity of Effluents and Receiving Water, 5th Edition.*”

6. Final Effluent Limitations

The following table presents a summary of final effluent limitations for toxic pollutants established by this Order. The most stringent of the TBELs and WQBELs are established by the Order as final effluent limitations. For pollutants where the WQBEL is more stringent than the

TBEL, average monthly and maximum daily effluent limitations have been established, which is consistent with the SIP. When the TBEL is limiting, only an MDEL is established. For pollutants where the analytical detection limit is higher than the effluent limitation, the Regional Water Board shall deem a discharge out of compliance if the sample result is greater than the detection limit.

In summary, the effluent limitations contained in the previously issued Fuel and VOC General Permits (Regional Water Board Order Nos. R2-2006-0075 and R2-2009-0059) were the same except the residual chlorine effluent limit in the VOC General NPDES permit, which has been continued into this Order as summarized in Table F-7.

Table F-7. Summary of Final Effluent Limitations

No	Compound	Discharge to Receiving Waters used as Drinking Water Source ^[1]		Discharge to Other Receiving Waters	
		AMEL (µg/L)	MDEL (µg/L)	AMEL (µg/L)	MDEL (µg/L)
1	Benzene	---	1	---	5
2	Carbon Tetrachloride	0.25	0.5	4.4	5
3	Chloroform	---	5	---	5
4	1,1-Dichloroethane	---	5	---	5
5	1,2-Dichloroethane	0.38	0.5	---	5
6	1,1-Dichloroethylene	0.057	0.11	3.2	5
7	Ethylbenzene	---	5	---	5
8	Methylene Chloride	4.7	5	---	5
9	Tetrachloroethylene	0.8	1.6	---	5
10	Toluene	---	5	---	5
11	Cis-1,2-Dichloroethylene	---	5	---	5
12	Trans-1,2-Dichloroethylene	---	5	---	5
13	1,1,1-Trichloroethane	---	5	---	5
14	1,1,2-Trichloroethane	0.60	1.2	---	5
15	Trichloroethylene	2.7	5	---	5
16	Vinyl Chloride	---	0.5	---	1
17	Total Xylenes	---	5	---	5
18	Methyl Tertiary Butyl Ether (MTBE)	---	5	---	5
19	Total Petroleum Hydrocarbons (TPH)	---	50	---	50
20	Ethylene Dibromide (1,2-Dibromoethane)	---	0.05	---	5
21	Trichlorotrifluoroethane	---	5	---	5
22	Total Residual Chlorine ^[2]	---	0.0	---	0.0

Notes:

[1] Receiving waters which are sources of drinking water are surface waters with the existing or potential beneficial use of Municipal and Domestic Supply, and/or Groundwater Recharge.

[2] Limitation defined as below the limit of detection using standard test methods defined in the latest USEPA approved edition of *Standard Methods for the Examination of Waste and Wastewater*

7. Anti-backsliding and Antidegradation

Effluent limitations in this Order comply with anti-backsliding and antidegradation requirements because all effluent limitations are as least as stringent as the limitations contained in the previously issued Fuel and VOC General Permits.

E. Reclamation Specifications

Reclamation or Reuse Specifications are retained from the previously issued Fuel and VOC General Permits. Reclamation specifications are required because reuse of treated groundwater is a preferred method of disposal. The basis for these requirements is Resolution No. 88-160.

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

Receiving water limitations V.A.1 and V.A.2 are based on narrative and numeric WQOs in Basin Plan Chapter 3.

Receiving water limitation V.A.3 is a more general requirement intended to protect receiving water quality based on water quality standards not expressly addressed in this Order and Fact Sheet. It is retained from the previously issued Fuel and VOC permits and requires compliance with all federal and State water quality standards established pursuant to the CWA.

B. Groundwater Limitations

Groundwater limitations are in section 3.4 of the Basin Plan.

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

NPDES regulations at 40 CFR 122.48 require that all NPDES permits specify monitoring and reporting requirements. California Water Code (CWC) sections 13267 and 13383 also authorize the Regional Water Board to require technical and monitoring reports. This Monitoring and Reporting Program establishes monitoring and reporting requirements that implement federal and State regulations.

The principal purposes of a monitoring program are to:

- Document compliance with waste discharge requirements and prohibitions established by the Regional Water Board,
- Facilitate self-policing by the Discharger in the prevention and abatement of pollution arising from waste discharge,
- Develop or assist in the development of limitations, discharge prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards, and

- Prepare water and wastewater quality inventories.

The Monitoring and Reporting Program is a standard requirement in almost all NPDES permits issued by the Regional Water Board, including this Order. It contains definitions of terms and sets out requirements for reporting of routine monitoring data in accordance with NPDES regulations, the CWC, and State and Regional Water Board policies. The Monitoring and Reporting Program also defines the sampling stations and frequency, the pollutants to be monitored, and additional reporting requirements. Pollutants to be monitored include all parameters for which effluent limitations are specified. Monitoring for additional constituents, for which no effluent limitations are established, is also required to provide data for future completion of RPAs.

The following provides the rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program for this facility.

A. Influent Monitoring

The purpose of influent monitoring is to provide documentation that pollutant loadings are below the level that the treatment system was designed for and to provide a warning if one or more new pollutants are being extracted that the as-built treatment system was not designed to remove. All influent monitoring requirements are retained from the previous Fuel General Permit and the VOC General Permit. If there is a discrepancy in monitoring frequency between the two General Permits, the more frequent requirement was retained.

B. Effluent Monitoring

The purpose of effluent monitoring is to provide documentation that the treatment system adequately removed all pollutants of concern in compliance with the limitations contained in the Order. Effluent monitoring data can also indicate if one or more pollutants are detected at levels less than effluent limits, but greater than trigger levels, which may indicate poor maintenance or other unexpected problems. All effluent monitoring requirements are retained from the previous Fuel General Permit and the VOC General Permit. If there is a discrepancy in monitoring frequency between the two General Permits, the more frequent requirement was retained.

C. Whole Effluent Toxicity Testing Requirements

The selected test species and frequency of testing are the same as previously issued Fuel and VOC General Permits and appropriately cost effective for the Dischargers covered under this Order.

D. Receiving Water Monitoring

The purpose of receiving water monitoring is to provide documentation about the condition of the receiving water should any effluent limit violations occur that may harm the life in the receiving water. The receiving water monitoring frequency is the same as previously issued Fuel and VOC General Permits.

E. Other Monitoring Requirements

The purpose of additional monitoring requirements is to investigate complaints, identify the discharges that should be regulated by individual NPDES permits, coordinate stormwater monitoring with municipalities, and quantify potential impacts of extracted and treated groundwater discharge on the receiving water and the ambient conditions of the receiving waters.

F. Reporting Requirements

Reporting requirements are included in the Monitoring and Reporting Program. The reporting requirements establish requirements for report submittal format.

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions (Provision VI.A)

Standard Provisions, which in accordance with 40 CFR 122.41 and 122.42 apply to all NPDES discharges and must be included in every NPDES permit, are provided in Attachments D of this Order. 40 CFR 122.41(a)(1) and (b) through (n) establish conditions that apply to all state-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. 40 CFR 123.25(a)(12) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with 40 CFR 123.25, this Order omits federal conditions that address enforcement authority specified in 40 CFR 122.41(j)(5) and (k)(2) because the CWC enforcement authority is more stringent. In lieu of these conditions, this Order incorporates by reference CWC section 13387(e).

B. Monitoring and Reporting Program Requirements (Provision VI.B)

The Discharger is required to monitor the permitted discharge in order to evaluate compliance with permit conditions. Monitoring requirements are contained in the Monitoring and Reporting Program (Attachment E), and Standard Provisions (Attachment D). This provision requires compliance with these documents and is authorized by 40 CFR 122.41(h) and (j), and CWC sections 13267 and 13383.

C. Special Provisions (Provision VI.C)

- 1. Reopener Provisions.** These reopener provisions are based on 40 CFR 122.63 and allow modification of this Order and its effluent limitations as necessary in response to updated WQOs, regulations, or other new relevant information that may be established in the future and other circumstances allowed by law.
- 2. Notice of Intent (NOI) Application.** Provision VI.C.2, Notice of Intent (NOI) Application, is based on 40 CFR 122.28(b).
- 3. NOI Review.** Provision VI.C.3, NOI Review, is based on 40 CFR 122.28(b).
- 4. Discharge Authorization.** Provision VI.C.4, Discharge Authorization, is based on 40 CFR 122.28(b).
- 5. Non-Compliance is a Violation.** Provision VI.C.5, Non-Compliance is a Violation, is based on 40 CFR 122.41(a).
- 6. Triggers.** Dischargers authorized under this Order are expected to use BAT and treat their fuel or VOC pollutants to non-detectable levels. Some compounds other than pollutants with

effluent limitations may be detected in the effluent of some of the treatment systems, however. These pollutants include both organic and inorganic compounds. The purpose of these provisions is to require Dischargers to do additional activities should any pollutants exceed the triggers in Table F-8. These triggers are not effluent limitations, and must not be construed as such. Instead, they are levels at which additional investigation is warranted to determine whether a numeric limit for a particular constituent is necessary. Unless explained in a note, the concentration-based triggers in Table F-8 are set at the minimum applicable criterion, as determined from State MCLs, federal MCLs, CTR criteria, or Basin Plan WQOs. The reason for this approach is explained in section IV of this Fact Sheet, and further explained below.

- a. Triggers for Inorganic Compounds.** Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc (hereinafter called inorganic compounds) are present in fuel- or VOC-cleanup discharges, primarily due to background concentrations in the shallow groundwater being remediated. The discharge volume and concentrations of inorganic compounds concentrations in the effluent are relatively low. The Regional Water Board has concluded that Bay-wide inorganic compounds loading from fuel- or VOC-cleanup discharges represent a very small portion of total inorganic compounds loadings from sources within the Region (including municipal and industrial point source discharges and stormwater discharges), and, therefore, shall cause no impairment of beneficial uses or potential exceedances of inorganic compounds objectives in receiving waters.

Facilities where inorganic compounds have adversely impacted groundwater are not eligible for coverage under this Order. Each Discharger shall submit, as part of the NOI application for proposed discharge, analytical results including inorganic compounds concentrations in the influent and effluent, if available, or maximum concentrations in any individual extraction wells, if not operating yet. Based on these data, the Discharger may receive a discharge authorization letter. In some cases after starting up an extraction and treatment system, the effluent concentration of some inorganic compounds may exceed the triggers listed in Table F-8. In this case, the Discharger shall take three additional samples and have them analyzed for the inorganic compound of concern and comply with the Provisions VI.C.7, VI.C.8, or VI.C.9.

Triggers for copper and nickel have been updated in the General Permit from the previous Fuel General Permit to reflect the recently adopted SSOs and SSTs for copper throughout San Francisco Bay, and the SSOs and SSTs for nickel in the South Bay.

- b. Triggers for Organic Compounds.** Dischargers authorized under this Order are expected to use BAT and treat their VOC pollutants to non-detectable levels. Sites where pesticides or other conservative pollutants have adversely impacted groundwater are not eligible for coverage under this Order. Each Discharger shall submit, as part of the NOI application for proposed discharge, analytical results including volatile and semi-volatile organic compounds concentrations in the influent and effluent if available or maximum concentrations in any individual extraction wells, if not operating yet. In addition, each Discharger shall submit a report, to the satisfaction of Executive Officer, certifying the

adequacy of the proposed treatment system in removal of all organic pollutants of concern. Based on these data and information, the Discharger may receive a discharge authorization letter. However, some organic compounds, other than pollutants with effluent limitations, may be detected in the effluent of some of the treatment systems. This could be due to the movement of the contaminated groundwater from a neighboring site into the capture zone of the treatment facility authorized under this permit. Table F-8 contains concentration-based triggers for conducting additional activities for a list of pollutants reported by Dischargers or listed in the CTR. This provision would allow Dischargers to continue groundwater cleanup while investigating the ability to treat any detected volatile or semi-volatile organic compounds, in excess of Table F-8 triggers.

Table F-8. Basis for Table 3 Trigger Compounds

Pollutant	CAS Number	Minimum State/Federal MCL (µg/L)	Minimum Basin Plan Criteria ^[1] (µg/L)	Minimum CTR Criteria ^[1] (µg/L)	Trigger ^{[1][7]} (µg/L)
Antimony	7440360	6	---	14	6
Arsenic	7440382	10	36	36	10
Beryllium	7440417	4	---	---	4
Cadmium	7440439	5	1.1	2.5	1.1
Chromium (VI)	18540299	---	11	11	11 ^[2]
Copper ^[3]	7440508	1000	5.9	---	5.9
Copper ^[4]	7440508	1000	3.4	---	3.4
Copper ^[5]	7440508	1000	4.7	---	4.7
Lead	7439921	15	3.2	3.2	3.2
Mercury	7439976	2	0.025	0.050	0.025
Nickel ^[3]	7440020	100	30	30	30
Nickel ^[4]	7440020	100	13	13	13
Nickel ^[5]	7440020	100	19	19	19
Selenium	7782492	50	---	5	5
Silver	7440224	100	2.2	2.2	2.2
Thallium	7440280	2	---	1.7	1.7
Zinc	7440666	5000	86	86	86
Cyanide	57125	150	2.9	5.2	2.9
2,3,7,8-TCDD	1746016	0.00003	---	1.3E-08	1.3E-08
Acrylonitrile	107131	---	---	0.059	0.059
Bromoform	75252	80	---	4.3	4.3
Chlorodibromomethane	124481	80	---	0.401	0.401
Dichlorobromomethane	75274	80	---	0.56	0.56
1,2-Dichloropropane	78875	5	---	0.52	0.52
1,3-Dichloropropylene	542756	0.5	---	10	0.5
1,1,2,2-Tetrachloroethane	79345	1	---	0.17	0.17
Pentachlorophenol	87865	1	---	0.28	0.28
2,4,6-Trichlorophenol	88062	---	---	2.1	2.1
Benzidine	92875	---	---	0.00012	0.00012
Benzo(a)anthracene	56553	---	---	0.0044	0.0044
Benzo(a)pyrene	50328	0.2	---	0.0044	0.0044
Benzo(b)fluoranthene	205992	---	---	0.0044	0.0044
Benzo(k)fluoranthene	207089	---	---	0.0044	0.0044
Bis(2-chloroethyl)ether	111444	---	---	0.031	0.031
Bis(2-ethylhexyl)phthalate	117817	---	---	1.8	1.8
Chrysene	218019	---	---	0.0044	0.044

Pollutant	CAS Number	Minimum State/Federal MCL (µg/L)	Minimum Basin Plan Criteria ^[1] (µg/L)	Minimum CTR Criteria ^[1] (µg/L)	Trigger ^{[1][7]} (µg/L)
Dibenzo(a,h)anthracene	53703	---	---	0.0044	0.0044
3,3'-Dichlorobenzidine	91941	---	---	0.04	0.04
2,4-Dinitrotoluene	121142	---	---	0.11	0.11
1,2-Diphenylhydrazine	122667	---	---	0.040	0.040
Hexachlorobenzene	118741	1	---	0.00075	0.00075
Hexachlorobutadiene	87683	---	---	0.44	0.44
Hexachloroethane	67721	---	---	1.9	1.9
Indeno(1,2,3-c,d)pyrene	193395	---	---	0.0044	0.0044
N-nitrosodimethylamine	62759	---	---	0.00069	0.00069
N-nitrosodi-n-propylamine	621647	---	---	0.005	0.005
Aldrin	309002	---	---	0.00013	0.00013
alpha-BHC	319846	---	---	0.0039	0.0039
beta-BHC	319857	---	---	0.014	0.014
gamma-BHC	58899	0.2	---	0.019	0.019
Chlordane	57749	0.1	---	0.00057	0.00057
4,4-DDT	50393	---	---	0.00059	0.00059
4,4-DDE	72559	---	---	0.00059	0.00059
4,4-DDD	72548	---	---	0.00083	0.00083
Dieldrin	60571	---	---	0.00014	0.00014
alpha-Endosulfan	959988	---	---	0.0087	0.0087
beta-Endosulfan	33213659	---	---	0.0087	0.0087
Endrin	72208	2	---	0.0023	0.0023
Endrin aldehyde	7421934	---	---	0.76	0.76
Heptachlor	76448	0.01	---	0.00021	0.00021
Heptachlor epoxide	1024573	0.01	---	0.00010	0.00010
PCBs, sum	1336363	0.5	---	0.00017	0.00017
Toxaphene	8001352	3	---	0.0002	0.0002
1,4-dioxane	123911	3	---	---	3
Turbidity (NTU)	---	5	---	---	5
Odor-Threshold (Units)	---	3	---	---	3
TPHs (other than gasoline and diesel)	---	---	---	---	50 ^[6]
Sulfate	---	250,000	---	---	250,000
Foaming agents	---	500	---	---	500
Color (units)	---	15	---	---	15
Notes for Table F-8: [1] Unit is µg/L unless noted otherwise right after the name of pollutant [2] If total chromium concentration exceeds 11 µg/L, then analysis for chromium(VI) shall also be conducted [3] Applicable to Suisun Bay and San Pablo Bay segments of San Francisco Bay. [4] Applicable to Central Bay and Lower Bay segments of San Francisco Bay. [5] Applicable to South San Francisco Bay, south of Hayward Shoals. [6] Trigger value based on Regional Water Board staff BPJ. If a discharger is reporting monitoring data with a detection level higher than 50 µg/L, the reason for the higher detection level shall be fully explained within the monitoring report. [7] If a discharger is reporting non-detect monitoring data with a reporting level higher than the trigger, the reason for the higher detection level shall be consistent with the SIP Appendix 4 required minimum levels (please refer to our web site for the latest version of SIP) and must be explained within the monitoring report.					

8. Individual NPDES Permit May Be Required. Provision VI.C.11 is retained from the previously issued Fuel and VOC General Permits and is based on 40 CFR 122.28(b)(3).

- 9. Treatment Reliability Requirement.** Provision VI.C.12, Treatment Reliability, is mostly based on 40 CFR 122.41. The basis for the requirement for a certified engineer to oversee the treatment and operation of the treatment system is to ensure that qualified professionals perform this work. Service stations operators are generally not qualified for this technical level of oversight.

VIII. PUBLIC PARTICIPATION

The Regional Water Board is considering the reissuance of general waste discharge requirements (GWDRs) that will serve as a General NPDES Permit. As a step in the GWDRs adoption process, the Regional Water Board has developed tentative GWDRs. The Regional Water Board encourages public participation in the GWDR adoption process.

A. Notification of Interested Parties

The Regional Water Board has notified the Dischargers and interested agencies and persons of its intent to prescribe GWDRs for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through the Recorder on December 12, 2011.

B. Written Comments

Staff determinations are tentative. Interested persons are invited to submit written comments concerning this Order. Comments should be submitted either in person or by mail to the Executive Officer at the Regional Water Board at the address above on the cover page of this Order.

To be fully responded to by staff and considered by the Regional Water Board, written comments should be received at the Regional Water Board offices by 5:00 p.m. on January 12, 2012.

C. Public Hearing

The Regional Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date: February 8, 2012
Time: 9:00 a.m.
Location: Elihu Harris State Building (1st Floor auditorium)
1515 Clay Street
(Walking distance from City Center 12th Street BART station)
Oakland, CA 94612

Interested persons are invited to attend. At the public hearing, the Regional Water Board will hear testimony, if any, pertinent to the discharge, GWDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our web address is <http://www.waterboards.ca.gov/sanfranciscobay> where you can access the current agenda for changes in dates and locations.

D. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the Regional Water Board regarding the final GWDRs. The petition must be submitted within 30 days of the Regional Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

E. Information and Copying

Report of Waste Discharges, related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above during regular office hours, which are generally weekdays from 8:00 a.m. to 5:00 p.m., excluding 12:00 p.m. to 1:00 p.m. lunch hours and holidays. Copying of documents may be arranged through the Regional Water Board by calling (510) 622-2300.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the GWDRs and NPDES permit should contact the Regional Water Board, reference this facility, and provide a name, address, and phone number.

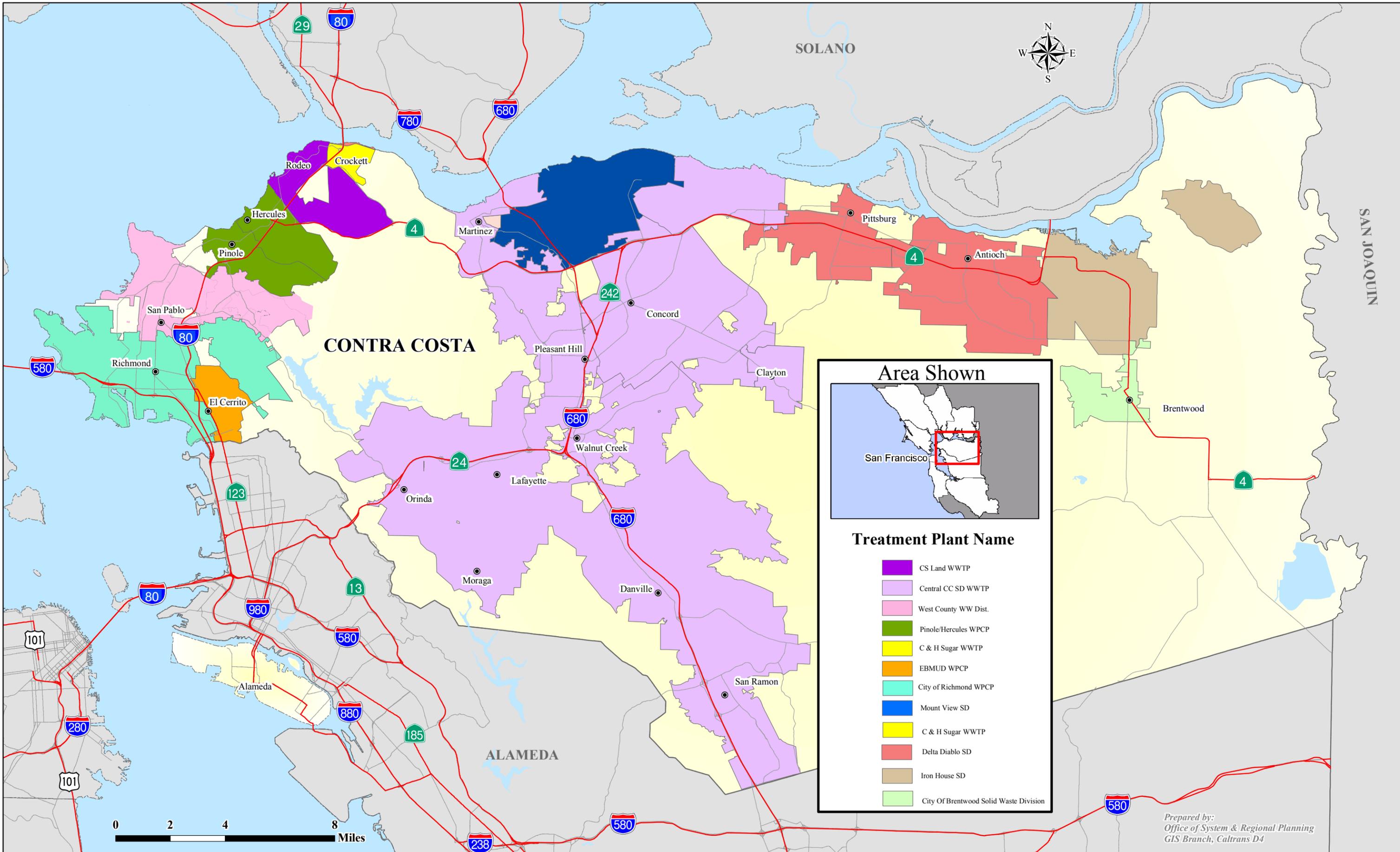
G. Additional Information

Requests for additional information or questions regarding this order should be directed to **Farhad Azimzadeh at (510) 622-2310 or by e-mail at fazimzadeh@waterboards.ca.gov**.

ATTACHMENT D

PUBLICLY-OWNED TREATMENT WORKS (POTW) FACILITY INFORMATION

Contra Costa County - POTW Service Areas



Area Shown

Treatment Plant Name

- CS Land WWTP
- Central CC SD WWTP
- West County WW Dist.
- Pinole/Hercules WPCP
- C & H Sugar WWTP
- EBMUD WPCP
- City of Richmond WPCP
- Mount View SD
- C & H Sugar WWTP
- Delta Diablo SD
- Iron House SD
- City Of Brentwood Solid Waste Division

Contra Costa POTW

	City Discharger	Treatment Plant Name	WDR Discharger Name	Discharger Contact Name	Contact Phone No.	Contact Email	Mail Address	Ct Contact for Groundwater & De-Watering Discharges	Service Area of the POTW
1	Richmond	City of Richmond WPCP	Veolia Water [formerly U.S. Filter]	Chris McAuliffe	510-412-2001	shalabej@usfilter.com	1401 Marine Way South, Richmond, CA 94804	Contact: Steve Friday @ 510-412-2009 website: "www.ci.richmond.ca.us/wastewater" Permit fee is now \$750 (good for multiple sites), Total Scan for metals needed, possible site history needed. Steve has worked with Ct before on a 580 project with Chevron	City of Richmond
2	Richmond	West County WW District	West County WW District	John Foly (agency manager), Paul Winnick (collection system manager)	510-222-6700	ifoly@wcvd.org ; pwinnick@wcvd.org	2910 Hill Top Drive, Richmond, CA 94806	Contact Paul Winnecke @ 510-222-6700. Service area is San Pablo, N. Richmond, El Sobrante. Need permit, analysis, per gallon fee - wouldn't take during major storm event Try wcvd.org website	San Pablo, N. Richmond, El Sobrante
3	Pinole	Pinole-Hercules WPCP	Pinole-Hercules WPCP	Brent M. Salmi	510-724-9017	bsalmi@ci.pinole.ca.us	Brent M. Salmi, 2131 Pear St., Pinole, CA 94564	Brent Salmi is the City Engineer for both Pinole and Hercules 510-724-9017: No permit process - prefers, if tested, clean, and sediment-free to put in Storm drain. Also depends on quantity - will decide when given specifics of job	Cities of Pinole and Hercules
4	Hercules		City of Hercules	Jeff Brown	510-799-8252	jbrown@ci.hercules.ca.us	Jeff Brown, City of Hercules, 111 Civic Drive, Hercules, CA 94547	City of Hercules sends their Wastewater to the Pinole-Hercules Plant-see Line # A - 3	City of Hercules - see Line # A - 3
87	Contra Costa County, Port Costa WWTP	Contra Costa County, Port Costa WWTP	Contra Costa County, Public Works Dept. (include CCCSD6 and CCCSD5, CCCM28)	Lisa Carnahan	925-313-2191	lcarnaha@pw.co.contra-costa.ca.us	Contra Costa County Public Work, 255 Glacier Dr., Martinez, CA 94553	Per Lisa Carnahan 925-313-2191: "Absolutely not." This is a very small plant with limited capacity, ie. # 6 is 47 homes (Stonehurst @ Alhambra.) #5 is 86 homes in Port Costa and #28 is a small Trailer Park.	Probably Port Costa - which has no Caltrans ROW within its city limits
88	CS Land WWTP	CS Land WWTP	CS Land WWTP	Dylan Radke	925-228-1400	dylan@gdwp.com	Dylan Radke, Attorney, P.O. Box 630, Martinez, CA 94553	Contact Tracy Sizemore @ 602-728-3047. This is a small land holding of 1900 acres only has Hwy 123 (San Pablo Ave in Crockett and Rodeo) TS says see Region 2 2004 Order #64	Crockett and Rodeo
89	Mt. View SD	Mt. View SD	Mt. View SD	Dave Contreras	925-228-5635x32	dcontreras@mvsd.org	David Contreras, 3800 Authur Road, Martinez, CA 94553	Per Dave Riddle: "Normally they would not accept - they didn't on Caltrans' 680/Marina Vista project - and the water was trucked to CC Central San." They would listen to proposals and the final decision would be made by Dr. Teng Wu or David Contreras.	Services unincorporated areas of Martinez - mostly North of Hwy 4 and E/W of Hwy 680
90	Central Contra Costa SD WWTP	Central Contra Costa SD WWTP	Central Contra Costa SD WWTP	Jim Kelly, John Pearl	JK, 925-229-7386; JP, 925-229-7156	jkelly@centralsan.dst.ca.us ; jpearl@centralsan.dst.ca.us	CCCSD, 5019 Imhoff Place, Martinez, CA 94553	Call Doug Craig @ 925-229-7284. They have accepted 60,000 gallons (8-12 truck loads per day) from Ct from the Ben-Mtz Bridge/680 project. They need source control, analyze - then talk about requirements and fee structure - will do what's best for their service area	They do these cities: Orinda, Moraga, Lafayette, Walnut Creek, San Ramon, Concord, Clayton, Pleasant Hill, Martinez, Alamo, Danville, and Port Chicago
91			City of Concord	Qamar Khan, Director of Public Works for Maintenance Services	925-671-3231			Same as Central Contra Costa SD see line # A - 90	The city of Concord had their own WWTP until CCSD (line # A - 91) was built. Their WW is collected by the city - then sent to CCSD
92			City of Clayton - system managed by City of Concord	Qamar Khan, Director of Public Works for Maintenance Services	925-671-3231			No Caltrans ROW within City of Clayton - Same as Central Contra Costa SD see line # A - 90	No Caltrans ROW within City of Clayton
104	C&H Sugar WWTP	C&H Sugar WWTP	C&H Sugar	Elizabeth Crowley	510-787-4352		They don't have sanitary sewer system. C&H sugar sends their WW to Crockett Valona SD and CVSD sends all the WW to C&H Sugar WWTP	Best contact: Elizabeth Crowley @ 510-787-4352. She is "scared to take on unknowns" anything would be "conditionally dependent" - they have very tight limits on all metals. She's approachable - but is very disappointed in Ct re: the Zampa Bridge Its possible.	The C & H plant handles all the waste north of the Railroad (in Crockett), the "Industrial" part of Crockett, and from their plant. WW is commingled with the Crockett-Valona residential wastes, treated and discharged.
105			Crockett-Valona SD	Kent Peterson	510-787-2992	cvsd@earthlink.net	Kent Peterson, Crockett Valona Sanitary District, P.O. Box 578, Crockett, CA 94525	Per Kent Peterson @ 510-787-2992 Crockett sends their WW to C&H and they WOULD NOT accept as it is disallowed per their agreement with C&H	The "Crockett" section is the area on both sides of I-80, while the "Valona" section is further east of 3rd Ave. Crockett and Valona called "Cro-Lona" sends their wastes to the C & H plant (on the Strait) where it is treated at a plant that is jointly owned by both of them

ATTACHMENT E

SITE INVESTIGATION REPORT

Only relevant portion of the Site Investigation Report are included. For rest of the report, please refer to Project Supplemental Information Handout in the section 2.106B of the standard special provisions

SUBSURFACE INVESTIGATION REPORT

MOCOCO OVERHEAD SEISMIC RESTORATION PROJECT
MARTINEZ, CONTRA COSTA COUNTY, CALIFORNIA

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE, MS8C
OAKLAND, CA 94612



PREPARED BY:

GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CA 94550



GEOCON PROJECT No. E8560-06-35
CALTRANS PROJECT ID 04-0000-0967-1
CALTRANS EA 04-3A8701

APRIL 2012

6.0 CONCLUSIONS

6.1 Soil

6.1.1 CAM 17 Metals

The near surface soil samples collected from borings B23-01, B23-02, and B23-12 exceeded the lead STLC of 5.0 mg/l, and two soil samples (B23-12 12'-12.5' and B23-13 6.0'-6.5') exceeded the copper STLC of 25 mg/l; however, based on the statistical analysis of the reported concentrations of total and soluble metals, soil excavated at the project location would not be classified as California or RCRA hazardous.

The CAM 17 metals concentrations in site soil were compared to ESLs (SFRWQCB, May 2008, Tables A and K-3) and published background levels typically present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March, 1996. Arsenic, barium, copper, lead, and vanadium were reported with concentrations equal to or greater than their respective residential land use ESL values.

ESLs and published background concentrations for these elements are summarized in the table below:

	MAXIMUM	95% UCL	MEAN	RESIDENTIAL ESL	COMMERCIAL/ INDUSTRIAL ESL	PUBLISHED BACKGROUND MEAN ¹	PUBLISHED BACKGROUND RANGE ¹
Arsenic	23	6.29	5.07	0.39	1.6	3.5	0.6 to 11
Barium	1,000	166	111	750	1,500	509	133 to 1,400
Copper	350	64	42.61	230	230	28.7	9.1 to 96.4
Lead	270	25.8	18.91	200	750	23.9	12.4 to 97.1
Vanadium	41	25.1	23.09	16	200	112	39 to 288

Concentrations reported in milligrams per kilogram (mg/kg)

¹ Kearney Foundation of Soil Science, March 1996

The reported arsenic concentrations in the soil samples exceed the shallow soil residential and commercial/industrial land use and construction worker exposure ESLs and are above the published background range. Arsenic was reported at concentrations ranging from <1.0 mg/kg to 23 mg/kg and has a calculated 95% UCL of 6.29 mg/kg, above the residential land use and commercial/industrial land use ESLs, but below the construction worker exposure ESL and within the published background range. The *SFRWQCB Update to Environmental Screening Levels (ESLs) Technical Document (November 2007, Revised May 2008)* states that ambient background concentrations of arsenic

typically exceed risk-based screening levels. In such instances, it may be more appropriate to compare site data to regionally-specific established background levels.

The reported barium concentrations reported in the soil samples exceed the shallow soil residential land use ESL and published background range, but are below the commercial/industrial and construction exposure ESLs. Barium was reported at concentrations ranging from 8.8 mg/kg to 1,000 mg/kg and has a calculated 95% UCL of 166 mg/kg, below the residential land use ESLs.

The reported copper concentrations in the soil samples exceed the shallow soil residential and commercial/industrial land use ESLs and are above the published background range; however, they are below the construction exposure ESL. Copper was reported at concentrations ranging from 4.6 mg/kg to 350 mg/kg and has a calculated 95% UCL of 64 mg/kg, below the residential land use and commercial/industrial land use ESLs.

Reported lead concentrations in soil exceed the residential land use ESL and are above reported background ranges; however, they are below commercial/industrial and construction worker direct exposure ESLs. Lead was reported at concentrations ranging from <1.0 mg/kg to 270 mg/kg and has a calculated 95% UCL of 25.8 mg/kg, below the residential land use ESL.

The reported vanadium concentrations in the soil samples exceed the shallow soil residential land use ESL; however, they are below the commercial/industrial and construction exposure ESLs and within the published background range. Vanadium was reported at concentrations ranging from 4.2 mg/kg to 180 mg/kg and has a calculated 95% UCL of 25.1 mg/kg, below the residential land use ESL.

Based on the reported arsenic, barium, copper, lead, or vanadium concentrations, offsite reuse or disposal of excavated soil may be restricted based on metals content depending on proposed use.

Lead and CAM 17 metals results are summarized in Tables 2 and 3. Statistical evaluations for arsenic, barium, copper, lead and vanadium concentrations reported during this investigation are presented in Appendix D.

6.1.2 Organics

Organic concentrations in soil were compared to ESLs. MTBE was not detected at or above the laboratory reporting limits. Benzene was detected in one sample (B23-01 1.5-2.0) at a concentration of 30 mg/kg, below the residential, commercial/industrial, and construction exposure ESLs for this compound. Remaining BTEX compounds were not detected at or above reporting limits.

TPHd was reported at concentrations ranging from <1.0 to 29,000 mg/kg, and TPHmo was reported at concentrations of <1.0 to 53,000 mg/kg. These values are above the residential, commercial/industrial and construction exposure ESLs for these compounds, however, the maximum concentrations of TPHd and TPHmo were reported for boring location B23-01, and this is the only location where construction exposure ESL values were exceeded.

With all data included, the TPHd and TPHmo calculated 95% UCLs are 1,508 mg/kg and 2,778 mg/kg, respectively. These values are above the residential and commercial/industrial land use ESLs but below the construction exposure ESL. If the results from boring B23-01 are omitted from calculations, the calculated 95% UCL concentration of TPHd for the site is 42 mg/kg, below the residential and commercial/industrial land use and construction exposure ESLs, and the calculated 95% UCL TPHmo for the site is 158 mg/kg which is above the residential and commercial/industrial land use ESLs but below the construction exposure ESLs.

Organic compound results for soil samples are summarized in Table 4. Statistical evaluations for TPHd and TPHmo concentrations reported during this investigation are presented in Appendix D.

Based on the reported TPHd and TPHmo concentrations, reuse or disposal of excavated soil may be restricted based on petroleum hydrocarbon content.

6.1.3 Naturally Occurring Asbestos

NOA was not detected above the CARB regulatory limit of 0.25% in the soil samples.

NOA results are presented in Table 5 and copies of the analytical laboratory reports and chain-of-custody documentation are provided in Appendix E.

6.2 Groundwater

6.2.1 CAM 17 Metals

Antimony, arsenic, barium, cadmium, cobalt, copper, lead, molybdenum, nickel, selenium, thallium, vanadium, and zinc exceeded one or more ESLs for sites where groundwater is and is not a current or potential drinking water source and where groundwater discharges to surface water in freshwater, marine, and estuarine environments. It should also be noted that surface water sampled during this investigation also exceeds one or more of these same ESLs for antimony, copper, and thallium. CAM 17 metals results for grab-groundwater samples are summarized in Table 6 and the analytical laboratory reports are included in Appendix C.

Groundwater and surface water encountered during the construction project may require special handling and/or treatment prior to disposal or discharge based on the reported metals concentrations.

6.2.2 Organics

Groundwater samples were collected from 10 boring locations during this investigation. BTEX and MTBE were not detected at or above laboratory reporting limits. TPHg was detected in one sample at a concentration of 0.05 mg/l, below the ESLs for this compound. TBA was reported in one sample at a concentration of 32 mg/l; exceeding the groundwater as a current/potential source of drinking water and surface water for a freshwater environment ESL of 12 mg/l. Remaining VOCs were not detected at or above reporting limits. TPHd was reported at concentrations ranging from <0.05 mg/l to 0.95 mg/l. TPHmo was reported at concentrations ranging from <0.05 mg/l to 1.1 mg/l. The reported TPHd and TPHmo concentrations exceed the ESLs at sites where groundwater is and is not a current or potential drinking water source and where groundwater discharges to surface water in freshwater, marine, and estuarine environments.

The surface water sample analyzed did not contain detectable concentrations of TPHg, BTEX, MTBE or VOCs at or above laboratory reporting limits. TPHd and TPHmo concentrations reported in the surface water sample, 0.13 mg/l and 0.22 mg/l, respectively, exceeded the ESLs for groundwater as a current or potential drinking water source, groundwater not as a current or potential drinking water source and where groundwater discharges to surface water in freshwater, marine, and estuarine environments.

Organic results for grab-groundwater samples are summarized in Table 7 and the analytical laboratory reports are included in Appendix C.

Groundwater and surface water encountered during the construction project may require special handling and/or treatment prior to disposal or discharge based on the reported TPHd and TPHmo concentrations.

6.3 Worker Protection

The contractor(s) should prepare a project-specific health and safety plan to prevent or minimize worker exposure to soil and groundwater. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of soil and groundwater.

TABLE 6
Summary of CAM 17 Metals Results - Groundwater
Mococo Overhead, State Route 680
Contra Costa County, California

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
B23 02	<0.005	<0.01	0.85	<0.003	<0.003	0.005	<0.003	0.009	<0.005	<0.0002	<0.005	<0.005	0.02	<0.003	<0.02	0.01	0.01
B23 04	<0.005	<0.01	0.90	<0.003	<0.003	0.01	<0.003	0.01	<0.005	<0.0002	<0.005	0.01	0.01	<0.003	<0.02	0.02	0.03
B23 07	0.03	<0.05	0.41	<0.02	<0.02	0.02	0.06	0.08	<0.02	<0.0002	0.06	0.05	<0.05	<0.02	0.18	<0.02	<0.05
B23 09	<0.005	0.01	0.19	<0.003	0.004	0.02	0.007	0.009	<0.005	<0.0002	<0.005	0.02	<0.01	<0.003	<0.02	0.03	0.02
B23 12	<0.02	<0.05	0.79	<0.02	<0.02	<0.02	0.09	0.08	<0.02	<0.0002	<0.02	0.07	<0.05	<0.02	0.16	<0.02	<0.05
B23 13	0.006	<0.01	0.13	<0.003	<0.003	0.006	0.03	0.02	<0.005	<0.0002	<0.005	0.04	<0.01	<0.003	0.03	<0.003	0.08
B23 16	<0.02	<0.05	3.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0002	<0.02	<0.02	<0.05	<0.02	<0.08	0.06	<0.05
B23 18	<0.02	<0.05	4.3	<0.02	<0.02	0.03	<0.02	0.06	<0.02	<0.0002	<0.02	<0.02	<0.05	<0.02	<0.08	0.13	0.08
B23 20	0.01	0.01	0.90	<0.003	<0.003	0.04	0.003	0.03	0.007	<0.0002	<0.005	0.03	<0.01	<0.003	0.04	0.03	0.08
B23 21	0.03	<0.05	0.29	<0.02	<0.02	0.04	0.02	0.08	<0.02	<0.0002	<0.02	0.03	<0.05	<0.02	0.16	<0.02	<0.05
Surface Water	0.009	<0.01	0.06	<0.003	<0.003	<0.003	<0.003	0.02	<0.005	<0.0002	<0.005	<0.005	<0.01	<0.003	0.04	<0.003	0.01
ESLs																	
GW is current/potential source	0.006	0.036	1.0	0.00053	0.00025	0.05	0.003	0.0031	0.0025	0.000025	0.035	0.0082	0.005	0.00019	0.002	0.015	0.081
GW not current/potential source	0.03	0.036	1.0	0.00053	0.00025	0.18	0.003	0.0031	0.0025	0.000025	0.24	0.0082	0.005	0.00019	0.004	0.019	0.081
Surface Water - Freshwater	0.006	0.00014	1.0	0.00270	0.00025	0.05	0.003	0.0090	0.0025	0.000025	0.035	0.052	0.005	0.00034	0.002	0.015	0.12
Surface Water - Marine	0.5	0.00014	1.0	0.00053	0.00930	0.18	0.003	0.0031	0.0056	0.000025	0.24	0.0082	0.071	0.00019	0.004	0.019	0.081
Surface Water - Estuarine	0.03	0.00014	1.0	0.00053	0.00025	0.18	0.003	0.0031	0.0025	0.000025	0.24	0.0082	0.005	0.00019	0.004	0.019	0.081

Notes:

Results shown in mg/l

< = Not detected at or above the stated laboratory reporting limit

ESLs = Environmental Screening Levels, Tables F-1A, F-1B, F-2A, F-2B, and F-2C, Revised May 2008.

TABLE 7
Summary of Organics Results - Groundwater
Mococo Overhead, State Route 680
Contra Costa County, California

Sample ID	TPHd (mg/l)	TPHmo (mg/l)	TPHg (mg/l)	BTEX (µg/l)	MTBE (µg/l)	VOCs (µg/l)
B23 02	<0.07	<0.07	0.05	ND	<0.50	ND
B23 04	0.18	0.36	<0.05	ND	<0.50	ND
B23 07	0.95	1.1	<0.05	ND	<0.50	ND
B23 09	0.81	0.89	<0.05	ND	<0.50	TBA=32
B23 12	0.51	0.46	<0.05	ND	<0.50	ND
B23 13	0.21	0.34	<0.05	ND	<0.50	ND
B23 16	0.70	0.74	<0.05	ND	<0.50	ND
B23 18	<0.05	<0.05	<0.05	ND	<0.50	ND
B23 20	0.19	0.24	<0.05	ND	<0.50	ND
B23 21	<0.05	<0.05	<0.05	ND	<0.50	ND
Surface Water	0.13	0.22	<0.05	ND	<0.50	ND
Trip Blank (1/31/12)	---	---	<0.05 (mg/l)	---	---	---
Trip Blank (2/1/12)	---	---	<0.05 (mg/l)	---	---	---
Trip Blank (2/2/12)	---	---	<0.05 (mg/l)	---	---	---
Trip Blank (2/3/12)	---	---	<0.05 (mg/l)	---	---	---
<u>ESLs</u>						
GW is current/potential source	0.10	0.10	0.10	---	5.0	TBA=12
GW not current/potential source	0.21	0.21	0.21	---	1,800	TBA=18,000
Surface Water - Freshwater	0.10	0.10	0.10	---	5.0	TBA=12
Surface Water - Marine	0.21	0.21	0.21	---	180	TBA=18,000
Surface Water - Estuarine	0.21	0.21	0.21	---	180	TBA=18,000

TABLE 7
Summary of Organics Results - Groundwater
Mococo Overhead, State Route 680
Contra Costa County, California

Sample ID	TPHd (mg/l)	TPHmo (mg/l)	TPHg (mg/l)	BTEX (µg/l)	MTBE (µg/l)	VOCs (µg/l)
------------------	------------------------	-------------------------	------------------------	------------------------	------------------------	------------------------

Notes:

mg/l = milligrams per liter

µg/l = micrograms per liter

TPHg = total petroleum hydrocarbons as gasoline

TPHd = total petroleum hydrocarbons as diesel

TPHmo = total petroleum hydrocarbons as motor oil

BTEX = benzene, toluene, ethylbenzene, and xylenes

MTBE = methyl tert-butyl ether

VOCs = volatile organic compounds

--- = not analyzed or no standard exists for this compound

< = not detected at the stated laboratory reporting limit

ND = not detected

ESLs = Environmental Screening Levels, Tables F-1A, F-1B, F-2A, F-2B, and F-2C, Revised May 2008.

Memorandum

*Flex your power!
Be energy efficient!*

To: MR. MIKE KEEVER
Office Chief
Office of Bridge Design West

Date: August 16, 2013

Attention: Phil Lutz

File: 04-CC-680 (PM 24.26)
04-3A8701
Mococo Off-ramp Replacement

From:  S. A
SUNNY YANG / SAMUEL AWAD
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services


HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Revised Final Foundation Report

This Foundation Report (FR) provides foundation recommendations for the proposed new off-ramp structure (Bridge No. 28-0171S) at the southbound Marina Vista Road exit on Highway 680 (PM 24.26) in Contra Costa County. This exit is located on the south side of Benicia-Martinez Bridge. This FR supersedes the previous version dated October 16, 2012.

1. SCOPE OF WORK

The following tasks were performed for the preparation of this FR:

- Review of as-built plans of the existing bridge structure.
- Field geotechnical exploration, including drilling three exploratory borings, performing Standard Penetration Test (SPT) and Pocket Penetrometer (PP) Test, and collecting soil samples;
- Laboratory testing of selected samples, including unit weight, moisture content, grain size distribution, Atterberg Limits, consolidation, unconfined compression, and corrosion tests;
- Foundation design analysis; and
- Preparation of this FR.

2. PROJECT DESCRIPTION

The existing off-ramp structure, constructed in 1962, is a continuous three-frame concrete slab bridge with a length of 673 feet and width of 30 feet. There are 15 multiple concrete pile extension bents. The end of ramp is supported by mainline bent 6L'. The proposed new off-ramp structure is 640 feet long and 31 feet wide. There are 10 bents and one abutment, all founded on piles.

MR. MIKE KEEVER
Attn: Phil Lutz
August 16, 2013
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The vertical datum used in this report is NAVD 88. The horizontal datum is NAD 83.

3. EXCEPTION TO POLICY

There is no known exception to Department policy relating to the investigation or design of the proposed structures.

4. FIELD INVESTIGATION AND TESTING PROGRAM

A total of three geotechnical exploratory borings were drilled at the project site to investigate subsurface soil conditions for foundation design of the bridge. All were rotary wash borings, using a truck-mounted drill rig. Table 1 lists the depths of these borings and the dates they were drilled. Boring RC-11-001 and RC-11-003 were drilled from top of the bridge deck.

In all borings, Standard Penetration Tests (SPT) were performed at 5-foot interval in soil strata. Pocket Penetrometer (PP) tests were conducted on soil samples showing apparent cohesion. For rock material, continuous core samples were collected in boxes. Rock Quality Determination (RQD) and percent of sample recovery for each run were also recorded. Soil and rock samples were selected at various depths for laboratory testing (see next Section).

Table 1. Summary of field borings

Boring ID	Surface Elev. (ft)	Total Depth (ft)	Bedrock Depth (ft)	Date of completion
RC-11-001	5.2	80	23	8/17/11
RC-11-002	4.0	80	29	8/23/11
RC-11-003	2.8	155	54	10/24/11

5. LABORATORY TESTING PROGRAM

The laboratory testing program included 7 unit weight tests, 28 moisture content tests, 2 gradation (particle distribution) analyses, 5 Atterberg Limits tests, 14 consolidation tests, 7 unconfined compression tests, and 2 corrosion tests.

6. SITE GEOLOGY AND SUBSURFACE CONDITIONS

Topography

The project site is located in the northern portion of Contra Costa County along and on the south side of the east end of the Carquinez Strait, which is narrow tidal strait that connects San Pablo Bay to Suisun Bay. The project site is on marshland just east of the base of Bulls Head Point and to the west of Pacheco Creek. The project area elevation is approximately at sea level.

MR. MIKE KEEVER
Attn: Phil Lutz
August 16, 2013
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Site Geology

The project area is located on the eastern edge of the central Coast Ranges geomorphic province. The project site is on the southwest side of a large embayment where tidal marsh deposits overlie the bedrock. The unconsolidated bay mud and peat make up much of the subsurface. The bay mud has been deposited by the influx of the sediments within tidal marshes and small deltas that borders Suisun Bay and Carquinez Strait. These soft bay mud deposits are 7 to 45 feet thick at the project site.

Sedimentary rocks of the Great Valley Sequence occur to the east and south of the project site. Sandstone and pebble conglomerate with thin shale interbeds of the Paleocene age Martinez formation overlie the Great Valley Sequence in the area. The Sedimentary beds in the area dip steeply to the west and southwest.

Numerous west and southwest trending primarily dip slip faults have been mapped on regional geologic maps between the active Concord fault to the east of the project and the potentially active Franklin fault to the west. The nearest trace of the active Concord –Green Valley fault is 1.6 miles to the northeast. It is capable of a maximum earthquake of moment magnitude 6.6. The active Marsh Creek- Greenville fault is 12.0 mile to the southeast. It is capable of a maximum earthquake of moment magnitude 6.9. The potentially active Southampton fault, capable of 6.3 magnitude earthquake, is 2.5 miles to the southwest.

Subsurface Conditions

Three borings (RC-11-001, RC-11-002, RC-11-003) were drilled in 2011 at the project site (Section 4). Based on As-Built plans, there are additionally ten borings (B-9, B-10, B-13, B-14, B-16, B-19, B-20, B-21, B-24 and B-25) drilled in 1956 at the same area. According to these borings, the subsurface materials encountered are mostly bay mud (very soft to stiff lean clay, fat clay, or silt) with Pocket Penetrometer values ranging from 0.0 to 2.0 tsf. Granular materials (sand and fine gravel) are also present within top 5 feet. The depth of bedrock varies dramatically along the bridge alignment. The bedrock depth is approximately 30 feet at Bents 2 and 3, and increases rapidly to approximately 50 to 60 feet at Bent 4 through Bent 9, and rapidly reduces to 20 feet at Bent 10 to Abutment 12. The bedrock consists mostly of alternating layers of fractured and intensely weathered claystone and sandstone. Moderately to intensely fractured Igneous rock was also encountered at RC-11-003 below 70 feet depth.

Groundwater

The project site is entirely covered by water and was difficult to differentiate between surface water and ground water. An older study in March 1956 showed that groundwater was shallow (5.0 feet depth).

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The groundwater level at the project site typically fluctuates with the season and correlates with local geology, topography, and the water level in the Pacheco Creek, Suisun Bay and Carquinez Strait.

7. SCOUR EVALUATION

Scour is not an issue at this site.

8. CORROSION EVALUATION

According to current Caltrans Corrosion Guidelines (2003), a soil is considered non-corrosive for structure foundation elements, if the minimum resistivity is greater than 1000 ohm-cm and the pH value is greater than 5.5. Based on our laboratory corrosion test performed on two soil samples (Table 2), the soil at the project site is corrosive.

Table 2. Soil Corrosion Test Summary

Location	SIC No.	Sample Depth (ft)	Min. Resistivity (ohm-cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
RC-11-001	709313A	15 – 20	337	7.12	1400	66
RC-11-002	709313B	1 – 5	252	7.3	1500	1900

9. SEISMIC RECOMMENDATIONS

Please refer to the Memo from Hossain Salimi of our office to your Branch, dated January 3, 2012 for the final seismic design recommendations. The following is a brief summary of the proposed seismic design parameters:

Controlling Fault = Concord Fault (1.6 miles northeast of project site)
Maximum Moment Magnitude, $M_w = 6.6$
Peak Ground Acceleration = 0.66 g
Surface Rupture Potential = Minimum
Liquefaction Potential = Minimum

For clarification or additional information on seismic design aspects of the project, please consult with Hossain Salimi at (916) 227-7147.

10. AS-BUILT FOUNDATION DATA

The existing structure has 15 bents founded on multiple concrete Raymond pile extensions. Pile tip elevations varied from Elevation -20 to -64 feet. Abutment 1 at the lower end of the off-ramp

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is an integral diaphragm type abutment. In 1963, bents 5 and 6 were modified with driven steel H piles and jacking to correct five inches of foundation settlement due to underlying soft soil. In 1990, the off-ramp was retrofit with cable restrainers and restrainer brackets at the hinge locations.

11. FOUNDATION RECOMMENDATIONS

The foundation design analysis was performed in general using the methods outlined in AASHTO LRFD Bridge Design Specifications (2007); however, reduction factors for geotechnical strength parameters were based on Caltrans/DES/Geotechnical Services criteria. Idealized subsurface soil profile and soil engineering parameters were defined based on the existing boring logs, field and laboratory testing results, relevant literature, and engineering judgment.

According to current Caltrans Bridge Design Specifications, the abutments are designed using the Working Stress Design (WSD) method, and the LRFD design method is used to design the bents (Table 3). For Bents 2 through 7, Structure Design desires to use CIDH piles with 60-inch-diameter permanent casing in the upper portion and 54-inch-diameter rock socket in the lower portion (2 piles per bent). For Bents 8 through 11 and Abutment 12, 24-inch-diameter CISS piles were suggested (4 piles per support). Note that the Finished Grade and pile cutoff elevations in Table 3 (and all the tables below) are approximate; more accurate elevation data shall be found in final structure plans. Structure Design has also provided structure loads as shown in Table 4.

Table 3. Foundation Design Data Sheet

Support No.	Design Method	Pile Type	Finished Grade Elevation (ft)	Cut-off Elevation (ft)	Pile Cap Size (ft)		Permissible Settlement under Service Load (in)	Number of Piles per Support
					B	L		
Bent 2	LRFD	60" CIDH Pile with 54" Rock Socket	3.2	3.2	N/A	N/A	1	2
Bent 3	LRFD		3.5	3.5	N/A	N/A	1	2
Bent 4	LRFD		2.8	2.8	N/A	N/A	1	2
Bent 5	LRFD		2.7	2.7	N/A	N/A	1	2
Bent 6	LRFD		3.0	3.0	N/A	N/A	1	2
Bent 7	LRFD		3.1	3.1	N/A	N/A	1	2
Bent 8	LRFD		24" CISS Pile	3.9	3.9	N/A	N/A	1
Bent 9	LRFD	3.5		3.5	N/A	N/A	1	4
Bent 10	LRFD	3.5		3.5	N/A	N/A	1	4
Bent 11	LRFD	4.5		4.5	N/A	N/A	1	4
Abut 12	WSD	5.1		1.1	N/A	N/A	1	4

Table 4. Foundation Design Loads

Support Support No.	Service Limit State (kips)			Strength Limit State (Controlling Group, kips)				Extreme Event Limit State (Controlling Group, kips)			
	Total Load		Permanent Loads Max. Per Pile	Compression		Tension		Compression		Tension	
	Per Support	Max. Per Pile		Per Support	Max. Per Pile	Per Support	Max. Per Pile	Per Support	Max. Per Pile	Per Support	Max. Per Pile
Bent 2	N/A	740	440	N/A	960	N/A	0	N/A	1280	N/A	410
Bent 3	N/A	810	470	N/A	1060	N/A	0	N/A	1440	N/A	520
Bent 4	N/A	890	490	N/A	1170	N/A	0	N/A	1450	N/A	520
Bent 5	N/A	1010	570	N/A	1320	N/A	0	N/A	1560	N/A	470
Bent 6	N/A	920	550	N/A	1200	N/A	0	N/A	1540	N/A	490
Bent 7	N/A	860	580	N/A	1110	N/A	0	N/A	1540	N/A	500
Bent 8	N/A	230	130	N/A	300	N/A	0	N/A	180	N/A	0
Bent 9	N/A	230	130	N/A	310	N/A	0	N/A	190	N/A	0
Bent 10	N/A	230	130	N/A	300	N/A	0	N/A	180	N/A	0
Bent 11	N/A	230	130	N/A	300	N/A	0	N/A	180	N/A	0
Abut 12	N/A	150	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Based on geotechnical field exploration and as-built foundation data, the estimated bedrock elevations are listed in Table 5. Note that these bedrock elevations are approximate due to limited subsurface information, and variations of up to 10 feet may be anticipated in the field. Structure Design also provided required tip elevations for permanent casings for CIDH piles based on lateral deformation analyses (Table 5).

Table 5. Estimated Bedrock Elevations and Required Permanent Casing Tip Elevations

Support	FG Elevation (ft)	Bedrock Elevation (ft)	Tip of Steel Casing Elevation (ft)
Bent 2	3.2	-32	-52
Bent 3	3.5	-27	-48
Bent 4	2.8	-46	-77
Bent 5	2.7	-52	-83
Bent 6	3.0	-57	-88
Bent 7	3.1	-57	-90
Bent 8	3.9	-50	N/A
Bent 9	3.5	-47	N/A
Bent 10	3.5	-20	N/A
Bent 11	4.5	-20	N/A
Abutment 12	5.1	-20	N/A

The computer program APILE PLUS (Version 5.0) was used to calculate nominal vertical bearing capacity for the CISS piles. In this program, the API method (1986, 1987, 1994) was selected to calculate soil resistance. Both skin friction and end bearing capacity were considered in pile resistance calculations.

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The computer program SHAFT (Version 6.0) was used to calculate nominal vertical bearing capacity for the CIDH piles. The computational methods in this program conform to the 1999 FHWA recommendations for drilled shafts (O'Neil and Reese 1999). Only skin friction in the bedrock was considered in pile resistance calculations.

Tables 6 and 7 provide a summary of foundation design recommendations for abutment and bents, respectively. Table 8 is the pile data table. The computed settlement under service load is less than one inch in all cases.

Table 6. Abutment Foundations Design Recommendations

Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-I Limit State Load per Support (kips)		LRFD Service-I Limit State Total Load per Pile (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 12	24" CISS Pile	1.1	-	-	150	300	-45 (a) -33 (c) -35 (d)	-45	300

- Notes:
- 1) Design tip elevations are controlled by: (a) Compression (Strength Limit), (c) Settlement, and (d) Lateral Load, respectively.
 - 2) The specified tip elevation shall not be raised above the design tip elevation for Lateral Load.
 - 3) The design tip elevation for Lateral Load was provided by Structure Design.
 - 4) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the design resistance.

Table 7. Bent Foundations Design Recommendations

Support Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (in)	Required Factored Nominal Resistance (kips)				Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Specified Permanent Casing Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
					Strength Limit		Extreme Event					
					Comp. ($\phi=0.7$)	Tension ($\phi=0.7$)	Comp. ($\phi=1$)	Tension ($\phi=1$)				
Bent 2	60" CIDH with 54" rock socket	3.2	740 per pile	1	1371	0	1280	410	-80 (a) -58 (c) -53 (d)	-80	-52	N/A
Bent 3		3.5	810 per pile	1	1514	0	1440	520	-81 (a) -59 (c) -49 (d)	-81	-48	N/A
Bent 4		2.8	890 per pile	1	1671	0	1450	520	-107 (a) -79 (c) -91 (d)	-107	-77	N/A
Bent 5		2.7	1010 per pile	1	1886	0	1560	470	-121 (a) -89 (c) -96 (d)	-121	-83	N/A
Bent 6		3.0	920 per pile	1	1714	0	1540	490	-119 (a) -90 (c) -101 (d)	-119	-88	N/A
Bent 7		3.1	860 per pile	1	1586	0	1540	500	-115 (a) -89 (c) -104 (d)	-115	-90	N/A
Bent 8		24" CISS	3.9	230 per pile	1	429	0	180	0	-86 (a) -67 (c) -60 (d)	-86	N/A
Bent 9	3.5		230 per pile	1	443	0	190	0	-84 (a) -64 (c) -62 (d)	-84	N/A	443
Bent 10	3.5		230 per pile	1	429	0	180	0	-58 (a) -40 (c) -43 (d)	-58	N/A	429
Bent 11	4.5		230 per pile	1	429	0	180	0	-58 (a) -40 (c) -42 (d)	-58	N/A	429

- Notes: 1) Design tip elevations are controlled by: (a) Compression (Strength Limit), (c) Settlement, and (d) Lateral Load, respectively.
 2) The CIDH specified tip elevations shall not be raised.
 3) The specified tip elevation for CISS piles shall not be raised above the design tip elevation for Lateral Load.

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- 4) The design tip elevation for Lateral Load was provided by Structure Design.
- 5) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the design resistance.

Table 8. Pile Data Table

Support No.	Pile Type	Nominal Resistance (kips)		Cutoff Elevation (ft)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Specified Permanent Casing Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension					
Bent 2	60" CIDH with 54" rock socket	1371	410	3.2	-80 (a) -58 (c) -53 (d)	-80	-52	N/A
Bent 3		1514	520	3.5	-81 (a) -59 (c) -49 (d)	-81	-48	N/A
Bent 4		1671	520	2.8	-107 (a) -79 (c) -91 (d)	-107	-77	N/A
Bent 5		1886	470	2.7	-121 (a) -89 (c) -96 (d)	-121	-83	N/A
Bent 6		1714	490	3.0	-119 (a) -90 (c) -101 (d)	-119	-88	N/A
Bent 7		1586	500	3.1	-115 (a) -89 (c) -104 (d)	-115	-90	N/A
Bent 8		24" CISS	429	0	3.9	-86 (a) -67 (c) -60 (d)	-86	N/A
Bent 9	443		0	3.5	-84 (a) -64 (c) -62 (d)	-84	N/A	443
Bent 10	429		0	3.5	-58 (a) -40 (c) -43 (d)	-58	N/A	429
Bent 11	429		0	4.5	-58 (a) -40 (c) -42 (d)	-58	N/A	429
Abut 12	300		N/A	1.1	-45 (a) -33 (c) -35 (d)	-45	N/A	300

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- Notes: 1) Design tip elevations are controlled by: (a) Compression (Strength Limit), (c) Settlement, and (d) Lateral Load, respectively.
- 2) The CIDH specified tip elevations shall not be raised.
 - 3) The specified tip elevation for CISS piles shall not be raised above the design tip elevation for Lateral Load.
 - 4) The design tip elevations for Lateral Load and for permanent casings were provided by Structure Design.
 - 5) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft, liquefiable, scourable, etc.), if any, which do not contribute to the design resistance.

12. CONSTRUCTION CONSIDERATIONS

12.1. CIDH Pile

All CIDH piles shall be constructed in accordance with Section 49-4 of the Caltrans Standard Specifications and "Guidelines for CIDH Piles Cast in Wet Conditions." Drilling of the CIDH piles, placement of rebar cage, and concrete pour shall be completed in a continuous operation. Prior to placement of concrete, the interior surface of the shaft including the bottom should be cleaned of residue from drilling operations.

Difficult pile installation is anticipated due to the presence of claystone/sandstone and Igneous bedrocks and groundwater.

The use of permanent steel casing is required to provide lateral resistance. Since the specified tip elevations for the casings vary greatly at different bents, cutting or welding of casings is most likely. Due to the corrosive nature of the soils at this site, appropriate measures shall be taken to protect the casing material from corrosion.

Ideally, steel casings shall be driven to the specified elevation. However, hard driving is anticipated due to the presence of bedrocks. In this case, a slightly larger hole may be drilled in bedrock and the casing is then lowered to the specified casing tip elevation. The void between the drilled hole and the casing must be filled with cement grout using an appropriate procedure. The contractor shall submit detailed description of the proposed grouting procedure prior to pile installation, for review and approval by our Office. The grouting process shall be subject to inspection by an engineer from our Office. Installation of permanent casings by rotation or vibration is not allowed, as it will compromise the friction between the casing and surrounding soil/rock.

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12.2 Driven Pile

Due to the corrosive nature of the soils at this site, appropriate measures shall be taken to protect the steel pile material from corrosion. A soil plug of at least 3 pile diameters is typically required at the bottom of the shell. However, due to the presence of very soft bay mud at this site, the soil plug may not be attainable (all bay mud material inside the shell must be removed). If the soil plug cannot be maintained, a seal course of at least one pile diameter thickness shall be placed. The drilling of the soil inside steel shells, the placement of the seal course if needed, the placement of rebar cage, and concrete pour should be completed in a continuous operation. Prior to placing concrete, the interior surfaces of the steel shell shall be cleaned of all foreign material, including residue from the drilling operation.

Since bedrock elevation varies drastically within the project area, the specified pile tip elevations (Tables 6 through 8) are not exact. Hard pile driving is anticipated due to the presence of claystone and sandstone rocks. If hard driving conditions are encountered, center relief drilling may be used. Pile acceptance criteria for all driven piles shall be based on Gates formula (Caltrans Standard Specifications Section 49-1.08). Our office should be notified in case pile driving encounters refusal before reaching the specified tip elevation.

13. DISCLAIMER AND CONTACT INFORMATION

The recommendations contained in this report are based on specific project information regarding structure type, location, and design loads that have been provided by the Office of Structure Design West. If any conceptual changes are made during final project design, the Office of Geotechnical Design West, Design Branch A should review those changes to determine if these foundation recommendations are still applicable. Any questions regarding the above recommendations should be directed to the attention of Hooshmand Nikoui at (510) 286-4811.

c: TJPokrywka, HNikoui, Daily File, Route File, J Stayton (DES Office Engineer)

SYang/mm





CLASSIFICATION TEST SUMMARY

SAMPLE ID	% FINER THAN														ATTERBERG LIMITS			AS RECEIVED		Gs				
	3"	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	5µ	1µ	LL	PI		Yd (pcf)	%m		
R-11-001_01																						14.2		
R-11-001_02																							13.4	
R-11-001_03																							14.3	
R-11-001_04																							12.7	
R-11-001_05																							12.6	
R-11-001_06																							13.5	
R-11-001_07																							10.4	
R-11-001_1																							26.9	
R-11-001_1-A																								
R-11-001_1-B																								
R-11-001_2																								
R-11-001_2-A																							23.0	
R-11-001_2-B																							125.5	2.60
R-11-001_3									100	97	82	78	79	76	75	43	24			NP		211.1	2.42	
R-11-001_3-A																		48	23			300.9		
R-11-001_3-B																						34.0	2.73	
R-11-001_4																						20.4	2.68	
R-11-001_5																						24.5		
R-11-002_1																								
R-11-002_1-A																						10.1		
R-11-002_1-B																						210.4	2.40	
R-11-002_2									100	95	87	85	83	82	81	49	30			NP		343.6	2.26	
R-11-002_2-A																						256.5		
R-11-002_2-B																						279.3	2.25	
R-11-002_3																						259.8	2.25	
R-11-002_3-A																						216.6		
R-11-002_3-B																				NP		288.5	2.03	
R-11-002_4-A																	34	17				298.2	2.14	
																						31.2	2.68	



CLASSIFICATION TEST SUMMARY

SAMPLE ID	% FINER THAN											ATTERBERG LIMITS			AS RECEIVED		Gs					
	3"	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	5µ		1µ	LL	PI	Yd (pcf)	%m
R-11-002_4-B																					16.0	2.73



EA: 04-3A8701 Shelby Tube Samples; R-11-001-1A and R-11-001-1B
Don't have samples in the Tube. Tube empty.
10/24/11

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-001
 Sample No.: 2-A
 Test No.: 11-071-G1

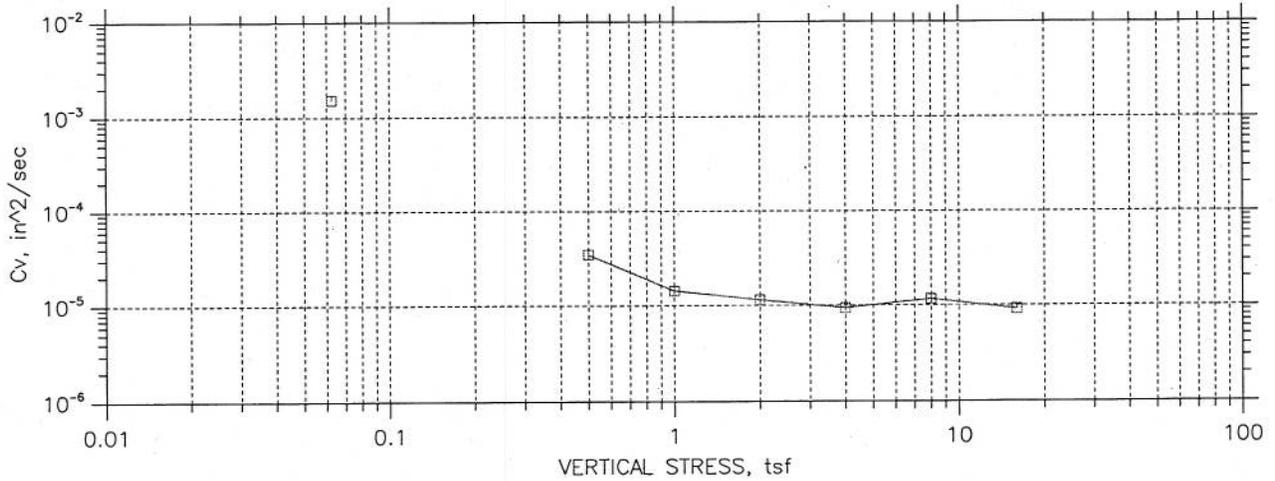
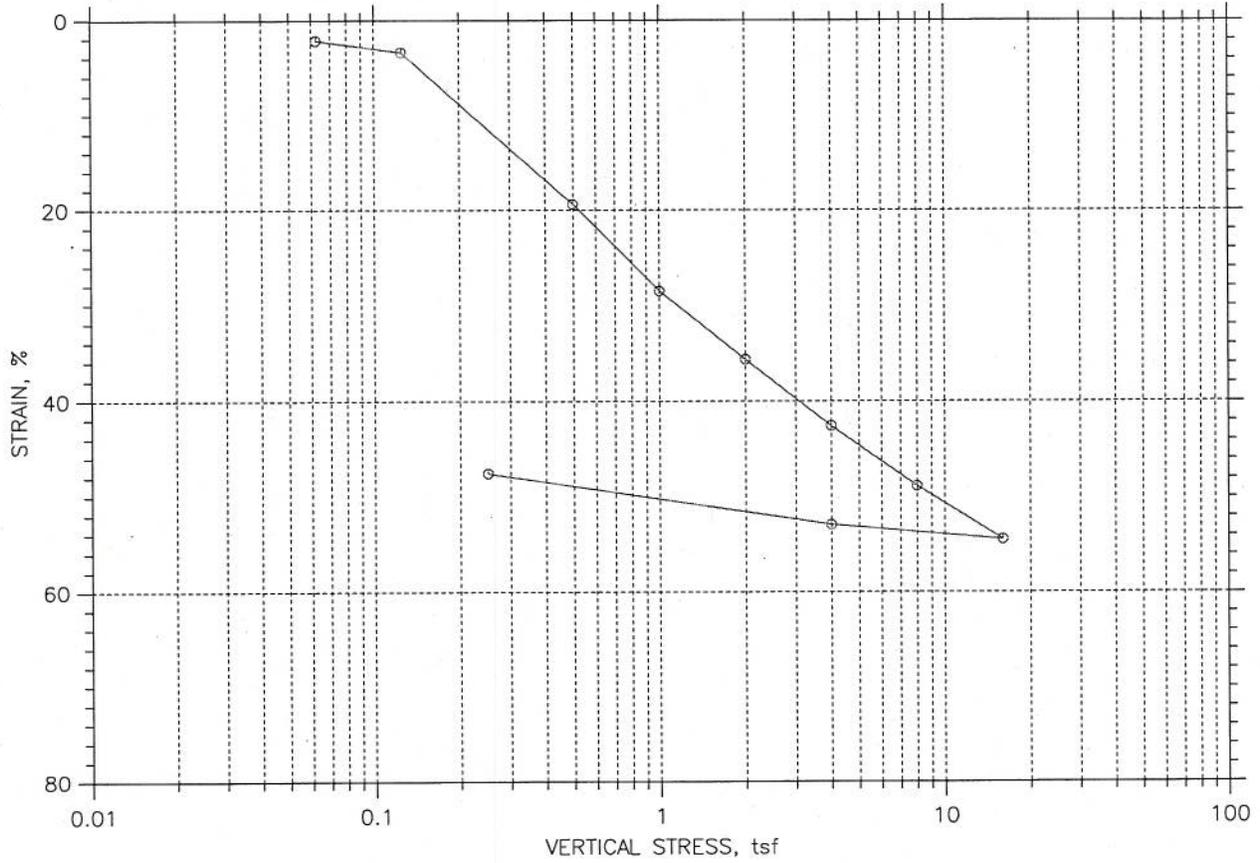
Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/17/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By:
 Depth: 21.5 - 23
 Elevation: GL 11-088

Soil Description: Moist, Gray, Soft, Clay with Silt
 Remarks:

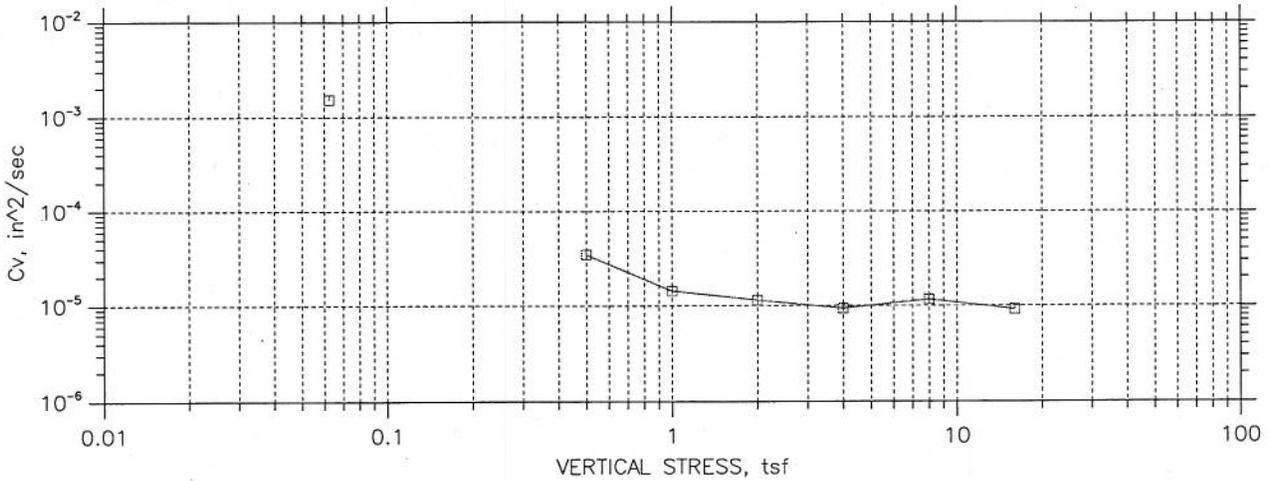
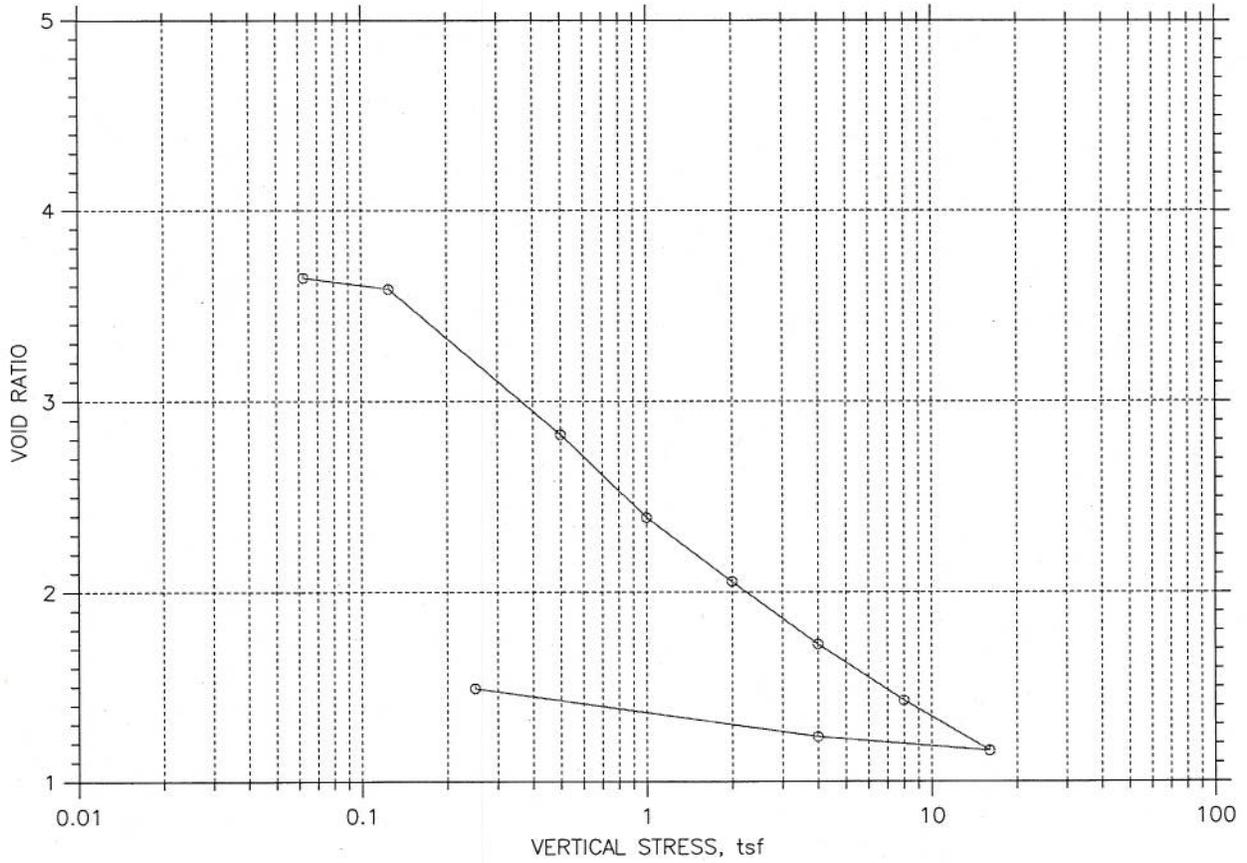
	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in ² /sec	Log in ² /sec	Ave. in ² /sec
1	0.0625	0.02147	3.644	2.15	0.5	0.5	1.57e-003	1.50e-003	1.53e-003
2	0.125	0.03395	3.585	3.39	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
3	0.5	0.1939	2.826	19.39	18.8	0.0	3.44e-005	0.00e+000	3.44e-005
4	1	0.2851	2.393	28.51	33.2	0.0	1.43e-005	0.00e+000	1.43e-005
5	2	0.3564	2.055	35.64	33.1	0.0	1.15e-005	0.00e+000	1.15e-005
6	4	0.4261	1.724	42.61	32.5	0.0	9.38e-006	0.00e+000	9.38e-006
7	8	0.489	1.425	48.90	20.8	0.0	1.16e-005	0.00e+000	1.16e-005
8	16	0.5447	1.161	54.47	20.9	0.0	9.16e-006	0.00e+000	9.16e-006
9	4	0.5293	1.234	52.93	8.0	2.9	2.20e-005	6.11e-005	3.24e-005
10	0.25	0.4756	1.489	47.56	64.4	70.3	3.16e-006	2.90e-006	3.02e-006

CONSOLIDATION TEST DATA SUMMARY REPORT



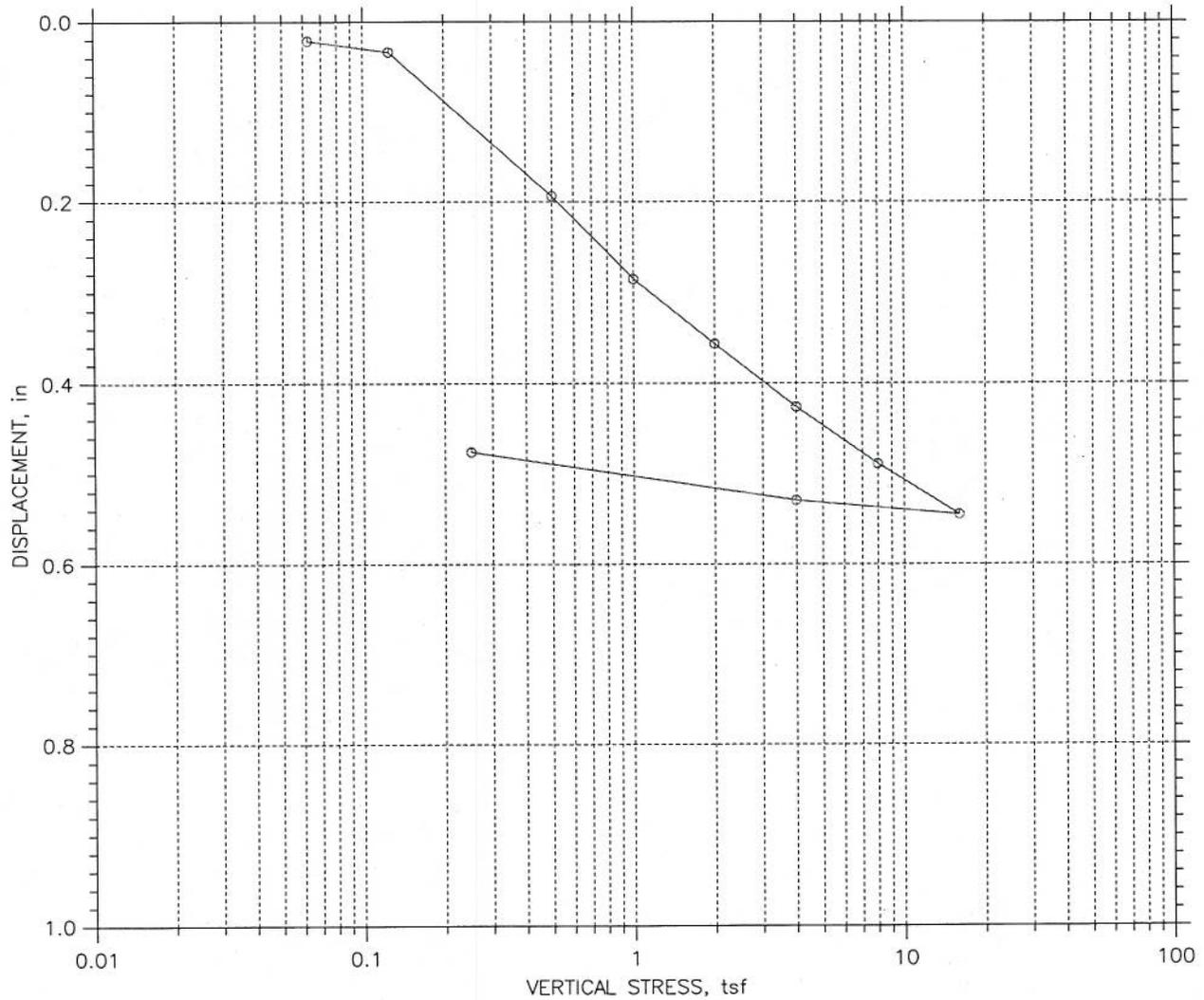
Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 2-A	Test Date: 10/17/11	Depth: 21.5 - 23
Test No.: 11-071-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay with Silt		
Remarks:		

CONSOLIDATION TEST DATA SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 2-A	Test Date: 10/17/11	Depth: 21.5 - 23
Test No.: 11-071-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay with Silt		
Remarks:		

CONSOLIDATION TEST DATA SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 8.864e-312 tsf				143.22	56.78
Preconsolidation Pressure: 3.612e-311 tsf				34.23	65.26
Compression Index: 2.75859e-313				99.47	99.22
Diameter: 2.375 in		Height: 1 in		3.75	1.49
LL: ---	PL: ---	PI: ---	GS: 2.60		

Project: Mococo OH		Location: 04-CC-680-24.4		Project No.: 04-3A8701	
Boring No.: R-11-001		Tested By: jg		Checked By:	
Sample No.: 2-A		Test Date: 10/17/11		Depth: 21.5 - 23	
Test No.: 11-071-G1		Sample Type: 2.5" Tube		Elevation: GL 11-088	
Description: Moist, Gray, Soft, Clay with Silt					
Remarks:					

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-001
 Sample No.: 2-B
 Test No.: 11-072-G4

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/18/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *JP 10/21*
 Depth: 21.5 - 23
 Elevation: GL 11-088

Soil Description: Moist, Gray, Soft, Clay with Silt
 Remarks:

Measured Specific Gravity: 2.42
 Initial Void Ratio: 6.50
 Final Void Ratio: 2.44

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
				RING
Wt. Container + Wet Soil, gm	174.2	174.2	136.8	136.8
Wt. Container + Dry Soil, gm	113.3	113.3	113.3	113.3
Wt. Container, gm	89.9	89.9	89.9	89.9
Wt. Dry Soil, gm	23.4	23.4	23.4	23.4
Water Content, %	260.26	260.26	100.43	100.43
Void Ratio	---	6.50	2.44	---
Degree of Saturation, %	---	96.80	99.29	---
Dry Unit Weight, pcf	---	20.122	43.802	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-001
 Sample No.: 2-B
 Test No.: 11-072-G4

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/18/11
 Sample Type: 2.5" Tube

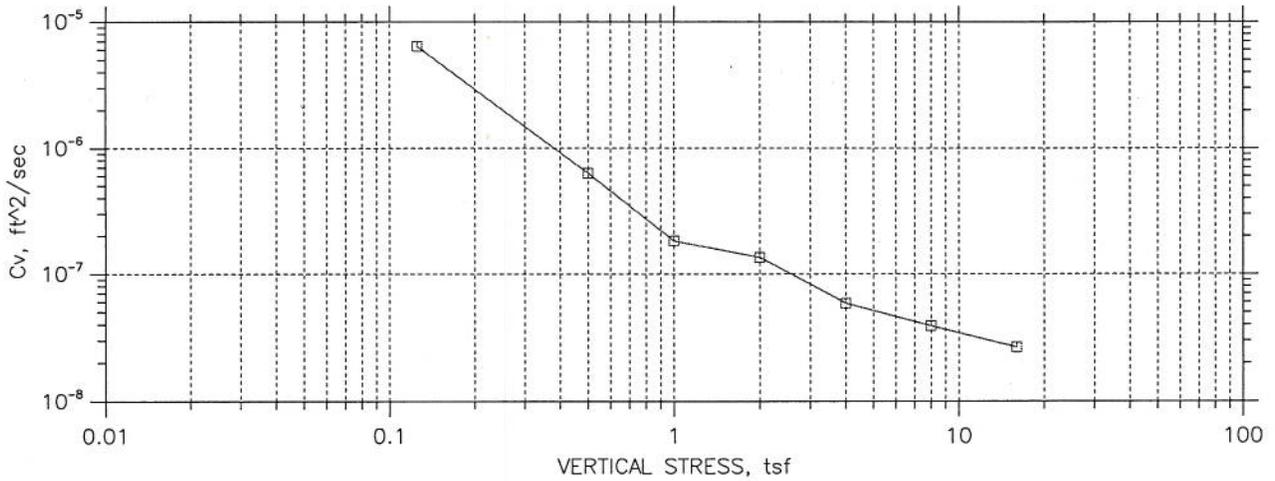
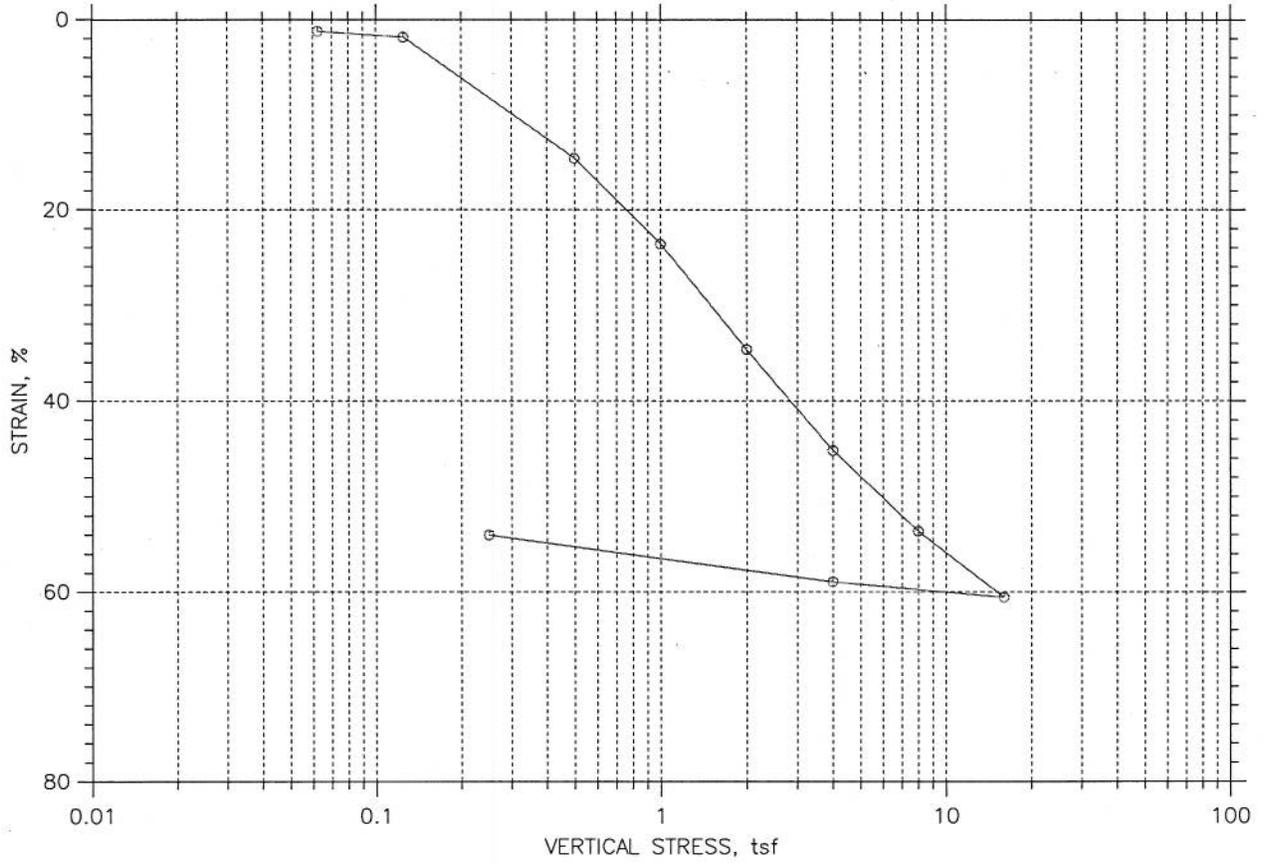
Project No.: 04-3A8701
 Checked By:
 Depth: 21.5 - 23
 Elevation: GL 11-088

Soil Description: Moist, Gray, Soft, Clay with Silt
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. ft ² /sec	Log ft ² /sec	Ave. ft ² /sec
1	0.0625	0.01263	6.404	1.26	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.125	0.01859	6.359	1.86	0.9	0.0	6.41e-006	0.00e+000	6.41e-006
3	0.5	0.1457	5.406	14.57	7.6	0.0	6.32e-007	0.00e+000	6.32e-007
4	1	0.2363	4.727	23.63	18.6	22.3	2.01e-007	1.68e-007	1.83e-007
5	2	0.3466	3.900	34.66	21.0	21.4	1.37e-007	1.34e-007	1.35e-007
6	4	0.4519	3.110	45.19	32.6	37.5	6.32e-008	5.49e-008	5.88e-008
7	8	0.5364	2.476	53.64	37.4	0.0	3.90e-008	0.00e+000	3.90e-008
8	16	0.6057	1.957	60.57	39.7	0.0	2.65e-008	0.00e+000	2.65e-008
9	4	0.5896	2.078	58.96	18.5	0.0	4.99e-008	0.00e+000	4.99e-008
10	0.25	0.5406	2.445	54.06	34.7	0.0	3.11e-008	0.00e+000	3.11e-008

CONSOLIDATION TEST DATA

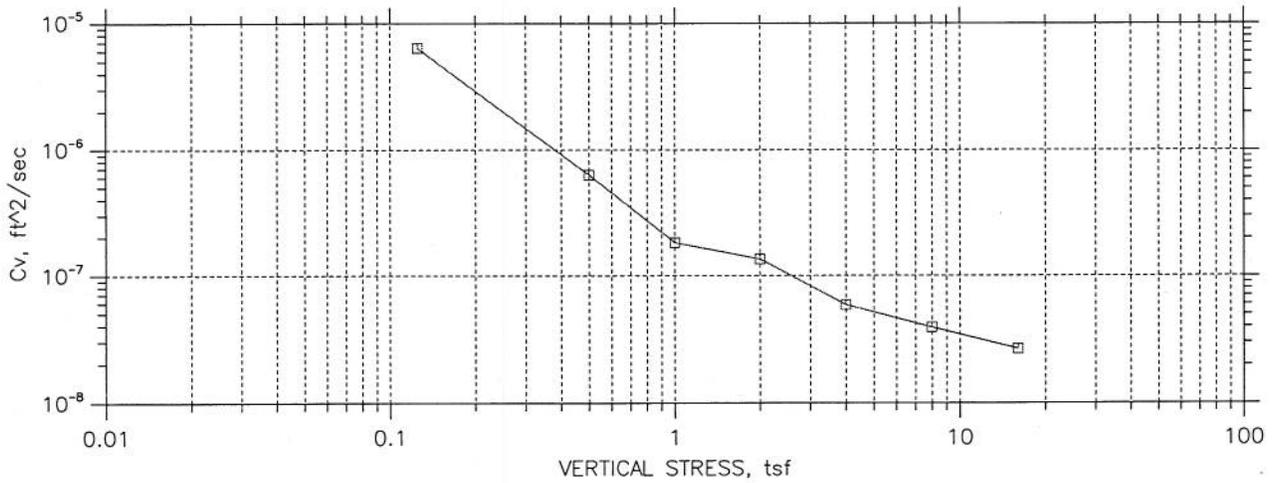
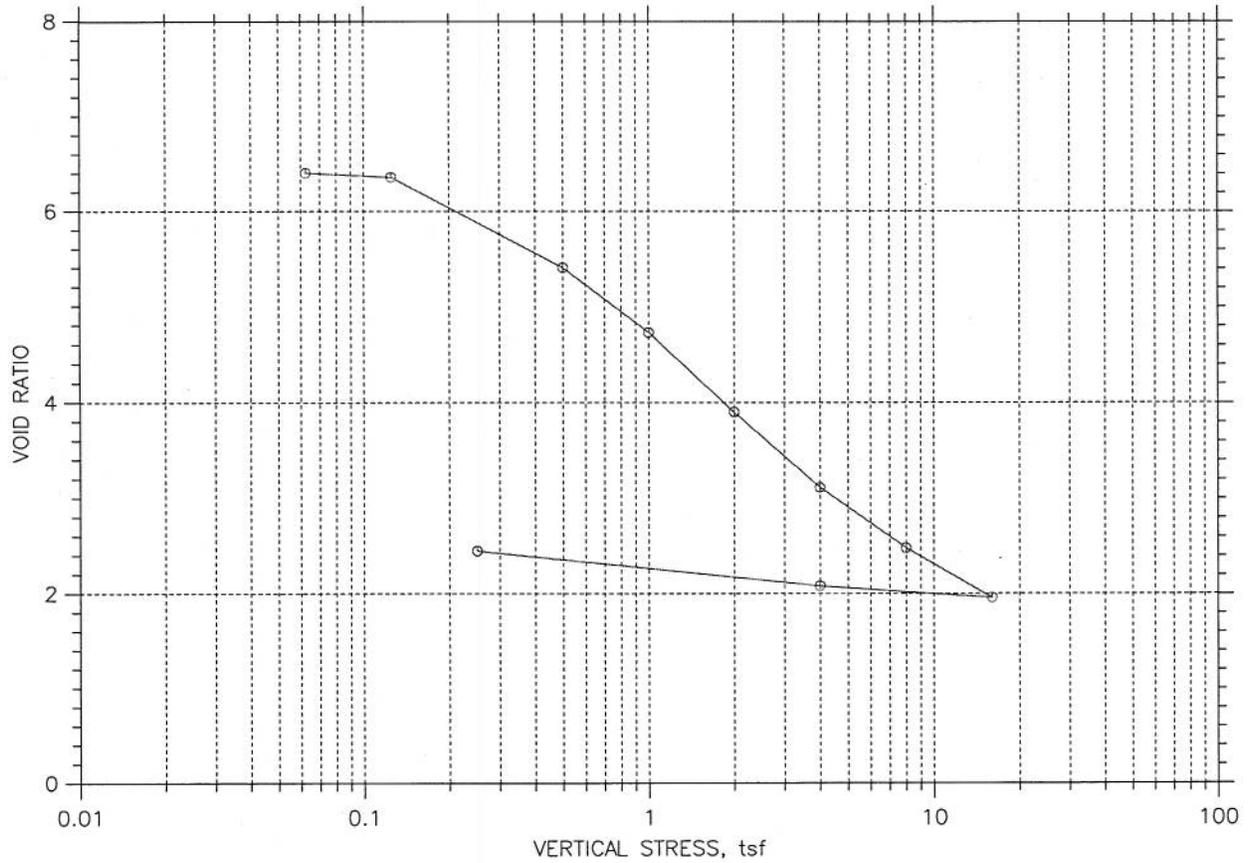
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 2-B	Test Date: 10/18/11	Depth: 21.5 - 23
Test No.: 11-072-G4	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay with Silt		
Remarks:		

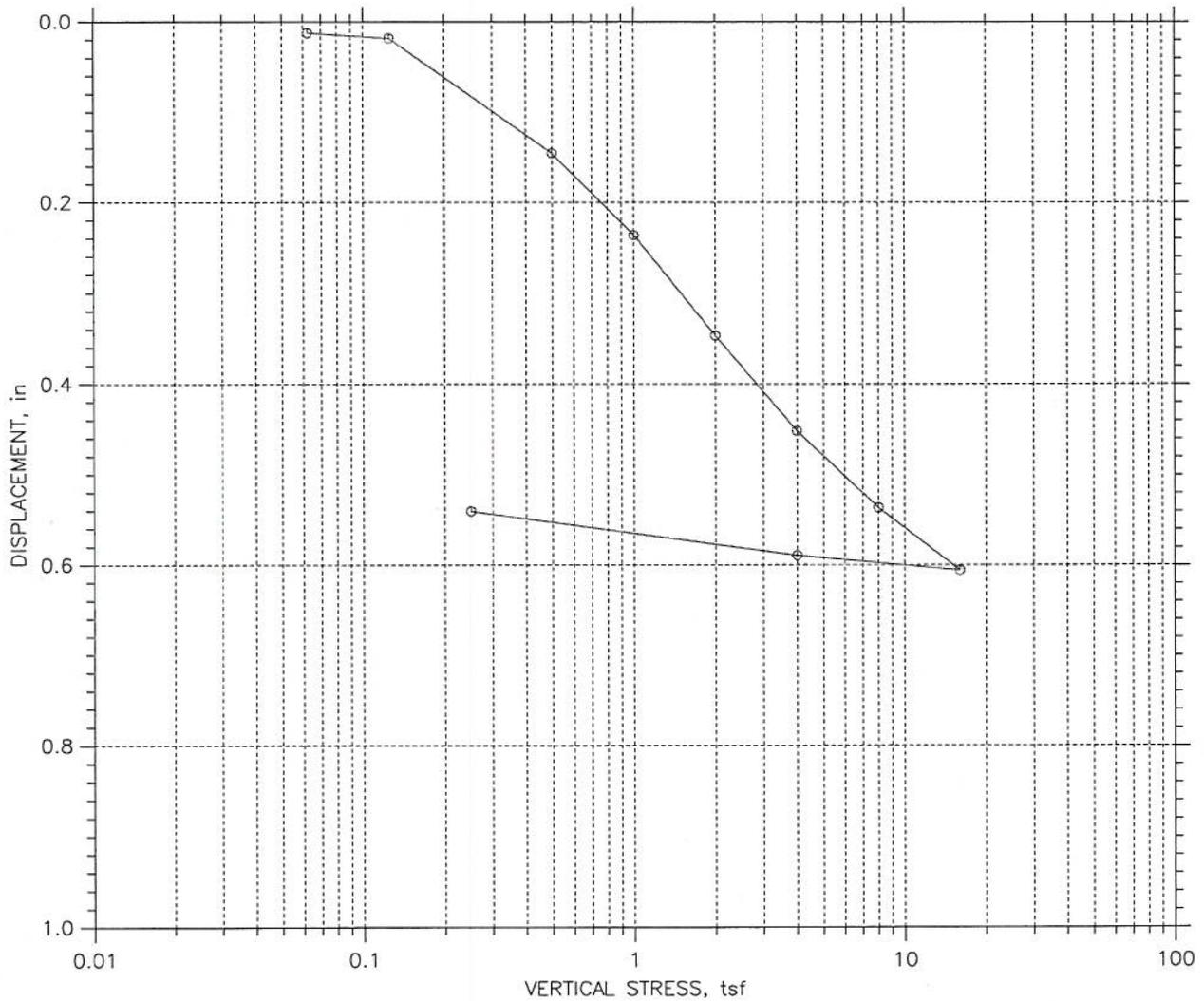
CONSOLIDATION TEST DATA

SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 2-B	Test Date: 10/18/11	Depth: 21.5 - 23
Test No.: 11-072-G4	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay with Silt		
Remarks:		

CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 0 tsf		260.26	100.43
Preconsolidation Pressure: 0 tsf		20.12	43.8
Compression Index: 3.81959e-313		96.80	99.29
Diameter: 2.375 in	Height: 1 in	6.50	2.44
LL: ---	PL: ---	PI: ---	GS: 2.42

Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 2-B	Test Date: 10/18/11	Depth: 21.5 - 23
Test No.: 11-072-G4	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay with Silt		
Remarks:		

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-001
 Sample No.: 3-A
 Test No.: 11-058-G1

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 09/20/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *hp 10/12*
 Depth: 30 - 31.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Soft, Clay
 Remarks:

Measured Specific Gravity: 2.73
 Initial Void Ratio: 1.03
 Final Void Ratio: 0.70

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
				RING
Wt. Container + Wet Soil, gm	222.3	222.3	210.7	210.7
Wt. Container + Dry Soil, gm	185.6	185.6	185.6	185.6
Wt. Container, gm	88.2	88.2	88.2	88.2
Wt. Dry Soil, gm	97.4	97.4	97.4	97.4
Water Content, %	37.68	37.68	25.77	25.77
Void Ratio	---	1.03	0.70	---
Degree of Saturation, %	---	99.51	99.69	---
Dry Unit Weight, pcf	---	83.757	99.851	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-001
 Sample No.: 3-A
 Test No.: 11-058-G1

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 09/20/11
 Sample Type: 2.5" Tube

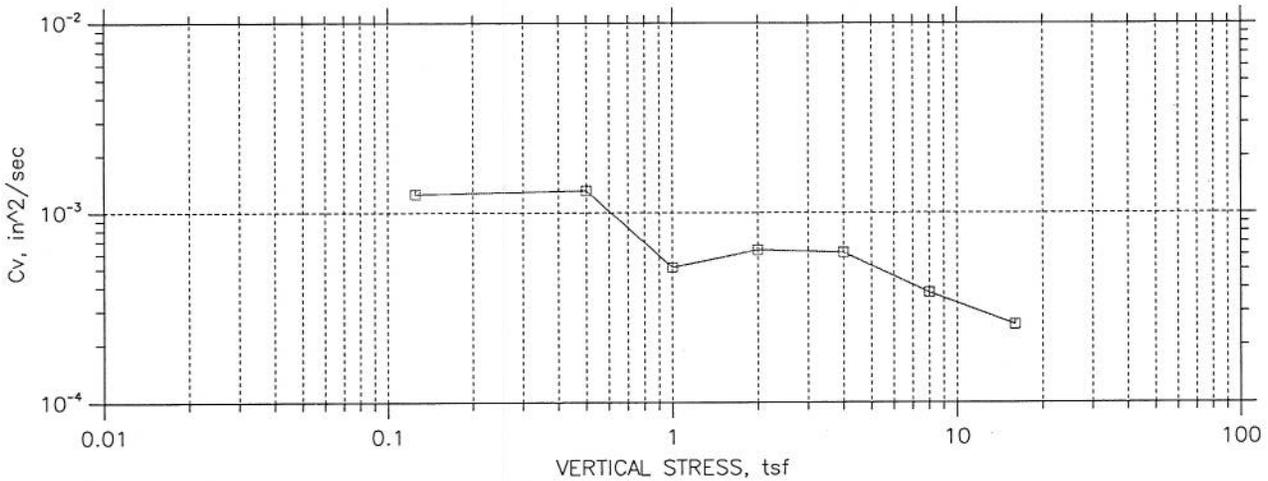
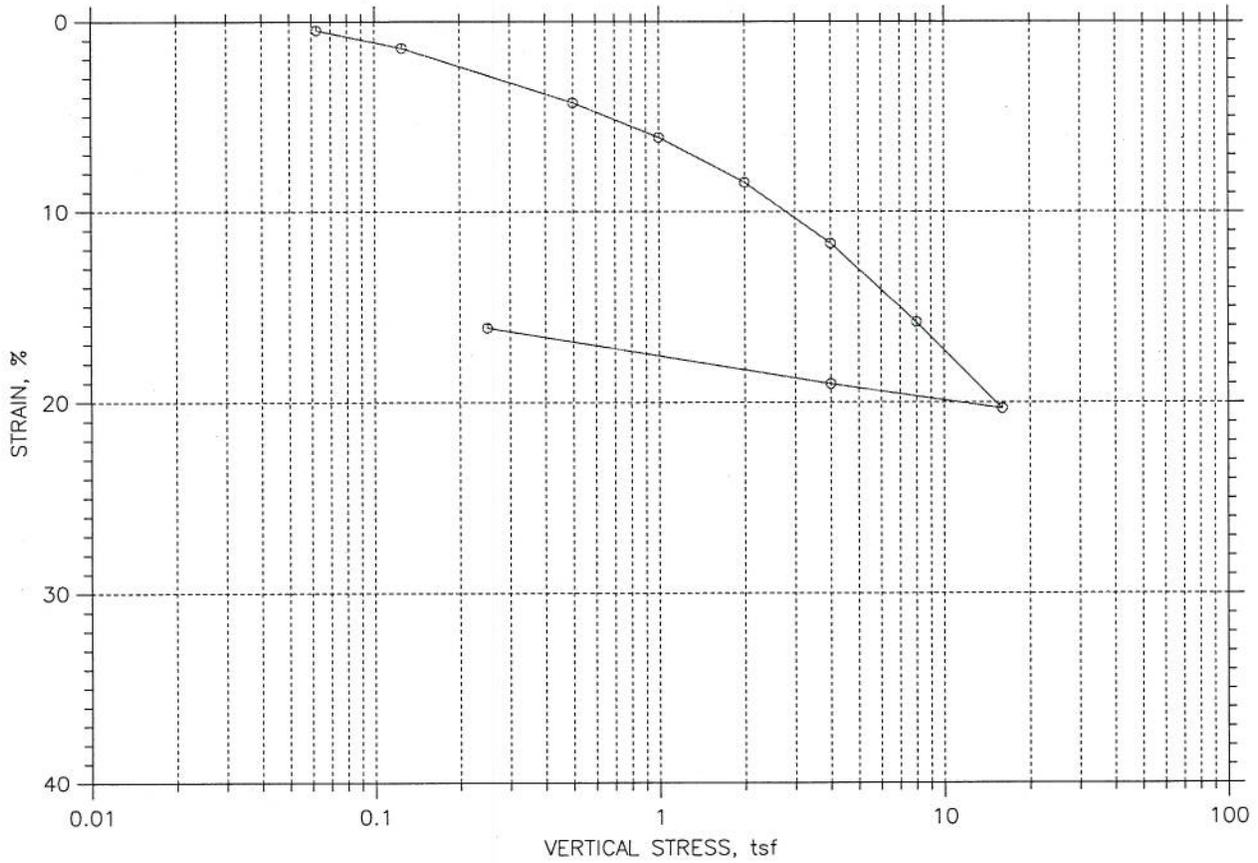
Project No.: 04-3A8701
 Checked By:
 Depth: 30 - 31.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Soft, Clay
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in ² /sec	Log in ² /sec	Ave. in ² /sec
1	0.0625	0.00467	1.023	0.47	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.125	0.01413	1.004	1.41	0.8	0.5	1.05e-003	1.55e-003	1.25e-003
3	0.5	0.04279	0.946	4.28	0.6	0.0	1.31e-003	0.00e+000	1.31e-003
4	1	0.061	0.909	6.10	1.4	0.0	5.11e-004	0.00e+000	5.11e-004
5	2	0.08454	0.861	8.45	0.9	1.3	7.62e-004	5.38e-004	6.31e-004
6	4	0.1167	0.795	11.67	1.1	1.0	5.89e-004	6.39e-004	6.13e-004
7	8	0.1582	0.711	15.82	1.4	1.9	4.43e-004	3.27e-004	3.76e-004
8	16	0.2032	0.619	20.32	2.2	2.1	2.52e-004	2.59e-004	2.56e-004
9	4	0.1905	0.645	19.05	0.2	0.0	2.49e-003	3.20e-002	4.63e-003
10	0.25	0.1612	0.705	16.12	1.7	1.1	3.29e-004	5.05e-004	3.98e-004

CONSOLIDATION TEST DATA

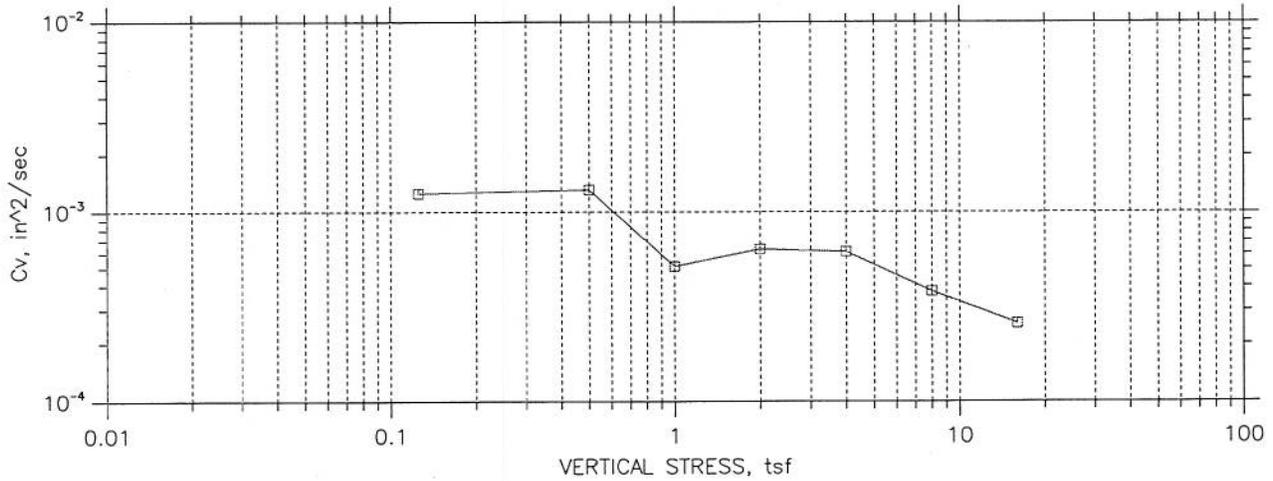
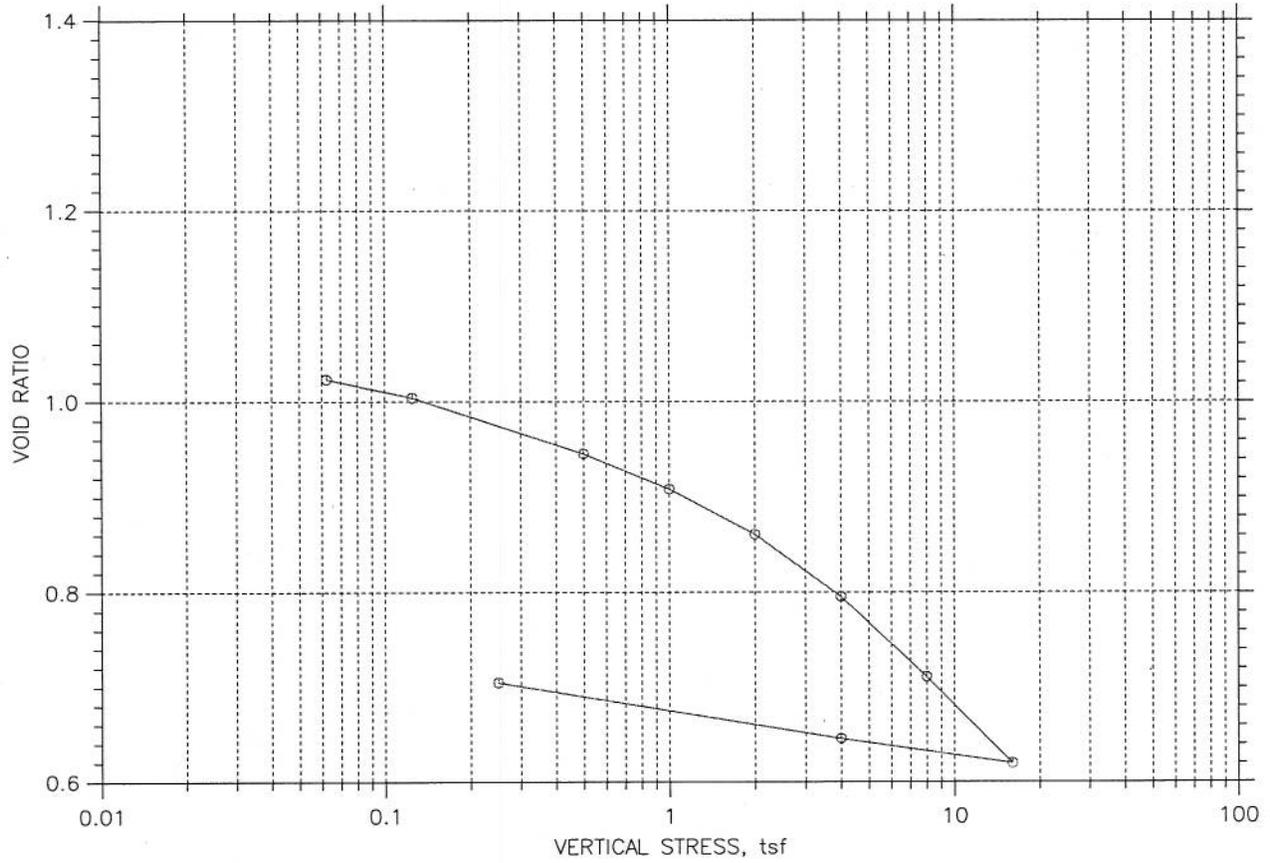
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 3-A	Test Date: 09/20/11	Depth: 30 - 31.5
Test No.: 11-058-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay		
Remarks:		

CONSOLIDATION TEST DATA

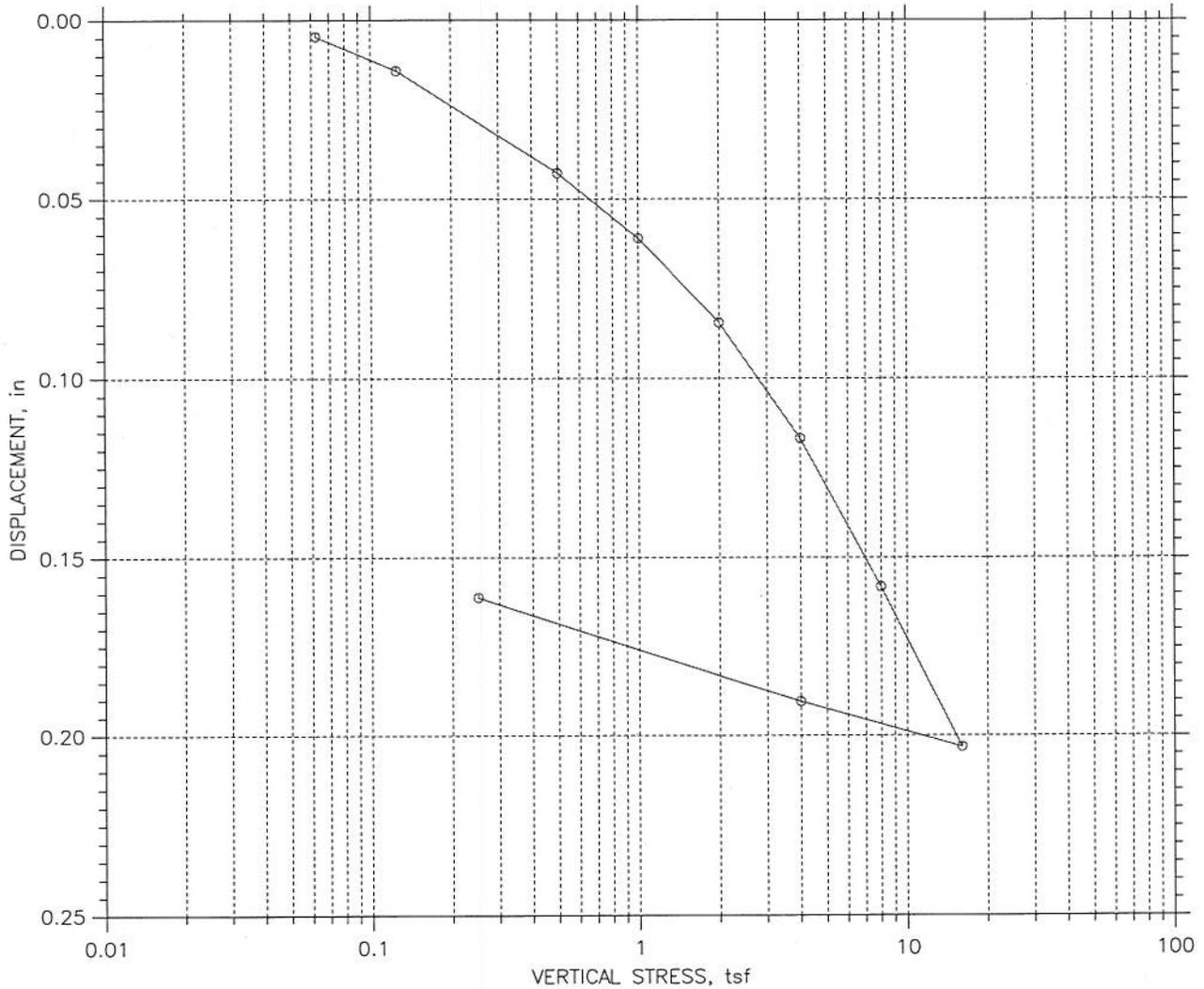
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 3-A	Test Date: 09/20/11	Depth: 30 - 31.5
Test No.: 11-058-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay		
Remarks:		

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 8.864e-312 tsf		Water Content, %		37.68	25.77
Preconsolidation Pressure: 3.612e-311 tsf		Dry Unit Weight, pcf		83.76	99.85
Compression Index: 2.75859e-313		Saturation, %		99.51	99.69
Diameter: 2.375 in	Height: 1 in	Void Ratio		1.03	0.70
LL: ---	PL: ---	PI: ---	GS: 2.73		

Project: Mococo OH		Location: 04-CC-680-24.4		Project No.: 04-3A8701	
Boring No.: R-11-001		Tested By: jg		Checked By:	
Sample No.: 3-A		Test Date: 09/20/11		Depth: 30 - 31.5	
Test No.: 11-058-G1		Sample Type: 2.5" Tube		Elevation: GL 11-088	
Description: Moist, Gray, Soft, Clay					
Remarks:					

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-001
 Sample No.: 3-B
 Test No.: 11-059-G1

Location: 04-CC-680-24.4-
 Tested By: jg
 Test Date: 09/26/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *W 10/12*
 Depth: 30 - 31.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Very Stiff, Clay with Silt and gravel
 Remarks: Crumbles

Measured Specific Gravity: 2.68
 Initial Void Ratio: 0.66
 Final Void Ratio: 0.56

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
		RING		
Wt. Container + Wet Soil, gm	229.9	229.9	229.3	229.3
Wt. Container + Dry Soil, gm	205	205	205	205
Wt. Container, gm	87.9	87.9	87.9	87.9
Wt. Dry Soil, gm	117.1	117.1	117.1	117.1
Water Content, %	21.26	21.26	20.75	20.75
Void Ratio	---	0.66	0.56	---
Degree of Saturation, %	---	86.35	99.82	---
Dry Unit Weight, pcf	---	100.7	107.34	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-001
 Sample No.: 3-B
 Test No.: 11-059-G1

Location: 04-CC-680-24.4-
 Tested By: jg
 Test Date: 09/26/11
 Sample Type: 2.5" Tube

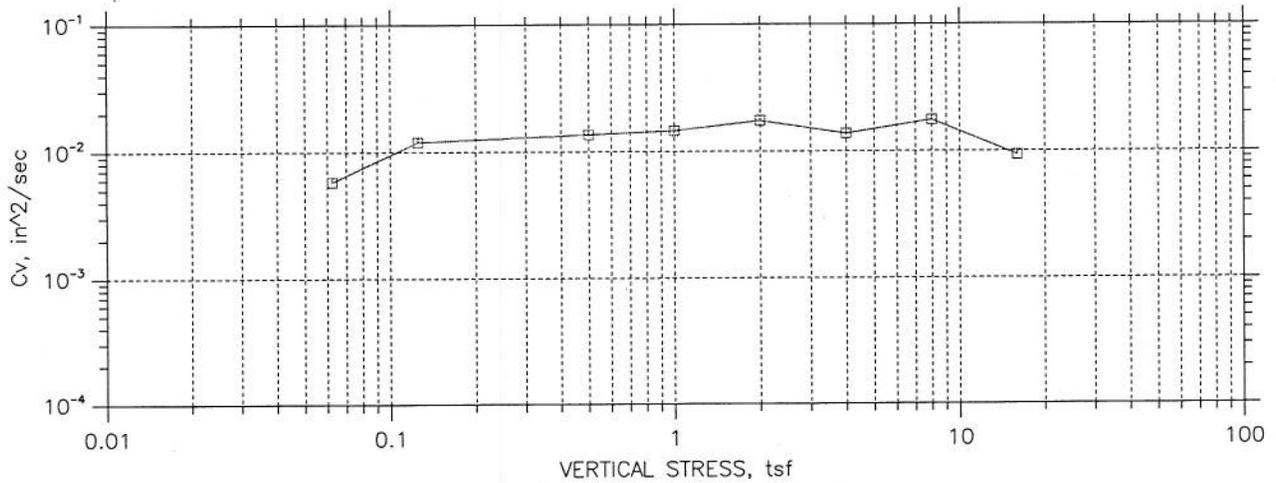
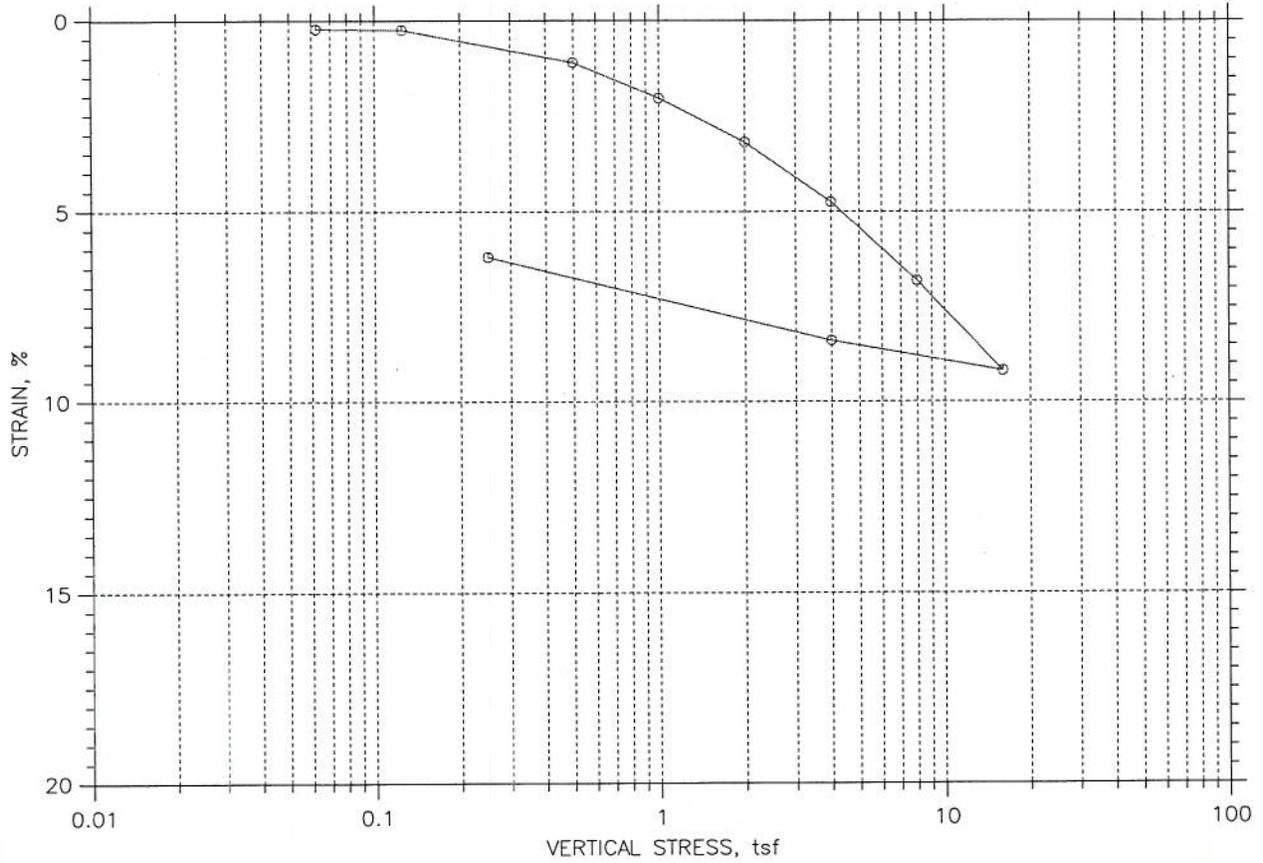
Project No.: 04-3A8701
 Checked By:
 Depth: 30 - 31.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Very Stiff, Clay with Silt and gravel
 Remarks: Crumbles

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in ² /sec	Log in ² /sec	Ave. in ² /sec
1	0.0625	0.002307	0.655	0.23	0.1	0.0	5.82e-003	0.00e+000	5.82e-003
2	0.125	0.002512	0.655	0.25	0.1	0.0	1.19e-002	0.00e+000	1.19e-002
3	0.5	0.01101	0.641	1.10	0.1	0.0	1.16e-002	1.64e-002	1.36e-002
4	1	0.02036	0.625	2.04	0.1	0.1	1.58e-002	1.35e-002	1.46e-002
5	2	0.03198	0.606	3.20	0.1	0.0	1.43e-002	2.23e-002	1.74e-002
6	4	0.04753	0.580	4.75	0.1	0.0	1.09e-002	1.87e-002	1.38e-002
7	8	0.0681	0.546	6.81	0.1	0.0	1.21e-002	3.25e-002	1.76e-002
8	16	0.09188	0.507	9.19	0.1	0.0	6.83e-003	1.47e-002	9.32e-003
9	4	0.08399	0.520	8.40	0.0	0.0	1.84e-002	3.80e-002	2.48e-002
10	0.25	0.0619	0.556	6.19	1.3	0.4	5.39e-004	1.64e-003	8.12e-004

CONSOLIDATION TEST DATA

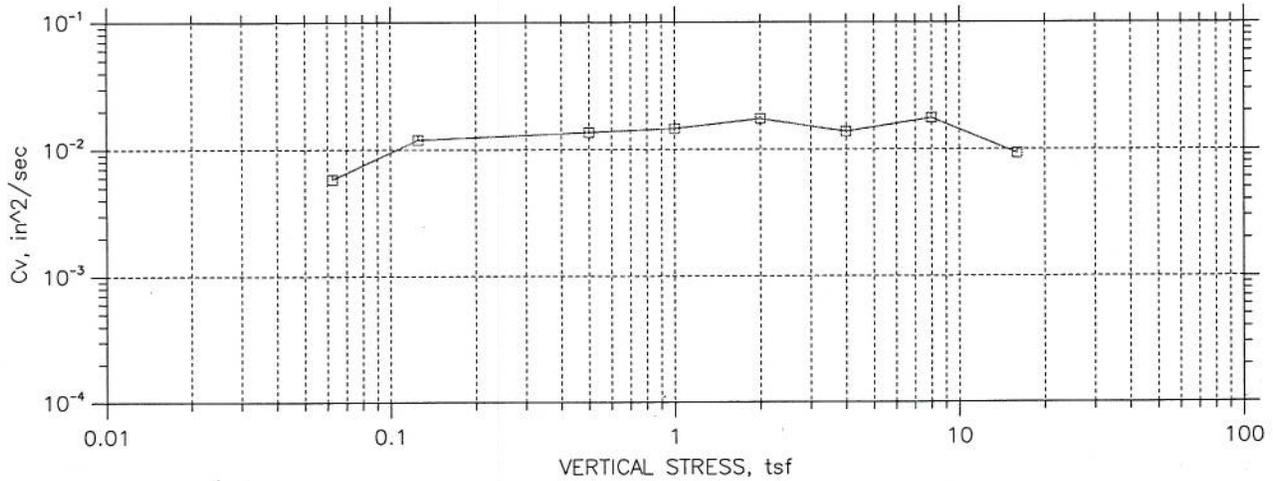
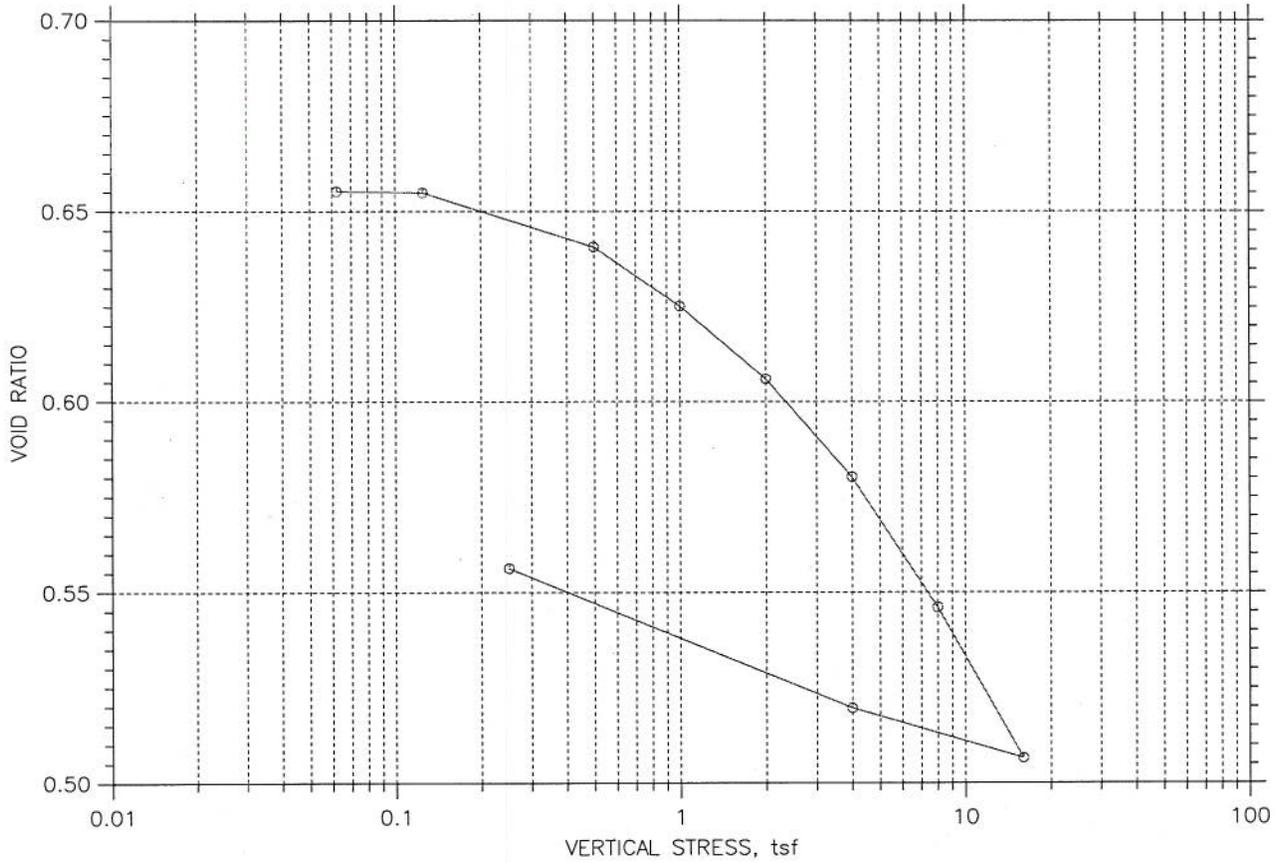
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 3-B	Test Date: 09/26/11	Depth: 30 - 31.5
Test No.: 11-059-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Very Stiff, Clay with Silt and gravel		
Remarks: Crumbles		

CONSOLIDATION TEST DATA

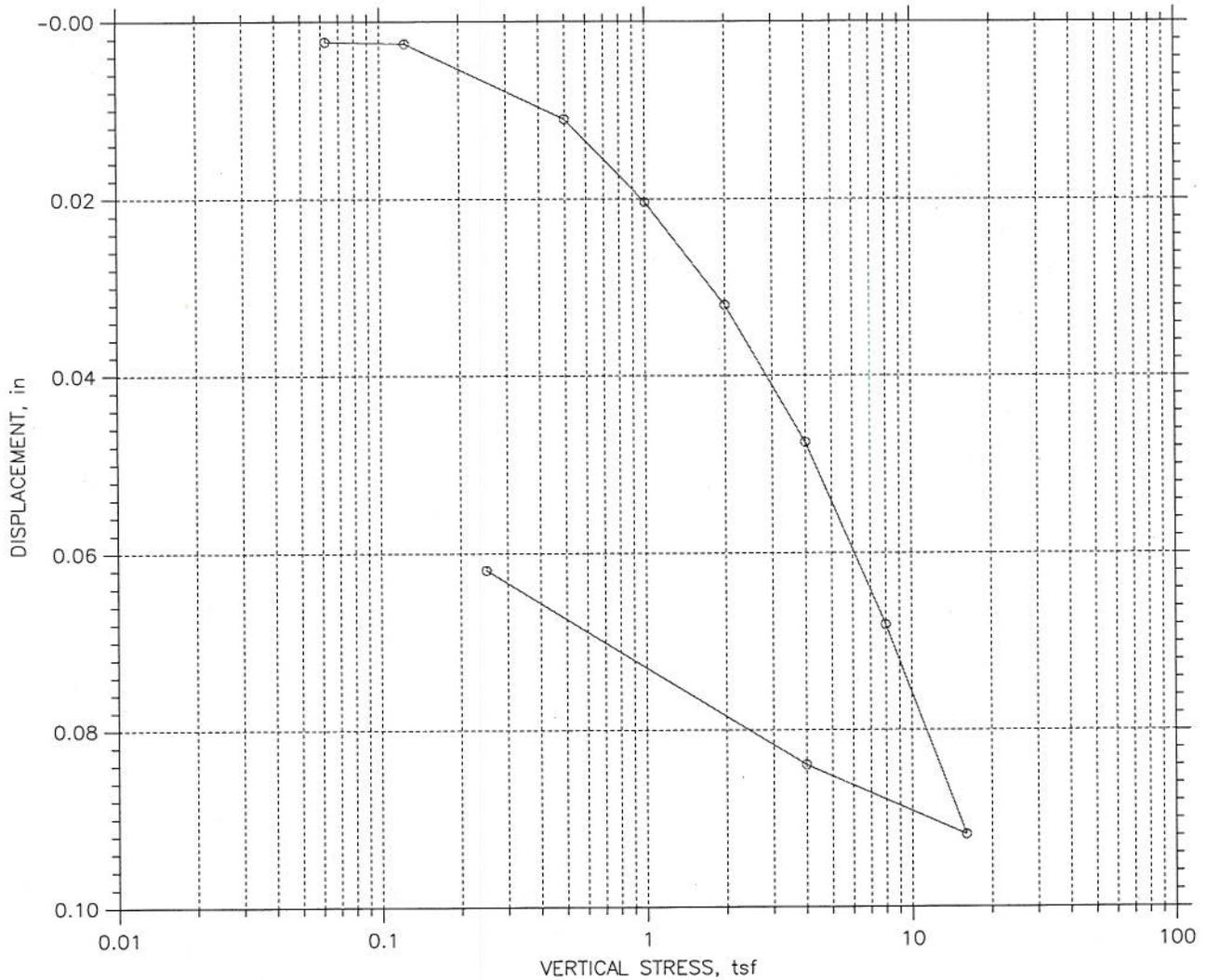
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-001	Tested By: jg	Checked By:
Sample No.: 3-B	Test Date: 09/26/11	Depth: 30 - 31.5
Test No.: 11-059-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Very Stiff, Clay with Silt and gravel		
Remarks: Crumbles		

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 8.864e-312 tsf			Water Content, %	21.26	20.75
Preconsolidation Pressure: 3.612e-311 tsf			Dry Unit Weight, pcf	100.7	107.3
Compression Index: 2.75859e-313			Saturation, %	86.35	99.82
Diameter: 2.375 in		Height: 1 in		Void Ratio	0.66
LL: ---	PL: ---	PI: ---	GS: 2.68		

Project: Mococo OH		Location: 04-CC-680-24.4-		Project No.: 04-3A8701	
Boring No.: R-11-001		Tested By: jg		Checked By:	
Sample No.: 3-B		Test Date: 09/26/11		Depth: 30 - 31.5	
Test No.: 11-059-G1		Sample Type: 2.5" Tube		Elevation: GL 11-088	
Description: Moist, Gray, Very Stiff, Clay with Silt and gravel					
Remarks: Crumbles					

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 1-A
 Test No.: 11-060-G4

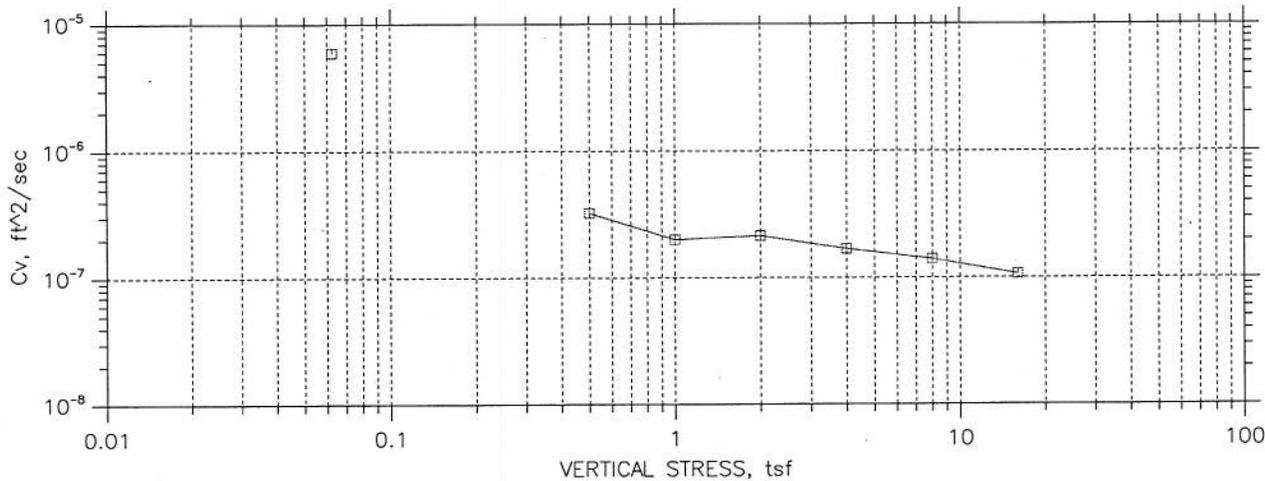
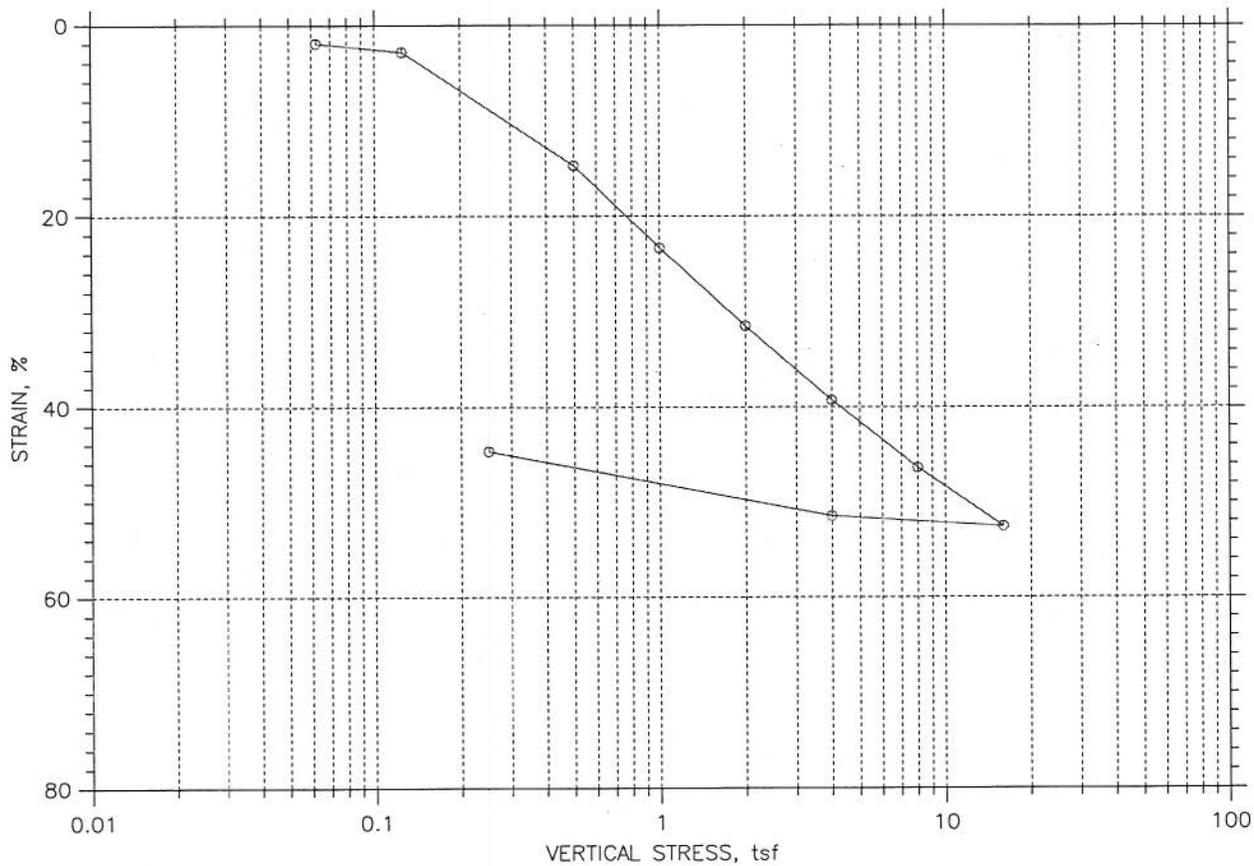
Location: 04-CC-680-24.4-
 Tested By: jg
 Test Date: 09/26/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By:
 Depth: 10 - 11.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Very Soft, Clay with Silt and gravel
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. ft ² /sec	Log ft ² /sec	Ave. ft ² /sec
1	0.0625	0.01951	4.395	1.95	0.9	0.0	5.94e-006	0.00e+000	5.94e-006
2	0.125	0.02864	4.345	2.86	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
3	0.5	0.1472	3.692	14.72	13.8	15.5	3.44e-007	3.06e-007	3.24e-007
4	1	0.2331	3.219	23.31	18.8	0.0	2.00e-007	0.00e+000	2.00e-007
5	2	0.3148	2.770	31.48	14.1	14.0	2.14e-007	2.15e-007	2.15e-007
6	4	0.3927	2.342	39.27	13.7	14.5	1.74e-007	1.64e-007	1.69e-007
7	8	0.4643	1.948	46.43	12.3	14.3	1.51e-007	1.30e-007	1.40e-007
8	16	0.526	1.608	52.60	10.7	16.5	1.36e-007	8.81e-008	1.07e-007
9	4	0.5152	1.667	51.52	3.3	0.0	3.92e-007	0.00e+000	3.92e-007
10	0.25	0.4469	2.043	44.69	45.9	0.0	3.35e-008	0.00e+000	3.35e-008

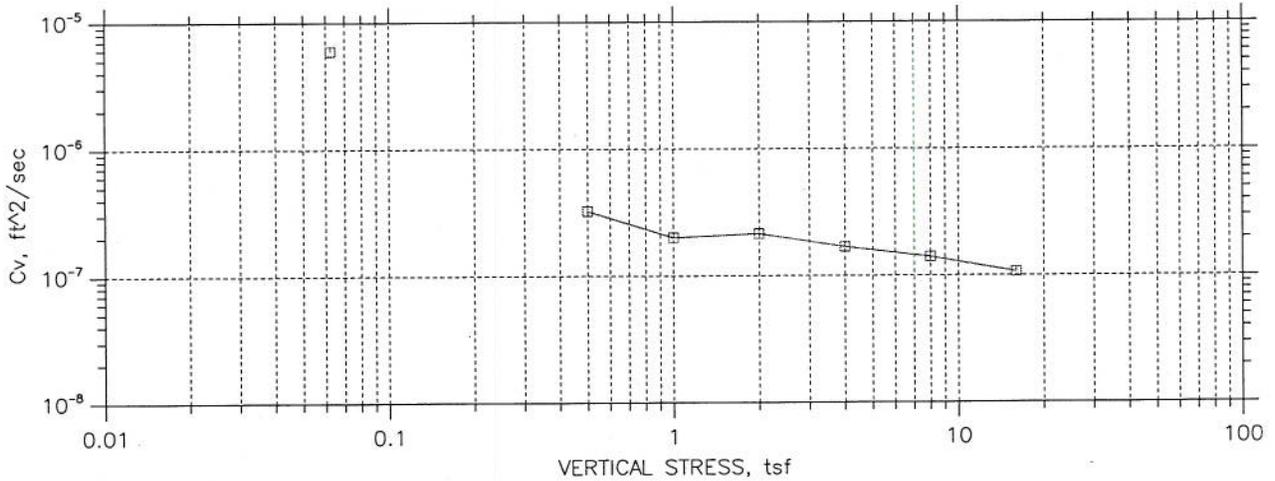
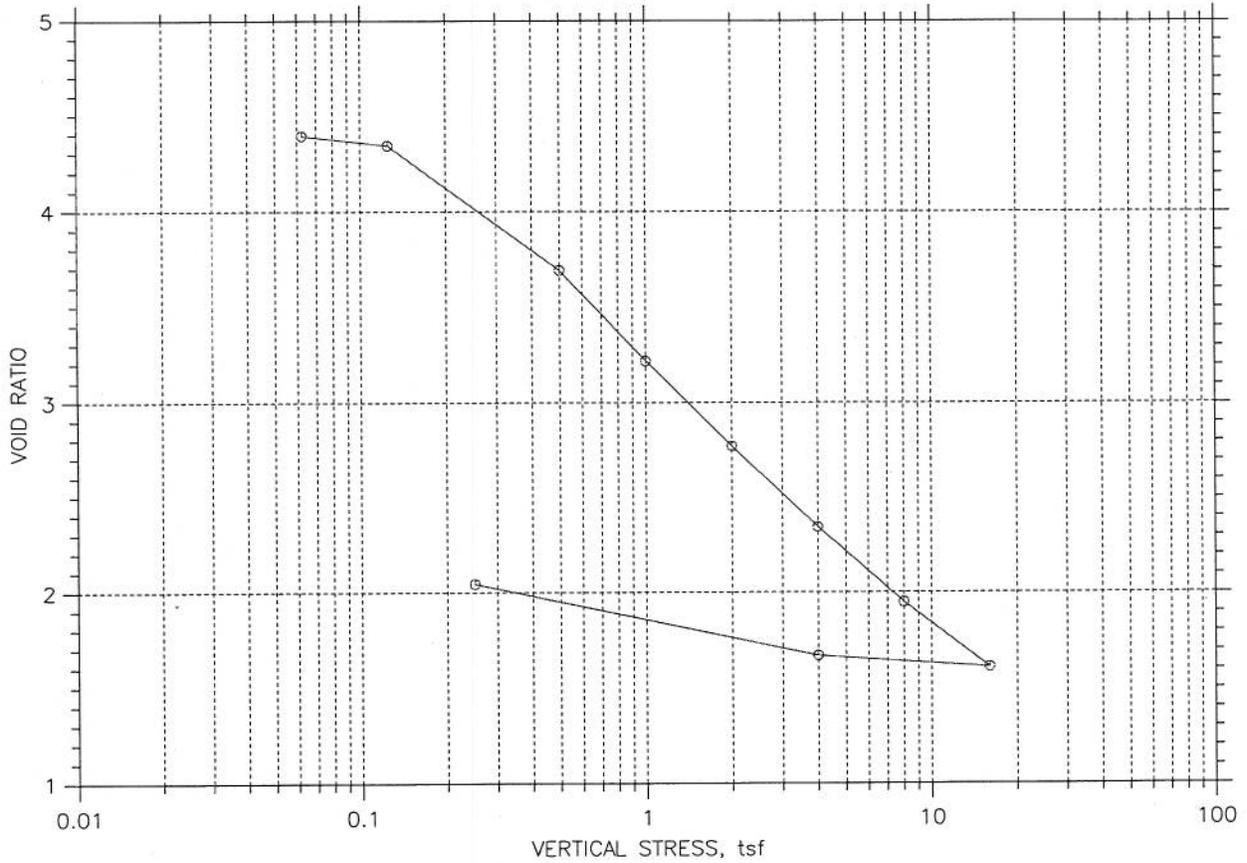
CONSOLIDATION TEST DATA SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 1-A	Test Date: 09/26/11	Depth: 10 - 11.5
Test No.: 11-060-G4	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Very Soft, Clay with Silt and gravel		
Remarks:		

CONSOLIDATION TEST DATA

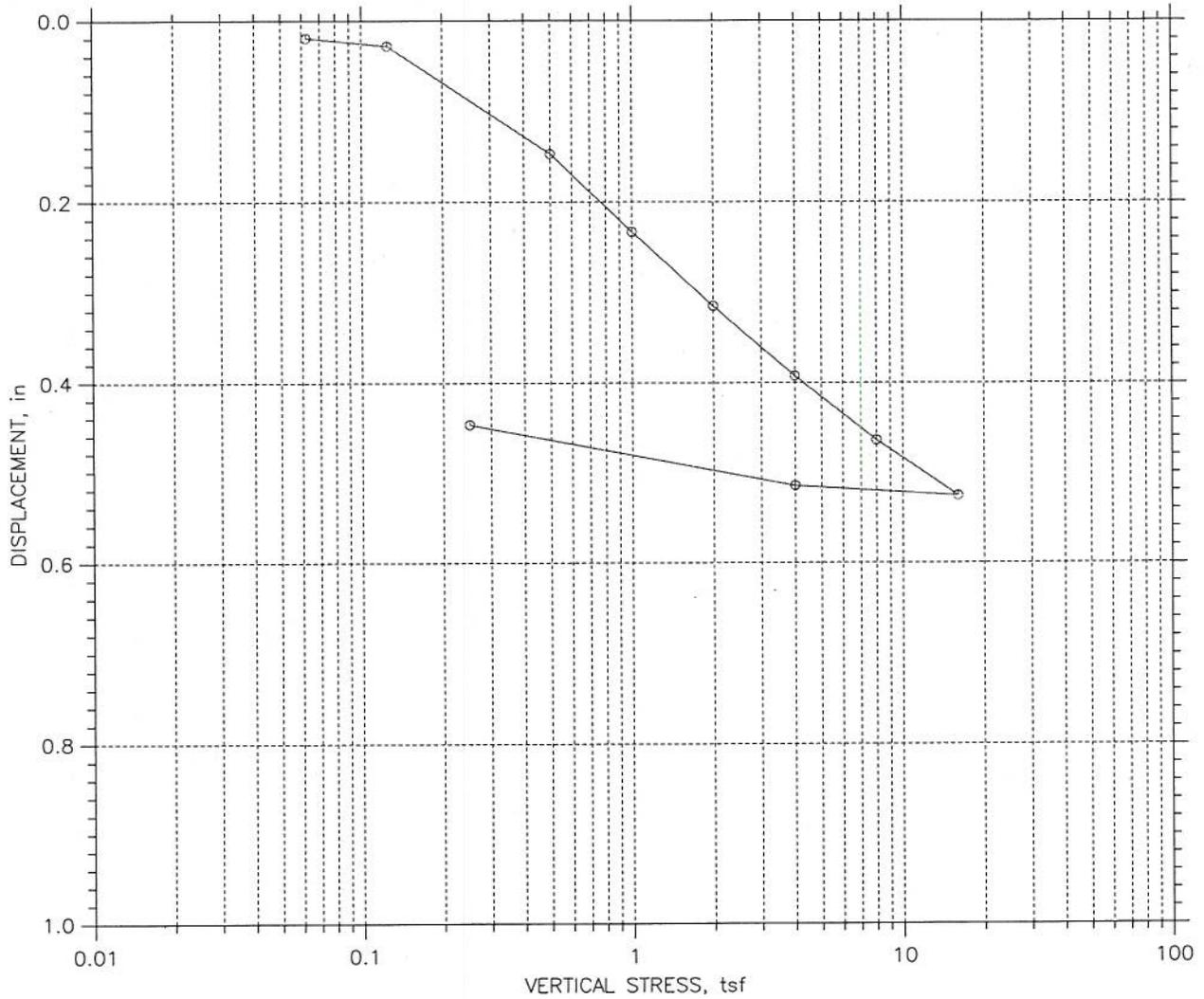
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 1-A	Test Date: 09/26/11	Depth: 10 - 11.5
Test No.: 11-060-G4	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Very Soft, Clay with Silt and gravel		
Remarks:		

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 0 tsf		Water Content, %		184.81	85.13
Preconsolidation Pressure: 0 tsf		Dry Unit Weight, pcf		27.17	49.13
Compression Index: 3.81959e-313		Saturation, %		98.31	99.77
Diameter: 2.375 in	Height: 1 in	Void Ratio		4.50	2.04
LL: ---	PL: ---	PI: ---	GS: 2.40		

Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 1-A	Test Date: 09/26/11	Depth: 10 - 11.5
Test No.: 11-060-G4	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Very Soft, Clay with Silt and gravel		
Remarks:		

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 1-B
 Test No.: 11-070-G4

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/13/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *W 10/21*
 Depth: 10 - 11.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay with Silt
 Remarks:

Measured Specific Gravity: 2.26
 Initial Void Ratio: 9.93
 Final Void Ratio: 3.41

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
		RING		
Wt. Container + Wet Soil, gm	165.1	165.1	123.1	123.1
Wt. Container + Dry Soil, gm	101.5	101.5	101.5	101.5
Wt. Container, gm	86.5	86.5	86.5	86.5
Wt. Dry Soil, gm	15	15	15	15
Water Content, %	424.00	424.00	144.00	144.00
Void Ratio	---	9.93	3.41	---
Degree of Saturation, %	---	96.43	95.27	---
Dry Unit Weight, pcf	---	12.899	31.943	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 1-B
 Test No.: 11-070-G4

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/13/11
 Sample Type: 2.5" Tube

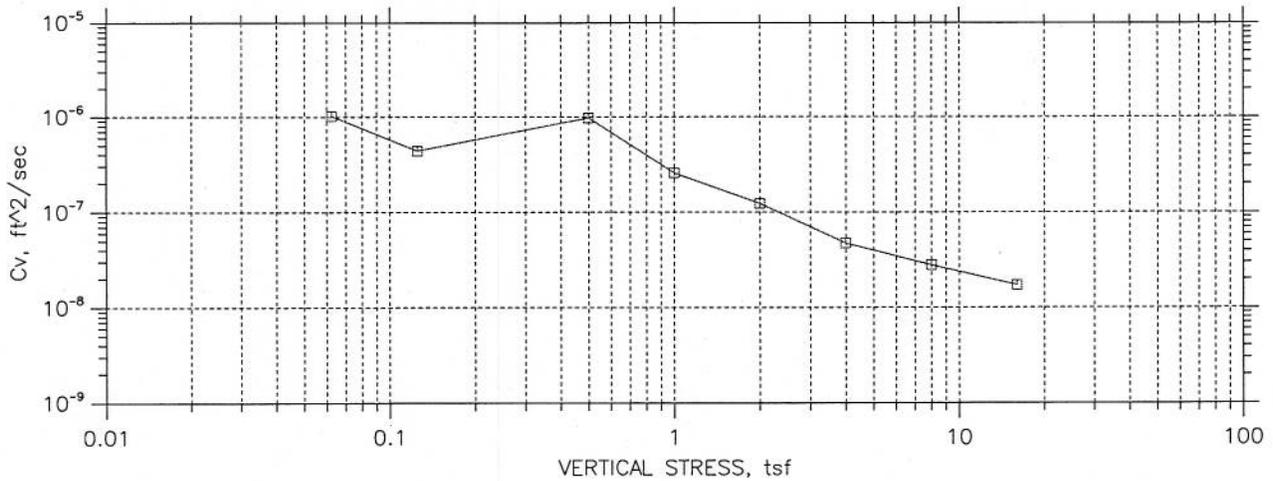
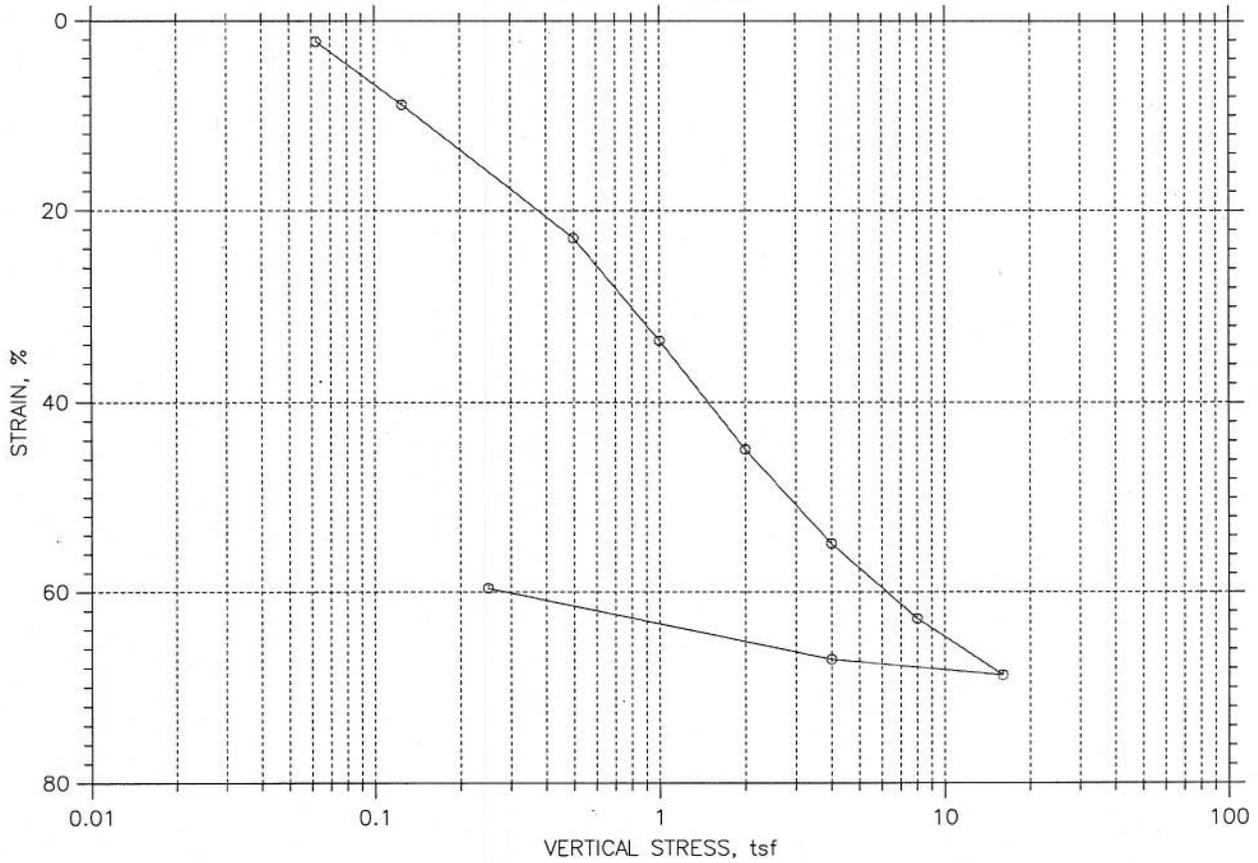
Project No.: 04-3A8701
 Checked By:
 Depth: 10 - 11.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay with Silt
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. ft ² /sec	Log ft ² /sec	Ave. ft ² /sec
1	0.0625	0.02215	9.686	2.21	5.5	0.0	1.02e-006	0.00e+000	1.02e-006
2	0.125	0.08919	8.954	8.92	11.6	0.0	4.37e-007	0.00e+000	4.37e-007
3	0.5	0.2288	7.428	22.88	4.1	4.2	9.90e-007	9.53e-007	9.71e-007
4	1	0.3358	6.259	33.58	11.5	11.5	2.56e-007	2.55e-007	2.55e-007
5	2	0.4491	5.020	44.91	18.7	15.5	1.13e-007	1.36e-007	1.23e-007
6	4	0.5487	3.932	54.87	27.9	32.6	5.14e-008	4.40e-008	4.74e-008
7	8	0.6282	3.063	62.82	34.7	0.0	2.79e-008	0.00e+000	2.79e-008
8	16	0.6874	2.416	68.74	38.8	0.0	1.72e-008	0.00e+000	1.72e-008
9	4	0.6711	2.594	67.11	13.8	0.0	4.25e-008	0.00e+000	4.25e-008
10	0.25	0.5962	3.413	59.62	108.2	93.2	7.08e-009	8.22e-009	7.61e-009

CONSOLIDATION TEST DATA

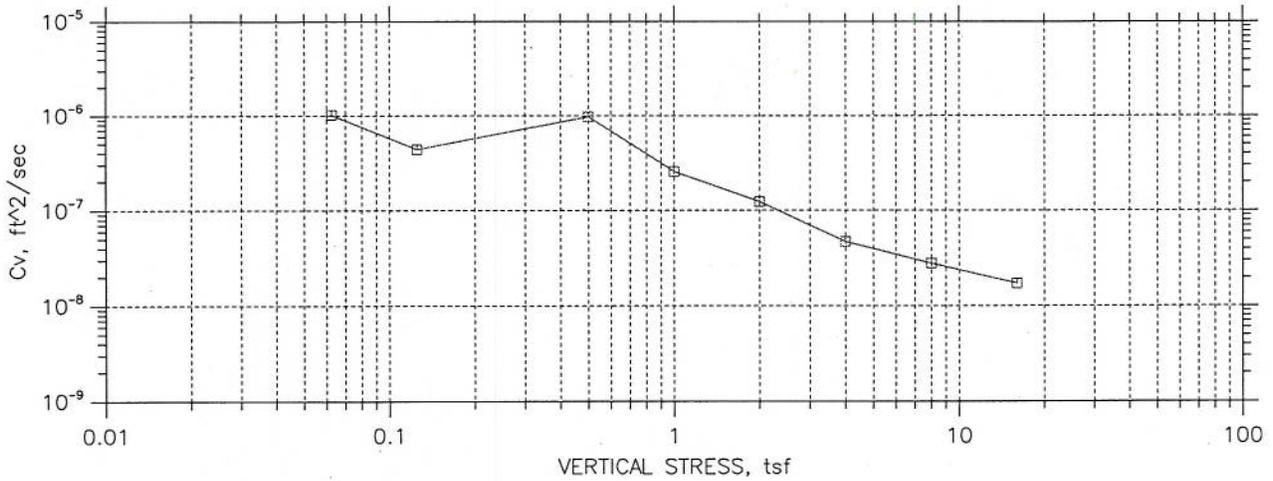
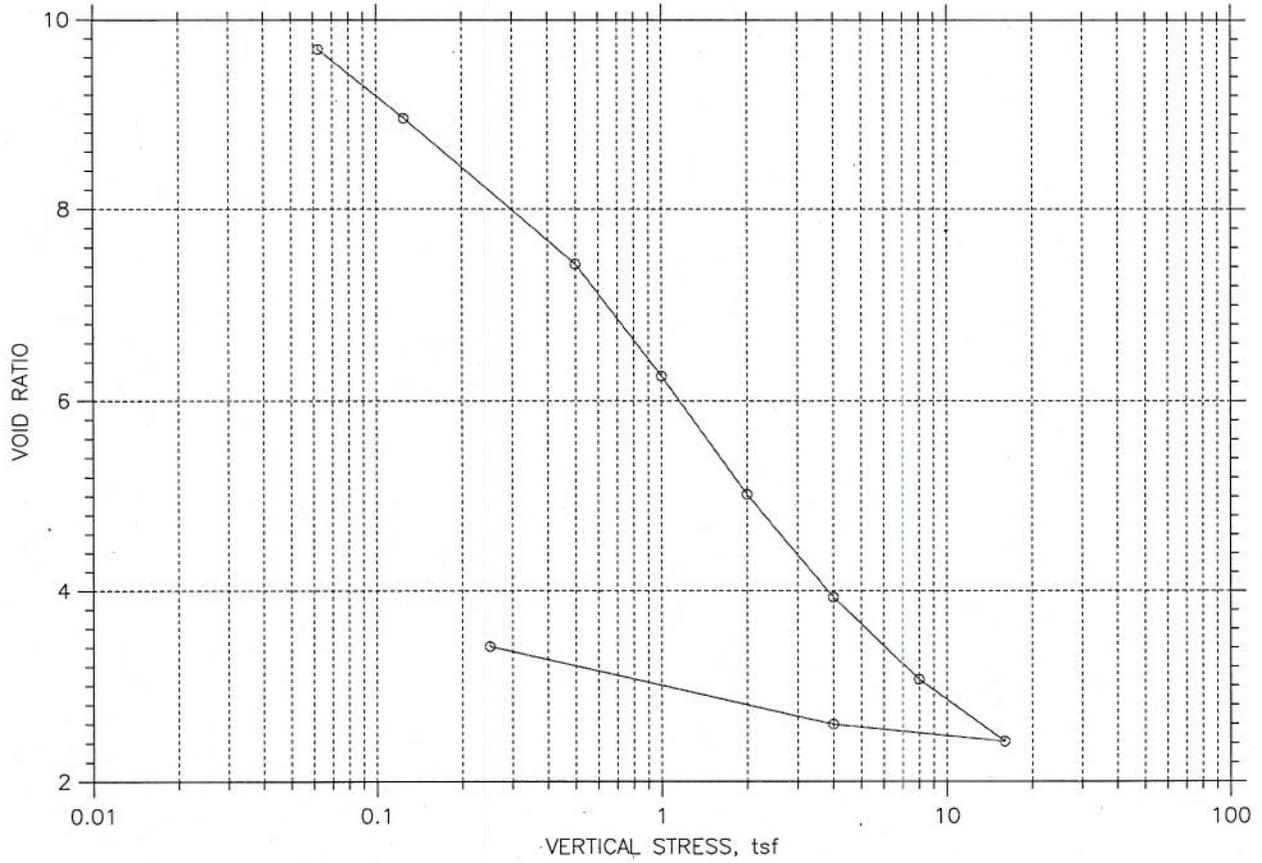
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 1-B	Test Date: 10/13/11	Depth: 10 - 11.5
Test No.: 11-070-G4	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay with Silt		
Remarks:		

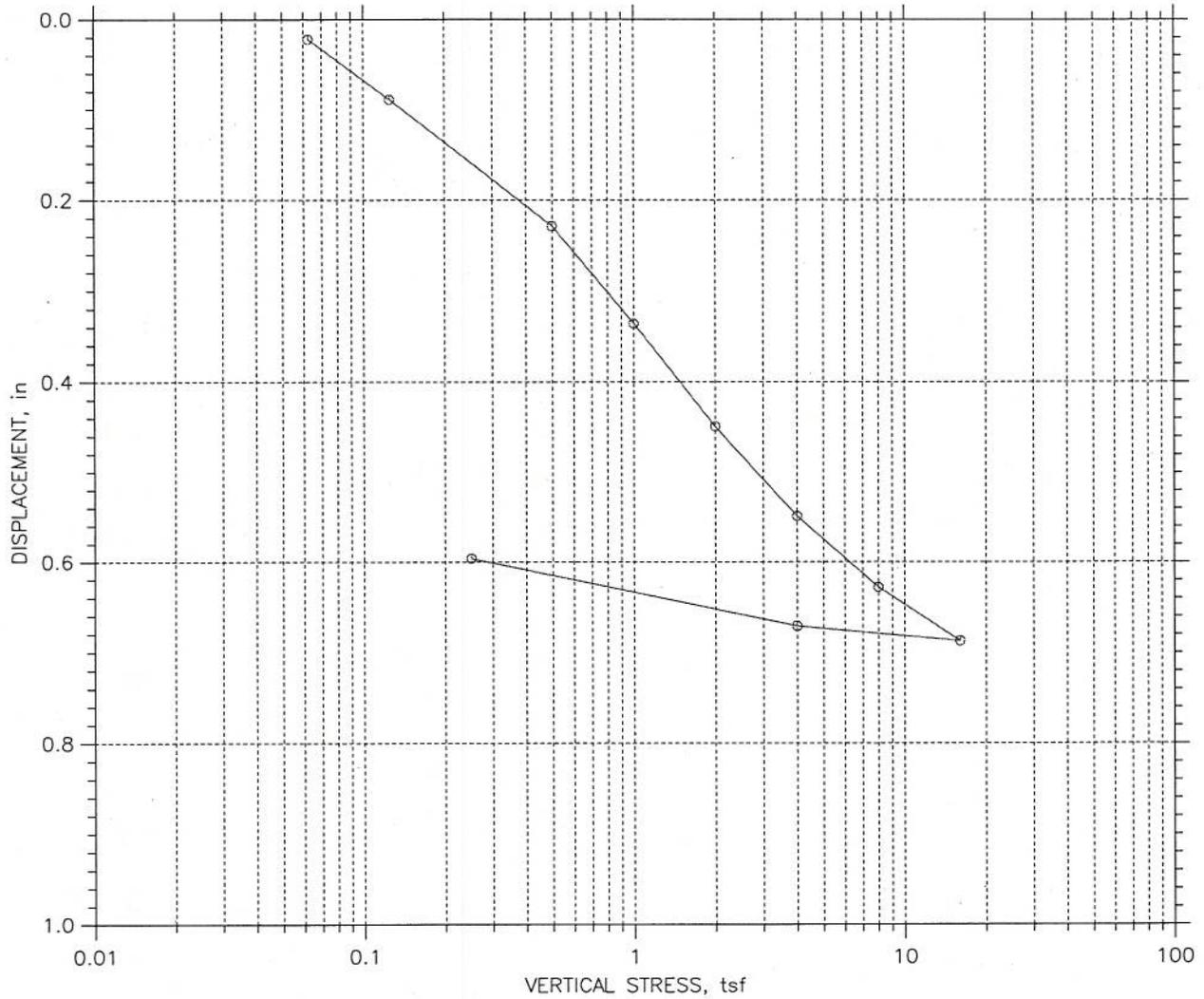
CONSOLIDATION TEST DATA

SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 1-B	Test Date: 10/13/11	Depth: 10 - 11.5
Test No.: 11-070-G4	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay with Silt		
Remarks:		

CONSOLIDATION TEST DATA SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 0 tsf		Water Content, %		424.00	144.00
Preconsolidation Pressure: 0 tsf		Dry Unit Weight, pcf		12.9	31.94
Compression Index: 3.81959e-313		Saturation, %		96.43	95.27
Diameter: 2.375 in	Height: 1 in	Void Ratio		9.93	3.41
LL: ---	PL: ---	PI: ---	GS: 2.26		

Project: Mococo OH		Location: 04-CC-680-24.4		Project No.: 04-3A8701	
Boring No.: R-11-002		Tested By: jg		Checked By:	
Sample No.: 1-B		Test Date: 10/13/11		Depth: 10 - 11.5	
Test No.: 11-070-G4		Sample Type: 2.5" Tube		Elevation: GL 11-088	
Description: Moist, Black, Soft, Clay with Silt					
Remarks:					

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 2-A
 Test No.: 11-061-G1

Location: 04-CC-680-24.4-
 Tested By: jg
 Test Date: 09/27/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *HP 10/11*
 Depth: 15 - 16.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay with Silt
 Remarks:

Measured Specific Gravity: 2.25
 Initial Void Ratio: 6.74
 Final Void Ratio: 2.24

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
		RING		
Wt. Container + Wet Soil, gm	172	172	130.1	130.1
Wt. Container + Dry Soil, gm	109.2	109.2	109.2	109.2
Wt. Container, gm	88.1	88.1	88.1	88.1
Wt. Dry Soil, gm	21.1	21.1	21.1	21.1
Water Content, %	297.63	297.63	99.05	99.05
Void Ratio	---	6.74	2.24	---
Degree of Saturation, %	---	99.34	99.58	---
Dry Unit Weight, pcf	---	18.144	43.379	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 2-A
 Test No.: 11-061-G1

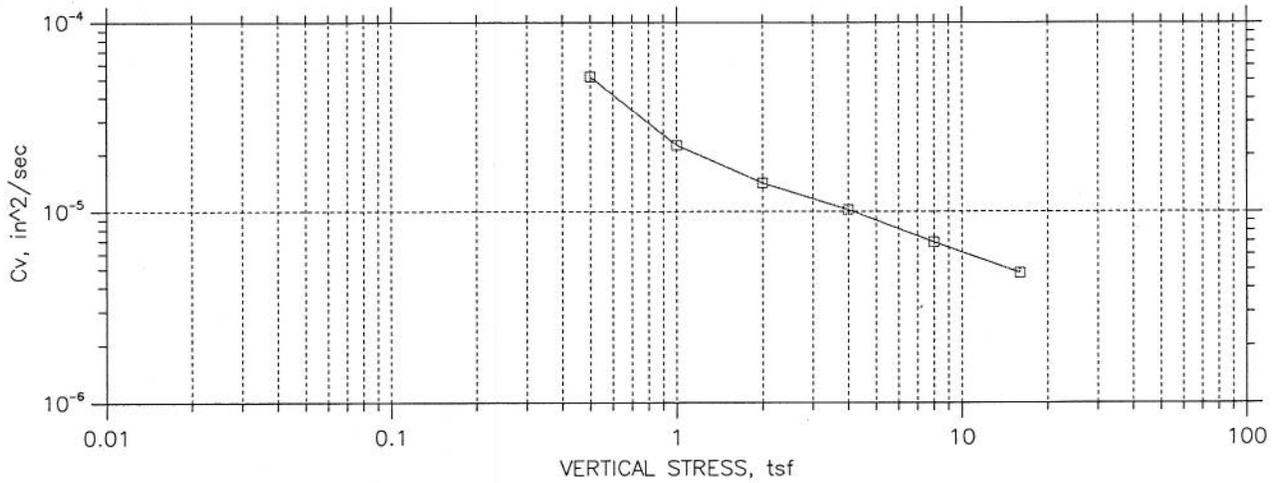
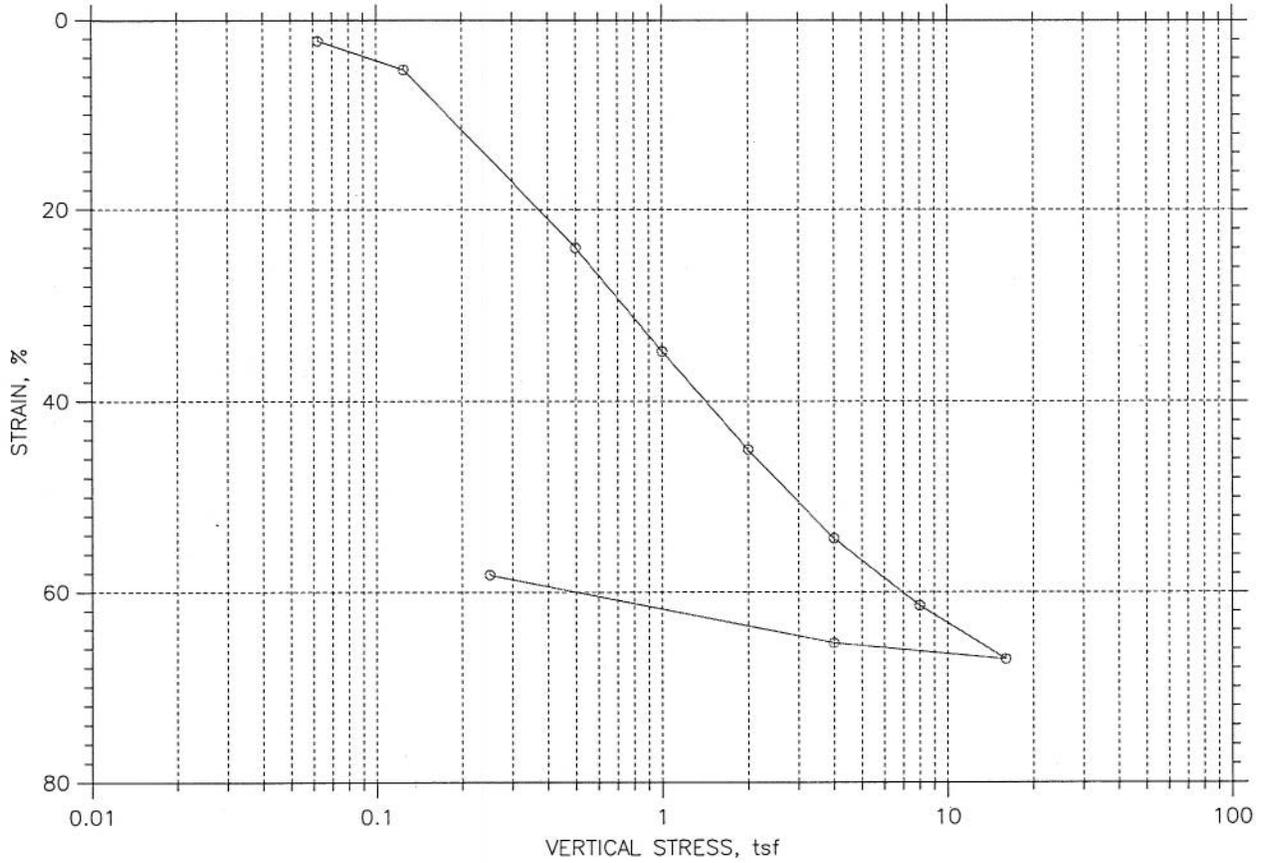
Location: 04-CC-680-24.4-
 Tested By: jg
 Test Date: 09/27/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By:
 Depth: 15 - 16.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay with Silt
 Remarks: Sticky

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in ² /sec	Log in ² /sec	Ave. in ² /sec
1	0.0625	0.02222	6.569	2.22	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.125	0.05255	6.335	5.26	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
3	0.5	0.2397	4.885	23.97	10.4	12.7	5.75e-005	4.72e-005	5.19e-005
4	1	0.3477	4.050	34.77	16.5	20.0	2.48e-005	2.05e-005	2.25e-005
5	2	0.4507	3.253	45.07	20.9	0.0	1.42e-005	0.00e+000	1.42e-005
6	4	0.5436	2.533	54.36	20.3	0.0	1.02e-005	0.00e+000	1.02e-005
7	8	0.6144	1.985	61.44	21.1	0.0	6.91e-006	0.00e+000	6.91e-006
8	16	0.6711	1.547	67.11	21.9	0.0	4.79e-006	0.00e+000	4.79e-006
9	4	0.6543	1.676	65.43	17.0	0.0	5.50e-006	0.00e+000	5.50e-006
10	0.25	0.5817	2.238	58.17	108.9	79.6	1.10e-006	1.51e-006	1.27e-006

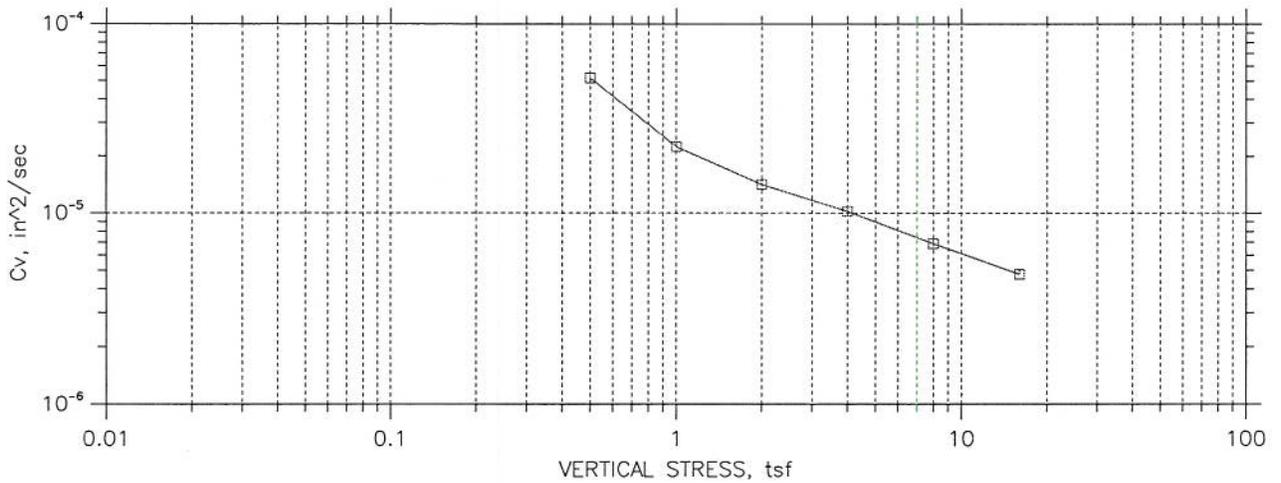
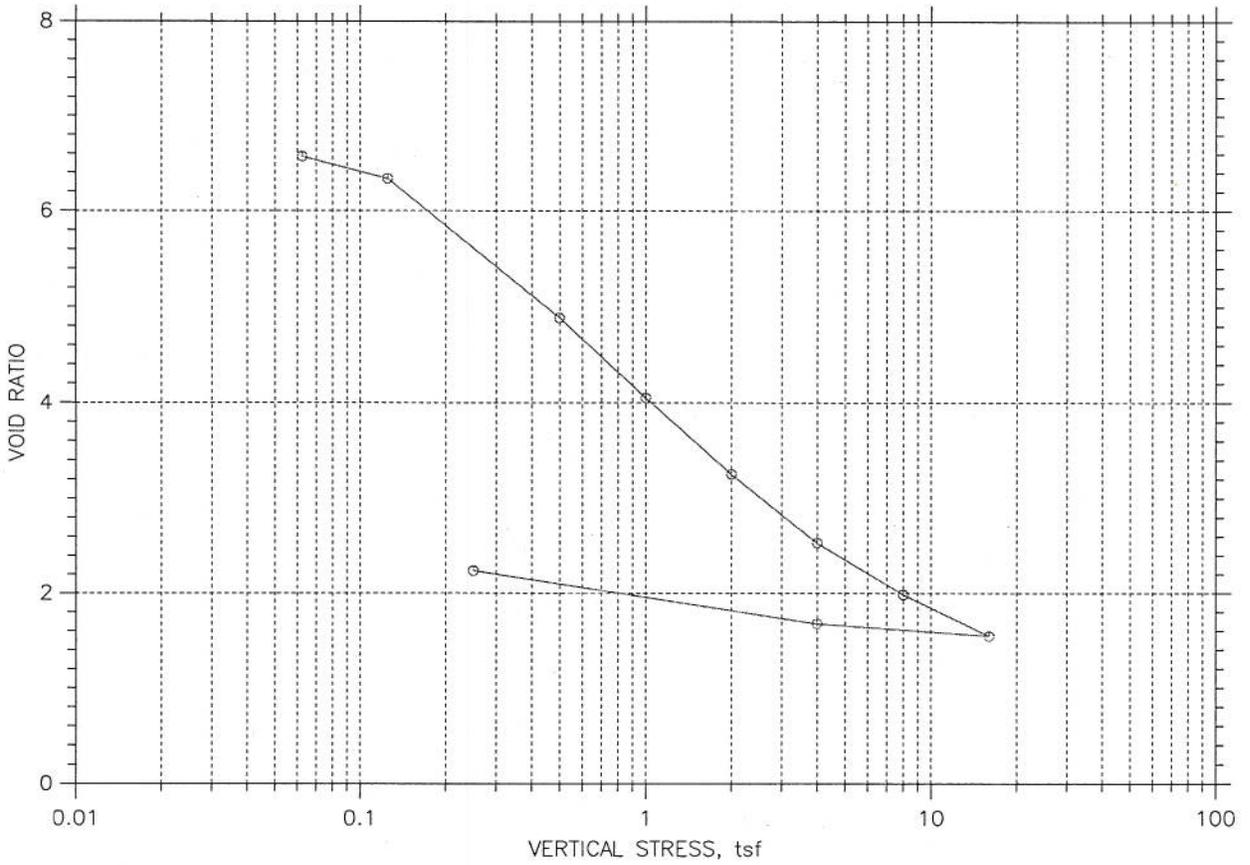
CONSOLIDATION TEST DATA SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 2-A	Test Date: 09/27/11	Depth: 15 - 16.5
Test No.: 11-061-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay with Silt		
Remarks: Sticky		

CONSOLIDATION TEST DATA

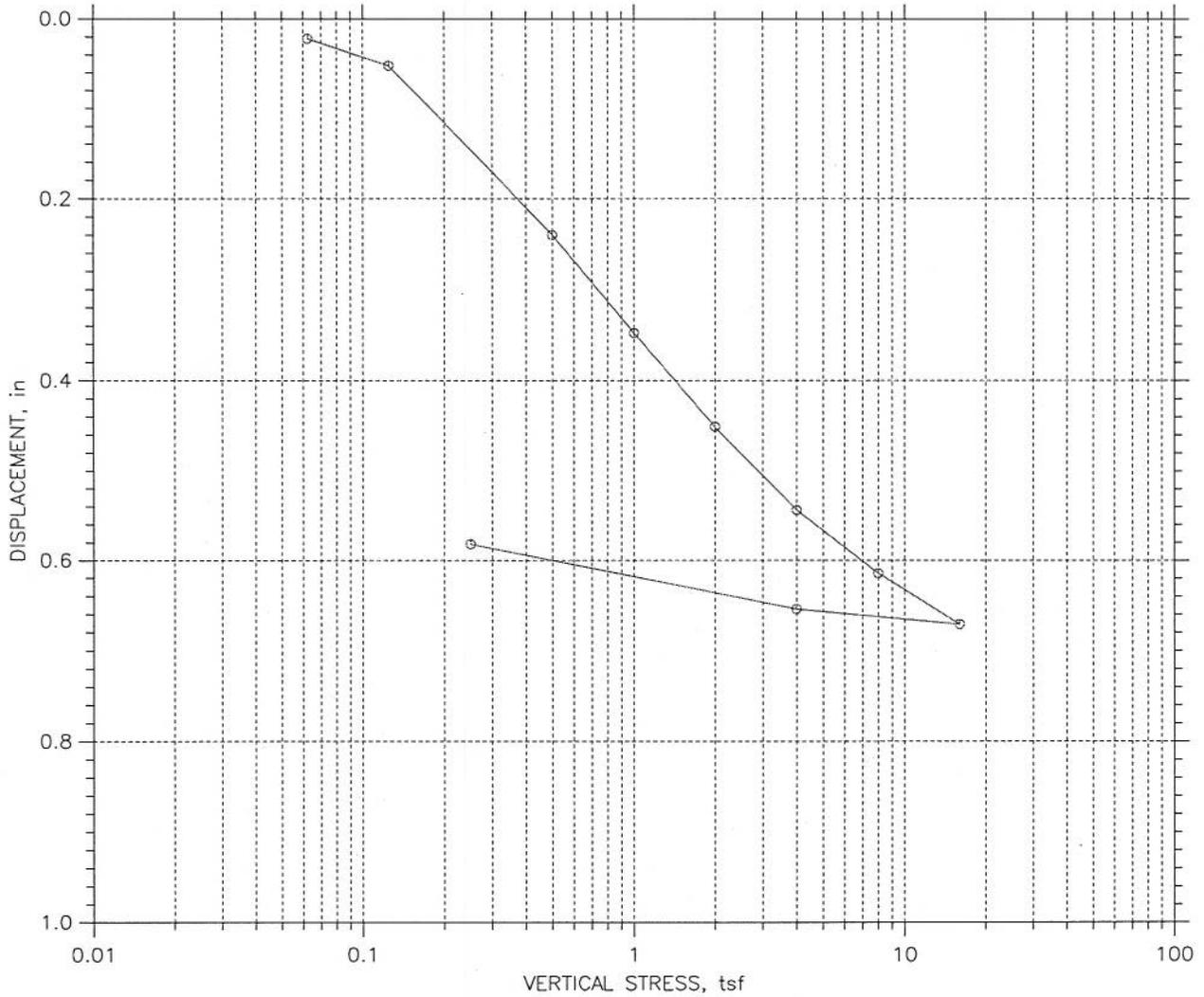
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 2-A	Test Date: 09/27/11	Depth: 15 - 16.5
Test No.: 11-061-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay with Silt		
Remarks: Sticky		

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 8.864e-312 tsf				297.63	99.05
Preconsolidation Pressure: 3.612e-311 tsf				18.14	43.38
Compression Index: 2.75859e-313				99.34	99.58
Diameter: 2.375 in		Height: 1 in		6.74	2.24
LL: ---	PL: ---	PI: ---	GS: 2.25		

Project: Mococo OH		Location: 04-CC-680-24.4-		Project No.: 04-3A8701	
Boring No.: R-11-002		Tested By: jg		Checked By:	
Sample No.: 2-A		Test Date: 09/27/11		Depth: 15 - 16.5	
Test No.: 11-061-G1		Sample Type: 2.5" Tube		Elevation: GL 11-088	
Description: Moist, Black, Soft, Clay with Silt					
Remarks: Sticky					

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 2-B
 Test No.: 11-065-G1

Location: 04-CC-680-24.4-
 Tested By: jg
 Test Date: 10/10/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *HP 10/18*
 Depth: 15 - 16.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay w/ Silt
 Remarks:

Measured Specific Gravity: 2.25
 Initial Void Ratio: 8.09
 Final Void Ratio: 2.45

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
		RING		
Wt. Container + Wet Soil, gm	167.3	167.3	126.3	126.3
Wt. Container + Dry Soil, gm	106.8	106.8	106.8	106.8
Wt. Container, gm	88.8	88.8	88.8	88.8
Wt. Dry Soil, gm	18	18	18	18
Water Content, %	336.11	336.11	108.33	108.33
Void Ratio	---	8.09	2.45	---
Degree of Saturation, %	---	93.64	99.56	---
Dry Unit Weight, pcf	---	15.479	40.755	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 2-B
 Test No.: 11-065-G1

Location: 04-CC-680-24.4-
 Tested By: jg
 Test Date: 10/10/11
 Sample Type: 2.5" Tube

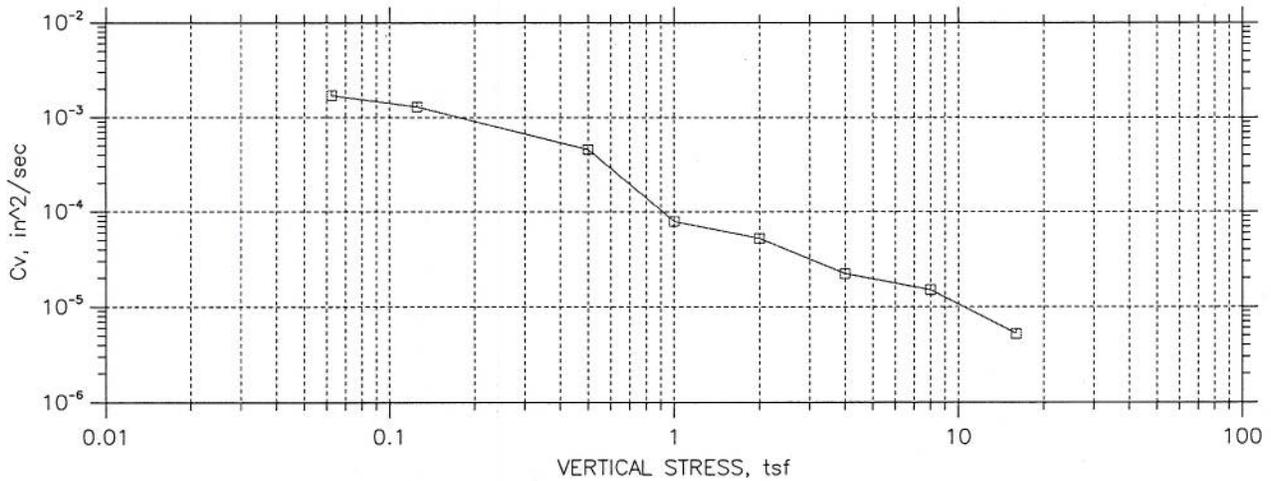
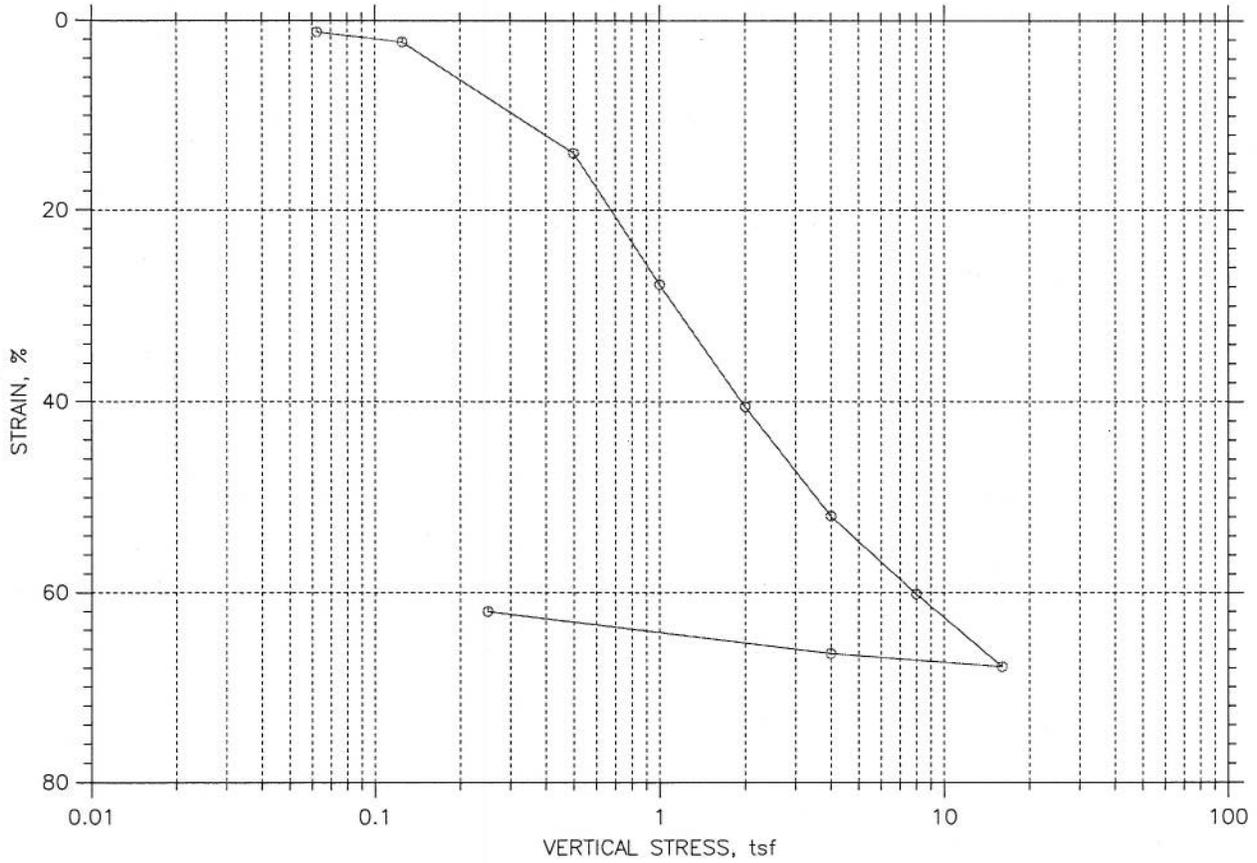
Project No.: 04-3A8701
 Checked By:
 Depth: 15 - 16.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay w/ Silt
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in ² /sec	Log in ² /sec	Ave. in ² /sec
1	0.0625	0.01226	7.979	1.23	0.5	0.4	1.58e-003	1.84e-003	1.70e-003
2	0.125	0.02273	7.884	2.27	0.7	0.5	1.10e-003	1.56e-003	1.29e-003
3	0.5	0.1399	6.819	13.99	1.9	1.1	3.58e-004	6.32e-004	4.57e-004
4	1	0.278	5.563	27.80	6.9	6.1	7.47e-005	8.46e-005	7.93e-005
5	2	0.4054	4.406	40.54	7.1	6.5	5.03e-005	5.48e-005	5.25e-005
6	4	0.5194	3.369	51.94	10.6	0.0	2.23e-005	0.00e+000	2.23e-005
7	8	0.6013	2.624	60.13	10.5	0.0	1.51e-005	0.00e+000	1.51e-005
8	16	0.6788	1.920	67.88	20.3	0.0	5.24e-006	0.00e+000	5.24e-006
9	4	0.6648	2.047	66.48	6.7	0.0	1.32e-005	0.00e+000	1.32e-005
10	0.25	0.6202	2.453	62.02	34.1	52.3	3.08e-006	2.01e-006	2.43e-006

CONSOLIDATION TEST DATA

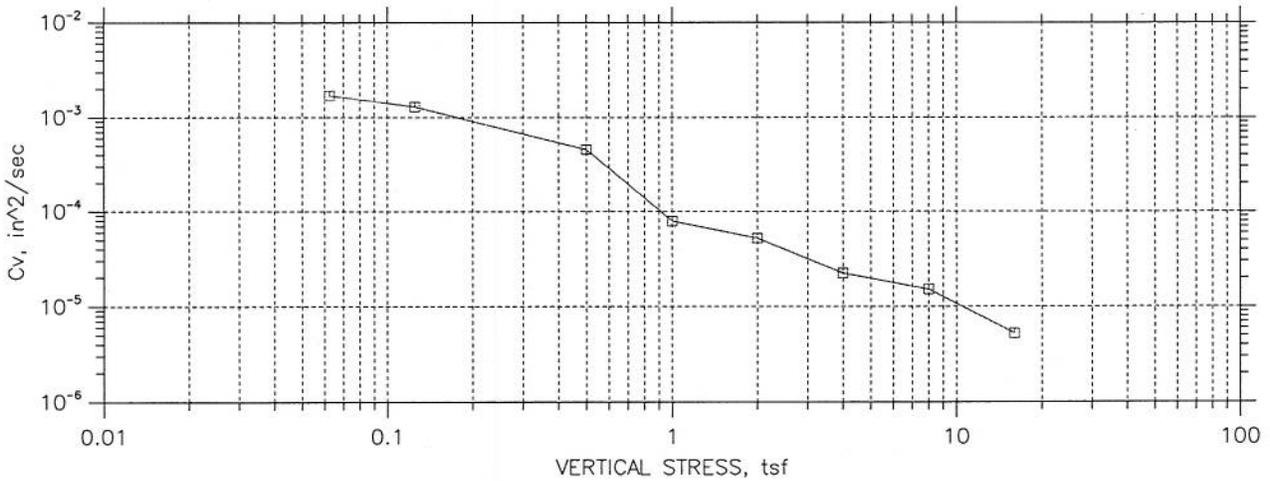
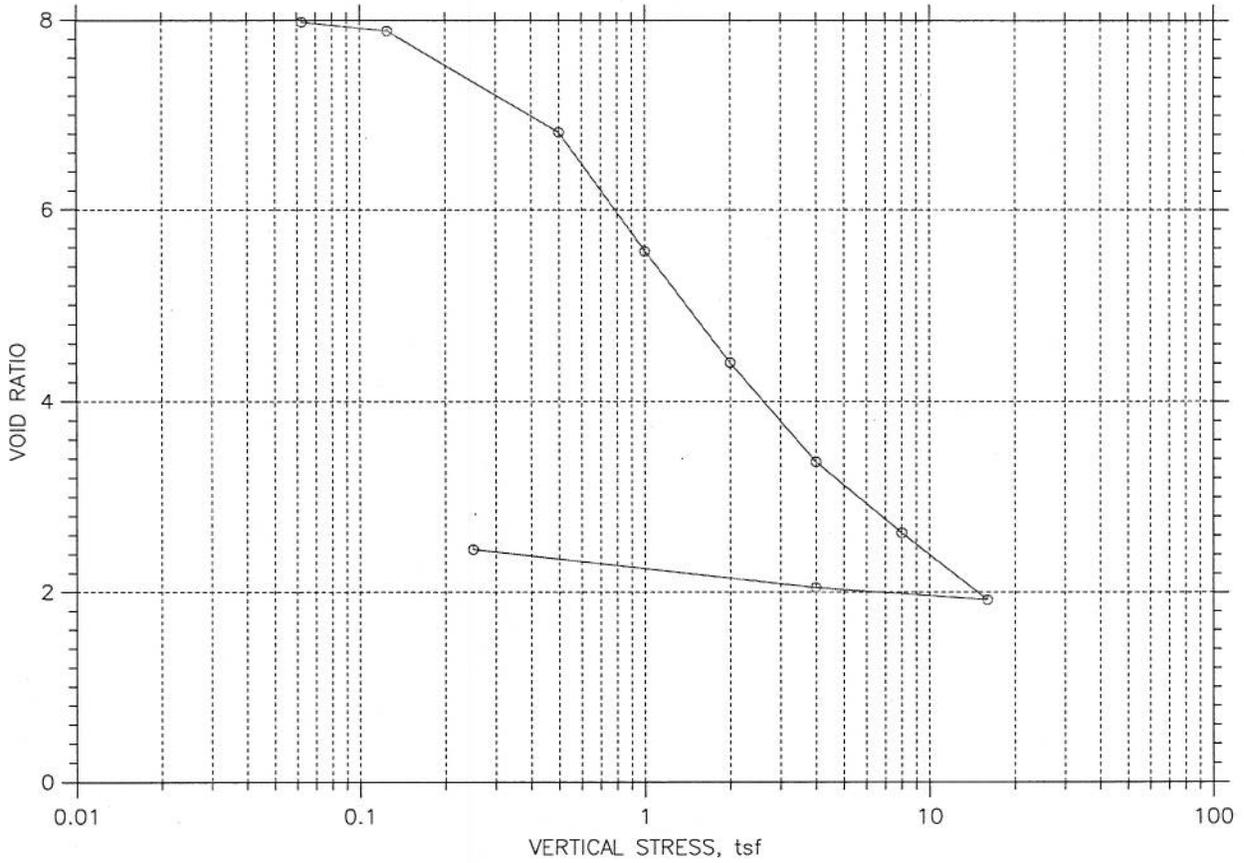
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 2-B	Test Date: 10/10/11	Depth: 15 - 16.5
Test No.: 11-065-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay w/ Silt		
Remarks:		

CONSOLIDATION TEST DATA

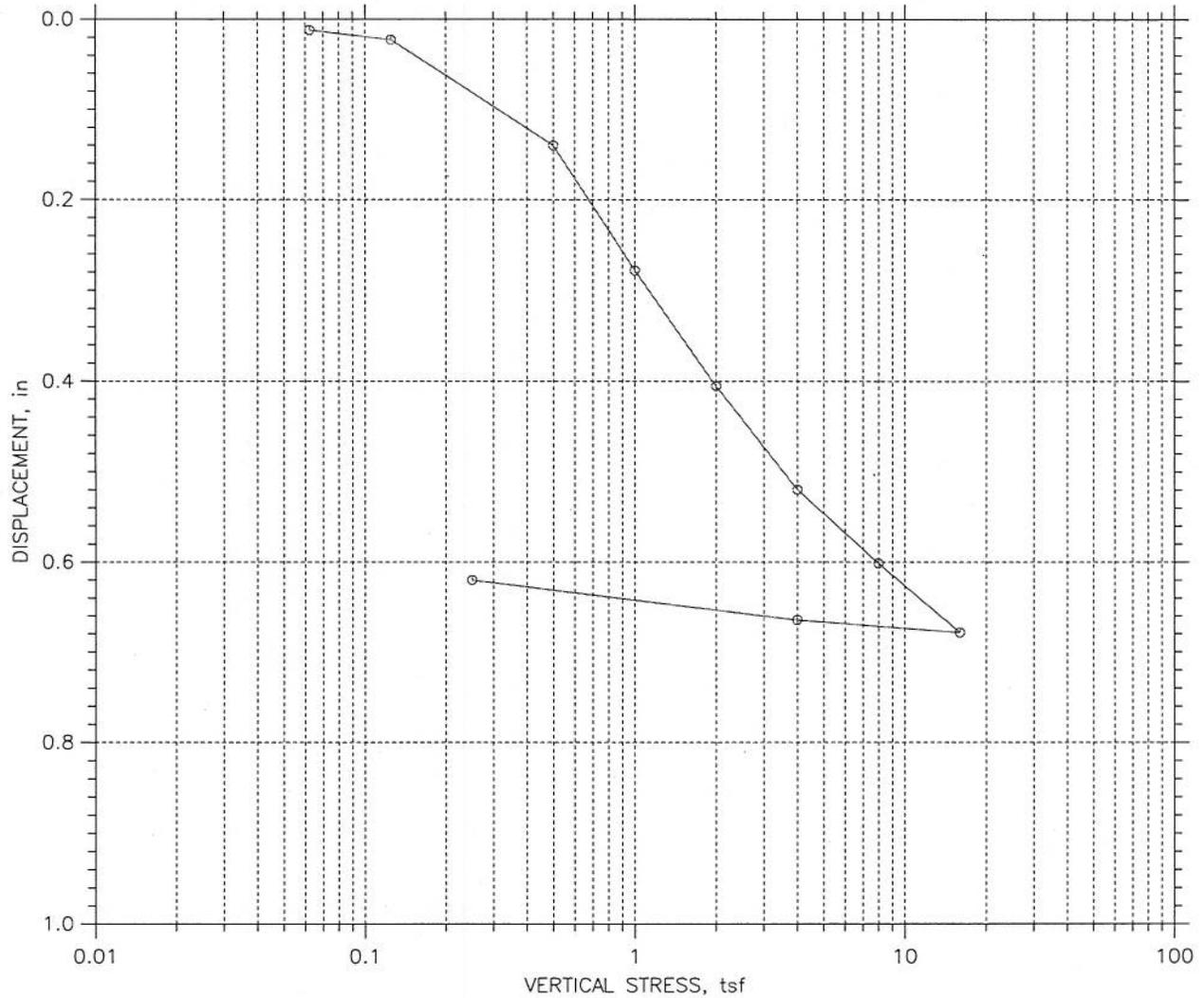
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 2-B	Test Date: 10/10/11	Depth: 15 - 16.5
Test No.: 11-065-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay w/ Silt		
Remarks:		

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 8.864e-312 tsf		Water Content, %		336.11	108.33
Preconsolidation Pressure: 3.612e-311 tsf		Dry Unit Weight, pcf		15.48	40.75
Compression Index: 2.75859e-313		Saturation, %		93.64	99.56
Diameter: 2.375 in	Height: 1 in	Void Ratio		8.09	2.45
LL: ---	PL: ---	PI: ---	GS: 2.25		

Project: Mococo OH	Location: 04-CC-680-24.4-	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 2-B	Test Date: 10/10/11	Depth: 15 - 16.5
Test No.: 11-065-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay w/ Silt		
Remarks:		

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 3-A
 Test No.: 11-066-G4

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/10/11
 Sample Type: 2.5" TUBE

Project No.: 04-3A8701
 Checked By: *HP 10/14*
 Depth: 20 - 21.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay w/ Silt
 Remarks:

Measured Specific Gravity: 2.03
 Initial Void Ratio: 6.48
 Final Void Ratio: 2.62

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
		RING		
Wt. Container + Wet Soil, gm	171	171	133.7	133.7
Wt. Container + Dry Soil, gm	108.4	108.4	108.4	108.4
Wt. Container, gm	88.7	88.7	88.7	88.7
Wt. Dry Soil, gm	19.7	19.7	19.7	19.7
Water Content, %	317.77	317.77	128.43	128.43
Void Ratio	---	6.48	2.62	---
Degree of Saturation, %	---	99.53	99.55	---
Dry Unit Weight, pcf	---	16.941	35.02	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 3-A
 Test No.: 11-066-G4

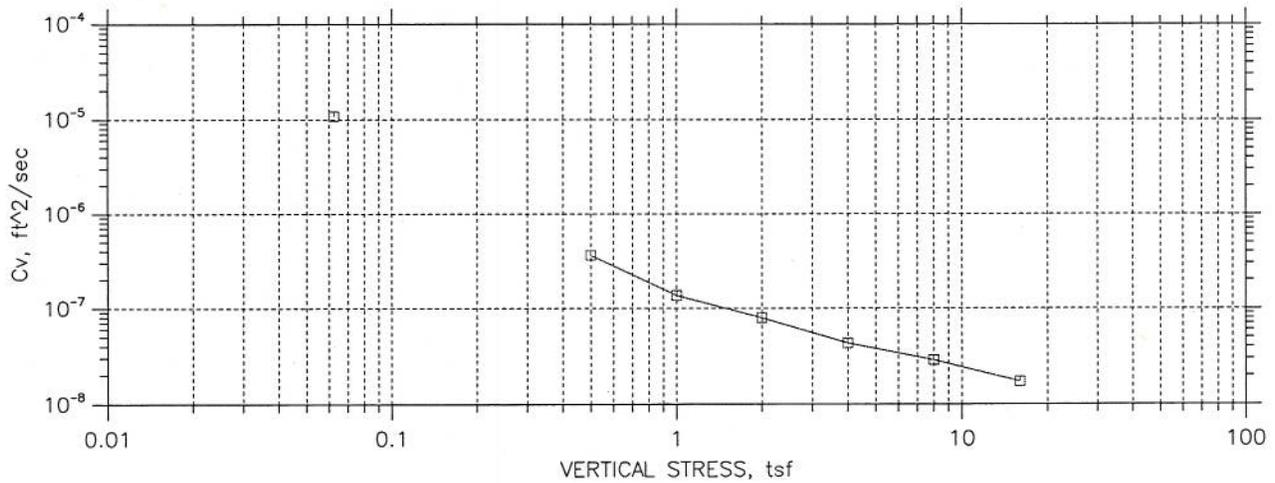
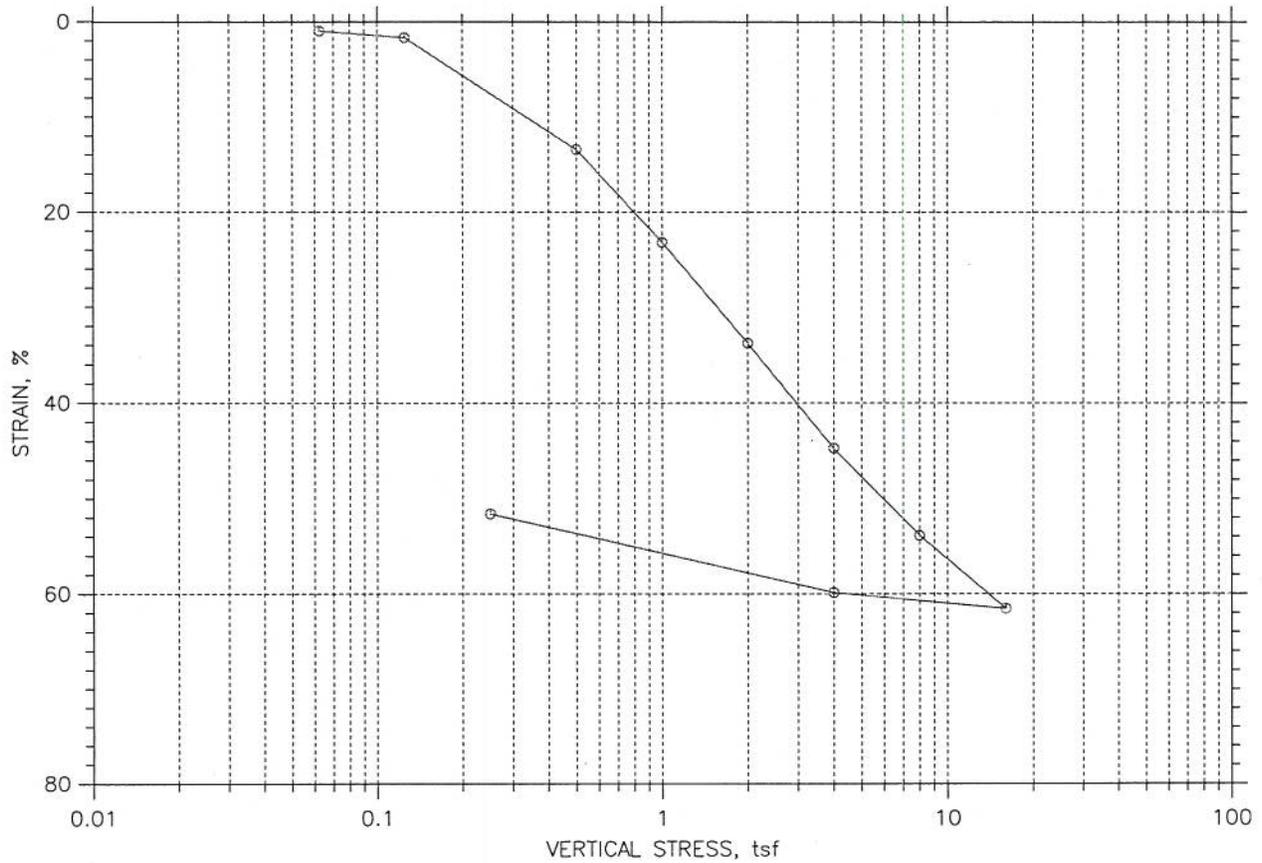
Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/10/11
 Sample Type: 2.5" TUBE

Project No.: 04-3A8701
 Checked By:
 Depth: 20 - 21.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay w/ Silt
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. ft ² /sec	Log ft ² /sec	Ave. ft ² /sec
1	0.0625	0.009892	6.407	0.99	0.5	0.5	1.14e-005	1.04e-005	1.09e-005
2	0.125	0.01699	6.354	1.70	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
3	0.5	0.1344	5.476	13.44	11.6	15.1	4.20e-007	3.23e-007	3.65e-007
4	1	0.232	4.745	23.20	27.8	0.0	1.37e-007	0.00e+000	1.37e-007
5	2	0.3377	3.954	33.77	36.8	0.0	7.93e-008	0.00e+000	7.93e-008
6	4	0.447	3.137	44.70	48.8	0.0	4.32e-008	0.00e+000	4.32e-008
7	8	0.539	2.449	53.90	50.9	0.0	2.88e-008	0.00e+000	2.88e-008
8	16	0.6154	1.877	61.54	59.3	0.0	1.72e-008	0.00e+000	1.72e-008
9	4	0.5988	2.001	59.88	10.7	0.0	8.22e-008	0.00e+000	8.22e-008
10	0.25	0.5163	2.619	51.63	84.8	0.0	1.32e-008	0.00e+000	1.32e-008

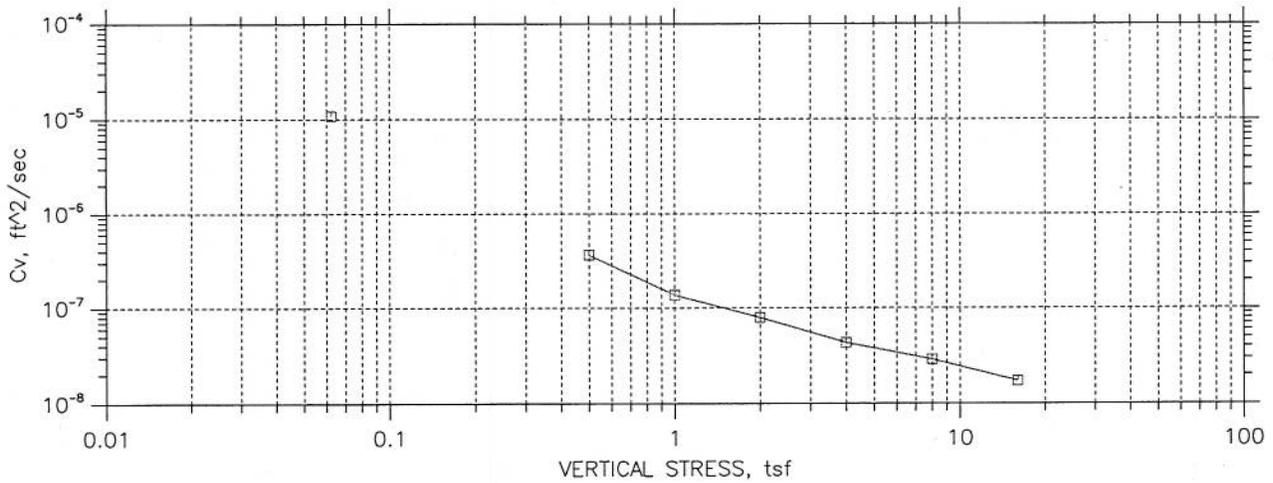
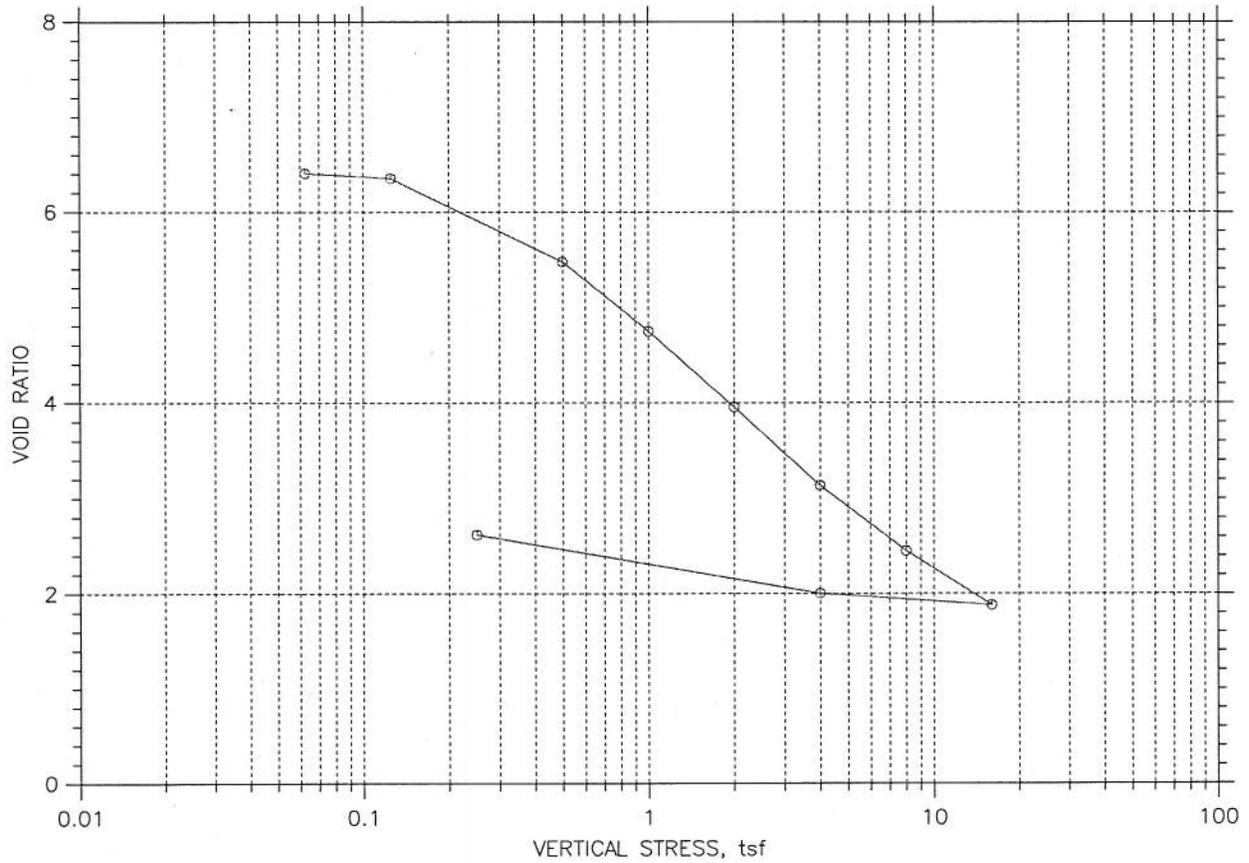
CONSOLIDATION TEST DATA SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 3-A	Test Date: 10/10/11	Depth: 20 - 21.5
Test No.: 11-066-G4	Sample Type: 2.5" TUBE	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay w/ Silt		
Remarks:		

CONSOLIDATION TEST DATA

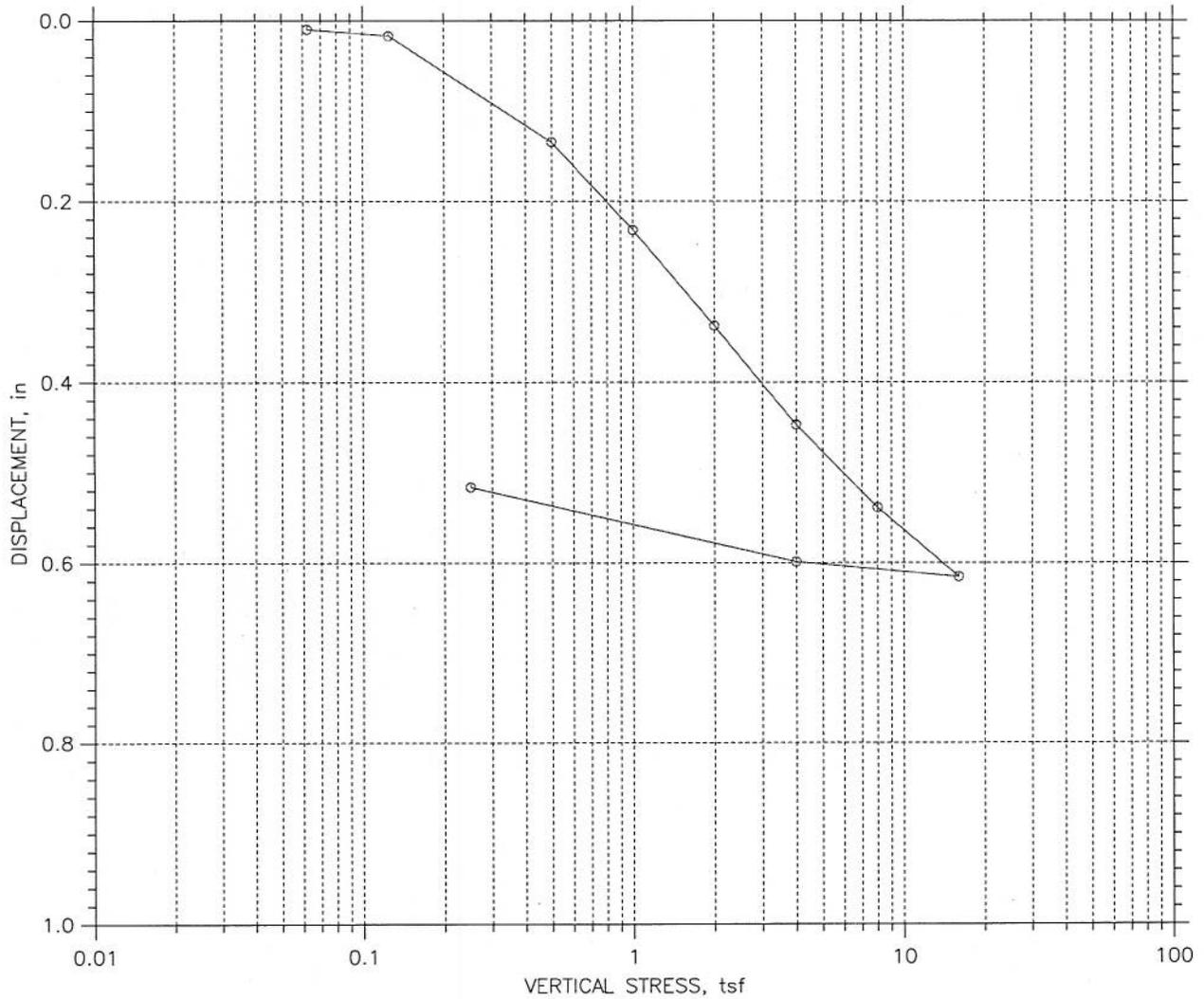
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 3-A	Test Date: 10/10/11	Depth: 20 - 21.5
Test No.: 11-066-G4	Sample Type: 2.5" TUBE	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay w/ Silt		
Remarks:		

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 0 tsf		Water Content, %		317.77	128.43
Preconsolidation Pressure: 0 tsf		Dry Unit Weight, pcf		16.94	35.02
Compression Index: 3.81959e-313		Saturation, %		99.53	99.55
Diameter: 2.375 in	Height: 1 in	Void Ratio		6.48	2.62
LL: ---	PL: ---	PI: ---	GS: 2.03		

Project: Mococo OH		Location: 04-CC-680-24.4		Project No.: 04-3A8701	
Boring No.: R-11-002		Tested By: jg		Checked By:	
Sample No.: 3-A		Test Date: 10/10/11		Depth: 20 - 21.5	
Test No.: 11-066-G4		Sample Type: 2.5" TUBE		Elevation: GL 11-088	
Description: Moist, Black, Soft, Clay w/ Silt					
Remarks:					

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 3-B
 Test No.: 11-067-G3

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/11/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *WP 10/19*
 Depth: 20 - 21.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay w/ Silt
 Remarks:

Measured Specific Gravity: 2.14
 Initial Void Ratio: 8.65
 Final Void Ratio: 2.95

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
		RING		
Wt. Container + Wet Soil, gm	163.1	163.1	126.2	126.2
Wt. Container + Dry Soil, gm	104.1	104.1	104.1	104.1
Wt. Container, gm	88	88	88	88
Wt. Dry Soil, gm	16.1	16.1	16.1	16.1
Water Content, %	366.46	366.46	137.27	137.27
Void Ratio	---	8.65	2.95	---
Degree of Saturation, %	---	90.67	99.74	---
Dry Unit Weight, pcf	---	13.845	33.863	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 3-B
 Test No.: 11-067-G3

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/11/11
 Sample Type: 2.5" Tube

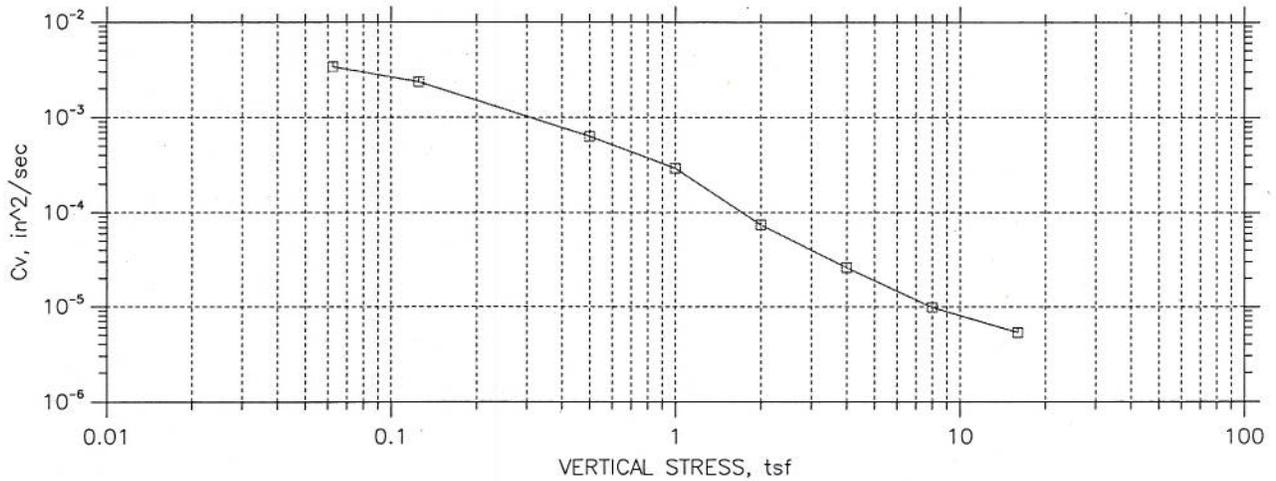
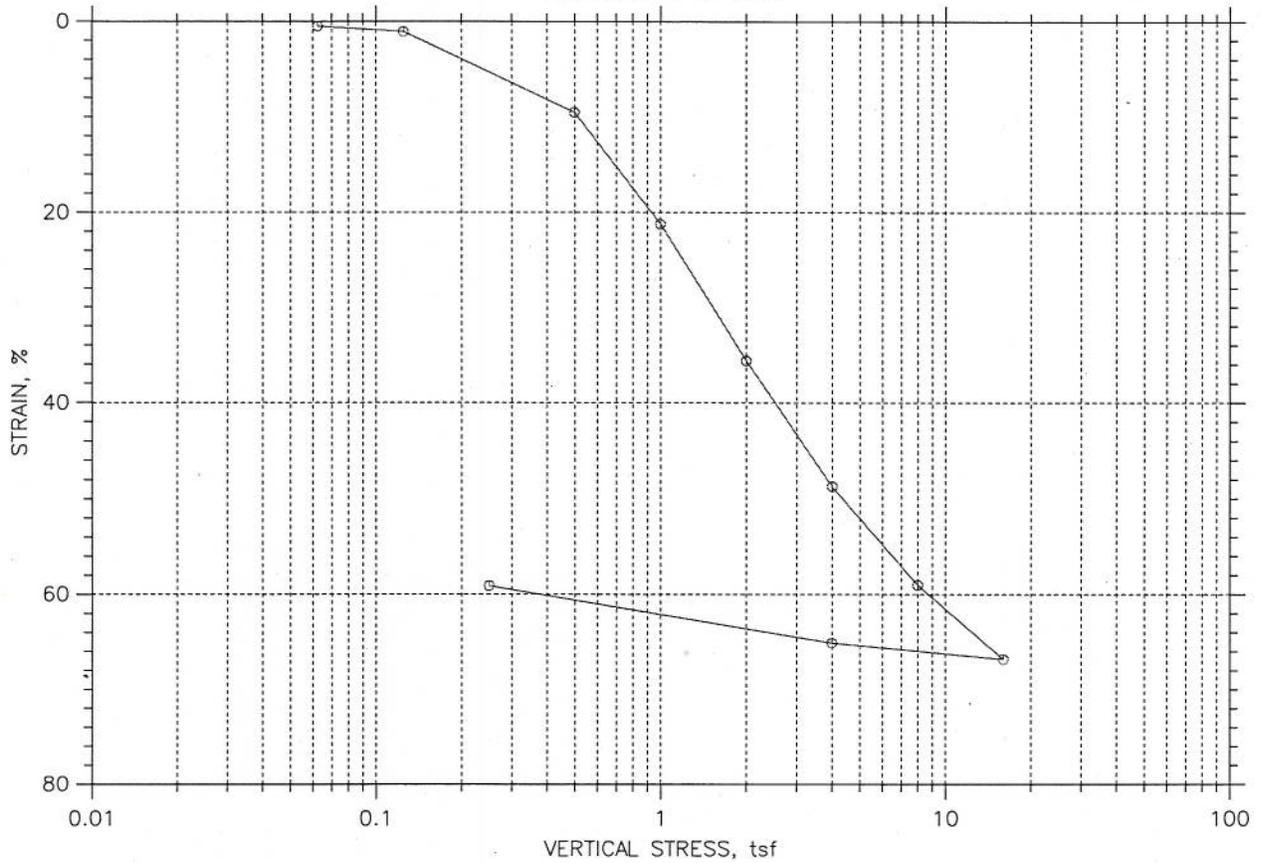
Project No.: 04-3A8701
 Checked By:
 Depth: 20 - 21.5
 Elevation: GL 11-088

Soil Description: Moist, Black, Soft, Clay w/ Silt
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in ² /sec	Log in ² /sec	Ave. in ² /sec
1	0.0625	0.005064	8.601	0.51	0.2	0.0	3.39e-003	0.00e+000	3.39e-003
2	0.125	0.01091	8.544	1.09	0.3	0.0	2.36e-003	0.00e+000	2.36e-003
3	0.5	0.09565	7.727	9.57	1.1	1.3	6.96e-004	5.85e-004	6.36e-004
4	1	0.2122	6.602	21.22	2.3	1.7	2.52e-004	3.49e-004	2.92e-004
5	2	0.356	5.214	35.60	7.0	4.4	6.04e-005	9.48e-005	7.38e-005
6	4	0.4872	3.949	48.72	10.6	0.0	2.60e-005	0.00e+000	2.60e-005
7	8	0.5902	2.955	59.02	17.8	0.0	9.81e-006	0.00e+000	9.81e-006
8	16	0.6683	2.201	66.83	21.3	0.0	5.30e-006	0.00e+000	5.30e-006
9	4	0.6512	2.365	65.12	14.0	0.0	6.78e-006	0.00e+000	6.78e-006
10	0.25	0.5911	2.945	59.11	41.6	55.9	2.84e-006	2.11e-006	2.42e-006

CONSOLIDATION TEST DATA

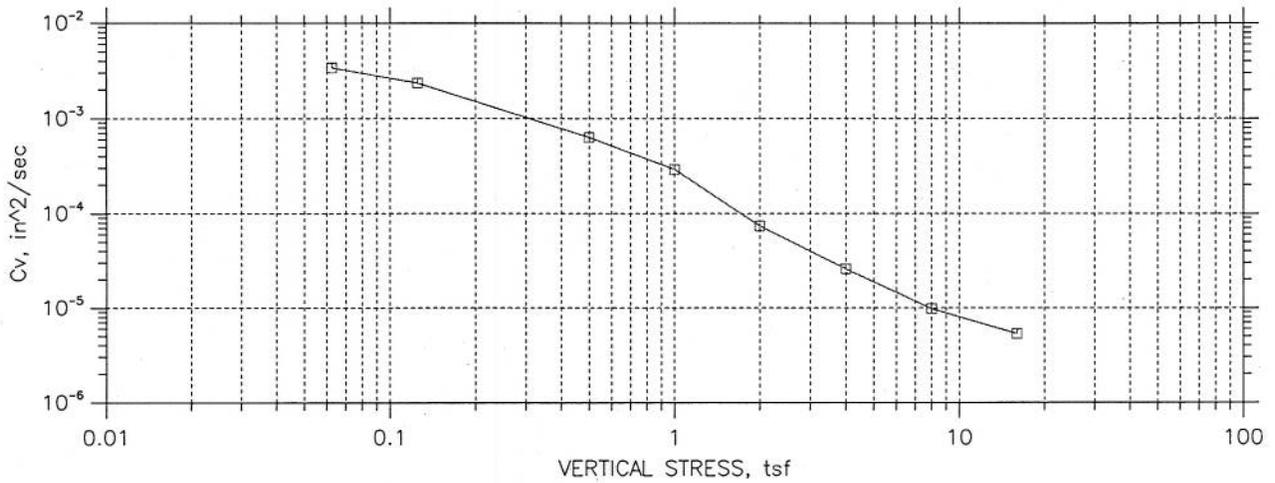
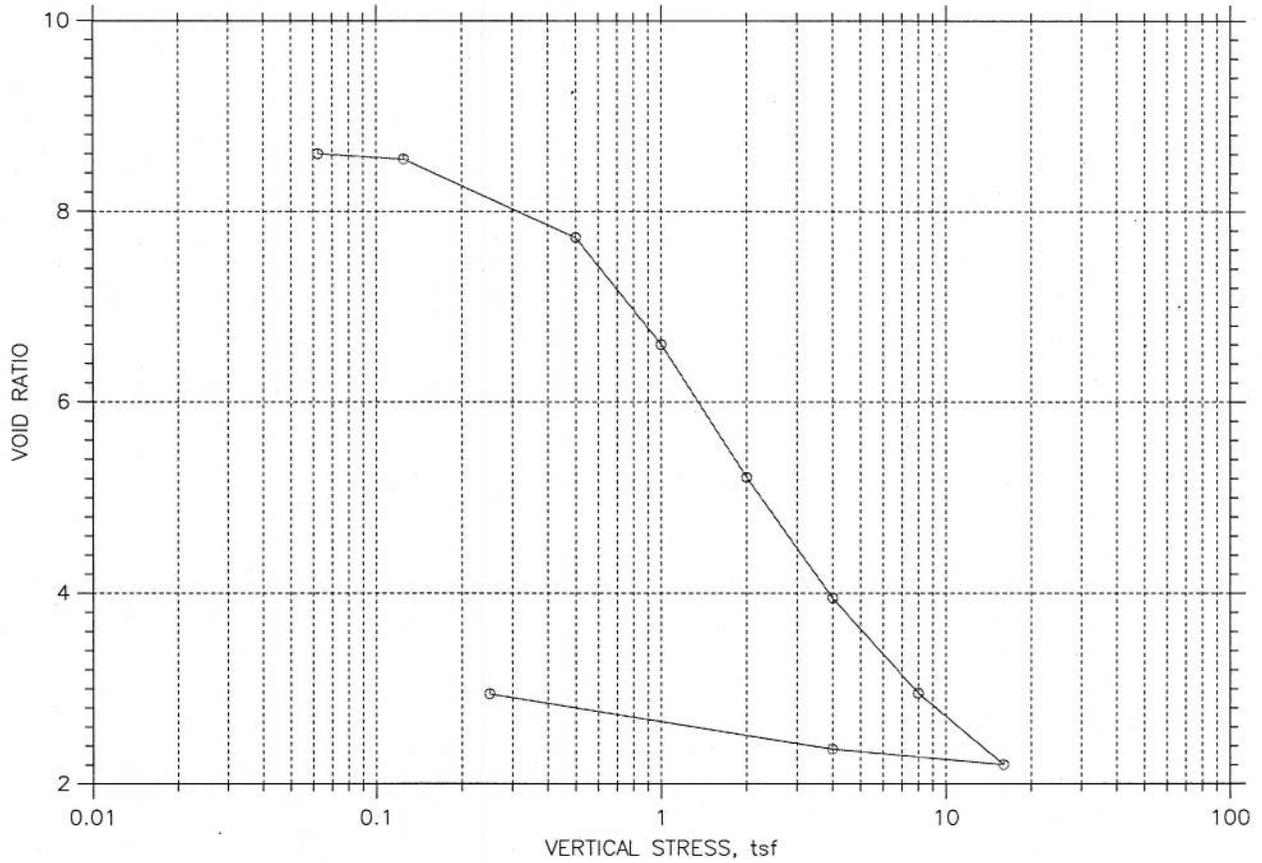
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 3-B	Test Date: 10/11/11	Depth: 20 - 21.5
Test No.: 11-067-G3	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay w/ Silt		
Remarks:		

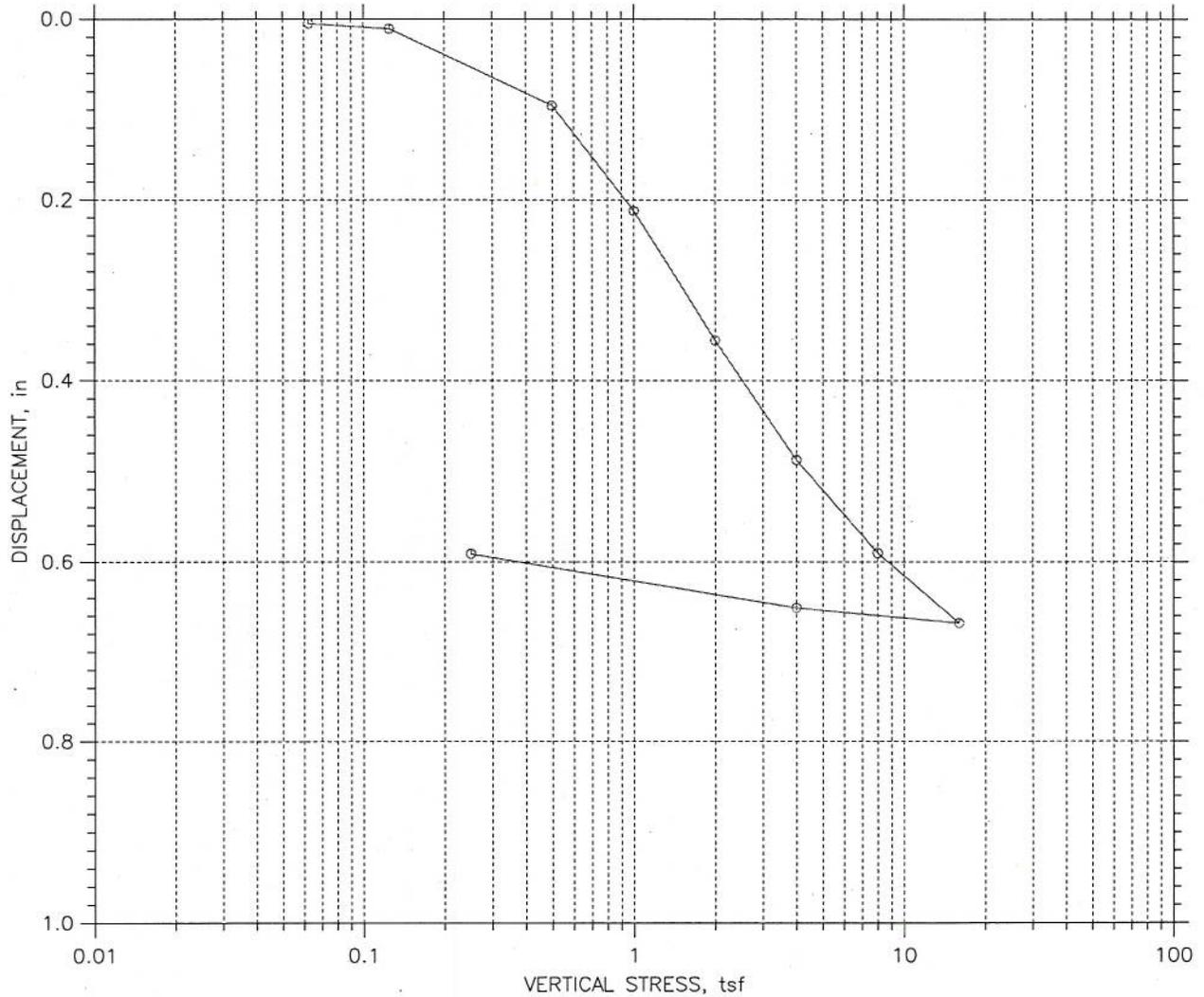
CONSOLIDATION TEST DATA

SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 3-B	Test Date: 10/11/11	Depth: 20 - 21.5
Test No.: 11-067-G3	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay w/ Silt		
Remarks:		

CONSOLIDATION TEST DATA SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 8.864e-312 tsf		Water Content, %		366.46	137.27
Preconsolidation Pressure: 3.612e-311 tsf		Dry Unit Weight, pcf		13.84	33.86
Compression Index: 2.75859e-313		Saturation, %		90.67	99.74
Diameter: 2.375 in	Height: 1 in	Void Ratio		8.65	2.95
LL: ---	PL: ---	PI: ---	GS: 2.14		

Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 3-B	Test Date: 10/11/11	Depth: 20 - 21.5
Test No.: 11-067-G3	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Black, Soft, Clay w/ Silt		
Remarks:		

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 4-A
 Test No.: 11-068-G1

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/12/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *W 10/19*
 Depth: 25 - 26.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Soft, Clay
 Remarks:

Measured Specific Gravity: 2.68
 Initial Void Ratio: 0.86
 Final Void Ratio: 0.50

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
		RING		
Wt. Container + Wet Soil, gm	228.3	228.3	214.7	214.7
Wt. Container + Dry Soil, gm	195.3	195.3	195.3	195.3
Wt. Container, gm	90.4	90.4	90.4	90.4
Wt. Dry Soil, gm	104.9	104.9	104.9	104.9
Water Content, %	31.46	31.46	18.49	18.49
Void Ratio	---	0.86	0.50	---
Degree of Saturation, %	---	98.60	99.52	---
Dry Unit Weight, pcf	---	90.206	111.71	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 4-A
 Test No.: 11-068-G1

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/12/11
 Sample Type: 2.5" Tube

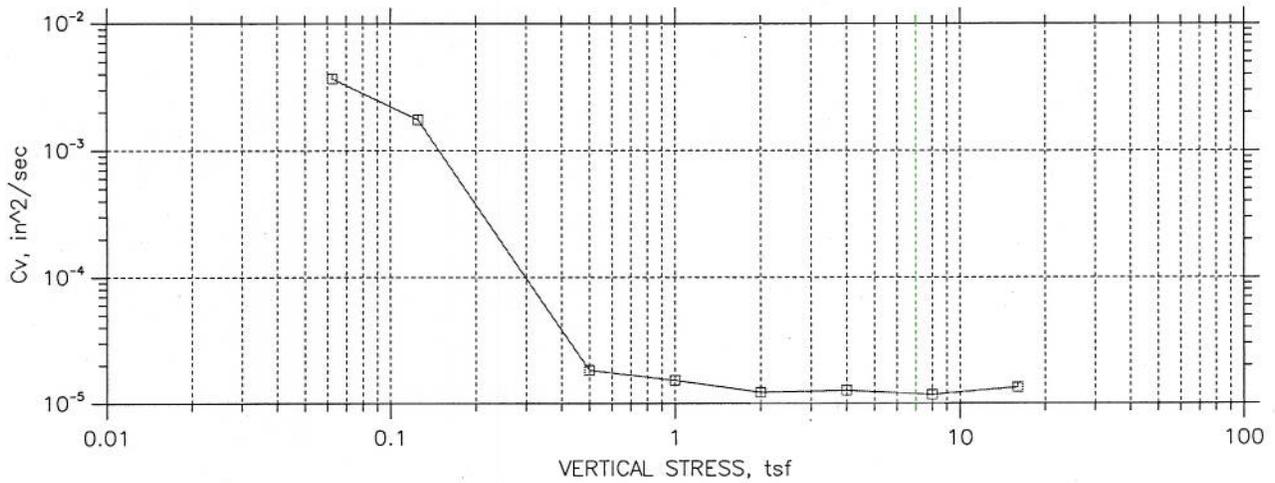
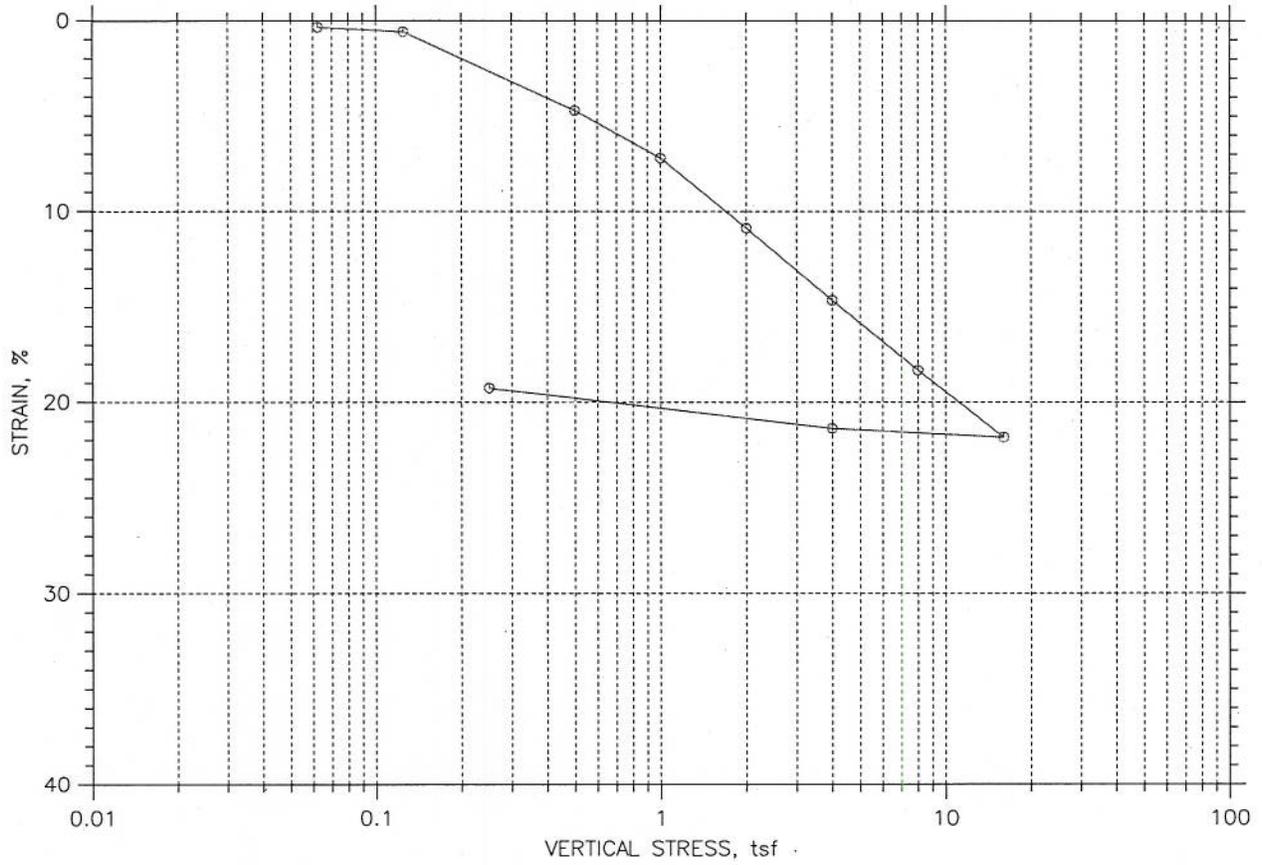
Project No.: 04-3A8701
 Checked By:
 Depth: 25 - 26.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Soft, Clay
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in ² /sec	Log in ² /sec	Ave. in ² /sec
1	0.0625	0.003514	0.849	0.35	0.2	0.0	3.67e-003	0.00e+000	3.67e-003
2	0.125	0.005983	0.844	0.60	0.5	0.0	1.75e-003	0.00e+000	1.75e-003
3	0.5	0.04712	0.768	4.71	42.8	0.0	1.82e-005	0.00e+000	1.82e-005
4	1	0.07212	0.722	7.21	35.2	60.5	2.06e-005	1.20e-005	1.52e-005
5	2	0.1085	0.654	10.85	55.9	55.9	1.22e-005	1.22e-005	1.22e-005
6	4	0.1463	0.584	14.63	44.6	54.3	1.40e-005	1.15e-005	1.27e-005
7	8	0.1831	0.516	18.31	42.1	55.6	1.36e-005	1.03e-005	1.17e-005
8	16	0.2184	0.450	21.84	37.3	41.1	1.41e-005	1.28e-005	1.34e-005
9	4	0.2137	0.459	21.37	1.5	0.2	3.29e-004	2.47e-003	5.80e-004
10	0.25	0.1925	0.498	19.25	32.7	0.0	1.59e-005	0.00e+000	1.59e-005

CONSOLIDATION TEST DATA

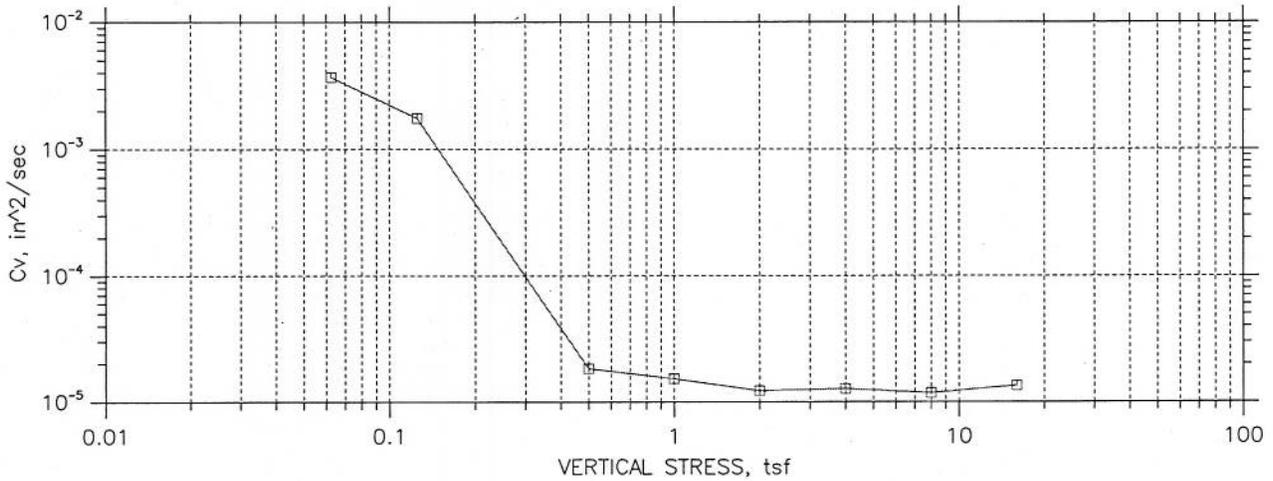
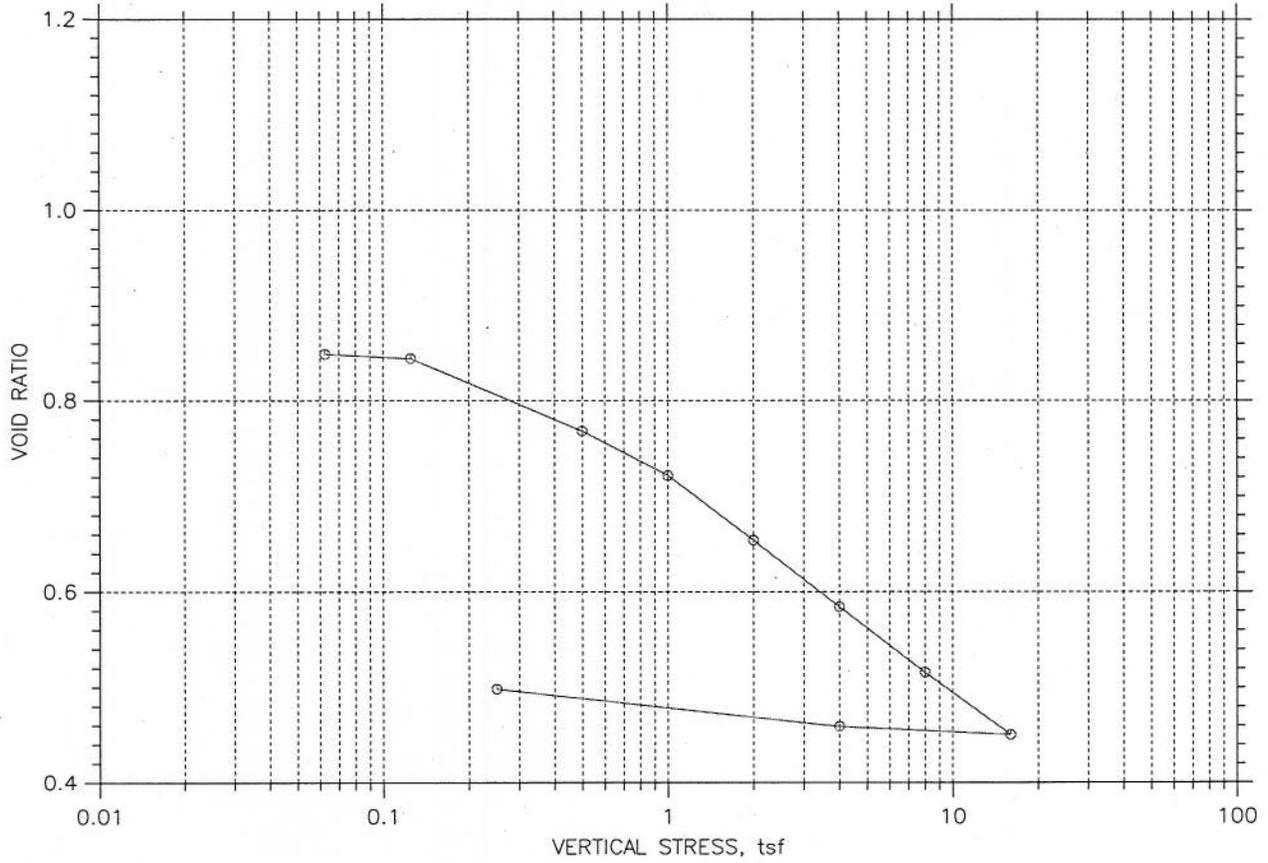
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 4-A	Test Date: 10/12/11	Depth: 25 - 26.5
Test No.: 11-068-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay		
Remarks:		

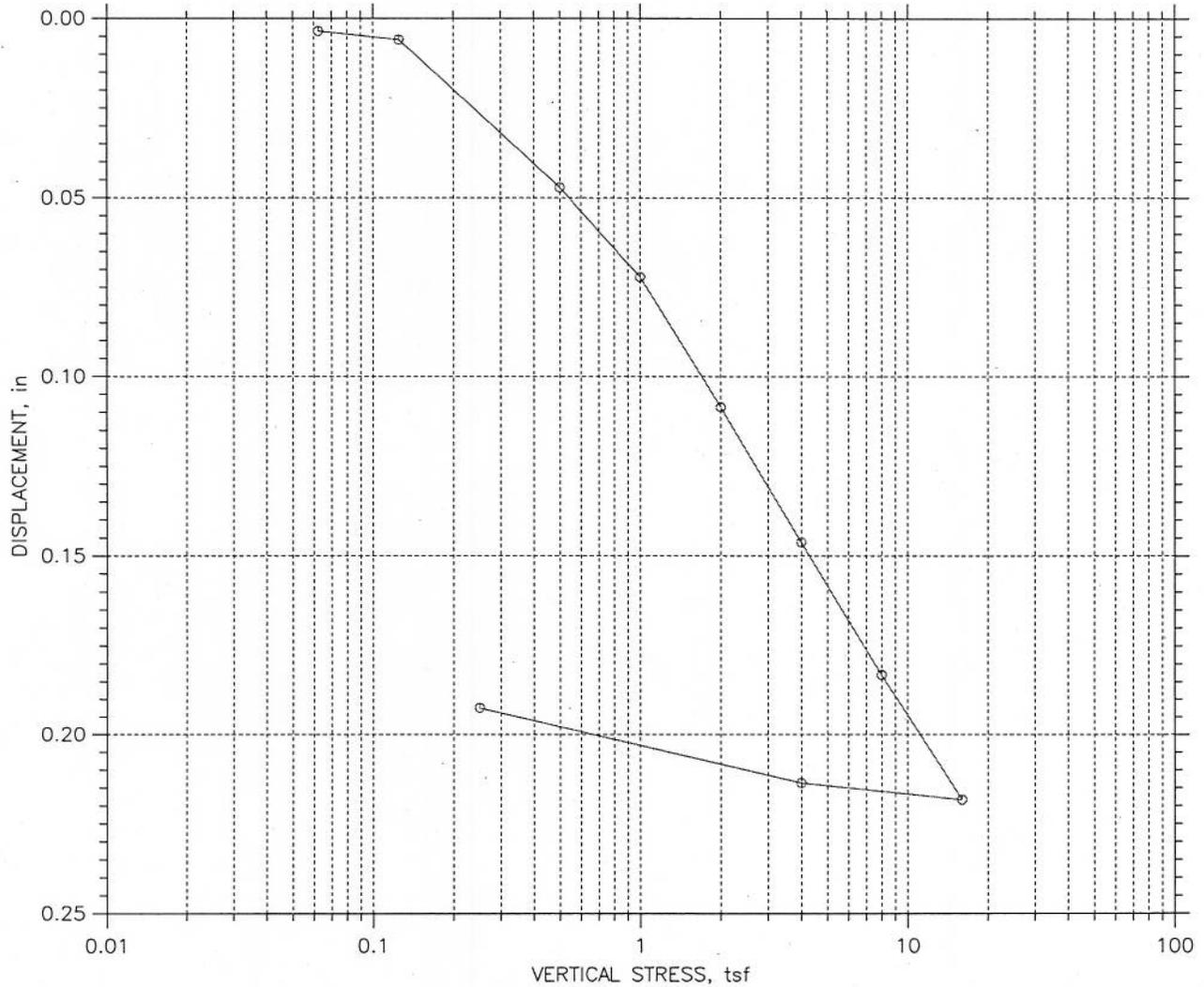
CONSOLIDATION TEST DATA

SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 4-A	Test Date: 10/12/11	Depth: 25 - 26.5
Test No.: 11-068-G1	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay		
Remarks:		

CONSOLIDATION TEST DATA SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 8.864e-312 tsf		Water Content, %		31.46	18.49
Preconsolidation Pressure: 3.612e-311 tsf		Dry Unit Weight, pcf		90.21	111.7
Compression Index: 2.75859e-313		Saturation, %		98.60	99.52
Diameter: 2.375 in	Height: 1 in	Void Ratio		0.86	0.50
LL: ---	PL: ---	PI: ---	GS: 2.68		

Project: Mococo OH		Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002		Tested By: jg	Checked By:
Sample No.: 4-A		Test Date: 10/12/11	Depth: 25 - 26.5
Test No.: 11-068-G1		Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Soft, Clay			
Remarks:			

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 4-B
 Test No.: 11-069-G3

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/13/11
 Sample Type: 2.5" Tube

Project No.: 04-3A8701
 Checked By: *MP 10/21*
 Depth: 25 - 26.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Stiff, Clay with Silt
 Remarks:

Measured Specific Gravity: 2.73
 Initial Void Ratio: 0.39
 Final Void Ratio: 0.31

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Initial Height: 1.00 in
 Specimen Diameter: 2.38 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
		RING		
Wt. Container + Wet Soil, gm	251.4	251.4	247.3	247.3
Wt. Container + Dry Soil, gm	231.3	231.3	231.3	231.3
Wt. Container, gm	89.1	89.1	89.1	89.1
Wt. Dry Soil, gm	142.2	142.2	142.2	142.2
Water Content, %	14.14	14.14	11.25	11.25
Void Ratio	---	0.39	0.31	---
Degree of Saturation, %	---	97.91	99.97	---
Dry Unit Weight, pcf	---	122.28	130.41	---

CONSOLIDATION TEST DATA

Project: Mococo OH
 Boring No.: R-11-002
 Sample No.: 4-B
 Test No.: 11-069-G3

Location: 04-CC-680-24.4
 Tested By: jg
 Test Date: 10/13/11
 Sample Type: 2.5" Tube

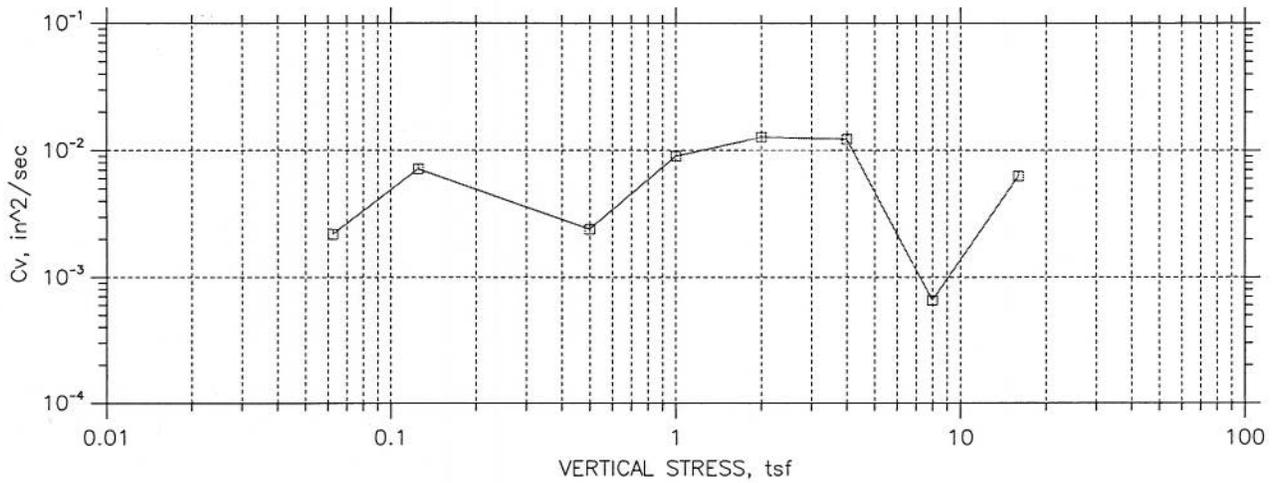
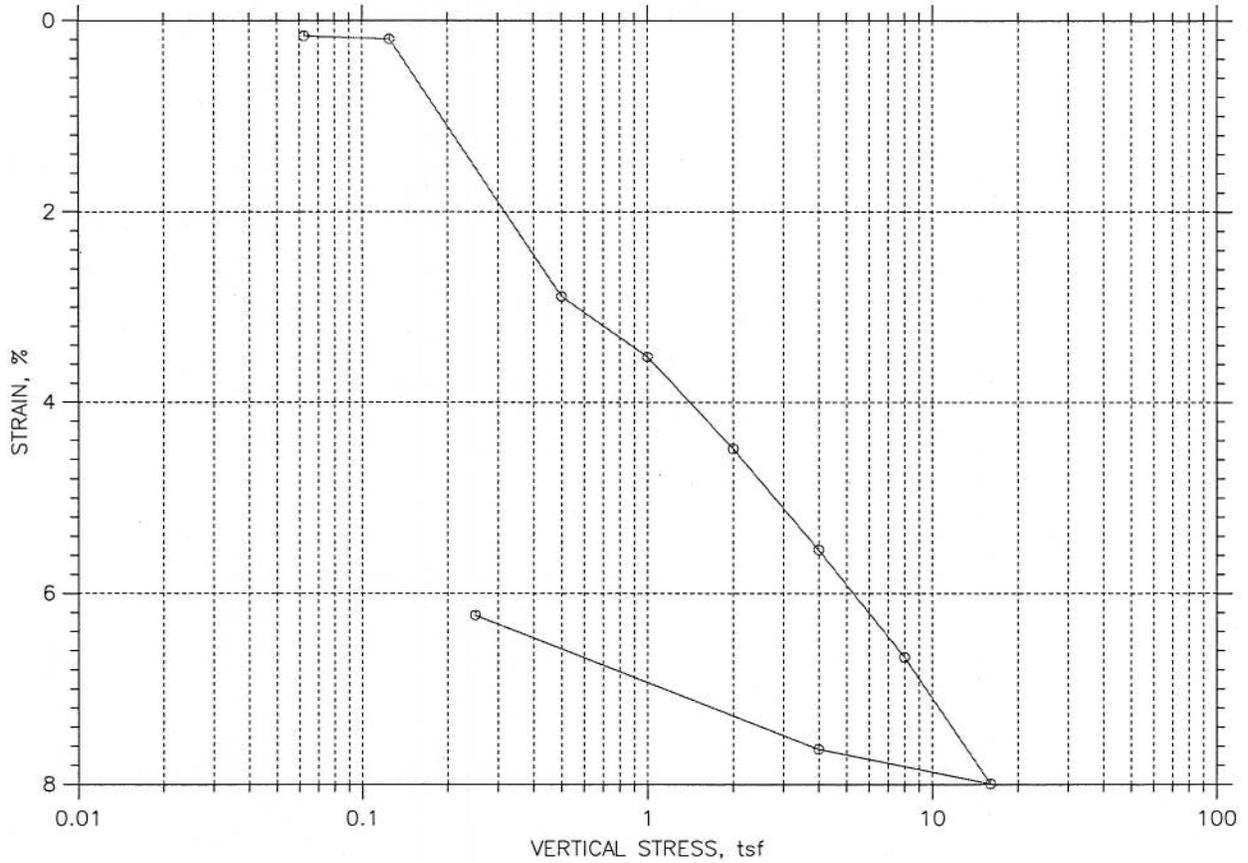
Project No.: 04-3A8701
 Checked By:
 Depth: 25 - 26.5
 Elevation: GL 11-088

Soil Description: Moist, Gray, Stiff, Clay with Silt
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in ² /sec	Log in ² /sec	Ave. in ² /sec
1	0.0625	0.00162	0.392	0.16	0.4	0.3	1.93e-003	2.56e-003	2.20e-003
2	0.125	0.001959	0.392	0.20	0.1	0.0	7.15e-003	0.00e+000	7.15e-003
3	0.5	0.02885	0.354	2.88	0.3	0.0	2.41e-003	0.00e+000	2.41e-003
4	1	0.03522	0.345	3.52	0.1	0.0	9.00e-003	0.00e+000	9.00e-003
5	2	0.04488	0.332	4.49	0.1	0.1	1.13e-002	1.45e-002	1.27e-002
6	4	0.05544	0.317	5.54	0.1	0.0	8.00e-003	2.64e-002	1.23e-002
7	8	0.06672	0.301	6.67	1.1	0.0	6.54e-004	0.00e+000	6.54e-004
8	16	0.07995	0.283	7.99	0.2	0.0	3.87e-003	1.66e-002	6.28e-003
9	4	0.07634	0.288	7.63	0.0	0.0	4.00e-002	4.52e-002	4.24e-002
10	0.25	0.0623	0.307	6.23	0.6	0.1	1.12e-003	8.14e-003	1.96e-003

CONSOLIDATION TEST DATA

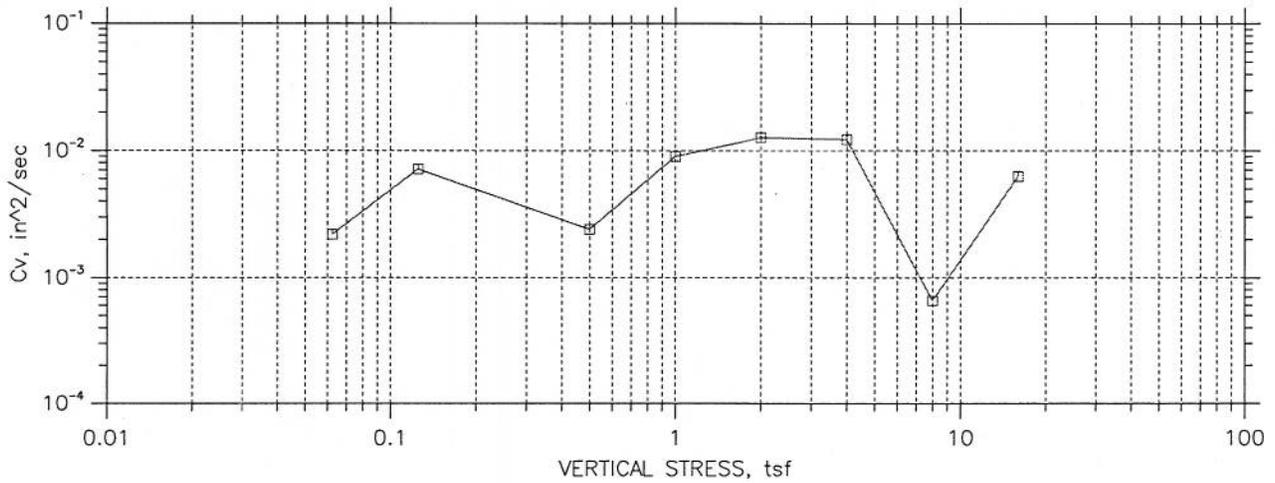
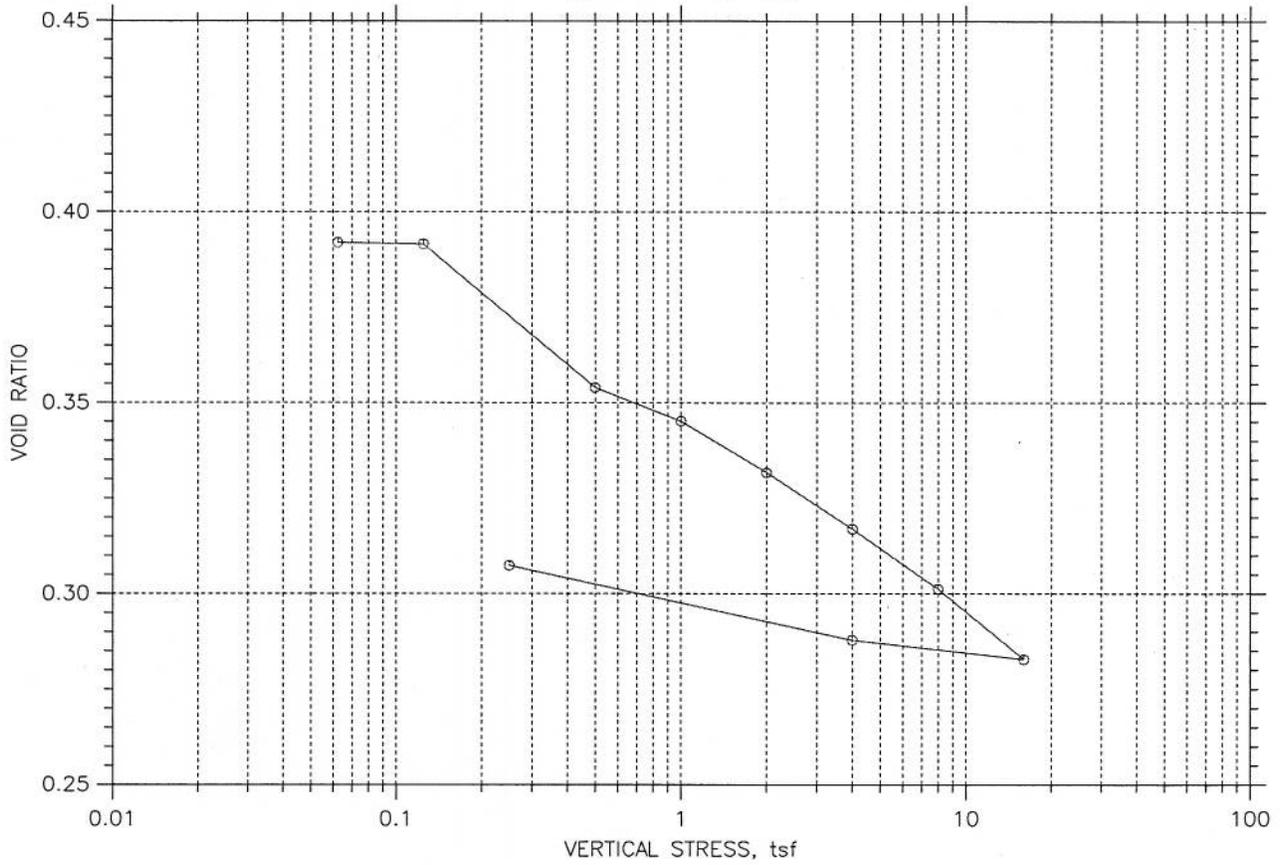
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 4-B	Test Date: 10/13/11	Depth: 25 - 26.5
Test No.: 11-069-G3	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Stiff, Clay with Silt		
Remarks:		

CONSOLIDATION TEST DATA

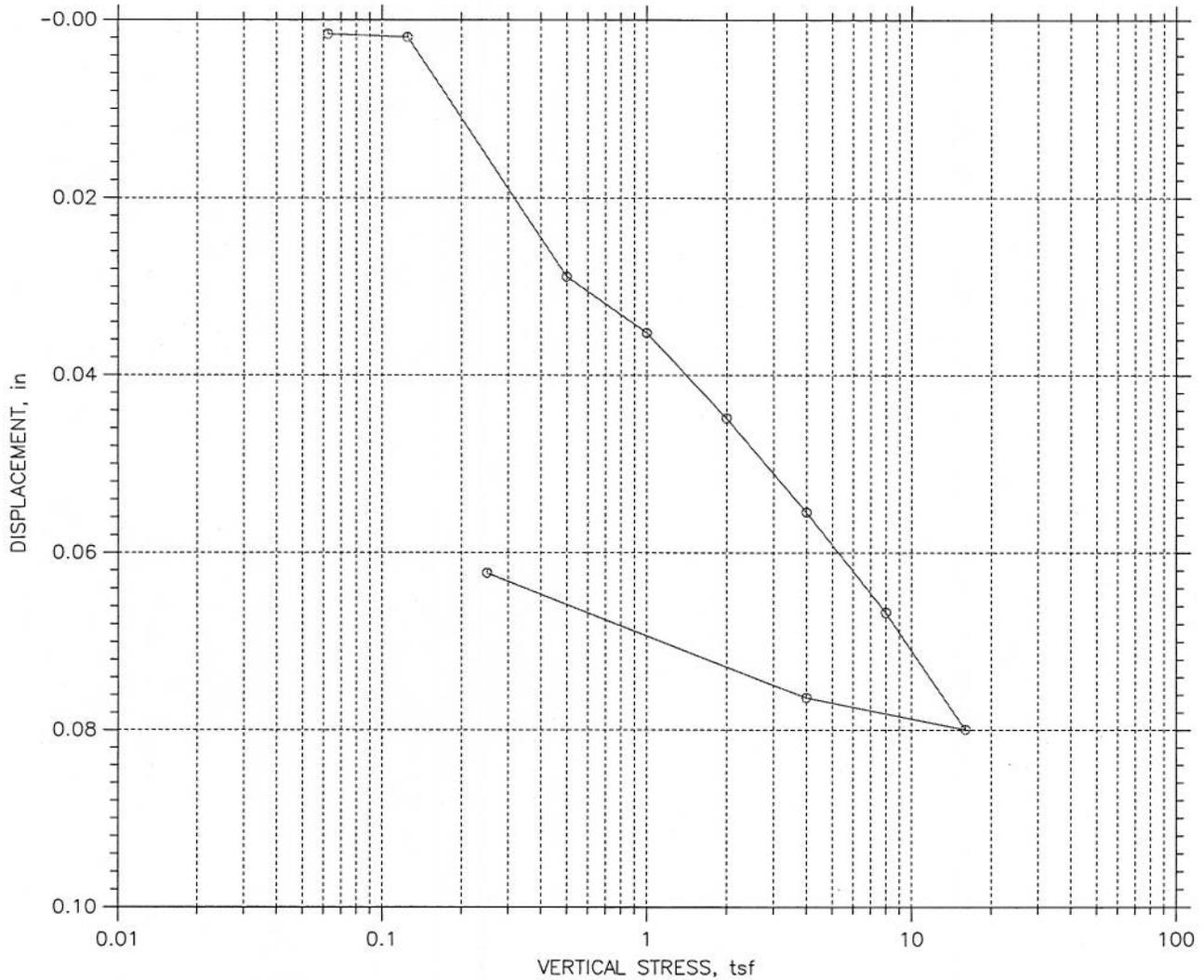
SUMMARY REPORT



Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 4-B	Test Date: 10/13/11	Depth: 25 - 26.5
Test No.: 11-069-G3	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Stiff, Clay with Silt		
Remarks:		

CONSOLIDATION TEST DATA

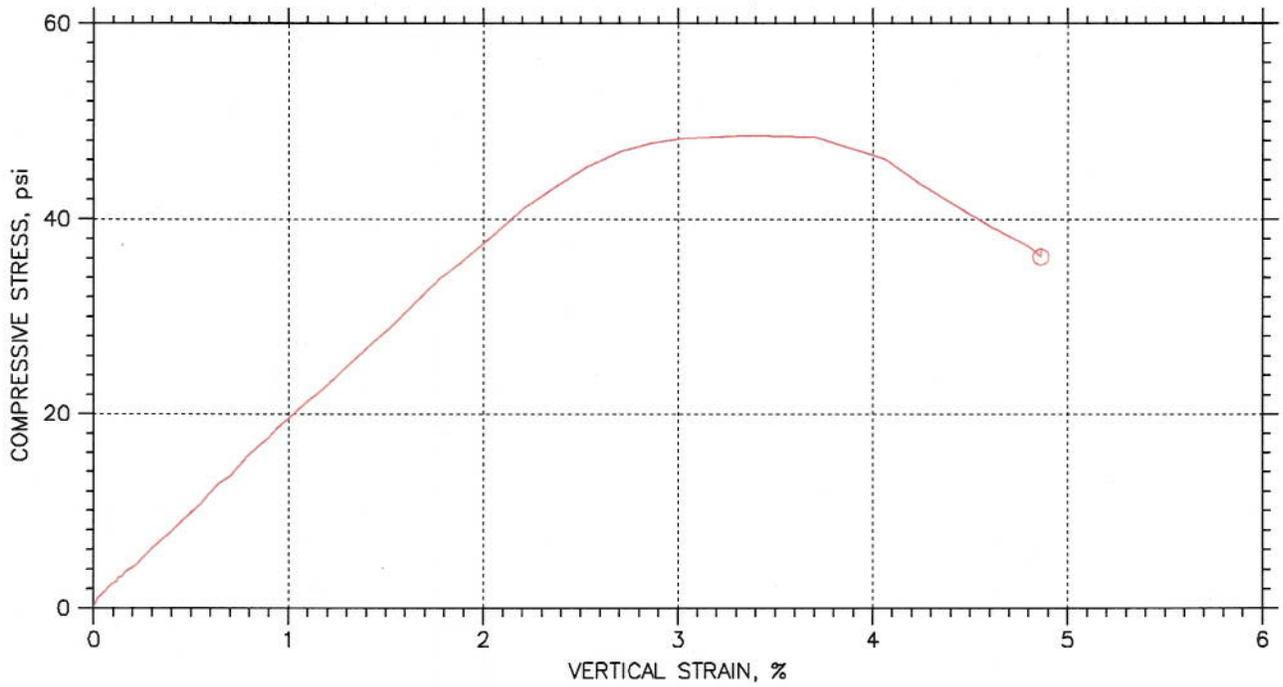
SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 8.864e-312 tsf		Water Content, %		14.14	11.25
Preconsolidation Pressure: 3.612e-311 tsf		Dry Unit Weight, pcf		122.3	130.4
Compression Index: 2.75859e-313		Saturation, %		97.91	99.97
Diameter: 2.375 in	Height: 1 in	Void Ratio		0.39	0.31
LL: ---	PL: ---	PI: ---	GS: 2.73		

Project: Mococo OH	Location: 04-CC-680-24.4	Project No.: 04-3A8701
Boring No.: R-11-002	Tested By: jg	Checked By:
Sample No.: 4-B	Test Date: 10/13/11	Depth: 25 - 26.5
Test No.: 11-069-G3	Sample Type: 2.5" Tube	Elevation: GL 11-088
Description: Moist, Gray, Stiff, Clay with Silt		
Remarks:		

UNCONFINED COMPRESSION TEST REPORT



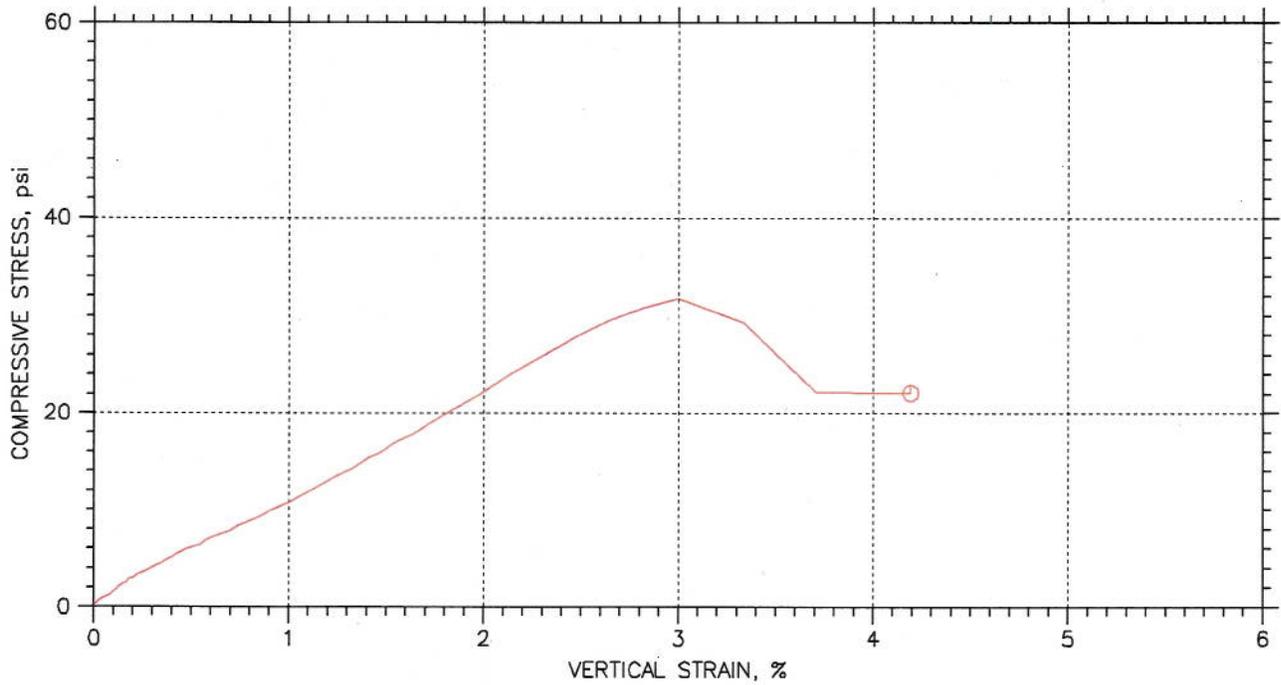
Symbol	⊙	
Test No.	Q11-351	
Initial	Diameter, in	2.39
	Height, in	5.56
	Water Content, %	14.23
	Dry Density, pcf	122.4
	Saturation, %	
	Void Ratio	
Unconfined Compressive Strength, psi	48.55	
Undrained Shear Strength, psi		
Time to Failure, min		
Strain Rate, %/min	1	
Implied Specific Gravity		
Liquid Limit	---	
Plastic Limit	---	
Plasticity Index	---	
Failure Sketch		



	Project: MOCOCO OH
	Location: 04-CC-680
	Project No.: 04-3A8701
	Boring No.: R11-001
	Sample No.: 01
	Description: MOIST OLIVE SILT
	Remarks: ASTM D 2166

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UNCONFINED COMPRESSION TEST REPORT



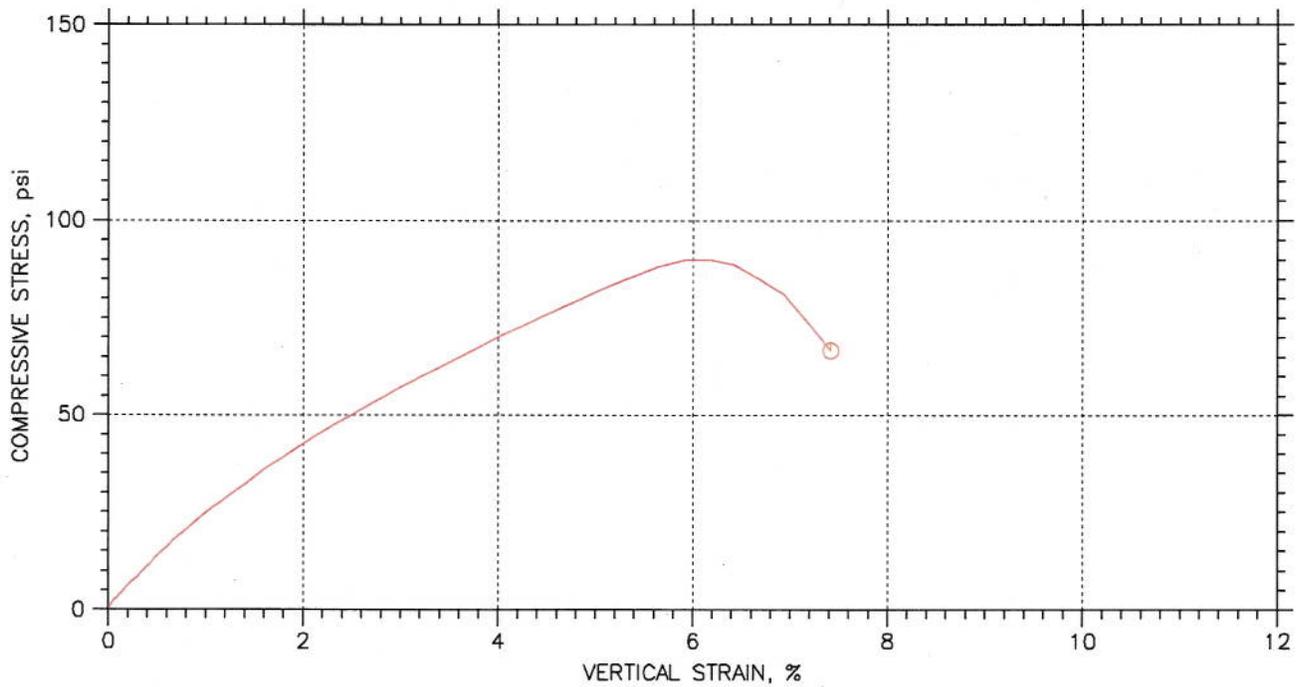
Symbol		⊙
Test No.		Q11-352
Initial	Diameter, in	2.35
	Height, in	4.04
	Water Content, %	13.42
	Dry Density, pcf	118.4
	Saturation, %	
	Void Ratio	
Unconfined Compressive Strength, psi		31.76
Undrained Shear Strength, psi		
Time to Failure, min		
Strain Rate, %/min		1
Implied Specific Gravity		
Liquid Limit		---
Plastic Limit		---
Plasticity Index		---
Failure Sketch		



	Project: MOCOCO OH
	Location: 04-CC-680
	Project No.: 04-3A8701
	Boring No.: R11-001
	Sample No.: 02
	Description: MOIST OLIVE SILT
	Remarks: ASTM D 2166 RATIO: L/D<2

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UNCONFINED COMPRESSION TEST REPORT



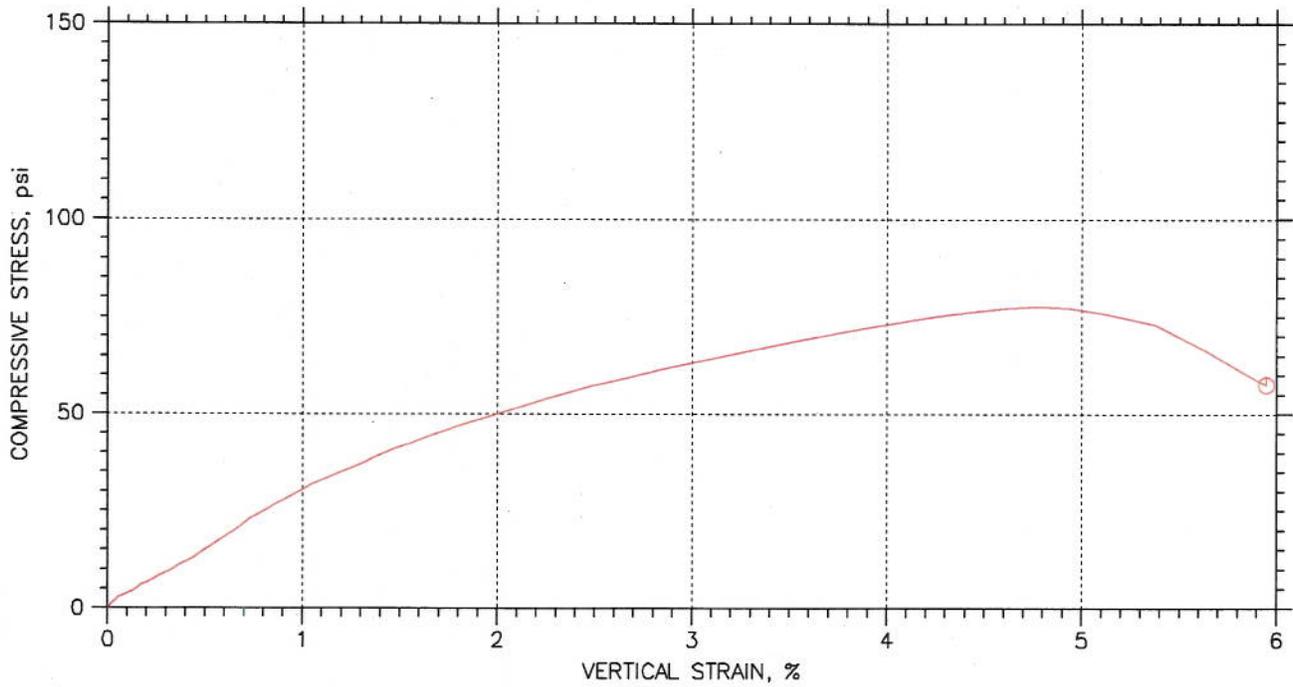
Symbol	⊙	
Test No.	Q11-353	
Initial	Diameter, in	2.42
	Height, in	5.6
	Water Content, %	14.31
	Dry Density, pcf	120.9
	Saturation, %	
	Void Ratio	
Unconfined Compressive Strength, psi	90.11	
Undrained Shear Strength, psi		
Time to Failure, min		
Strain Rate, %/min	1	
Implied Specific Gravity		
Liquid Limit	---	
Plastic Limit	---	
Plasticity Index	---	
Failure Sketch		



	Project: MOCOCO OH
	Location: 04-CC-680
	Project No.: 04-3A8701
	Boring No.: R11-001
	Sample No.: 03
	Description: MOIST OLIVE SILT
	Remarks: ASTM D 2166

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UNCONFINED COMPRESSION TEST REPORT



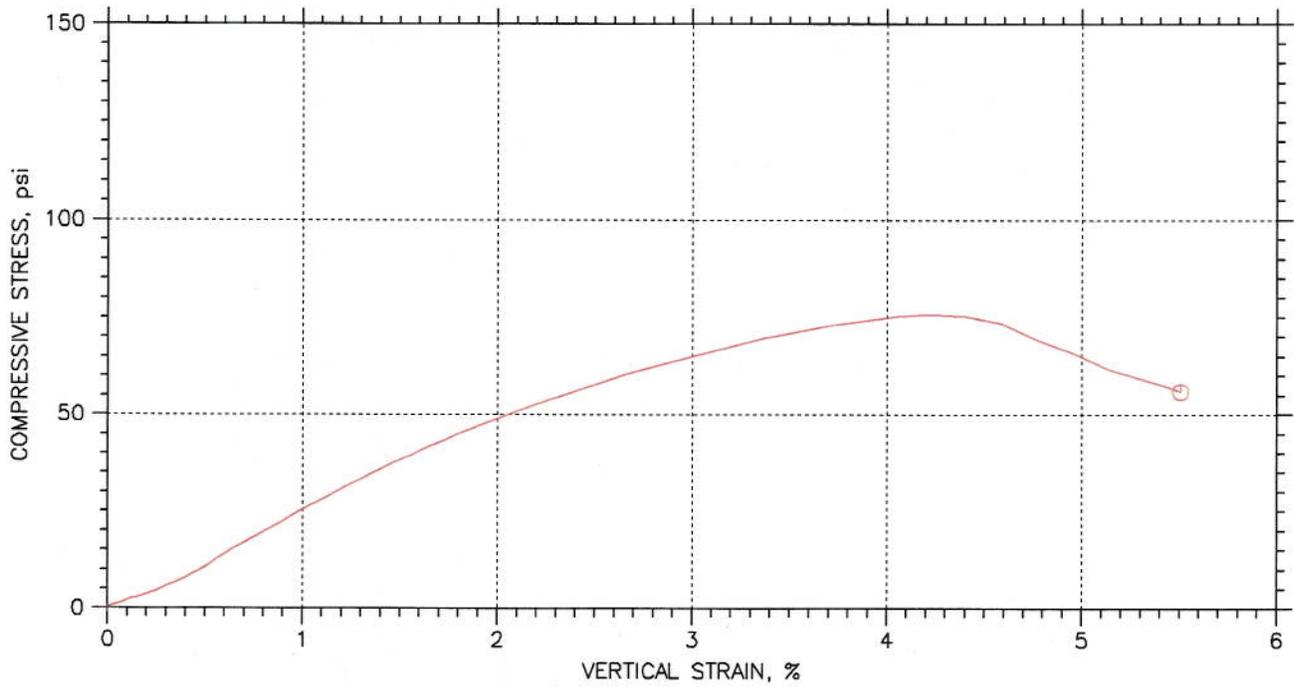
Symbol	⊙	
Test No.	Q11-354	
Initial	Diameter, in	2.42
	Height, in	5.54
	Water Content, %	12.73
	Dry Density, pcf	122.2
	Saturation, %	
	Void Ratio	
Unconfined Compressive Strength, psi	77.84	
Undrained Shear Strength, psi		
Time to Failure, min		
Strain Rate, %/min	1	
Implied Specific Gravity		
Liquid Limit	---	
Plastic Limit	---	
Plasticity Index	---	
Failure Sketch		



	Project: MOCOCO OH
	Location: 04-CC-680
	Project No.: 04-3A8701
	Boring No.: R11-001
	Sample No.: 04
	Description: MOIST OLIVE SILT
	Remarks: ASTM D 2166

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UNCONFINED COMPRESSION TEST REPORT

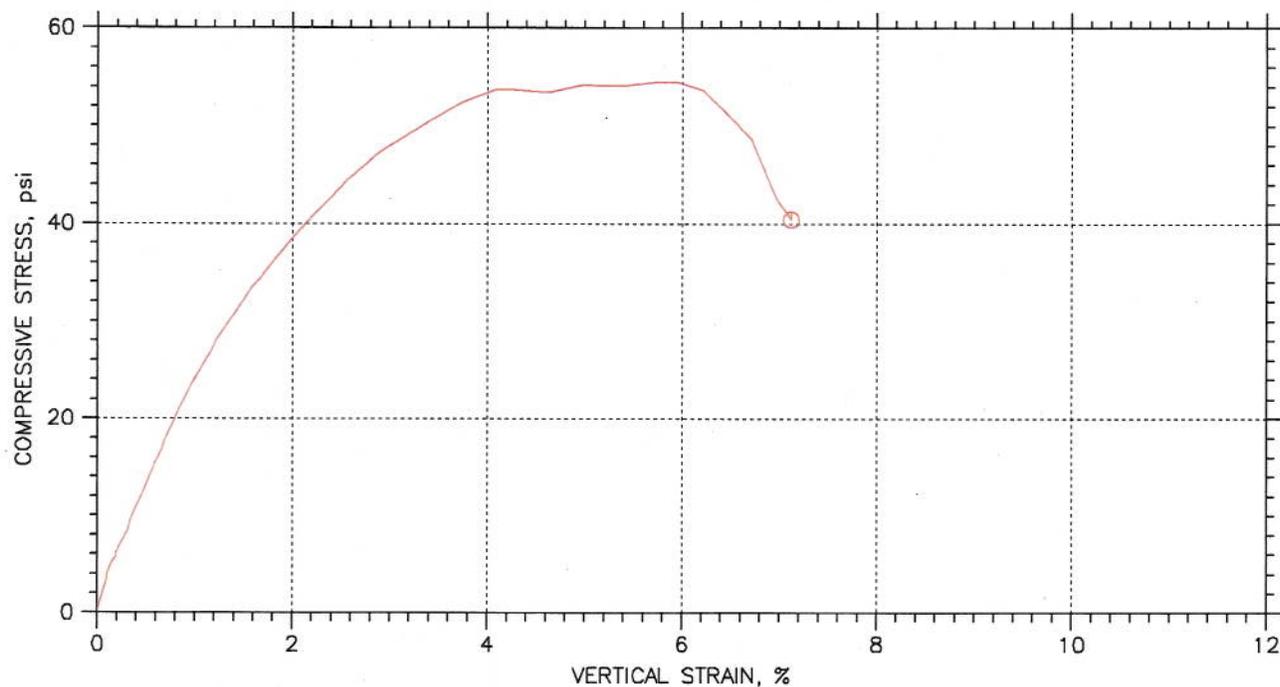


Symbol		⊙	
Test No.		Q11-355	
Initial	Diameter, in	2.42	
	Height, in	5.45	
	Water Content, %	12.58	
	Dry Density, pcf	123.3	
	Saturation, %		
	Void Ratio		
Unconfined Compressive Strength, psi		75.73	
Undrained Shear Strength, psi			
Time to Failure, min			
Strain Rate, %/min		1	
Implied Specific Gravity			
Liquid Limit		---	
Plastic Limit		---	
Plasticity Index		---	
Failure Sketch			

	Project: MOCOCO OH
	Location: 04-CC-680
	Project No.: 04-3A8701
	Boring No.: R11-001
	Sample No.: 05
	Description: MOIST OLIVE SILT
	Remarks: ASTM D 2166

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UNCONFINED COMPRESSION TEST REPORT



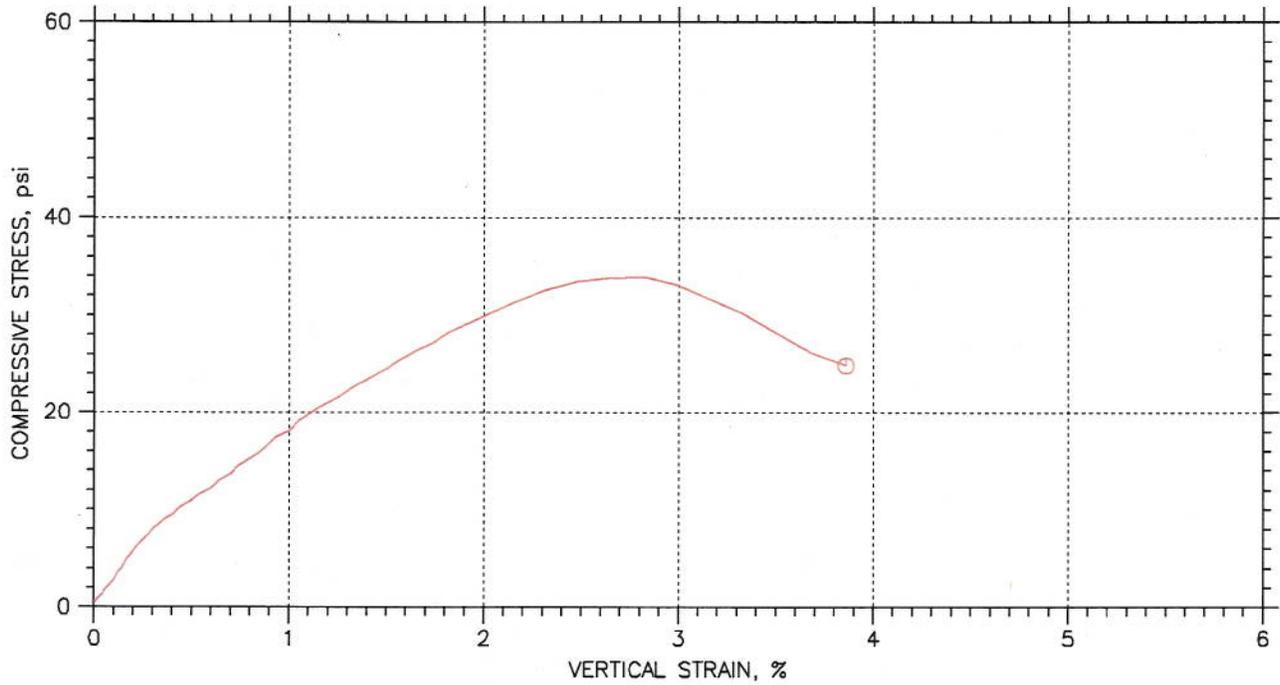
Symbol	⊙	
Test No.	Q11-356	
Initial	Diameter, in	2.37
	Height, in	5.44
	Water Content, %	13.49
	Dry Density, pcf	122.3
	Saturation, %	
	Void Ratio	
Unconfined Compressive Strength, psi	54.51	
Undrained Shear Strength, psi		
Time to Failure, min		
Strain Rate, %/min	1	
Implied Specific Gravity		
Liquid Limit	---	
Plastic Limit	---	
Plasticity Index	---	
Failure Sketch		



	Project: MOCOCO OH
	Location: 04-CC-680
	Project No.: 04-3A8701
	Boring No.: R11-001
	Sample No.: 06
	Description: MOIST OLIVE SILT
	Remarks: ASTM D 2166

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UNCONFINED COMPRESSION TEST REPORT



Symbol		⊙
Test No.		Q11-357
Initial	Diameter, in	2.38
	Height, in	3.49
	Water Content, %	10.45
	Dry Density, pcf	122.6
	Saturation, %	
	Void Ratio	
Unconfined Compressive Strength, psi		33.96
Undrained Shear Strength, psi		
Time to Failure, min		
Strain Rate, %/min		1
Implied Specific Gravity		
Liquid Limit		---
Plastic Limit		---
Plasticity Index		---
Failure Sketch		



	Project: MOCOCO OH
	Location: 04-CC-680
	Project No.: 04-3A8701
	Boring No.: R11-001
	Sample No.: 07
	Description: MOIST OLIVE SILT
	Remarks: ASTM D 2166 RATIO:L/D<2

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TEST SUMMARY REPORT - Soil/Water

Bridge Name: **MOCOCO OH**

Bridge Number: **28-0171L**

EA No.: **04-3A8701**

EFIS No.: **0400000967**

Dist/Co/Rte/PM or KP: **04 / CC / 680 / 24,26**

SIC Number (TL101)	Sample Location	Sample Type	Sample Depth	Minimum Resistivity ¹ (ohm-cm)	pH ²	Chloride Content ³ (ppm)	Sulfate Content ⁴ (ppm)
709313A	R-11-001	SOIL	15-20 FT	337	7.12	1400	66
709313B	R-11-002	SOIL	1-5 FT	252	7.3	1500	1900

This site is corrosive (see note below for MSE wall backfill).

Controlling corrosion parameters are as follows:

- 7.12 pH
- 1500 ppm Chloride
- 1900 ppm Sulfate

Note: For MSE wall structure backfill material, minimum resistivity must be 2000 ohm-cm or greater, pH must be between 5.5 and 10.0, chloride content must not be greater than 250 ppm, and sulfate content must not be greater than 500 ppm.

^{1,2}CTM 643, ³CTM 422, ⁴CTM 417