

CITY OF RICHMOND  
Pt. Molate Community Advisory Committee  
Monday, February 13, 2017 6:30 - 9:00 pm  
Multi-Purpose Room, 440 Civic Center Plaza

**AGENDA**

**Members:**

Bruce Beyaert

Bruce Brubaker  
Vice Chair

Paul Carman

Charles Duncan

Joan Garrett

Dorothy Gilbert

Don Gosney

Jim Hanson  
Chair

Mark Howe

Bob McNeil

Connie Portero

Katrinka Ruk

- 6:30**    **1. Call to Order - Roll Call**
- 2. Approval of Agenda**
- 3. Approval of PMCAC Meeting Minutes – 11/14/16, 1/9/17**
- 4. Chair Announcements**
- 5. Open Forum** (3 minutes per person limit - *please file an open forum request with staff prior to start of meeting, or file a request to speak on a particular item prior to discussion of the item*)
- 6:45**    **6. Council Liaison Report** (5 min.)
- 6:50**    **7. Presentations, Discussion & Action Items** (1 hr. 55 min.)
- a. *Planning:* Discussion Pt. Molate Community Planning Meetings. MIG Planning Consultants (10 min.; Q&A (10 min.)
- b. *Remediation:* Presentation 2016 Dry Season Monitoring; IR Site 3 Remedial Action Completion Report; Monthly Report Jan. 2017 and Human Health Risk Assessments – Drum Lot 2, USTs – Tomer Schetrit, Terraphase;(20 min.) Q&A (10 min.)
- c. *Site reports:* Presentation Recent Historic Finds Pt Molate Public Beach Park – Volunteer, Jan Gilbrecht, Dr. Laurie Wilkie, Department Chair, UCB Anthropology (10 min.), Q&A (5 min.)
- d. *Site reports:* Presentation Pt Molate Shoreline Erosion – Nichols Consulting Engineers, Franz Haidinger, PE, Engineering Manager (15 min), Q&A (5 min.)
- e. *Site reports:* Presentation River Otter Ecology Project- Robert Aston, Board Member, Field Volunteer (10 min.), Q&A (5 min.)
- f. *Site reports:* Presentation Golden Gate Raptor Observatory – Tony Brake, President (10 min.), Q&A (5 min.)
- 8:45**    **8. Staff report** (Notable items from written reports in agenda materials) (10 min.)
- 9. PMCAC Ad Hoc Committee and Subcommittee Reports** (10 min.)
- 10. Action Items Review** (5 min.)
- 11. Future Agenda Items** (5 min.)
- 9:00**    **12. Adjournment & Next Meeting**

**Scheduled Meetings**

Committee Meeting - This meeting is held in a building that is accessible to people with disabilities. Persons with disabilities, who require auxiliary aids of services using city facilities, services or programs or would like information of the city's compliance with the American Disabilities Act (ADA) of 1990, contact: Rochelle Monk, City of Richmond (510) 620-6511 (voice).

Pt. Molate Community Advisory Committee Staff Liaison Contact: Craig K. Murray (510) 307-8140, [craig\\_murray@ci.richmond.ca.us](mailto:craig_murray@ci.richmond.ca.us). Additional correspondence can be directed to: [PtMolateCAC@gmail.com](mailto:PtMolateCAC@gmail.com)

Agenda and minute information on the PMCAC can be found on the City Clerk's web location:

<http://ca-richmond2.civicplus.com/index.aspx?NID=2442>

PMCAC Repository Information is available at: [https://docs.google.com/open?id=0B9WXrZeb-\\_72MzVkZWQ1ZDQeNWtWNC00ZjE4LTgxYjctOTQyMDk4Y2FjNDYw](https://docs.google.com/open?id=0B9WXrZeb-_72MzVkZWQ1ZDQeNWtWNC00ZjE4LTgxYjctOTQyMDk4Y2FjNDYw)

Terraphase Environmental Repository: <https://terraphaseengineering.sharefile.com/i/i592048379f448948>

Public Notice: Upstream v. City of Richmond Oral Arguments Hearing, 9<sup>th</sup> Circuit Court, Tues. Feb. 14, 9:30 am, Courtroom 3, 3<sup>rd</sup> Floor, Room 307, James R. Browning United States Federal Courthouse, San Francisco. Open to the public.



**City of Richmond – POINT MOLATE COMMUNITY ADVISORY COMMITTEE**  
**Multi-Purpose Room**  
**440 Civic Center Plaza**

**PROPOSED MINUTES**  
**Monday, November 14, 2016, 6:30 PM**

**1. Call to Order**

Chair Hanson called the meeting to order at 6:36 pm.

**2. Roll Call**

Present: Committee Members, Beyaert, Brubaker, Carman, Duncan, Garrett, Hanson, Howe, McNeil, Portero, Ruk (6:46)

Absent: Gilbert

Staff Present: Craig K. Murray, Staff Liaison, Development Project Manager II; Alex Knox, City Council Liaison; Shanita Harris, Administrative Aide, DIMO Department

**3. Welcome and Meeting Procedures**

Hanson presented.

**4. Agenda Review and Adoption**

Beyaert called for motion to remove #9B from consent calendar.

**Action:** Committee approved (M/S Beyaert/Duncan 9-0-2-0) to adopt the motion.

AYES: Beyaert, Brubaker, Carmen, Duncan, Garrett, Hanson, Howe, McNeil, Portero

NOES: None

ABSENT: Gilbert, Ruk

ABSTAIN: None

**5. Announcements Through the Chair**

Hanson reported. Long meeting tonight, if additional information is needed, please hold until end of meeting.

**6. Open Forum**

Cordell Hindler presented Doris Day song Que Sera Sera, committee members joined in with serenade. Rich Fratus, East Bay Branch Manager with First Security Service for Point Molate introduced himself.

**7. Presentations, Discussion and Action Items**

- a. Presentation: Bill Carson and Tomar Schetrit of Terraphase discussed annual budget and overview and concerns of IR Site 1, 3 and 4.

Powerpoint presentation was shown. Craig Murray agreed to forward to PMCAC members.

Garrett asked if PMCAC could receive a draft of work plans and comments from the Water Board. Bill Carson agreed with direction from the City.

Monthly inspection of UST's with quarterly reporting. Next structural inspection due early 2017. Discussion regarding removal of tanks. Howe asked how does the ESL polar compounds issue affect closure.

Discussion of \$50,000 cost per year to monitor tanks and what activities are performed.

Garrett called for motion to appoint a PMCAC representative to be the document recipient of all documents whether draft or otherwise from both the Water Board and Terraphase to be communicated to PMCAC and then distributed. Include in health and human risk assessment for Drum Lots 1 and 2 scenario evals for commercial, residential, recreational and no use. Produce very rough estimate of cost to monitor, remediate and excavate UST's per tank with MVP value.

**Action:** Committee approved (M/S Garrett/Duncan 10-0-1-0) to adopt the motion.

AYES: Beyaert, Brubaker, Carmen, Duncan, Garrett, Hanson, Howe, McNeil,  
Portero, Ruk,  
NOES: None  
ABSENT: Gilbert  
ABSTAIN: None

- b. Mayor Butt gave presentation along with powerpoint on Pt. Molate National Historic District. He stated we need to find a way to capitalize on the aspect of the wine industry. Winehaven was built in 1907 and was the largest in the world in 1908 producing 10 million gallons per year and had 400 workers. Prohibition shut it down in 1919 and was sold off and stated vacant until 1941 when it was bought by the Navy.

Speaker Cordell Hindler stated it was a wonderful presentation. He would like to see a hotel built which would generate revenue. Discussion of the restrictions in planning development around historical buildings.

**Action:** Hanson asked committee to move items 7c, d and e to after staff reports so leasing could be discussed. (M/S Garrett, Duncan 10-0-1-0) to approve motion.

AYES: Beyaert, Brubaker, Carmen, Duncan, Garrett, Hanson, Howe, McNeil,  
Portero, Ruk,  
NOES: None  
ABSENT: Gilbert  
ABSTAIN: None

- c. Held over to Future Agenda Items.
- d. Brubaker presented draft of streamlined agenda format, motioned for approval.

**Action:** A revised motion by Garrett to approve the new streamlined form of agenda, implemented within the bylaws as a draft, agendize item with public participation at next PMCAC meeting to approve updated bylaws. (M/S Garrett, Brubaker 10-0-1-0) to approve motion.

AYES: Beyaert, Brubaker, Carmen, Duncan, Garrett, Hanson, Howe, McNeil,  
Portero, Ruk,  
NOES: None  
ABSENT: Gilbert  
ABSTAIN: None

Speaker Cordell Hindler liked new format and to take off consent calendar.

Bruce Beyaert distributed information regarding Meeting of Minds Conference he attended.  
Discussion held.

## 8. Staff Reports

Craig Murray asked committee to refer to page 8A 4.11 presenting Nematode Holdings Space Measurements for Pt. Molate showing existing lease agreement and proposed/ expanded lease agreements. He stated this was second proposal to work through any concerns of first lease document. Request of 9 additional lease spaces that would generate revenue over \$3,000 and would activate the space and have more eyes and activity but to stay within the nature allowed within the current use of the structures.

Bobby Winston thanked everyone for patience and expressed benefit of having more tenants that would help prevent further gang graffiti on buildings. Discussion of types of tenants proposed, status of leaking buildings and problems with license agreement. Portero stated there should be a process to track those that would be interested in utilizing Pt. Molate spaces.

Brubaker motioned for PMCAC to give conditional conceptual approval to license agreement subject to Mark Howe working out details with City Staff.

**Action:** Committee approved (M/S Brubaker/Duncan 10-0-1-0) to adopt the motion.

AYES: Beyaert, Brubaker, Carmen, Duncan, Garrett, Hanson, Howe, McNeil,  
Portero, Ruk,  
NOES: None  
ABSENT: Gilbert  
ABSTAIN: None

## 9. Consent Calendar

Garrett made motion to approve minutes from September 12, 2016 PMCAC meeting.

**Action:** Committee approved (M/S Garrett/Beyaert) 10-0-1-0) to approve motion.

AYES: Beyaert, Brubaker, Carmen, Duncan, Garrett, Hanson, Howe, McNeil,  
Portero, Ruk,  
NOES: None  
ABSENT: Gilbert  
ABSTAIN: None

Action: Motion to extend meeting to 9:15 p.m. (Duncan/Beyaert) 10-0-1-0) to approve motion.

AYES: Beyaert, Brubaker, Carmen, Duncan, Garrett, Hanson, Howe, McNeil,  
Portero, Ruk,  
NOES: None  
ABSENT: Gilbert  
ABSTAIN: None

**10. PMCAC Report to City Council – No report**

**11. Future Agenda Items**

- a. PMCAC process and lease
- b. 7c – NCE contract
- c. Bylaw update
- d. Report of Community Meetings
- e. San Pablo Yacht Harbor new owners invited to PMCAC meeting
- f. Sub-contractor to restore electricity to Pt. Molate (Howe)

**12. City Council Liaison Reports - No report.**

**13. Chair and Sub-Committee Reports - No report.**

**14. Adjournment of PMCAC regular meeting**

Duncan moved to adjourn meeting at 9:15 p.m., seconded by Beyaert; passed unanimously.

**SCHEDULED MEETINGS**

Committee Meeting –

Monday, December 12, 2016, 6:30 p.m., Multi-Purpose Room, 440 Civic Center Plaza

Minutes respectfully submitted by:

\_\_\_\_\_  
Craig K. Murray, PMCAC Staff Liaison

**City of Richmond – POINT MOLATE COMMUNITY ADVISORY COMMITTEE  
Multi-Purpose Room  
440 Civic Center Plaza**

**PROPOSED MINUTES  
Monday, January 9, 2017, 6:30 PM**

**1. Call to Order**

Chair Hanson called the meeting to order at 6:38 pm.

**2. Roll Call**

**Present:** Committee Members, Beyaert, Brubaker, Carman, Duncan, Gosney, Hanson, Howe, McNeil, Portero (6:53), Ruk

**Absent:** Garrett, Gilbert

**Staff Present:** Craig K. Murray, Staff Liaison, Development Project Manager II, Debra Holter, Fire Prevention, Office Assistant II

**3. Agenda Review and Adoption**

Howe called for motion to postpone until February, 2017, #7b from consent calendar.

**Action:** Committee approved (M/S Beyaert/Brubaker 9-0-3-0) to adopt the motion.

**AYES:** Beyaert, Brubaker, Carman, Duncan, Gosney, Hanson, Howe, McNeil, Ruk

**NOES:** None

**ABSENT:** Garrett, Gilbert, Ruk

**ABSTAIN:** None

**4. Approval of PMCAC Meeting Minutes.**

**Action:** Committee approved (M/S Brubaker/Beyaert 9-0-3-0) to adopt the motion.

**AYES:** Beyaert, Brubaker, Carman, Duncan, Gosney, Hanson, Howe, McNeil, Ruk

**NOES:** None

**ABSENT:** Garrett, Gilbert, Ruk

**ABSTAIN:** None

**5. Announcements Through the Chair**

Hanson reported. Don Gosney will be distributing binders with pictures of Pt. Molate in Presentation 7d. Gayle McLaughlin unable to attend tonight's meeting. Mention of upcoming court date in San Francisco on February 14, 2017, Upstream vs. City of Richmond.

## 6. Open Forum

Cordell Hindler presented Nat King Cole song L-O-V-E. Peter Clark discussed HOV issue on San Rafael Bridge, left entrance. Joe Puleo stated he would like short term/interim way to generate revenue from Winehaven revisited with new City Council Members.

## 7. Presentations, Discussion and Action Items

- a. Presentation: Tomar Schetrit of Terraphase presented map of areas subject to restrictions at Pt. Molate listing FOSET Property, Offshore FOST Property, FOST Property and FOST Property 2003 CRUP Property.

Tomar discussed future work; 1<sup>st</sup> quarter erosion inspection report; IR Site 3 completion report; IR Site 1 annual report; annual UST report; progress on health assessment for Water Board; summarize findings of polar compounds; additional work to monitor wetlands. Tomar to produce 2017 cost estimate for committee.

- b. Postponed by Howe until February, 2017.
- c. Yealla Frankel of San Pablo Marina Harbor introduced new owners. Currently learning about the property, stated plans to reopen café; fix marina to make it safe, giving the Sportsman Club a facelift.

Long term plans for small retreat center; camping area; environmental and outdoor education center and to partner with non-profit organizations and to improve the road.

Marina currently has 10 floating homes (permitted for 12) and 9 live-aboards. Ms. Frankel invited committee to visit the marina.

- d. Don Gosney presented slide show of pictures throughout Pt. Molate of deteriorating buildings; safety hazards; vandalism; storage of personal belongings; possible sellable or salvageable piping; leaking forklift; water damage.

Howe called for motion to inventory salvageable pipes and fittings to be submitted to City Manager with recommendation for disposal to generate revenue.

**Action:** Committee approved (M/S Howe/Beyaert 10-0-2-0) to adopt the motion.

AYES: Beyaert, Brubaker, Carman, Duncan, Gosney, Hanson, Howe,  
McNeil, Portero, Ruk,

NOES: None

ABSENT: Garrett, Gilbert

ABSTAIN: None

Craig Murray to speak with Tim Higare of DIMO regarding posting of hazard signs and to bring issues up with the caretakers.

- e. Mark Howe presented electrical study he completed at the request of Mayor Butt. Pictures were shown regarding damaged electrical equipment; location of street lights. Discussion of cost to repair/reactivate electrical service.

Bruce Brubaker made a motion to recommend the City look into MSH presentation and seek funding for Phase 1 power upgrade.

**Action:** Committee approved (M/S Brubaker/Howe 9-0-2-1) to adopt the motion.

AYES:           Beyaert, Brubaker, Duncan, Gosney, Hanson, Howe, McNeil,  
                      Portero, Ruk,  
NOES:           None  
ABSENT:        Garrett, Gilbert  
ABSTAIN:       Carman

- f. Connie Portero shared ideas on Community Planning Meetings after meeting with North Richmond Advisory Committee. Cordell Hindler spoke on benefit of having hotel on site.
- g. Speaker Cordell Hindler asked for change of Pt. Molate meetings to 3<sup>rd</sup> Monday per Bylaws so to not conflict with other City meeting . Item was dropped and meetings will continue to be held on 2<sup>nd</sup> Monday of each month. Bylaws will be adjusted accordingly.

#### **8. Staff Reports**

Craig Murray discussed Navy and General Fund expenditures; insurance report filings; caretaker report on lease/occupation status; security incident report; monthly authorized entries; DIMO caretaker summary; DIMO/Parks & Landscaping contractor report; Ducks Unlimited report on Creosote Piling Removal project.

Additional items discussed, business cards for committee members; Pt. Molate Entry/Visitor Process; word searching agenda packets; environmental documents from Terraphase Respository; and community meetings/Winehaven tours.

#### **9. PMCAC Ad Hoc Committee and Subcommittee Reports**

No report.

#### **10. Action Item Review**

- a. Item 7d, motion by Howe to inventory salvageable material at Pt. Molate to be submitted to City Manager for disposal of property. Gosney to draft inventory summary. Howe will take pictures.
- b. Item 7e, motion by Brubaker to seek funding for Phase 1 power upgrade. Letter to be created on PMCAC letterhead to Mayor, City Council and City Manager articulating this recommendation, Hanson, Brubaker and Howe to work on.

**11. Future Agenda Items**

No report.

**12. Adjournment of PMCAC regular meeting.**

Motion by Jim Hanson to adjourn meeting.

**Action:** Committee approved (M/S Brubaker/Howe 10-0-2-0) to adopt the motion.

AYES:           Beyaert, Brubaker, Carman, Duncan, Gosney, Hanson, Howe, McNeil,  
                    Portero, Ruk,  
NOES:           None  
ABSENT:       Garrett, Gilbert  
ABSTAIN:       None

Meeting adjourned at 9:03 p.m.

**SCHEDULED MEETINGS**

Committee Meeting –

Monday, January 9, 2017, 6:30 p.m., Multi-Purpose Room, 440 Civic Center Plaza

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Minutes respectfully submitted by:

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Craig K. Murray, PMCAC Staff Liaison

2017-02-14 9:00 am Courtroom 1, 3rd Floor Rm 338, James R. Browning U.S. Courthouse, San Francisco					
Before: W. FLETCHER, and RAWLINSON, Circuit Judges, and GORDON (Nevada), District Judge					
Case No.	Title	Nature	Origin	Time / Side	
<a href="#">13-73041</a>	<b>Kit Li v. Dana J. Boente</b> - A citizen of Hong Kong petitions for review of the Board of Immigration Appeals' decision denying adjustment and a waiver of inadmissibility.	Immigration	BIA	Subm.	
<a href="#">15-15504</a>	<b>Jared Stradling v. Nancy Berryhill</b> - Jared Stradling appeals the district court's decision remanding for further proceedings the Commissioner of Social Security's denial of Stradling's application for disability insurance benefits and supplemental security income. [2:13-cv-01685-DLR]	Social Security	AZ	Subm.	
<a href="#">15-15537</a>	<b>Christine Harris v. Nancy Berryhill</b> - Christine Harris appeals the district court's decision affirming the Commissioner of Social Security's denial of Harris's application for disability insurance benefits and supplemental security income under of the Social Security Act. [1:13-cv-01584-BAM]	Social Security	E. CA	Subm.	
<a href="#">15-15299</a> <a href="#">15-15318</a>	<b>Huimin Song v. County of Santa Clara</b> - The County of Santa Clara appeals from the summary judgment and jury verdict in a 42 U.S.C. § 1983 action brought by two current employees of the County who alleged due process violations in connection with grievance processes. [5:11-cv-04450-EJD]	Civil	N. CA	15 min	
<a href="#">15-17502</a>	<b>Wild Equity Institute v. USEPA</b> - Wild Equity Institute appeals the district court's dismissal of its action against the U.S. Environmental Protection Agency asserting a claim under § 7 of the Endangered Species Act, challenging authorization of a power plant in Contra Costa County. [4:15-cv-02461-PJH]	Civil	N. CA	15 min	
<a href="#">15-70199</a>	<b>Wild Equity Institute v. USEPA</b> - Wild Equity Institute petitions for review of a decision by the U.S. EPA, denying a petition requesting the Administrator of the EPA to object to the Bay Area Air Quality Management District's issuance of a Title V permit.	Agency	EPA	15 min	

2017-02-14 9:30 am Courtroom 3, 3rd Floor Rm 307, James R. Browning U.S. Courthouse, San Francisco					
Before: GOULD, and BERZON, Circuit Judges, and GARBIS (Maryland), District Judge					
Case No.	Title	Nature	Origin	Time / Side	
<a href="#">15-15267</a>	<b>MedCath Empl. Health Care Plan v. Dustin Stratton</b> - An appeal from the dismissal of an ERISA subrogation action. [3:14-cv-08099-NVW]	Civil	AZ	10 min	
<a href="#">16-10082</a>	<b>USA v. Eric Sudduth</b> - Appeal from conviction for being a felon in possession of a firearm. [3:15-cr-00019-HDM-WGC-1]	Criminal	NV	10 min	
<a href="#">14-17492</a>	<b>Derek Hoggett v. University of Phoenix</b> - An appeal from the dismissal of an action under the False Claims Act. [2:10-cv-02478-MCE-EFB]	Civil	E. CA	15 min	
<a href="#">14-16864</a>	<b>Navajo Nation v. Dept. of the Interior</b> - Navajo Nation appeals the district court's dismissal for lack of subject matter jurisdiction of their action, alleging that the United States failed in its tribal trust obligation to protect the Nation's water rights to the Colorado River. [3:03-cv-00507-GMS]	Civil	AZ	20 min	
<a href="#">15-15221</a> <a href="#">15-17069</a>	<b>Guidiville Rancheria of Calif. v. USA</b> - Guidiville Rancheria of California and Upstream Point Molate, LLC appeal the district court's judgment in favor of the City of Richmond, in the Tribe's action alleging breach of contract, arising out of a contract, the Land Disposition Agreement. [4:12-cv-01326-YGR]	Civil	N. CA	20 min	



## Craig Murray

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**From:** Richard Mitchell  
**Sent:** Thursday, February 09, 2017 4:22 PM  
**To:** Jenna Louder  
**Cc:** Craig Murray; I Kuan Choi; Soco Montore  
**Subject:** RE: FW: Pt. Molate community planning meetings - initial planning discussions

We can commit to specific dates after Daniel meets with the advisory committee. I believe these dates should be discussed during that meeting.

Richard

**From:** Jenna Louder [mailto:jennal@migcom.com]  
**Sent:** Thursday, February 09, 2017 3:50 PM  
**To:** Richard Mitchell; Craig Murray  
**Subject:** Re: FW: Pt. Molate community planning meetings - initial planning discussions

Richard, Craig,

I'm following up here on the proposed dates for the workshop. Are there any updates as to whether these will work or not?

March 18th - Workshop #1  
April 22nd - Workshop #2  
May 20th - Workshop #3

Many thanks,  
Jenna

**Jenna Louder**

*Executive Administrator, Office of the CEO*



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Berkeley, California 94710  
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On Thu, Feb 2, 2017 at 12:09 PM, Jenna Louder <jennal@migcom.com> wrote:  
Richard,

Apologies for the delay in getting back to you. Here are some Saturday dates that work for our facilitators:





February 9, 2017

Ms. Margarete Beth  
California Regional Water Quality Control Board  
San Francisco Bay Region  
1515 Clay Street, Suite 1400  
Oakland, California 94612

*sent via: email*

**Subject:** Monthly Remediation Status Report for Work in January 2017, Former Naval Fuel Depot Point Molate, Richmond, California

Dear Ms. Beth:

This monthly remediation status report summarizes the remediation activities conducted by Terraphase Engineering Inc. (Terraphase) on behalf of the City of Richmond at the former Naval Fuel Depot Point Molate (the Site). This remediation status report is intended to meet the requirements of Task 9 in the Regional Water Quality Control Board (RWQCB) Order R2-2011-0087 (RWQCB 2011d). The requirements of Task 9 are as follows:

*The Discharger shall submit a report to the Regional Water Board, 30 days prior to the start of any onsite remediation activities, and then on a monthly basis beginning 30 days after the start of the remediation activities, outlining the onsite remediation activities accomplished during the past month and those planned for the following month. The first monthly report at the beginning of each quarter shall include monitoring and test results and any conclusions or proposed changes to the remediation process based on those results. If any changes to the remediation are proposed during any monthly report, applicable supporting monitoring or test data will be submitted at that time. The status report shall also verify that the Prohibitions in Section A, stipulated above, have been adhered to. Should any of those prohibitions be trespassed, the report shall propose a recommendation acceptable to the Executive Officer to correct the trespass.*

This remediation status report provides a monthly update on the progress of environmental investigations, remediation, maintenance, and monitoring at the Site. This report is organized around each task listed in the RWQCB Order R2-2011-0087 (RWQCB 2011d). Additional tasks related to the Installation Restoration (IR) Site 3 Packaged Groundwater Treatment Plant (PGWTP) and site-wide groundwater monitoring are included below. For major work tasks completed in 2015, please see the monthly status report for December 2015 (Terraphase 2015aa). A reference list of reports and submittals is included as an attachment to this letter.

Terraphase Engineering Inc.  
1404 Franklin Street, Suite 600  
Oakland, California 94612  
www.terrphase.com

FB.1

**Task 1: Soil Cleanup Goals (Compliance Date: February 13, 2012)**

*Work completed in January 2017:*

1. None.

*Major Work Items Previously Completed in 2016:*

1. None.

*Upcoming work in February 2017:*

1. None.

**Task 2: Soil and Groundwater Management Plan (Compliance Date: March 15, 2012)**

Complete - *Final Soil and Groundwater Management Plan submitted to the RWQCB September 21, 2012 (Terraphase 2012jj).*

**Task 3a: IR Site 3 Feasibility Study and Remedial Action Plan (Compliance Date: May 4, 2012 Revised: February 28, 2014)**

Complete - *Final Feasibility Study and Remedial Action Plan submitted to the RWQCB June 4, 2014 (Terraphase 2014o).*

**Task 3b: IR Site 3 Remedial Action Completion Report (Compliance Date: February 3, 2014 Revised: June 30, 2015)**

Remedial Action commenced August 2014 and was substantially completed in November 2015.

*Work completed in January 2017:*

1. Preparation of Remedial Action Completion Report.

*Major Work Items Previously Completed in 2017:*

1. None.

*Upcoming work in February 2017:*

1. Submittal of Remedial Action Completion Report.

**Task 4a: IR Site 4 Interim Remedial Action Work Plan (Compliance Date: April 3, 2012)**

Complete - *IR Site 4 Interim Remedial Action Work Plan submitted to the RWQCB (Terraphase 2011r, 2012gg, 2012ii, and 2012mm).*

**Task 4b: IR Site 4 Interim Remedial Action Completion Report (Compliance Date: November 2, 2012)**

Complete - *Interim Remedial Measures Performance Evaluation, IR Site 4, Drum Lot2/Building 87 Area, Former Naval Fuel Depot, Point Molate, Richmond, California. October 22 (Terraphase 2015u)*

**Task 4c: IR Site 4 Human Health Risk Assessment (Compliance Date: November 4, 2013)**

*Work completed in January 2017:*

1. Preparation of response to RWQCB comments on HHRA work plan.

*Major Work Items Previously Completed in 2017:*

1. None.

*Upcoming work in February 2017:*

1. Preparation of response to RWQCB comments on HHRA work plan.

**Task 4d: IR Site 4 Feasibility Study and Remedial Action Plan (Compliance Date: February 3, 2014)**

Not Applicable. This task may not be necessary dependent upon the outcome of Task 4c. A revised completion date will be requested from the RWQCB.

**Task 4e: IR Site 4 Remedial Action Completion Report (Compliance Date: February 3, 2015)**

Not Applicable. This task may not be necessary dependent upon the outcome of Task 4c. A revised completion date will be requested from the RWQCB.

**Task 5: UST Management Plan (Compliance Date: March 4, 2013)**

*Work completed in January 2017:*

1. Review of RWQCB comments on tank closure request for UST 2.

*Major Work Items Previously Completed in 2017:*

1. None.

*Upcoming work in February 2017:*

1. Review of RWQCB comments on tank closure request for UST 2.

**Task 6: UST Removal Plan (Compliance Date: 90 days prior to UST demolition)**

Not Applicable – Triggered when demolition of a UST is contemplated. No UST demolition is scheduled at this time.

**Task 7: UST Status Report (Compliance Date: June 3, 2012)**

*Work completed in January 2017:*

1. Conducted the routine monthly UST closure monitoring inspections.
2. Preparation of Q4/Annual UST Report.

*Major Work Items Previously Completed in 2017:*

1. None.

*Upcoming work in February 2017:*

1. Conduct the routine monthly UST closure monitoring inspections.
2. Submittal of Q4/Annual UST Report.

**Task 8: Amended Land Use Controls (Compliance Date: When environmental closure is requested)**

Not Applicable. No closures have been requested.

**Task 9: Remediation Status Reports (Compliance Date: Monthly)**

*Work completed in January 2017:*

1. Submitted the monthly remediation status report for December 2016 (Terraphase 2017b) to the RWQCB.

*Major Work Items Previously Completed in 2017:*

1. None

*Upcoming work in February 2017:*

1. Submit the monthly remediation status report for January 2017 to the RWQCB.

**Task 10: Discoveries During Facility Redevelopment (Compliance Date: 60 days from initial discovery)**

None

**Task 11: IR Site 1 ROD (Compliance Date: None)**

*Work completed in January 2017:*

1. Routine monthly landfill inspection of signs, gates, locks, etc.
2. Submittal of IR Site 1 5 year review report (Terraphase 2017a).
3. Conduct routine sampling IR 1 treatment system.
4. Preparation of 2016 IR 1 annual report

*Major Work Items Previously Completed in 2017:*

1. None.

*Upcoming work in February 2017:*

1. Routine monthly landfill inspection of signs, gates, locks, etc.
2. Submittal of 2016 IR 1 annual report
3. Conduct routine sampling IR 1 treatment system.
4. Quarterly inspection of IR Site 1 with CCEHD
5. Response to RWQCB comments on 5 year review report.

**Task 12: Construction Stormwater General Permit (Compliance Date: Prior to field work)**

A Notice of Intent was filed with the Water Board (Application # 449157) September 3, 2014. A WDID was issued for the project (2 07C370778). A notice of termination (NOT) was filed with waterboard on February 6, 2017 after achieving over 70% vegetative growth at the site.

**IR Site 3: PGWTP**

Terraphase, under the direction of the City of Richmond, operated, maintained, and monitored the PGWTP under the existing 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) (RWQCB 2012a). The PGWTP ceased all operations on July 31, 2015. Notice of Termination for the VOC and Fuel General Permit to the RWQCB and receipt of Notice of Rescission from the RWQCB was received October 9, 2015.

### **Site-wide Groundwater Monitoring**

The purpose of the site-wide groundwater monitoring is to provide groundwater quality data that can be evaluated against established screening criteria for the Site. This program will help protect human health and the environment and prevent releases to the San Francisco Bay. Integrating data collected under this program with previous data is intended to support compliance and closure in accordance with regulatory requirements. Groundwater monitoring is being conducted on a semi-annual basis (wet-season and dry-season) per the Site-Wide Groundwater Monitoring Plan (Terraphase 2011n) that was approved by the RWQCB on August 30, 2011 (RWQCB 2011b). Data collected is summarized and submitted as semi-annual monitoring reports to the RWQCB.

#### *Work completed in January 2017:*

1. Monthly monitoring and skimming of free product in wells MTWB-01R, MWT05-02, MWT08-01, MWT06-02, MW10-23, MWT15-02, MW02-06R. Bi-weekly skimming of MW10-24.
2. Submittal of the Dry Season 2016 semi-annual monitoring report (Terraphase 2017c).

#### *Major work items completed previously in 2017:*

1. None.

#### *Upcoming work in February 2017:*

1. Monthly monitoring and skimming of free product in wells MTWB-01R, MWT05-02, MWT08-01, MWT06-02, MW10-23, MWT15-02, MW02-06R. Bi-weekly skimming of MW10-24.
2. Preparation of a report summarizing results of Phases 1&2 of the workplan for alternative quantification methodology, additional characterization and/or risk evaluation for areas outside of IR Site 3 where USEPA Method 8015 without Silica Gel Cleanup quantifies TPH and TPH decomposition products as exceeding the Fuel Product Action Levels within 150 feet of the San Pablo Bay (Terraphase 2015a).

### **Prohibitions Verification**

As required in Task 9 of the RWQCB Order, the following prohibitions (Section A of the RWQCB Order) were adhered to during the remedial activities in January 2017, to the knowledge of Terraphase.

1. The discharge of wastes and/or non-hazardous or hazardous substances in a manner which will degrade, or threaten to degrade, water quality or adversely affect, or threaten to adversely affect, the beneficial uses of the waters of the State is prohibited.
2. Further migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup that will cause adverse migration of wastes or hazardous substances are prohibited.
4. The tidal marsh habitat and wetland habitats onsite shall be completely avoided unless encroachment on these areas is required to implement Facility remediation work and resultant impacts to the affected habitat are mitigated through a plan approved by the Executive Officer. A setback of 50 feet shall be established around the tidal marsh and any wetland area as a means of preventing any unintended impacts to it from the remediation.

5. The Site's offshore eel-grass habitat shall be completely avoided during any remedial work to the maximum extent practicable.

**Summary**

The above detailed summaries by task provide a look at the ongoing remediation activities at the former Naval Fuel Depot Point Molate. The RWQCB accepted the Final FS/RAP on June 4, 2014. Construction at IR Site 3 was substantially completed in November 2015.

If you have questions regarding this report, please call Tomer Schetrit at (510) 645-1850.

Sincerely,  
For Terraphase Engineering Inc.



Tomer Schetrit, PE (C81411)  
Senior Project Engineer

cc: Craig Murray, City of Richmond  
Carlos Privat, City of Richmond  
Bruce Goodmiller, City of Richmond  
LaShonda White, City of Richmond  
James Whitcomb, BRAC Program Management Office  
Venkat Puranapanda, ACE Group  
Jim Hanson, PMCAC  
Mark Howe, PMCAC  
Joan Garret, PMCAC

Attachments: Point Molate Bibliography

## Craig Murray

---

**From:** Tomer Schetrit <tomerschetrit@terraphase.com>  
**Sent:** Monday, February 06, 2017 3:46 PM  
**To:** Margarete.Beth@waterboards.ca.gov  
**Cc:** Craig Murray; Carlos A. Privat; William Carson; Jim Hanson; 'joan@vbsi.com'  
**Subject:** IR Site 3 Completion Report

Hi Maggie,

Please find the link below to the Investigation Restoration Site 3 Remedial Action Completion Report for the Former Naval Fuel Depot Point Molate, Richmond, California.

<https://terraphaseengineering.sharefile.com/d-sf2dab551fba4cdfb>

The text, tables and figures are in one file and the appendices are separated into three files due to their size. Please let me know if you have any issues accessing the documents.

I will also upload the report onto Geotracker.

Feel free to contact me with any questions.

Tomer

**Tomer Schetrit, P.E.**

Senior Project Engineer

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February 6, 2017

Margarete Beth  
San Francisco Bay Regional Water Quality Control Board  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

*sent via: email to margarete.beth@waterboards.ca.gov*

**Subject:** Transmittal of the Investigation Restoration Site 3 Remedial Action Completion Report,  
Former Naval Fuel Depot Point Molate, Richmond, California

Dear Ms. Beth:

Terraphase Engineering Inc. is pleased to transmit the subject document. If you have any questions or comments regarding this monitoring report, please contact Tomer Schetrit or Bill Carson at 510-645-1850.

For Terraphase Engineering Inc.

A handwritten signature in black ink, appearing to read 'T.S.', is positioned above the typed name of Tomer Schetrit.

Tomer Schetrit, PE (81411)  
Senior Project Engineer

*Attachment: Investigation Restoration Site 3 Remedial Action Completion Report, Former Naval Fuel Depot Point Molate, Richmond, California*

**Cc:** Craig Murray, City of Richmond  
Carlos Privat, City of Richmond  
William Carson, Terraphase  
Joan Garrett, PMCAC  
Jim Hanson, PMCAC

Terraphase Engineering Inc.  
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Oakland, California 94612  
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**INVESTIGATION RESTORATION SITE 3  
REMEDIAL ACTION COMPLETION REPORT  
FORMER NFD POINT MOLATE  
RICHMOND, CALIFORNIA**

---

*Prepared for*

City of Richmond  
Craig Murray  
Development Project Manager II  
Successor Agency, Engineering Department  
450 Civic Center Plaza, 2nd Floor  
Richmond, CA 94804-1630

*Prepared by*

Terraphase Engineering Inc.  
1404 Franklin Street, Suite 600  
Oakland, California

February 6, 2017

Project Number 0078.001.019

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- L Hydroseed Mix Specifications
- M Weekly Project Updates
- N Construction Work Plan

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## ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
APE	Area of Potential Effects
BCDC	San Francisco Bay Conservation and Development Commission
BMP	best management practice
bgs	below ground surface
BRAC IV	Base Realignment and Closure Act IV
CAM-17	California Title 22 Metals
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGP	California's General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities
the City	City of Richmond, California
CO	carbon monoxide
COCs	chemicals of concern
CWA	Clean Water Act
CY	cubic yards
Dusttraks	Dusttrak™ aerosol monitors
ESL	Environmental Screening Level
EPA	Environmental Protection Agency
ETCA	Early Transfer Cooperative Agreement
FOSET	Finding of Suitability for Early Transfer
FRF	fuel reclamation facility
FSRAP	Feasibility Study/Remedial Action Plan
FPAL	fuel product action level
GAC	granular activated carbon
gpm	gallons per minute
H <sub>2</sub> S	hydrogen sulfide
HASP	Health and Safety Plan
the Completion Report	Investigation Restoration Site 3 Completion Report

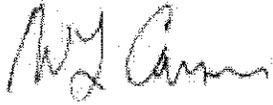
IR Site 3	Investigation Restoration Site 3
kg	kilograms
LEL	lower explosive limit
LUC	Land Use Controls
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
the Navy	U.S. Department of the Navy
NCP	National Contingency Plan
NFD	Naval Fuel Depot
NOI	Notice of Intent
O <sub>2</sub>	oxygen
OWS	oil/water separator
PAHs	polyaromatic hydrocarbons
PGWTP	Package Groundwater Treatment Plant
PPE	personal protective equipment
PM <sub>10</sub>	particulate matter 10 microns in diameter or less
ppm	parts per million
PSEC	Pacific States Environmental Contractors
QC	quality control
RAOs	Remedial Action Objectives
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation and Recovery Act
RWQCB	Regional Water Quality Control Board
SCRs	Site Clean-up Requirements
sf	square feet
the Site	IR3 at NFD Point Molate
the Specifications	the 100-percent design specifications
STLC	soluble threshold limits concentration
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board

TCLP	toxicity characteristic leaching procedure
Terraphase	Terraphase Engineering Inc.
TPH	total petroleum hydrocarbons
TPHbc	total petroleum hydrocarbons as residual fuels
TPHd	total petroleum hydrocarbons as diesel
TPHg	total petroleum hydrocarbons as gasoline
the Transportation Plan	Traffic Control and Waste Transportation Plan
UCL	upper concentration limit
USACE	United States Army Corps of Engineers
Upstream	Upstream Point Molate LLC
VOCs	volatile organic compounds
WMU	Waste Management Unit

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## CERTIFICATION

All geologic information, conclusions, and recommendations in this document have been prepared by a California Professional Engineer.



February 6, 2017

---

William L. Carson  
Principal Engineer  
California Professional Engineer (60735)

Date



February 6, 2017

---

Tomer Schetrit  
Senior Project Engineer  
California Professional Engineer (81411)

Date

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## 1.0 INTRODUCTION

Terraphase Engineering Inc. (Terraphase) has prepared this *Investigation Restoration Site 3 Completion Report* (the "Completion Report") on behalf of the City of Richmond (the "City") to document the execution of the Feasibility Study/Remedial Action Plan (FSRAP) for Investigation Restoration Site 3 (IR Site 3, or the "Site"), approved by the Regional Water Quality Control Board (RWQCB) on June 4, 2014 (RWQCB 2014). This Completion Report was prepared to summarize the remediation activities, which were conducted between August 16, 2014, and November 6, 2015, by Pacific States Environmental Contractors (PSEC) under Terraphase oversight.

Details of the remediation activities, including the site preparation, permitting, backfill and removal, monitoring, and post-construction activities, are presented in the following sections.

### 1.1 Site Background

The former Naval Fuel Depot (NFD) Point Molate is on the San Pablo peninsula (Figure 1), approximately 1.5 miles north of the Richmond-San Rafael Bridge in the City of Richmond, California. The San Pablo peninsula is the land mass between San Pablo Bay and San Francisco Bay. The former NFD Point Molate covers approximately 412 acres in the Potrero Hills along the northeastern shore of San Francisco Bay, of which 140 acres are submerged. Former NFD Point Molate contains approximately 1.6 miles of shoreline, and its property extends into adjacent hillsides up to the top of the San Pablo ridge. Topography ranges from flat, filled areas (reclaimed tidal areas) near the bay, to steep, dissected slopes of nearly 500 feet in elevation. The facility is bordered to the north, south, and east by the Chevron Corporation Richmond refinery and to the west by San Francisco Bay.

Former NFD Point Molate became a closing base under the Base Realignment and Closure Act IV (BRAC IV) program in September 1995, and operational closure of the facility occurred in September 1998. In September 2003, approximately 372 acres of the depot were transferred to the City under a Finding of Suitability to Transfer (Navy 2003). The remaining 40 acres of the 412-acre federal facility, which include IR Site 3, were transferred to the City on March 29, 2010 on the basis of a Finding of Suitability for Early Transfer (FOSET; Navy 2008).

An Early Transfer Cooperative Agreement (ETCA) between the Navy and the City of Richmond for the environmental remediation of the former NFD Point Molate was executed in September 2008 (Navy 2008). The ETCA was created to satisfy the requirements of the then Draft Site Clean-up Requirements (SCRs) developed by the RWQCB. Subsequently, the SCRs were formally adopted by the RWQCB on December 19, 2011 (See Order No. R2-2011-0087).

The order requires clean-up, maintenance, or monitoring in the following areas:

1. IR Site 1: Former Waste Disposal Area

2. IR Site 3: Treatment Pond Area
3. IR Site 4: Drum Lot 1 and Drum Lot 2/Building 87
4. Large Hillside Underground Storage Tanks

IR Site 3 is the subject of this Completion Report. It is the location of several former oily-waste and stormwater treatment facilities. Based on the RWQCB approved FSRAP, the City of Richmond planned to implement a final remedial action at the Site to allow for its development as described in the EIR/EIS (City of Richmond 2011) or similar uses.

This Completion Report satisfies Task 3b of RWQCB order No. R2-2011-0087, which states:

*Upon implementation of the Final FS/RAP, the Discharger shall prepare a Remedial Action Completion Report for Site 3, acceptable to the Executive Officer. The Remedial Action Report shall include LUCs as needed. The report shall identify the location of all remedial actions and describe the volume of soil excavated, describe the specifics of the disposal of that material, and present all test data generated during the remediation process and how the remediation activities met or did not meet remediation goals.*

## 1.2 Remedial Action Objectives

Eight remedial alternatives were evaluated as part of the FSRAP process. Alternatives were developed after considering the requirements of the National Contingency Plan (NCP) and U.S. Environmental Protection Agency (EPA) technical guidance (U.S. EPA 1988), the statutory preferences listed in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(b), and Remedial Action Objectives (RAOs). Alternatives 5(b), 6 and 7 were considered the most desirable and were recommended for further development. These alternatives were developed and bid to contractors based on the City of Richmond's ability to fund the alternatives at the time. After contractor bids were submitted, the City chose Alternative 6 as the alternative that most effectively meets their future needs at the Site.

A summary of Alternative 6 is presented below:

- Alternative 6 – excavation/off-site disposal or treatment of subsurface soil exceeding RAOs for exposure scenario 2 and industrial waste in the former fuel reclamation facility (FRF) waste disposal area/excavation of petroleum-affected soil exceeding the waste criteria throughout the Site, thus eliminating the Waste Management Unit (WMU).

RAOs for soil and groundwater for Alternative 6 were developed as part of the FSRAP. Alternative 6 RAOs were based upon Exposure Scenario 2, which consisted of the following:

- Exposure Scenario 2 - protection of human health for future residents of multi-family housing (0 to 3 feet below ground surface [bgs] plus indoor air) and construction and maintenance workers (0 to 10 feet bgs plus indoor air)

Exposure Scenario 2 Land Use Restrictions include:

*Prohibited Uses.* The Property shall not be used for any of the following purposes:

- A single-family, unattached residence.
- A hospital for humans.
- A public or private school for persons under 21 years of age.
- Private unpaved backyards.
- First-floor residential development, unless soil vapor results (post-remediation activities) indicate no risk to human health or nuisance. Alternatively, final residential development design includes soil vapor mitigation measures acceptable to the RWQCB.

*Restrictions.* The following shall be restricted at the Property:

- Raising of food (livestock, food crops).
- Groundwater use.

*Soil Management*

- No activities that will disturb the soil (e.g., excavation, grading, removal, trenching, filling, earth movement, or mining) shall be allowed on the Property unless they are conducted in accordance with a Site Soil and Groundwater Management Plan approved by the RWQCB.
- Contaminated soils brought to the surface by grading, excavation, trenching, or backfilling shall be managed in accordance with all applicable provisions of state and federal law.

For scenario 2 (Alternative 6) where the site is redeveloped as mixed use with multi-family residential, the remedial goals rely on the lower of the residential and recreational Risk Based Screening Levels (RBSLs). These RBSLs were developed for the RWQCB-approved FSRAP for the top 5 feet of soil and construction worker RBSLs for soil from 5 to 10 feet bgs.

Enforcement of the restricted residential development will be through a covenant recorded with Contra Costa County in favor of the RWQCB. This covenant will run with the land and require annual inspection and reporting on compliance with the Covenant. This Covenant will replace the existing covenant in place for IR Site 3.

The groundwater RAOs for IR Site 3 are as follows and apply to all reuse scenarios:

- Protect beneficial uses of the shallow groundwater underlying IR Site 3 and adjacent surface water to the extent practicable consistent with San Francisco Bay RWQCB policies and regulations.
- Prevent receptor exposure to volatile compounds in groundwater that pose an unacceptable risk to human health through the indoor air inhalation pathway until the San Francisco Bay RWQCB determines that risks from the residual contaminants are acceptable.

Waste profiles were developed from in-situ soil sampling conducted prior to the excavation activities (Terraphase 2012). Based on these results, it was estimated that approximately 3,700 tons of soil would require disposal as non-Resource Conservation and Recovery Act (RCRA), California hazardous waste and 500 tons of soil would require disposal as RCRA-hazardous waste based on lead concentrations. Alternative 6 included the excavation and disposal or treatment of 150,000 tons of soil as Class 2 waste to eliminate WMU requirements.

### 1.3 Report Organization

The remainder of this Completion Report is organized into the following sections:

**Section 2** summarizes the preconstruction and site preparation activities.

**Section 3** summarizes the construction sequencing and field activities.

**Section 4** discusses the air monitoring, dust control, and best management practices (BMPs) implemented during the remediation activities.

**Section 5** describes construction quality control activities performed during remediation and construction activities.

**Section 6** summarizes the implementation of the Remedial Action Plan.

**Section 7** describes the required post-construction activities and maintenance period.

**Section 8** presents final conclusions and recommendations for IR Site 3.

**Section 9** presents a list of references used to prepare this report.

The following documents are also provided as appendices to this Completion Report:

- Appendix A – Specifications
- Appendix B – Permits and Notifications Associated with Construction Activities
- Appendix C – Biological Evaluations
- Appendix D – Analytical and Geotechnical Laboratory Results for Imported Materials

- Appendix E – Waste Disposal Record Summary and Waste Stream Documentation
- Appendix F – Daily Field Notes and Logs
- Appendix G – Waste Characterization Laboratory Reports
- Appendix H – Post-Excavation Sample Laboratory Reports
- Appendix I – Perimeter Air Monitoring Results
- Appendix J – Stormwater Inspection Forms
- Appendix K – As-Built Survey
- Appendix L – Hydroseed Mix Specifications
- Appendix M – Weekly Project Updates
- Appendix N – Construction Work Plan

## **2.0 PRECONSTRUCTION AND SITE PREPARATION ACTIVITIES**

The preconstruction and site preparation activities conducted prior to implementing the FSRAP included site surveying, submittal of a construction work plan by PSEC for review, preparation of a Transportation Plan, Stormwater Pollution Prevention Plan (SWPPP), and Air Monitoring Plan, as well as other plans and documents, and required permitting. A site survey was completed, and a set of grading plans was submitted to the City of Richmond Engineering Services Department.

### **2.1 Agency Permitting**

#### **2.1.1 USACE 404**

A jurisdictional wetland delineation was performed on the former NFD Point Molate in 2007 (Wetlands and Water Resources 2007) and verified by the United States Army Corps of Engineers (USACE) in February, 2009 (USACE file number 2008-00415S). The wetland delineation identified a 0.266-acre seasonal wetland, subject to USACE jurisdiction under Section 404 of the Clean Water Act (CWA), located within IR Site 3. An application for Nationwide Permit Number 38 was submitted and approved on July 9, 2013. The permit application and approval are included in Appendix B.

#### **2.1.2 BCDC**

San Francisco Bay Conservation and Development Commission (BCDC) jurisdiction extends 100 feet from the high tide line of San Francisco Bay. Because Alternative 6 involved excavation and construction in this area, BCDC approval in the form of a major improvement permit was required. BCDC permit number M2012.006.00 was issued on September 23, 2014. The BCDC permit is included in Appendix B.

#### **2.1.3 Section 106**

A letter request for consultation, pursuant to Section 106 of the National Historic Preservation Act, and specifically 36 Code of Federal Regulations (CFR) 800.4, regarding the identification of historic resources and potential effects within the Undertaking's Area of Potential Effects (APE) was submitted to the California Office of Historic Preservation on April 3, 2012. A determination was made that no historic properties would be affected by the subject undertaking. The letter is included in Appendix B.

### **2.2 Biological Survey**

An Existing Biological Conditions Report was prepared by Pacific Biology (Pacific Biology 2012). As required by the Point Molate Mixed-Use Tribal Destination Resort and Casino Final EIR (City of Richmond 2011), preconstruction nesting bird surveys were conducted to ensure that birds potentially nesting at the adjacent tidal marsh (e.g., San Pablo song sparrow), on site (e.g.,

osprey), or at other nearby locations (e.g., Cooper's hawk) are not disturbed. As also required, clearance surveys for roosting bats were conducted to ensure that special-status bat species potentially roosting in the on-site buildings proposed for demolition (Buildings 82 and 83) are not harmed. Both Existing Biological Conditions Report and Preconstruction Nesting and Roosting Survey have been included in Appendix C.

## 2.3 Import Soil Evaluation

Prior to mobilization activities, PSEC arranged for the collection and analysis of proposed clean import soil for geotechnical testing and environmental analysis in accordance with the design specifications (the "Specifications"). Soil sample results from a variety of sources were submitted for review. The following sites were reviewed and approved for import as meeting the specifications :

- Cathedral Hill Parcel, 1101 Van Ness Ave, San Francisco, California (Approx. 70,000 tons)
- "Parcel C" Development Project, Hercules, California (Approx. 65,000 tons)
- San Francisco State University Wellness Center, San Francisco, California (Approx. 24,000 tons)
- "Harvest Court" Development Project, Moraga, California (Approx. 41,000 tons)

### 2.3.1 Geotechnical Testing

Geotechnical testing was performed to ensure that the proposed backfill material met the geotechnical properties per the Specifications. The requirements and parameters of the imported backfill materials include:

- No more than 10% of the general fill shall be greater than 3 inches in largest dimension.
- Imported soil shall be classified by the Unified Soil Classification System as GP, GW, GC, GM, SP, SW, SC, SM, CL or ML.
- Soil Plasticity Index, as determined using the methodology of ASTM D4318, shall not exceed 20.
- Imported general fill to be placed within 4 feet of the ground surface shall not have the following characteristics (unless accepted by the OWNER in writing):
  - pH less than 6
  - chloride concentration greater than 500 parts per million (ppm)
  - sulfate concentration greater than 150 ppm
  - electrical resistivity less than 1,500 ohm-centimeters

The geotechnical results were reviewed by a Terraphase geotechnical engineer to evaluate if the material was acceptable for backfill material at the Site. The geotechnical test results for the above source sites are presented in Appendix D.

### 2.3.2 Environmental Analysis

Environmental analytical testing of proposed fill materials was conducted in accordance with the Specifications. The environmental analysis included the following target analytes:

- Polyaromatic hydrocarbons (PAHs; EPA Method 8270)
- Volatile organic compounds (VOCs; EPA Method 8260)
- Total petroleum hydrocarbons (TPH) as gasoline (TPHg; EPA Method 8260)
- TPH as diesel and residual fuels (TPHg, TPHbc; EPA Method 8015 modified)
- California Title 22 Metals (CAM-17): antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc (EPA Method 6010C and 7471A/7471B for mercury)

Analytical results are presented in Appendix D and include the screening values for Tier 1 RWQCB Environmental Screening Levels (ESLs) for residential land use. Terraphase reviewed the data and found the soil acceptable for use at the Site. The environmental test results for the above source sites are presented in Appendix D.

## 2.4 Transportation Plan

A Traffic Control and Waste Transportation Plan (the "Transportation Plan") was prepared by PSEC prior to implementing the FSRAP. The purpose of the Transportation Plan was to describe the general traffic control and waste transportation procedures and protocols to minimize potential health, safety, and environmental risks resulting from the transportation of materials to off-site disposal facilities. The Transportation Plan took into account both on-site and off-site transport of soil debris and construction equipment. The Transportation Plan included a description of the waste to be transported, potential disposal facilities, the transportation mode, routes, traffic control, loading procedures, and record keeping. The Transportation Plan was submitted by PSEC as Exhibit D of the Construction Work Plan and is included in this document in Appendix N.

## 2.5 Stormwater Pollution Prevention Plan

A SWPPP was prepared by Terraphase for construction activities related to the construction activities (WDID# 2 07C370778). The SWPPP was prepared to comply with the State of California's General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (CGP) Order No. 2009-0009-DWQ, as amended by Order No.

2010-0014-DWQ (NPDES No. CAS000002), issued by the State Water Resources Control Board (SWRCB). A copy of the SWPPP was kept on site for the duration of the project.

### 3.0 CONSTRUCTION ACTIVITIES

This section describes the construction activities performed as part of the FSRAP. The construction activities were documented in digital field logbooks by Terraphase field staff (Appendix F), including photographic logs documenting the work performed during construction activities. The construction activities were conducted in the following phases:

- Mobilization
- Lead and asbestos abatement of Buildings 82 and 83
- Demolition of Buildings 82 and 83 in addition to aboveground piping, oil/water separator (OWS), power poles, and other small concrete structures on site
- Relocation of the Package Groundwater Treatment Plant (PGWTP)
- Soil import and stockpiling
- Demolition of underground utilities including subsurface vaults, concrete foundations, and pipelines
- Excavation and transport of Class II waste 0-5 feet
- Stockpiling overburden 0-5 feet
- Excavation and transport of Class II waste 5-10 feet
- Excavation and transport of Class I RCRA hazardous waste and California Regulated (non-RCRA) hazardous waste from the former FRF area
- Excavation and stockpiling of overburden 5-10 feet
- Excavation and transport of Class II waste deeper than 10 feet bgs
- Backfill
- Placement of topsoil
- Demolition of Building 125
- Grading and hydroseeding
- Final survey and demobilization

The following subsections describe each of the construction activities listed above.

#### 3.1 Mobilization

PSEC and Terraphase mobilized the following equipment and supplies to the site:

- Field trailers with support equipment
- Heavy earthmoving equipment (e.g., excavators, bulldozers, loader, dump truck, compactor, and grader)
- Water truck
- Street sweeper
- Traffic controls (i.e., barricades, signs, flags, barrier tape, and traffic cones)
- Decontamination supplies

- Safety equipment (e.g., eyewash, first-aid kit, ropes and harnesses, personal protective equipment [PPE])
- Construction supplies (i.e., geotextile fabric, stormwater BMPs)
- Portable toilets
- Air-monitoring equipment
- Digital field logbooks

Site mobilization consisted of the following tasks:

- Setting up staging areas
- Delineating work zones
- Air monitoring and weather station setup

### 3.1.1 Setting Up Staging Areas

During the mobilization stage, PSEC set up staging areas to support excavation and soil construction activities. The staging areas included equipment storage containers, portable toilets, hand wash stations, and temporary office space. First-aid kits, an eyewash station, and fire extinguishers were placed in areas of the exclusion zone where workers could readily access them. A stockpile laydown area was also established on Drum Lot 1 for the temporary stockpiling of clean soil, rock, processed debris and other materials and equipment. The staging area is shown in the Specifications (Appendix A).

### 3.1.2 Air Monitoring and Dust Monitoring Station Setup

For meteorological data, a handheld weather meter was used to collect information about weather at the Site in conjunction with the Contra Costa County station 21 rain gauge located at Richmond City Hall. Wind speed, wind direction, and temperature were collected twice daily during soil excavation, soil stockpiling, and loading activities. Precipitation measurements were recorded from the Richmond City Hall Rain Gauge (Station 21).

Dustrak™ aerosol monitors (Dustraks) were set up at four locations, two upwind and two downwind of the excavation area, to provide immediate information for total respirable particulate matter (particulate matter 10 microns in diameter or less [PM<sub>10</sub>]) and dust levels present at the Site. The Dustraks were calibrated and set up daily to continuously log and transmit real-time data during all soil movement activities. The Dustraks were checked by field staff at least twice per day and more frequently during days of heavy vehicle traffic and/or poor air quality that could affect the monitors. Data from the Dustraks were periodically downloaded and reviewed.

The air monitoring procedures and results are discussed further in Section 4.0. A summary of air monitoring and weather data is presented in Appendix I.

### 3.1.3 Site Preparation

Prior to commencement of excavation activities, site preparatory work included the following activities

- grubbing of vegetation within the excavation boundaries,
- removal of existing equipment and structures (fencing, buildings, utilities, and underground concrete vaults),
- installation of stormwater BMPs (including approximately 1,500 feet of silt fence on the western edge of the Site adjacent to the coastline, rumble strips outside of the southern exit gates to the Site, and storm drain inlet protection).
- The PGWTP was also moved to a new location to the north of the excavation boundary to facilitate continuous groundwater treatment, and the influent and effluent pipelines were moved so as to run outside of the excavation boundaries. Terraphase continued to operate the PGWTP until dewatering activity associated with the project was complete.

## 3.2 Health and Safety Measures

Remedial activities at the Site were performed in accordance with the site specific Health and Safety Plan (HASP), Air Monitoring Plan, and Dust Control Plan prepared by Terraphase. The HASP is primarily concerned with earthwork that includes excavation, grading, trenching, stockpiling, backfilling, and other intrusive construction activities that could lead to potential exposure of site workers to physical and environmental hazards. It also addresses the potential chemicals of concern (COCs) and hazards associated with the chemicals, and presents the minimum health and safety requirements for establishing and maintaining a safe working environment during the course of work. A copy of the HASP was maintained at the Site at all times. Further information on the air monitoring and dust control procedures are discussed in Section 4.0 of this report.

PSEC prepared its own HASP for its employees and subcontractors. As part of this plan, the PSEC held tailgate meetings at the commencement of each workday. Terraphase attended the meetings on a regular basis.

### 3.2.1 Personal Protective Equipment

IR Site 3 required Level D PPE for excavation and backfill work, which includes, at a minimum, hard hat, safety glasses, reflective vest, gloves, and steel-toe boots. Workers operating the dewatering pumps were required to wear Tyvek coveralls and face shields in addition to the standard Level D, due to the increased risk of splash hazards. In spring 2015, all personnel conducting work around the excavations that had become full with stormwater were required

to wear personal flotation devices due to the potential for immersion. Ongoing air monitoring at the Site did not support any evidence for inhalation hazards during the earthwork; therefore, respirators were not required.

Asbestos and lead-based paint abatement was performed in Level C PPE, as designated in the lead and asbestos abatement plans submitted by PSEC.

### 3.2.2 Decontamination Procedures

In accordance with the HASP prepared by PSEC, proper decontamination procedures were followed for personnel and equipment during remediation activities on site to prevent the spread of contamination into the clean zones and to reduce exposure to personnel and the environment.

Decontamination areas for personnel were established by PSEC. All discarded PPE, such as gloves and Tyvek coveralls, were collected and disposed of at an appropriate landfill.

Decontamination areas were established at the exit point of each contaminated work area for vehicles and equipment to stage upon while receiving either dry or wet decontamination, as appropriate. To minimize the need for wet-decontamination at the Site, all trucks were kept 3 to 5 feet above the water table.

Vehicle and equipment decontamination procedures were as follows:

- If a truck drove over contaminated soil, it received broom, dry-decontamination over steel rumble-plates at the exit point of the contaminated work area. The steel rumble plates were swept regularly to prevent the buildup of contaminated debris. The debris removed from the rumble plates was placed back within a contaminated excavation for disposal.
- Construction equipment that remained above the water table was subject to the same broom, dry-decontamination as the trucks at the exit point of the contaminated work area.
- Construction equipment working within the water table was subject to wet decontamination by means of high-pressure water stream wash-down at the exit point, by the on-site water truck. Track and undercarriage wash-down was performed on the rumble plates with wash water channeled into the contaminated excavation.
- Excavator buckets or attachments that had been in contact with contaminated materials were suspended over the contaminated work area and washed by a water truck-based pressure water hose prior to exiting the work area.
- Visual inspections were completed of the tracks, tires, and undercarriages of all construction equipment before exiting the Site.

### 3.3 Building Demolition

Prior to excavation and backfill activities, site demolition involving several minor buildings (Buildings 82 and 83), railroad tracks, storm drainage structures, and other small structures, such as an oil water separation (OWS), was performed. Large Excavators (Cat 330 or larger) were used for surface and subsurface demolition by PSEC. Demolition debris was temporarily stockpiled adjacent to the structure being demolished and processed for size reduction and material classification (i.e., steel versus concrete). Upon completion of material processing, demolition debris was loaded into end-dump trucks, high sides, and/or bins and properly tarped before leaving the Site.

Construction debris was recycled at the following locations:

- Metal to SIMS in Richmond
- Concrete to Diablo Valley Rock
- Green waste and debris to the Zanker Road Recycling Facility

#### 3.3.1 Asbestos and Lead Abatement

The first task following mobilization was the abatement of the asbestos and lead-based paint in Buildings 82 and 83 by Plant Hazardous Services, a PSEC subcontractor. Abatement included the removal of asbestos-containing material (ACM) in the buildings and any loose or peeling lead-based paint. During this activity, controlled areas with limited access were established to avoid cross contamination.

Asbestos and lead abatement of buildings 82 and 83 began on September 8, 2014, and was completed on September 23, 2014. The abatement procedure was as follows:

- Plastic was placed on the ground around the perimeter of each building to contain ACM and lead paint. Containment plastic was "burrito-wrapped" and disposed of at the end of each work day.
- Water was sprayed on the exterior and interior surfaces prior to removal to inhibit airborne dispersal of ACM and lead paint.
- ACM was removed by hand using scraping tools. Removable building components (such as a piping) coated in ACM were disposed of whole and intact.
- Lead paint on the exterior and interior was removed using scraping tools and abrasive pads. Stray paint chips were removed with a high-efficiency particulate arrestance vacuum.
- After bulk lead paint chips and ACM were removed, surfaces were sprayed with abatement materials.

### 3.3.2 Surface Demolition

Following the lead and asbestos abatement activities, the demolition of the buildings and other structures, such as the OWS and small concrete structures, was performed by PSEC. The surface demolition activities occurred concurrently with the PGWTP relocation.

Prior to the OWS demolition, the tanks were decontaminated and drums containing decontaminated fluid from the OWS were disposed of by Environmental Logistics Inc. when the OWS was demolished.

Miscellaneous concrete, asphalt, berms, railroad tracks, ballast and ties, as well as aboveground power poles and wires within the excavation area, were removed and stockpiled for processing as described above.

### 3.3.3 Subsurface Demolition

Subsurface removals include the removal of the former FRF foundation, berms, underground utilities, remnants of an old dock, and subsurface vaults within the excavation area. An underground concrete stormwater/overflow vault (approximately 24 feet by 12 feet by 8 feet deep) planned for demolition and replacement was instead cleaned and retrofitted as a flow control vault for the new stormwater drainage system. Before pipelines potentially containing product were demolished, they were inspected to evaluate if they contained any residual liquid so that they could be disposed of appropriately. No pipes with residual liquids were identified.

Transite pipe containing asbestos was also encountered during the excavation and subsurface demolition work. A total of approximately 2,500 linear feet of transite pipe was removed from the excavation area and properly disposed of as ACM.

A groundwater barrier (sheet pile wall) designed to limit the amount of groundwater flow between San Pablo Bay and the Site was also removed. As the excavation and backfill work was completed adjacent to the sheet pile groundwater barrier, the piles were removed using a vibratory attachment on an excavator, then cleaned, stockpiled, and sent for recycling. Further information on the sheet pile wall removal methodology and procedures is presented in Section 3.4.5 of this report.

## 3.4 Excavation

Excavation activities began on September 22, 2014, and were then halted due to weather and wet site conditions from November 27, 2014, through March 17, 2015. Excavation resumed on March 18, 2015, and was completed on July 27, 2015. Excavation operations complied with California Occupational Safety and Health Administration trenching, excavation, sloping, and shoring safety requirements. Excavation progressed in sequence from 0-5 feet (to the residential fuel product action level [FPAL]), 5-10 feet (to the construction and maintenance worker FPAL), and deep excavation greater than 10 feet down to Bay Mud (to the construction and

maintenance worker FPAL). Excavation boundaries at the 0-5 foot interval were identified as “A” through “H” as shown on Figure 2. Excavation boundaries at the 5-10 foot interval were identified as “I” through “M” as shown on Figure 3. Below 10 feet, the excavation boundary was divided into a grid of 50-foot by 50-foot cells with a specific number associated with each cell for identification purposes as shown in Figure 4. The RCRA and non-RCRA hazardous waste area associated with the FRF was excavated in conjunction with the 0-5 foot and 5-10 foot intervals (Figures 5, 6 and 8).

As required in the FSRAP (Terraphase 2014), confirmation samples were collected at every 50 feet of exposed sidewall, and a bottom sample was collected at every 2,500 square feet where the bottom of the excavation was left in place or used as overburden. Excavation work was completed to the depth and dimensions shown in Figures 2-8 and As Built (Appendix K). In the event of a failed confirmation sample, a step-out excavation was executed with additional sidewall and/or bottom samples taken as required. Step-out excavations are described in further detail in Section 3.6.2.

The total excavation tonnage is as follows:

- RCRA Hazardous Waste – 335 tons
- Non-RCRA Hazardous Waste – 5,209 tons
- Class II Waste – 196,212 tons

### 3.4.1 RCRA and non-RCRA Hazardous Waste Areas

Excavation of the RCRA and California Regulated (non-RCRA) hazardous waste areas within the FRF commenced on October 6, 2014. Class 1 RCRA hazardous waste was excavated per the hazardous waste delineation (Terraphase 2013) to a depth of 3 feet bgs (Figure 5). Confirmation samples were taken along the excavation boundaries (sidewall and bottom) and compared to toxicity characteristic leaching procedure (TCLP) criteria. No samples were collected along the northern boundary, as it was located within a concrete enclosure filled with aggregate base. This is further discussed in Section 3.6.1. Samples that met the TCLP criteria are provided in Figure 5. No step-out excavation was required. Results of all confirmation samples are available in Appendix H. The Class I RCRA Hazardous Waste was hauled in end dumps by a certified hazardous material hauler and disposed of at the Clean Harbors Buttonwillow facility. Copies of manifests are provided in Appendix E. A total of 335 tons of Class I RCRA Hazardous Waste were excavated, transported, and disposed of at the Clean Harbors Buttonwillow facility. The last load of RCRA hazardous waste was transported off site on October 23, 2015.

A total of 5,209 tons of California Regulated (non-RCRA) hazardous waste were excavated, transported, and disposed of at the Clean Harbors Buttonwillow facility. California Regulated (non-RCRA) hazardous waste was excavated per the hazardous waste delineation (Terraphase

2013) in two initial depth intervals: 0-5 feet bgs and 5-12 feet bgs (Figures 5 and 6). After completion of the 0-5 foot depth interval, and confirmation sample results under soluble threshold limits concentrations (STLCs) for lead were completed, excavation continued down to 12 feet bgs. Step-outs were executed horizontally at the 0-5 foot interval, and both horizontally and vertically at the 5-12 foot interval. Figure 8 presents an overall picture of the confirmation sample results, final excavation boundaries, and depths of RCRA and California Regulated (non-RCRA) waste within the FRF area shown individually on Figures 5 and 6. The excavated quantity of California Regulated (non-RCRA) hazardous waste exceeded estimates in the FSRAP by 41%. Removal of California Regulated (non-RCRA) hazardous waste was completed on March 19, 2015. Waste disposal records are presented in Appendix E. After removal and confirmation of RCRA and California Regulated (non-RCRA) hazardous waste, remaining unexcavated soil within the former FRF area was considered Class II waste and part of Excavation C (Figure 2; 0-5 feet). Based upon confirmation sampling in the field, a decision was made to excavate the remaining soil within the FRF area and within the boundaries of Excavation C down to 14 feet bgs in order to meet the clean-up goal requirements for the respective depth intervals. The area excavated to 14 feet bgs is shown in Figure 7.

### 3.4.2 Excavation and Overburden Removal (0-5 foot)

Excavation of the 0-5 foot interval commenced on September 22, 2014. Approximately 16,216 cubic yards (CY) were excavated, transported, and disposed of as Class II waste at the Waste Connections Potrero Hill facility.

Sidewall and bottom confirmation samples were collected per the requirements of the FSRAP (Terraphase 2014). Samples at the 0-5 foot interval were sampled for the following:

- Metals (lead, manganese, thallium, arsenic; EPA 6010B) in FRF area only
- TPHd, TPHbc, TPHg (8015B)
- PAH (EPA 8270 SIM)
- Benzene, toluene, ethylbenzene, xylenes (EPA 8021)

Figure 2 presents confirmation sample locations for the 0-5 foot interval including step-out locations. Table 1 provides a summary of the sample results for the 0-5 foot depth interval compared to RWQCB approved clean-up goals. Appendix H contains the final laboratory reports associated with the confirmation samples.

An Interim Data Submittal Package #1 was submitted to the RWQCB on October 23, 2014, identifying completed excavations to date and deviations from the FSRAP. Following submittal of the data package, approximately 33,475 CY of overburden from the 0-5 foot interval was excavated and stockpiled on site for use as backfill and to facilitate excavation of the >5 foot bgs interval.

### 3.4.3 Excavation and Overburden Removal (5-10 foot)

Excavation of the 5-10 foot interval commenced on October 27, 2014. Approximately 8,475 CY were excavated, transported, and disposed of as Class II waste at the Waste Connections Potrero Hill facility.

Sidewall and bottom confirmation samples were collected per the requirements of the FSRAP (Terraphase 2014). Samples at the 5-10 foot interval were sampled for the following:

- Metals (lead, manganese, thallium, arsenic; EPA 6010B) in FRF area only
- TPHd, TPHbc, TPHg (8015B)
- PAH (EPA 8270 SIM)

Figure 3 presents confirmation sample locations for the 5-10 foot interval including step-out locations. Table 2 provides a summary of the sample results for the 5-10 foot depth interval compared to RWQCB approved clean-up goals. Appendix H contains the final laboratory reports associated with the confirmation samples.

A second Interim Data Submittal Package #2 was submitted to the RWQCB on December 2, 2014. Following submittal of the data package, approximately 37,452 CY of overburden from the 5-10 foot interval was excavated and stockpiled on site for use as backfill and to facilitate excavation of the deep excavation interval. A follow-up Data Submittal Package #3 was submitted to the RWQCB on May 5, 2015 (following an RWQCB site visit on April 30, 2015) to summarize the completion of excavation in the 5-10 foot interval.

### 3.4.4 Excavation (10+ foot)

Excavation to the design depth of approximately 17 feet bgs began initially with the excavation of one 50-by-50-foot cell within Excavation J on October 29, 2014, in order to develop an understanding of soil and groundwater conditions at depth. Further excavation of the 10+ foot interval began on March 27, 2015, within the boundaries of Excavation I continuing to the remainder of Excavation J and then from the eastern boundary of the Site towards the shoreline. Approximately 78,684 CY were excavated, transported, and disposed of as Class II waste at the Waste Connections Potrero Hill facility.

Sidewall and bottom confirmation samples were collected per the requirements of the FSRAP (Terraphase 2014). Samples at the 10+ foot interval were sampled for the following:

- TPHd, TPHbc (8015B)

Figure 4 presents confirmation sample locations for the 10+ foot interval including step-out locations. Table 3 provides a summary of the sample results. Appendix H contains the final laboratory reports associated with the confirmation samples.

### 3.4.5 Removal of Sheetpile wall

In 1995, the Navy conducted an interim removal action at IR Site 3, which included the installation of a subsurface containment wall and a groundwater extraction trench system. The wall and trench were 1,100 feet long and ranged from 19 to 26 feet deep keyed into the Younger Bay Mud. An extension to the containment wall was constructed on the southern portion of the trench in 1997 to further contain product near monitoring well MW11-54. The containment wall was installed on the downgradient side of the extraction trench, to prevent migration of free product toward the Bay, via a continuous high-density polyethylene liner and sheet pile barrier.

During the remedial excavation activities, the sheet pile wall limited the amount of water that flowed into the excavation from the San Francisco Bay and was therefore left intact for as long as possible. By June 10, 2015, the sheet pile wall was removed to facilitate the remainder of the planned excavation.

The sheet pile wall removal was achieved by excavating the surrounding overburden to expose the tops of the sheet piles, followed by pulling each individual pile using an excavator with hydraulic jaws attached to a vibratory head. Excavation and backfill work was conducted simultaneously with the removal of the sheet pile wall to minimize the size of open excavations adjacent to the piles. The interplay of excavation, sheet pile wall removal, dewatering, and backfilling was carefully conducted to reduce the amount of water infiltrating into the excavation from the Bay. All of the water in the excavations resulting from the removal of the sheet pile wall was pumped to the PGWTP for treatment and discharge.

### 3.4.6 Dewatering Activity

Prior the excavation activities, the existing on-site PGWTP was relocated to an area outside of the planned excavation boundaries. After relocation, and to increase the surge capacity, two 20,000-gallon fractionation tanks with cloth weirs were added to the system.

The PGWTP treated groundwater pumped from four screened wells set into a trench extending below the water table that had been backfilled with gravel to minimize the resistance to groundwater flow into the wells. The PGWTP continued to treat groundwater from these extraction wells as part of the dewatering effort until May 19, 2015, when the extraction trench and wells were demolished as part of the excavation activities.

Further dewatering of the excavated areas was required as the excavations extended below the water table. Dewatering was conducted to maintain a safe excavation and to allow for effective backfill of the excavation. The bottoms of the excavations were left sloped to facilitate accumulation and removal of groundwater. Water that entered the excavations during the work was pumped from the excavations directly to the relocated PGWTP for treatment and discharge.

The PGWTP was operated and maintained by Terraphase in accordance with the RWQCB Order No. R2-2012-0012, NPDES Permit No. CAG912002 (adopted March 15, 2012), titled "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)".

Groundwater pumped to the PGWTP initially entered an additional 18,000-gallon settling tank to add residence time for the settling of suspended sediments and the capture of potential free product prior to entering the two 20,000 gallon fractionation tanks. Groundwater from excavations was routed to the PGWTP as of October 31, 2014. After residing in the settling and fractionation tanks, the extracted groundwater was conveyed directly to two, two-pod sand filters plumbed in parallel. To reduce turbidity, water then passed through an eight-basket bag filter containing 1- to 5-micron filter bags. Following the bag filter, water then flowed through four granular activated carbon (GAC) units (2,000 pounds each) plumbed in series to further reduce the concentrations of the COCs in the PGWTP's effluent discharge. Treated groundwater was discharged directly to San Pablo Bay as allowed by the NPDES permit.

On June 5, 2015, the PGWTP was upgraded from a treatment capacity of 100 gallons per minute (gpm) to a capacity of 200 gpm per the Modified Notice of Intent (NOI) submitted to the RWQCB on February 4, 2015. The Modified NOI addressed increased flows resulting from dewatering activities occurring at the Site after removal of the sheet pile wall. The upgrade included the addition of a larger pump as well as an additional three GAC units plumbed in parallel to the three existing GAC units. These units were added in combination with the existing treatment system components that included two, two-pod sand filter units, an eight-basket bag filter (1 to 5 microns), an 18,000-gallon settling tank, and two 20,000-gallon fractionation tanks.

On July 31, 2015, construction dewatering activities were complete and the remaining groundwater in the settling tanks was pumped through the system. The City requested rescission of permit coverage on October 1, 2015, and rescission was granted by the RWQCB on October 8, 2015.

During dewatering activities, a total of 6,048,320 gallons of water were treated with a total of 43.2 kilograms (kg) of TPH removed.

The remaining City owned equipment will remain on site until RWQCB approval of IR Site 3 for No Further Action (NFA).

### **3.5 Backfill**

Backfilling of the Site began on March 26, 2015, and occurred simultaneously with the excavation activities in completed areas as described in the approved excavation sequence provided in the Construction Work Plan (Appendix N).

### 3.5.1 Methodology

Excavation backfilling was completed as follows to meet the requirements of the Specifications:

- Upon receipt of confirmation sidewall and/or bottom sampling results below the cleanup criteria, permission from Terraphase was granted to PSEC to begin backfilling the representative area.
- Prior to placement, soil (overburden and imported) was amply moisture-conditioned. Fill that was too wet, by the judgment of Terraphase, was not placed in any excavation until it had been sufficiently dried. Fill that was overly dry was moistened to the satisfaction of Terraphase.
- To the extent possible, overburden was removed from subsequent excavations and directly placed and compacted as backfill in the excavated areas approved by Terraphase in the completed and confirmed excavation areas at depths exceeding 5 feet. Under no circumstance was overburden placed in the top 5 feet of backfill.
- When direct placement was not possible, overburden was stockpiled within the work area for later reuse as backfill material.
- Imported backfill, meeting the requirements of the Specifications, was transported and placed above the compacted overburden (where overburden was present) or directly into the full depth of the excavation. The last 5 feet of backfill were completed only with imported soil and not overburden.
- Imported topsoil was the final lift installed during the backfilling effort. The lift consisted of 6 inches of imported topsoil "track-walked" to match surrounding grades. The top soil was not over-compacted and was immediately fertilized, seeded, and irrigated to promote growth.
- Import backfill was weighed by PSEC on site with a scale calibrated to weigh trucks hauling the import material.
- All engineered fills were constructed by placing uniformly moisture-conditioned soil in a maximum of 10-inch-thick loose lifts prior to compacting. Compaction was completed using four passes of a Caterpillar 825.

### 3.5.2 Import Sites

To obtain the required volume of backfill necessary to meet the final grading plan, multiple source sites for import material had to be considered and evaluated. See Section 2.3 for the evaluation of imported soils.

Source Site	Tons Imported
Cathedral Hill, San Francisco, CA	70,000

SF Wellness Center, San Francisco, CA	24,000
Harvest Court, Moraga, CA	41,000
Parcel C, Hercules, CA	65,000
BFI Recyclery, Milpitas, CA (compost)	4,300

### 3.6 Deviations From the Work Plan

#### 3.6.1 Fuel Recovery Facility Area

During initial excavation activities of the industrial waste disposal area within the FRF area, a concrete enclosure of approximately 2025 square feet (sf) with a depth of 6 feet was found to be completely filled with clean aggregate base material (approximately 450 CY). The enclosure included concrete walls on all four sides and a concrete bottom. Terraphase collected composite samples on September 11, 2014, and again on October 9, 2014. Once the material was removed from the structure Terraphase confirmed that the aggregate base material located within the concrete structure was clean, met the RWQCB ESLs for Shallow Soil Residential Land Use and could be reused on site as clean fill material. This material was placed on-site as overburden.

#### 3.6.2 Step-out Excavations

Step-out excavations were executed in the former FRF area, 0-5 foot, 5-10 foot, and 10+ foot intervals. In the event of a failed confirmation sample, a step-out excavation was executed, with additional sidewall and/or bottom samples taken as required. Step-out excavations consisted of extending the sidewall excavation back 5 feet and half the distance to the nearest clean sample at the 0-5 foot and 5-10 foot intervals. Additional confirmation samples were then taken from all three sides of the step-out. In the event of a failed confirmation sample, step-out excavations in the 10+ foot interval were executed in 2-foot vertical increments and 10-foot horizontal increments. Step-out excavations were extended as necessary per confirmation sample results.

**Former FRF Area:** Step-out excavations were executed for California Regulated (non-RCRA) hazardous waste at the 0-5 foot interval and 5-12 foot interval. The final extent of the excavation for the 0-5 foot California Regulated (non-RCRA) excavation is shown on Figure 5. The final extent of the excavation for the 5-12 foot California Regulated (non-RCRA) excavation is shown on Figure 6. Table 4 provides a summary of the confirmation sample results. An additional 1,516 tons of California Regulated (non-RCRA) hazardous was removed over initial estimates.

**0-5 Foot Interval:** Step-out excavations were executed in Excavations A, B, C, E, F, G, and H for confirmation sample locations exceeding the residential ESLs. The final extents of the excavation location of the step-out excavations is shown in Figure 2. Table 1 provides a summary of the sample results.

**5-10 Foot Interval:** Step-out excavations were conducted in Excavations J, I, L, and M. The final extents of the excavation location of the step-out excavations is shown in Figure 3. Table 2 provides a summary of the sample results. The step-out associated with the western side of Excavation L was extended to the west and encompassed an area of approximately 12,200 sf adjacent to the former building 82. The soil removed from this area was characterized by petroleum-scented greenish-grey sand with staining from free product at depth. The entire area associated with the step-out was excavated to a depth of 17 feet bgs and is shown on both Figure 2 and Figure 3. Tables 2 and 3 provide sample results from this area.

**10+ Foot Interval:** Step-out excavations were executed both horizontally and vertically in the 10+ foot interval. Vertical step-outs were carried out in 2-foot increments, usually culminating in the exposure of Bay Mud, enabling a clean confirmation sample to be taken. Bay Mud was generally encountered at 19 feet bgs site-wide with deeper excavation required along the western border of the Site. Excavation ranged from 19 feet bgs to 23 feet bgs at select excavation cells along the western border of the Site. The final extents of the excavation location of the step-out excavations are shown in Figure 4. Table 3 provides a summary of the sample results.

In total, approximately 49,000 additional tons were excavated over initial estimates due to step-out excavations across three depth intervals.

### 3.6.3 Samples Left in Place That Exceed Remedial Goals

Results exceeding remedial goals are as follows:

**Excavation Area B:** Confirmation sample results are below clean-up goals or were removed from the Site with a step-out excavation with the following exceptions:

- Samples from locations B05-13-SW (0-5 feet bgs) and B05-14-SW (0-5 feet bgs) exceed remedial goals for benzo(a)pyrene and diesel and bunker fuel. These locations are at the boundary of IR Site 3 and adjacent to Building 6. Their removal could not be completed without jeopardizing the structural integrity of Building 6 (Figure 2).

**10+ Excavation Area:** Confirmation sample results are below clean-up goals or were removed from the Site with a step-out excavation with the following exceptions:

- Samples from locations DEEP-6-SW, DEEP-8-SW, DEEP-29-SW, DEEP-59-SW, DEEP-70-SW, and DEEP-84-SW exceed remedial goals for bunker fuel, with DEEP-59-SW, DEEP-70-SW, and DEEP-84-SW exceeding remedial goals for diesel fuel as well. These locations are at the boundary of IR Site 3 and adjacent to the shoreline. Excavation could not be completed without risking a breach of bay water to the Site excavation area.
- Sample DEEP-104-SW exceeded the clean-up goal for bunker and diesel fuels. Step-out excavation for this sample location was not possible due to the slope of the adjacent

hillside ( See photo in Field Log for June 10, 2015). As noted in Table 32 of the FSRAP, "Summary of Clean-up Goals and Soil Treatment Standards," for risk-based screening criteria, concentration for outliers can exceed the clean-up goal by up to two times as long as the 95% upper concentration limit (UCL) on the mean for the nearest 10 confirmation samples is less than the clean-up goal. The TPHd concentration was 10,000 milligrams per kilogram (mg/kg; less than two times the clean-up goal) and TPHbc concentration was 27,000 mg/kg. The upper 95% UCL on the mean for the nearest 10 confirmation samples was 1,244 mg/kg for TPHd and 4,166 mg/kg for TPHbc, both significantly below the cleanup goal.

Constituent	Result (mg/kg)	Clean-Up Goal	95% UCL
TPHd	10,000	6,700	1,244
TPHbc	27,000	9,400	4,166

### 3.6.4 Sheet Pile Wall

During removal of the sheet pile wall, two sheets of the wall were not removed due to difficulty in extracting them from the ground with the excavator with hydraulic jaws attached to a vibratory head. The two sheets were cut at a depth of 19 feet bgs and were located adjacent to sidewall samples DEEP-4-SW and DEEP-8-SW.

## 4.0 AIR MONITORING, DUST CONTROL, AND BEST MANAGEMENT PRACTICES

This section summarizes air monitoring and BMPs implemented during construction activities to protect workers, minimize the potential for unacceptable levels of airborne contaminants from exiting the Site, and prevent sediment and/or soil erosion during runoff.

### 4.1 Air Monitoring and Dust Control

The soil disturbance activities were performed in a manner that minimized dust generation in accordance with the Dust Control Plan in the FSRAP (Terraphase 2014) to control fugitive dust during the excavation and transportation of petroleum-impacted soils. The primary engineering control used to minimize dust generation was the application of water on disturbed soil surfaces to minimize the generation of dust. Dust-suppression water was applied judiciously to minimize the formation of water puddles.

During construction activities, the following dust control measures were implemented:

- Maintaining vehicle speeds below 10 miles per hour on unpaved or paved surfaces;
- Controlled spraying of water on exposed areas that had been disturbed, to prevent visible dust emissions;
- Controlled spraying of water while excavating soil, moving demolition debris, loading dump trucks, or moving soil;
- Controlling the rate of grading activities to minimize dust generation;
- Keeping drop heights to a minimum while loading trucks.

#### 4.1.1 Dust Monitoring

Dustrak aerosol monitors were utilized during soil movement activities at the Site (i.e., clean soil import, clearing and grubbing, excavation, soil off-haul, backfill and grading) to measure and record real-time data for total respirable particulate matter with a target action level of 0.05 milligram per cubic meter of PM<sub>10</sub> (24-hour average) both upwind and downwind of the work area. The primary purpose of the dust monitoring program was to assess the effectiveness of the dust control procedures employed at the Site and to utilize additional control methods when necessary.

For the 2014 construction period from September 17 through November 25, 2014, Dustrak monitors were stationed in four air monitoring locations designated AM-1 through AM-4 to record upwind and downwind particulate concentrations. During this monitoring period, the PM<sub>10</sub> action level was exceeded at both upwind and downwind stations on three separate occasions (November 6, November 10, and November 25, 2014), all of which were attributed to poor air quality in the Bay Area and not attributed to dust created by construction work in the

field. Poor surrounding air quality included days of heavy fog and haze detectable on the aerosol monitors.

Due to the consistently low dust emissions measured in 2014, Terraphase reduced the number of dust monitoring stations from four to two stations located at AM-2 and AM-4 as described in a letter to the RWQCB dated March 16, 2015. Stations AM-2 and AM-4 were chosen as the upwind and downwind monitoring locations, with the heaviest construction traffic to continue to provide adequate monitoring for the Site.

On March 19, 2015, following the wet season, earthwork resumed with Dusttrak monitors stationed at locations AM-2 and AM-4. During the construction period from March 19 through July 30, 2015, three separate exceedances were detected at the upwind station AM-2 (April 23, June 13, and June 22, 2015) located directly adjacent to the site entrance. The exceedances were attributed to a combination of high relative humidity and exceptionally heavy vehicle traffic both for trucks importing soil and trucks for exporting soil. There were no exceedances at the downwind station (AM-4) during the monitoring period from March 19 through July 30, 2015, at which time PSEC was provided a hiatus to locate an additional source for backfill material and construction stopped along with dust monitoring.

Following the hiatus, work resumed along with dust monitoring on September 21, 2015, to complete the final stages of backfill, compaction, and grading. A Sidepak personal aerosol monitor was used to monitor upwind and downwind particulate concentrations at stations AM-1 through AM-4 from September 21 through October 19, 2015, at which time all soil movement and heavy vehicle traffic had been completed. No exceedances occurred during the monitoring period from September 21 through October 19, 2015.

The daily time-weighted averages of particulate concentrations at air monitoring stations AM-1 through AM-4 are presented in Appendix I.

In conjunction with the dust monitoring, a handheld weather meter was utilized for the duration of the project to determine the predominant wind direction and weather conditions for each day of monitoring. A log of the daily weather conditions on site is presented in Appendix I.

#### 4.1.2 Target Contaminant Air Monitoring

In accordance with the Air Monitoring Plan included in the FSRAP (Terraphase 2014), perimeter monitoring was conducted for the duration of the remedial activities at the Site. The purpose of the perimeter air monitoring program was to verify that the surrounding community was not exposed to significant concentrations of airborne COCs, to evaluate the atmosphere for explosive conditions, and to evaluate the adequacy of the dust and odor control methods being applied by the remediation contractor. Assigned action levels based on the nature of the contaminants detected in perimeter air samples were strictly followed to minimize risk to the human receptors working in and utilizing the surrounding areas.

Perimeter air monitoring was conducted regularly each day at the four air monitoring locations AM-1 through AM-4 for both upwind and downwind measurements. A MiniRae 5-gas meter was utilized to provide immediate monitoring of the following information:

- VOCs, calibrated to isobutylene
- Explosivity, calibrated to methane, displayed as the lower explosive limit (LEL)
- Hydrogen sulfide (H<sub>2</sub>S)
- Oxygen (O<sub>2</sub>)
- Carbon monoxide (CO)

Initial calibration (using known calibration standards) was conducted prior to the start of each work shift. The daily calibration logs and perimeter air monitoring logs are presented in Appendix I.

## 5.0 CONSTRUCTION QUALITY CONTROL

The following construction quality control (QC) and monitoring activities were conducted at the project site:

- Weekly QC meetings and inspections
- Compaction monitoring
- Multi-layered topographic surveys

### 5.1 QC Meetings and Inspections

QC meetings and inspections included preparatory meetings before any new work activity commenced, followed by initial inspections at the start of the new work activity, and periodic follow-up inspections during the performance of each of the work activities. On-site Terraphase staff provided monitoring QC of field activities. Daily field note logs are provided in Appendix F.

Weekly meetings were conducted between PSEC and Terraphase project management to discuss the upcoming site activities and schedule.

Weekly project updates along with two interim data submittals were prepared and sent to the RWQCB for review and to inform the board of the progress made and the work being conducted on site. The full data summary of the post-excavation samples collected can be found in Appendix H and the weekly project updates are provided as Appendix M.

### 5.2 Compaction Testing

Prior to compaction, the fill was uniformly moisture-conditioned and placed in loose lifts no greater than 10 inches thick. Following the placement of each lift, the soil was then compacted using a minimum of four passes with a Caterpillar 825 sheepsfoot compactor per the Specifications and under the observation of Terraphase field staff.

In September 2015, PSEC requested permission to use a large, smooth drum vibratory roller rather than the 825 sheepsfoot roller for the compaction of the final 8,000 CY of soil from the Cathedral Hill site and the San Francisco Wellness Center site. The request was made in that because of the sandy composition of the soil a smooth vibratory roller would be more effective. Permission was granted to PSEC by a Terraphase engineer on September 17, 2015.

### 5.3 Topographic Survey

Topographic surveys were conducted continuously by PSEC for the duration of the project to accurately excavate the targeted areas and depth intervals, to record the final excavation extents, to calculate excavated soil volumes, and to complete a comprehensive set of as-built drawings. As an additional quality control measure, portions of the Site were also surveyed by a

licensed land surveyor several times at various stages of the project to confirm the accuracy of the surveys conducted by PSEC. The final set of as-built drawings is presented in Appendix K.

## 6.0 REMEDIAL ACTION PLAN IMPLEMENTATION SUMMARY

The remedial activities in the FSRAP were conducted in IR Site 3 between August 16, 2014, and November 6, 2015. This included the following activities:

- Preconstruction – The preconstruction activities consisted of obtaining the necessary state and local permits including USACE 404, BCDC, and Section 106 permits. Additional preconstruction activities included a biological survey of IR Site 3, and the development of a transportation plan, SWPPP, and Air Monitoring Plan.
- Site preparation – The preparation at the Site included grubbing, installation of stormwater BMPs, lead and asbestos abatement in Buildings 82 and 83, demolition of Buildings 82 and 83, the removal of existing equipment and structures (fencing, buildings, utilities, and underground concrete vaults), and relocation of the PGWTP.
- Excavation of the RCRA and California Regulated (non-RCRA) hazardous waste areas within the FRF – A total of 335.21 tons of Class I RCRA Hazardous Waste and 5,208.99 tons California Regulated (non-RCRA) hazardous waste was removed from the Site.
- Excavation of Class II contaminated soil and overburden removal 0-5 feet – Approximately 16,215 CY Class II contaminated soil was removed from the Site. Approximately 33,475 CY of overburden from the 0-5 foot interval was excavated and stockpiled on site for use as backfill and to facilitate excavation of the 5-10 foot interval.
- Excavation of Class II contaminated soil and overburden removal 5-10 feet – Approximately 8,475 CY Class II contaminated soil was removed from the Site. Approximately 37,452 CY of overburden from the 5-10 foot interval was excavated and stockpiled on site for use as backfill and to facilitate excavation of the 10+ foot excavation interval.
- Excavation of Class II contaminated soil 10+ feet – Approximately 78,684 CY of Class II contaminated soil was removed from the Site.
- Removal of approximately 1,100 feet of sheetpile wall along the western boundary of the Site.
- During dewatering activities, a total of 6,048,320 gallons of water were treated by the PGWTP with a total of 43.2 kg of TPH removed.
- Backfill – Approximately 200,835.53 of clean soil was imported to the Site and used as backfill.
- Contingency Extraction Trench – A contingency groundwater trench was constructed to a depth of 2 feet into the underlying Younger Bay Mud, including seven groundwater extraction/monitoring wells.
- Stormwater Drainage and Revegetation – To control stormwater runoff and soil erosion, a vegetated swale was constructed on the western portion of the Site. Wattles were

placed on the western perimeter along the coast line and the surface was revegetated by hydroseeding.



## Craig Murray

---

**From:** Tomer Schetrit <tomer.schetrit@terrphase.com>  
**Sent:** Monday, January 30, 2017 12:57 PM  
**To:** Margarete.Beth@waterboards.ca.gov  
**Cc:** Emily Mosen; William Carson; Peter Zawislanski; Craig Murray; Carlos A. Privat; Jim Hanson; 'joan@vbsi.com'  
**Subject:** Point Molate Dry-Season Annual GWM Report

Hi Maggie,

Please find the link below to the 2016 Dry-Season Annual Groundwater Monitoring Report for Point Molate. A link to the report is provided below. A copy has also been uploaded to Geotracker.

<https://terrphaseengineering.sharefile.com/d-sc2ecb01c9ac475a9>

Please feel free to contact me if you have any questions.

Thanks

Tomer

**Tomer Schetrit, P.E.**

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**DRY-SEASON ANNUAL GROUNDWATER MONITORING  
REPORT  
FORMER NAVAL FUEL DEPOT POINT MOLATE  
RICHMOND, CALIFORNIA**

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*Prepared for*

City of Richmond  
450 Civic Center Plaza  
Richmond, California

*Prepared by*

Terraphase Engineering Inc.  
1404 Franklin Street, Suite 600  
Oakland, California 94612

January 30, 2017

Project Number 0078.001.034





January 30, 2017

Margarete Beth  
San Francisco Bay Regional Water Quality Control Board  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

*sent via: email to margarete.beth@waterboards.ca.gov*

**Subject:** Transmittal of the Dry-Season Annual Groundwater Monitoring Report, Former Naval Fuel Depot Point Molate, Richmond, California

Dear Ms. Beth:

Terraphase Engineering Inc. is pleased to transmit the subject document. If you have any questions or comments regarding this monitoring report, please contact Peter Zawislanski at 510-645-1858.

For Terraphase Engineering Inc.

A handwritten signature in black ink that reads 'Peter Zawislanski'.

Peter Zawislanski, PG (7210), CHG (925)  
Vice President and Principal Hydrogeologist

*Attachment: Dry-Season Annual Groundwater Monitoring Report, Former Naval Fuel Depot Point Molate, Richmond, California*

**Cc:** Craig Murray, City of Richmond (electronic only)  
Carlos Privat, City of Richmond (electronic only)  
Joan Garrett, PMCAC (electronic only)  
Jim Hanson, PMCAC (electronic only)

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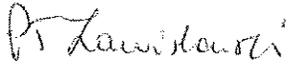
## ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
1,1-DCE	1,1-dichloroethene
AMR	Annual Groundwater Monitoring Report
AMSL	above mean sea level
ASTM	American Society for Testing and Materials
bgs	below ground surface
Chevron	Chevron Corporation
cis-1,2-DCE	cis-1,2-dichloroethene
the City	City of Richmond
cm/s	centimeters per second
Draft GWMP	<i>Draft Site-Wide Groundwater Monitoring Plan</i>
EPA	Environmental Protection Agency
ESL	San Francisco Bay RWQCB Environmental Screening Levels
°F	degrees Fahrenheit
FPAL	fuel product action level
FPALDR	Fuel Product Action Level Development Report
FSRAP	Feasibility Study/Remedial Action Plan
GWMP	<i>final Site-Wide Groundwater Monitoring Plan</i>
IR	Installation Restoration
IRM	interim remedial measure
IT	International Technology Corporation
ITSI	Innovative Technical Solutions, Incorporated
J	indicates analyte was detected at a concentration below the reporting limit
K	hydraulic conductivity
Navy	Department of the Navy
NFD	Naval Fuel Depot
PRC	PRC Environmental Management, Inc.
QA	quality assurance
QC	quality control
the Reporting Period	annual reporting period of January 1 through December 31, 2016

RL	reporting limit
RPD	relative percent difference
RWQCB	Regional Water Quality Control Board
SGC	silica-gel cleanup
the Site	Former Naval Fuel Depot Point Molate, Richmond, California
TCE	trichloroethene
Terraphase	Terraphase Engineering Inc.
TPH	total petroleum hydrocarbons
TPH-bunker	TPH as bunker fuel
TPH-diesel	TPH as diesel
TPH-jet-fuel	TPH as jet fuel
TPH+polars	estimated total petroleum hydrocarbons plus polar compounds
trans-1,2-DCE	trans-1,2-dichloroethene
TtEMI	Tetra Tech EM Inc.
UST	underground storage tank
VC	vinyl chloride
VOC	volatile organic compound

## CERTIFICATION

All geologic information, conclusions, and recommendations in this document have been prepared by a California Professional Geologist.

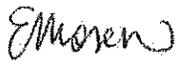


January 30, 2017

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Peter T. Zawislanski  
Principal Hydrogeologist  
California Professional Geologist (7210)  
California Certified Hydrogeologist (925)

Date



January 30, 2017

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Emily Mosen  
Project Geologist  
California Professional Geologist (9318)

Date

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## 1.0 INTRODUCTION

Terraphase Engineering Inc. (Terraphase) has prepared this *Dry-Season Annual Groundwater Monitoring Report* (AMR) for the Former Naval Fuel Depot (NFD) Point Molate, Richmond, California ("the Site"; Figures 1 and 2) on behalf of the City of Richmond ("the City"). This AMR was prepared for the annual reporting period of January 1 through December 31, 2016 ("the Reporting Period").

The Site is a former Department of the Navy (Navy) fuel storage facility, which consisted of a series of underground storage tanks (USTs) capable of storing up to 40 million gallons of fuel. Historical releases of fuel occurred during transfer of fuel to and from the USTs.

On May 24, 2011, a *Draft Site-Wide Groundwater Monitoring Plan* (Draft GWMP; Terraphase 2011a) was submitted to the Regional Water Quality Control Board (RWQCB). The Draft GWMP included modifications to the groundwater monitoring strategy for the Site. The RWQCB issued comments in a letter from Mr. George Leyva, dated June 22, 2011. In this letter, the RWQCB approved the implementation of the Draft GWMP, provided that the implementation addressed the RWQCB's comments. The final *Site-Wide Groundwater Monitoring Plan* (GWMP; Terraphase 2011b), which incorporated the RWQCB comments, was submitted to the RWQCB on August 19, 2011.

On February 7, 2014, the RWQCB issued a comment letter regarding the January 31, 2014, Dry-Season Semiannual Groundwater Monitoring Report. In the comment letter, the RWQCB requested a revision to the site groundwater monitoring procedures, specifically requesting that future groundwater analysis for total petroleum hydrocarbons (TPH) at the Site be performed without silica-gel cleanup (SGC). The RWQCB did allow the continued analysis of samples with SGC, as long as it is performed in addition to non-SGC analysis. Samples collected during the Reporting Period for TPH analysis were analyzed in accordance with this request.

The RWQCB issued a letter on August 26, 2014, requesting the removal of free product from all wells in which it is detected in quantities greater than a sheen. The letter also requested the inclusion of concentration trend graphs and a conclusions and recommendations section in all future groundwater monitoring reports. These criteria have been incorporated into this AMR in accordance with the August 26, 2014, letter.

Wet-season monitoring events take place in the late part of the second quarter of the year (May-June) and the dry-season monitoring event take place during the early part of the fourth quarter of the year (October-November). This AMR presents groundwater monitoring data representative of dry-season conditions at the Site. A summary of both wet-season and dry-season monitoring data is presented in Section 7.1.

Groundwater monitoring was conducted in accordance with the RWQCB-approved GWMP, as discussed above. This AMR presents the following information:

- Section 2.0 provides a site description, site history, physical setting, and a discussion of groundwater action levels for the Site.
- Section 3.0 summarizes the monitoring activities completed during the Reporting Period, including a discussion regarding the groundwater monitoring procedures and any deviations from the GWMP.
- Section 4.0 presents and discusses groundwater monitoring results for the Reporting Period, including groundwater elevation and analytical data.
- Section 5.0 discusses the quality assurance/quality control (QA/QC) assessment for the Reporting Period.
- Section 6.0 provides a summary of findings for the Reporting Period and compares these findings with historical data.
- Section 7.0 provides conclusions and recommendations for future monitoring activities and a summary of the work tentatively scheduled to take place during the first half of 2017.
- Section 8.0 provides a list of report references.

## 2.0 BACKGROUND

This section provides a site description, site history, physical setting, and a discussion of groundwater action levels for the Site.

### 2.1 Site Description

Former NFD Point Molate consists of 412 acres located in Richmond, Contra Costa County, California. The Site is situated in the Potrero Hills on the southern portion of the San Pablo Peninsula along the east shore of San Francisco Bay, and is approximately 1.5 miles north of the Richmond-San Rafael Bridge (Figure 1). Former NFD Point Molate was a former Navy fuel storage facility consisting of 20 concrete fuel storage tanks, capable of storing 40 million gallons of fuel, in 20 large USTs (each with a 2.1-million-gallon capacity) and several smaller USTs connected to refueling piers by over 9 miles of buried pipeline. Historical releases of fuel have occurred primarily from leakage of valves or overflow of USTs. Residual fuel product is present in subsurface soil adjacent to several USTs, and residual concentrations of fuel constituents (diesel, JP 4/5, and bunker fuel) are present in groundwater.

The facility is bordered by undeveloped land to the north and south with the San Francisco Bay to the west, and by the Chevron Corporation (Chevron) refinery to the east. Chevron uses most of the land near NFD Point Molate for refining, storage, and pipeline distribution of petroleum products.

### 2.2 Site History

In the early 1800s, the area was used by the padres of Mission Dolores and later became a Spanish Rancho. In the late 1860s, Chinese fishermen developed a shrimp fishing camp, which operated for more than 40 years. And by 1899, a quarry was in operation at the Site until 1915.

After the 1906 earthquake devastated San Francisco, the California Wine Association moved to Point Molate and began construction of the Winehaven winery. Once in operation, Winehaven held the title of "world's largest winery," with as many as 400 workers living at Point Molate during peak seasons of operation. However, with the advent of prohibition in 1919, Winehaven went mostly unused from around 1920 until the late 1930s. In 1937, the California Wine Association dissolved and began selling off its holdings.

In 1941, Point Molate was acquired by the Navy for use as a Naval Fuel Depot. Beginning in 1942, the Navy used NFD Point Molate for fuel storage and distribution for the Pacific Fleet. Fuel storage and supply operations ceased in May 1995 (Navy 2008). The Navy designated NFD Point Molate for closure under the Base Realignment and Closure Program on September 30, 1995. Operational closure of the facility occurred on September 30, 1998.

In October 2003, the Navy transferred 85% of NFD Point Molate (USTs, drainage basins, and shoreline areas) to the City. The Navy retained 15% of the Site to continue restoration activities.

The area retained by the Navy included Installation Restoration (IR) Site 1 (landfill), IR Site 3 (former treatment ponds area), and IR Site 4 (Drum Lot 1 and Drum Lot 2/Building 87). Based on the finding of suitability for early transfer, the remaining 15% of former NFD Point Molate was transferred to the City on May 29, 2010.

## 2.3 Physical Setting

The following sections describe the physical setting of former NFD Point Molate, including site topography and drainage, climate, geology, and hydrogeology.

### 2.3.1 Site Topography and Drainage

Topography at NFD Point Molate ranges from flat, low-lying near-shore areas (reclaimed tidal flats) to the steep-sided western slopes of the San Pablo Hills. The ridgeline of the San Pablo Hills runs generally northwest-southeast and reaches an elevation of nearly 500 feet above mean sea level (AMSL). Within NFD Point Molate, there are six steep-sided ravines that are generally oriented perpendicular to the ridge axis, draining west toward San Francisco Bay. Drainage from these ravines is intercepted by Drainage Areas 1 through 6 (Figure 2). Small areas of delineated wetlands occur in the ravine at Drainage Area 2 and along the shoreline. Several ephemeral seeps have been identified near the stormwater catch basins, along the bottom of steep slopes, or along the axes of ravines (TetraTech EM Inc. [TtEMI] 2002).

### 2.3.2 Climate

The climate of former NFD Point Molate is characterized as marine, with cool summers and mild winters. Monthly average maximum temperatures (for Richmond, California) vary from 73.8 degrees Fahrenheit (°F) in September to 57.6°F in January; monthly average minimum temperatures vary from 56.3°F in September to 42.4°F in January. Richmond receives an average of 23.10 inches of precipitation per year. Average monthly precipitation varies from 4.89 inches in January to 0.04 inch in July. Monthly averages for wet weather months are as follows: November, 3.12 inches; December, 4.34 inches; January, 4.89 inches; February, 3.82 inches; March, 3.11 inches; and April, 1.54 inches (Innovative Technical Solutions, Incorporated [ITSI] 2005).

### 2.3.3 Geology

The geology of NFD Point Molate consists of sedimentary and low-grade metamorphic units of Cretaceous-aged Franciscan Formation bedrock, Quaternary unconsolidated colluvial and alluvial deposits, Bay Mud, and emplaced fill. The Franciscan bedrock generally consists of arkosic sandstone, quartzite, or siltstone with interbedded mudstone or shale (ITSI 2005).

The general lithology of the hillside areas, where the USTs are located, consists of overburden (emplaced fill) overlying bedrock. The constructed fill is generally composed of abundant rock fragments ranging from 0.5 to 3 inches in diameter in a predominantly clayey silt soil matrix.

Extensive excavation and earth moving during UST construction (including blasting “benches” into the bedrock) disturbed native surface materials over a wide area of the Site. The overburden materials overlie a zone of weathered bedrock that ranges considerably in thickness (from 0 to more than 7 feet in places), but with an average thickness of 2 to 3 feet. Typically, weathered bedrock consists of unconsolidated rock fragments (mudstone or sandstone) ranging from 0.25 to 1 inch in diameter. This zone is saturated locally. Weathered sandstone fragments tend to be friable, and weathered mudstone is often deteriorated to moderately jointed stiff clay, especially where saturated conditions prevail (TtEMI 2002).

The weathered Franciscan bedrock zone grades into more competent bedrock, generally encountered at depths of 25 to 35 feet below the tops of the USTs that are near ground surface. The competent Franciscan bedrock contact generally manifests itself by increased rock mass in core specimens and refusal of augering equipment. Standard penetration tests in bedrock generally indicate less than 6 inches’ penetration at 50 blow counts. Little or no moisture is encountered in competent bedrock. Bedrock lithology is primarily interbedded mudstone and sandstone. Mudstone is typically gray to dark gray, thinly laminated, and fractured (fractures generally represent 2% to 5% of the rock matrix). Sandstone bedrock is typically yellowish brown, fine-grained, and friable, with less prevalent fracturing than the mudstone. Fracturing in the mudstone and sandstone is regular, following consistent fracture planes. Fractures are commonly iron-stained, filled by high-plasticity clay, and tend to show secondary quartz mineralization (TtEMI 2002).

Ravines and drainage areas at former NFD Point Molate are characterized by the presence of colluvium (valley fill) deposits. Colluvium consists of moderately stiff clayey silt mixed with weathered bedrock fragments, exhibiting an olive-gray to yellowish-brown mottled texture. Colluvium deposits tend to be thicker at the bases of the larger, more prominent ravines. Colluvial deposits underlying Tanks B and C, located below the base of the ravine at Drainage Area 3, are a minimum of 5 feet thick, and exceed 20 feet in thickness in some areas (TtEMI 2002).

The subsurface geology of the shoreline areas generally consists of varying amounts of emplaced fill overlying Bay Mud, alluvial, and/or colluvial deposits. At the North Shoreline, emplaced fill consisting of clayey silt, sandy silt, and rock rubble is present to depths of 15 to 20 feet below ground surface (bgs). The fill materials are underlain by a Bay Mud layer approximately 4 to 5 feet thick, which in turn is underlain by approximately 15 to 18 feet of colluvium. The colluvium overlies bedrock, which generally is encountered at a depth of approximately 35 feet bgs. At the South Shoreline, emplaced fill ranges from 2 feet thick near the Public Beach to 20 feet thick in the central portion of the south shoreline. The emplaced fill is underlain by colluvium that increases in thickness (from 12 to 20 feet) northward from the Public Beach. Bedrock was encountered at depths of 17 to 23 feet bgs in the Public Beach area, and at 29 feet bgs in the central portion of the south shoreline area (TtEMI 2002).

### 2.3.4 Hydrogeology

Groundwater at NFD Point Molate is present in limited quantities in the hillside areas and more prevalently in the flat-lying near-shore areas, where the groundwater forms a highly variable (tidally influenced) water table that is in hydraulic connection with San Francisco Bay (ITSI 2005).

Groundwater in the hillside areas is limited to isolated perched zones, located primarily within weathered bedrock. Colluvium in the ravines generally inhibits groundwater movement, due to its predominantly clay matrix. Physical analysis of colluvium resulted in hydraulic conductivity (K) values ranging from  $10^{-7}$  to  $10^{-8}$  centimeters per second (cm/s). However, some ravines receive sufficient surface water recharge (seasonally) to contain groundwater in unconsolidated material within permeable zones at the base of the colluvium and within underlying fractured bedrock horizons (PRC Environmental Management, Inc. [PRC] 1994; TtEMI 2002).

In near-shore areas, tidally influenced groundwater is present in the emplaced fill materials and underlying colluvial and alluvial deposits. The fill materials are not uniform and exhibit highly variable permeability; physical samples from the former Treatment Ponds area yielded an average K of  $10^{-6}$  cm/s. Bay Mud, where present, is saturated, but it is a low permeability unit. Laboratory-derived K values ranged from  $1.5 \times 10^{-7}$  to  $5.3 \times 10^{-8}$  cm/s in six samples (PRC 1994; TtEMI 2002).

Underlying bedrock throughout NFD Point Molate shows very little primary (matrix) porosity, but the presence of well-developed and consistent fractures throughout allows for the possibility of significant secondary (fracture) porosity. This secondary porosity is inhibited by the abundance of oxidation products (limonite and pyrolusite), clay minerals, and quartz mineralization along the fractures. In situ permeability tests conducted in bedrock wells indicated a K range of  $2 \times 10^{-3}$  to  $1.5 \times 10^{-6}$  cm/s (PRC 1994). These values were considered to be anomalously high for competent bedrock, and were attributed to an artificial increase in the secondary porosity due to hydrofracturing caused by the increased pressure of the injected water during testing (ITSI 2005). These data notwithstanding, unweathered bedrock at NFD Point Molate was interpreted to be a geologic unit with low K (PRC 1994; TtEMI 2002). Additional testing in six bedrock wells during the Phase II Remedial Investigation produced similar calculated K values, ranging from  $1.6 \times 10^{-3}$  to  $1.0 \times 10^{-6}$  cm/s. These data indicate a moderate K in the bedrock at NFD Point Molate, likely due to secondary porosity (TtEMI 2002).

## 2.4 Fuel Product Action Levels

Fuel product action levels (FPALs) were developed for the former NFD Point Molate, as described in the final Fuel Product Action Level Development Report (FPALDR; TtEMI 2001). The overall objective of the FPALDR was to develop an approach for assessing potential risks to human and ecological receptors exposed to petroleum-contaminated soil, groundwater, and surface water. The action levels developed in the FPALDR are intended to be used as a screening tool in conjunction with the RWQCB's Interim Guidance on Required Cleanup at Low-Risk Fuel

Sites (RWQCB 1996). The FPALDR approach is similar to the Risk-Based Corrective Action approach developed by the American Society for Testing and Materials (ASTM; ASTM 1995), in that early tiers consist of conservative, generic screening values. More site-specific information is incorporated in successive tiers so that the values become more representative of the site. The FPALDR focuses exclusively on Tier 1 action levels rather than on successive tiers that incorporate site-specific information and more comprehensive analytical approaches.

#### 2.4.1 Action Levels from San Francisco Presidio Report

The FPALDR reviewed existing action levels in the San Francisco Bay Area. The Navy proposed that the action levels developed for gasoline, diesel fuel, fuel oil, and fuel constituents in soil, groundwater, and surface water at the Presidio of San Francisco be adopted as the preliminary or Tier 1 FPALDR action levels for the former NFD Point Molate. The FPALs for soil and groundwater are summarized in Table 1.

#### 2.4.2 Groundwater Action Levels

Groundwater beneath the former NFD Point Molate is not considered to be of sufficient quality or quantity to be used as a municipal or domestic potable water supply (Terraphase 2011b). Therefore, for groundwater located more than 150 feet from the shoreline, a groundwater exposure pathway is considered only for the construction/park maintenance worker who might come into contact with contaminated groundwater during excavation. A detailed description of the risk assessment is provided in Attachment E of the Presidio FPALDR (Montgomery Watson 1995).

The FPALDR identified action levels for TPH and TPH-related constituents in groundwater located less than 150 feet from a wetland or shoreline. These action levels were developed for the protection of saltwater aquatic receptors for future wetland and near-shore ecological communities within the Presidio's Saltwater Ecological Protection Zone (a 150-foot setback from the Bay and the periphery of the proposed wetlands) that are subject to groundwater discharge (International Technology Corporation [IT] 1997a). These action levels are not a part of the official RWQCB Presidio Board Order but have been approved and applied by RWQCB staff. These action levels were based on a bioassay that measured the toxicity of site media to receptors in a future wetland (IT 1997a). Action levels calculated for fuel oil were assumed to represent the diesel fraction of petroleum hydrocarbons as well as fuel oil, since fuel oil samples at the Presidio typically exhibited a characteristic pattern in the diesel range (IT 1997b). Action levels for benzene, toluene, ethylbenzene, and xylenes, and methyl tertiary-butyl ether were obtained from the literature because these fuel constituents were not reported above detection limits in samples collected for the bioassay study.

Action levels for the protection of freshwater aquatic receptors from TPH-related constituents in groundwater were developed for the Presidio using the results of a chronic aquatic toxicity bioassay, and toxicological information obtained from the literature were applied to freshwater

seeps. A detailed description of the bioassays is presented in a 1997 report, *Development of Point of Compliance Concentrations for Gasoline in Surface Waters and Sediments of the Proposed Freshwater Stream* (IT 1997a).

### 3.0 ACTIVITIES COMPLETED DURING THE REPORTING PERIOD

The following section discusses the groundwater monitoring activities completed at the Site during the Reporting Period.

#### 3.1 Groundwater Monitoring Well Network

The current groundwater monitoring well network is based on an evaluation of the monitoring conducted to date and historical data trends. Past data indicate that the spatial distribution and concentrations of constituents of potential concern in groundwater have been well-characterized through past groundwater monitoring activities (Terraphase 2011b). Groundwater quality trends have been documented over approximately a decade of groundwater monitoring in most parts of the Site. The groundwater monitoring well network includes wells that were selected to monitor groundwater conditions along the perimeter of the Site along the San Francisco Bay, and additional groundwater monitoring wells in selected parts of the Site.

The current monitoring well network includes of six categories of wells:

1. Perimeter wells: wells located near the San Francisco Bay shoreline
2. IR Site 3 Contingency Trench wells: wells installed in the contingency trench in the IR Site 3 remediation area
3. IR Site 3 Contingency Trench Upgradient wells: wells installed in the area upgradient of the contingency trench in the IR Site 3 remediation area
4. UST wells: wells near "open" USTs, i.e., tanks for which regulatory closure has not yet been obtained
5. Drainage area wells: wells located at the base of major drainages that contain an open tank site or other sites
6. Drum Lot 2 wells: wells located in the northern portion of former Drum Lot 2, where volatile organic compounds (VOCs) are present in groundwater

The groundwater monitoring well network is presented on Figure 3. Construction details for groundwater monitoring wells are presented in Table 2.

Six Perimeter wells (wells MW11-100A, MW11-104, MW11-118, MW13+27, MW16+25, and MW11-88) were abandoned in August 2014 in preparation for IR Site 3 remediation activities. In July 2015, the groundwater extraction trench and the associated extraction wells in IR Site 3 were removed. One perimeter well, MW11-55R, sustained damage during remediation activities at IR Site 3 in the summer of 2015. When well MW11-55R was sampled in October 2015, it was determined that the well vault and top of casing sustained damage. A new well vault was installed in November 2015, during which time the top of casing was repaired. The new top of

casing elevation was surveyed prior to the wet-season sampling event in 2016. Beginning with the May 2016 sampling event, the new top of casing elevation was used when calculating groundwater elevation at monitoring well MW11-55R.

### 3.1.1 Drum Lot 2 Interim Remedial Measure Performance Monitoring Wells

Seven groundwater performance monitoring wells (MW31-02 through MW31-08) were installed in the Drum Lot 2/Building 87 Area between April and October 2012, to provide performance monitoring data for the interim remedial measure (IRM) implemented in this area to reduce concentrations of VOCs in groundwater (Terraphase 2013). Well construction details for these performance monitoring wells are presented in Table 2. These wells are not part of the RWQCB-approved groundwater monitoring network. The IRM performance monitoring wells were sampled quarterly from May 2012 to December 2014 to provide post-IRM groundwater data. The IRM Performance Evaluation was submitted to the RWQCB in October 2015 (Terraphase 2015).

### 3.1.2 IR Site 3 Remedial Measure Performance Monitoring Wells

A contingency trench was constructed in IR Site 3 as part of the remediation activities described in the RWQCB-approved Feasibility Study/Remedial Action Plan (FSRAP; Terraphase 2014). As required by Section 8.12 of the FSRAP (Terraphase 2014), seven groundwater performance monitoring wells were installed in the IR Site 3 contingency trench in October 2015, and five groundwater performance monitoring wells were installed upgradient of the contingency trench in August 2016. Both the Contingency Trench wells (MW11-122 through MW11-128) and the Contingency Trench Upgradient wells (MW11-129 through MW11-133) have been incorporated into the monitoring well network to provide performance monitoring data for the remedial activities conducted in IR Site 3. The IR Site 3 Contingency Trench wells were initially sampled during the wet-season sampling event in May 2016 and the Contingency Trench Upgradient wells were monitored for the first time in October 2016 for inclusion into this dry-season reporting period. Well construction details for these performance monitoring wells are presented in Table 2.

## 3.2 Groundwater Elevation and Fuel Product Thickness Measurements

Depth-to-groundwater and fuel-product-thickness measurements were made on October 20, 2016, and November 3, 2016. Depth-to-groundwater and fuel-product thickness were measured using an oil-water interface probe. The data were collected to assess groundwater elevation and flow direction, and the potential presence of free product.

## 3.3 Groundwater Sampling

Between October 19 and October 26, 2016, groundwater samples were collected from the groundwater monitoring wells and piezometers categorized as Perimeter wells, IR Site 3

Contingency Trench wells, IR Site 3 Contingency Trench Upgradient wells, and Drum Lot 2 wells, as listed in Table 2, with the exception of wells MW10-25 and MW11-131, which had insufficient water to sample during this dry season Reporting Period.

Groundwater samples were collected using low-flow purging techniques in all wells, except in wells MW01-03, MW10-21, MW10-23, MW11-02, MW11-130, MW11-132, MW29-01, MW29-03, MW30-08, and PZ11-76R, which were sampled using either the three-well-volume purge method or the purge-and-recharge method (Table 4). The three-well-volume purge method was used when the well did not meet low-flow purging criteria, i.e., when groundwater level could not be maintained during purging. The purge-and-recharge method was used if the well could not produce three well volumes of groundwater. The field sampling methods and procedures used during groundwater sampling were consistent with the GWMP.

Equilibration parameters, including water temperature, pH, turbidity, conductivity, oxidation-reduction potential, and dissolved oxygen were measured during well purging. Observations were made regarding sample color, odor, and turbidity. Copies of the water-quality sampling log sheets completed during the Reporting Period are included in Appendix D.

Groundwater samples were collected in sample containers provided by the analytical laboratory and were stored in an ice-chilled cooler for transport to the laboratory. Sample containers were labeled with the collector's initials, sample identification number (well identification), time of sample collection, date, location, sample type, analytical method, and preservative used. Complete chain-of-custody forms accompanied the samples to Curtis & Tompkins, Ltd., a California-certified analytical laboratory located in Berkeley, California.

### **3.4 Visual Inspection of Shoreline Area and Free Product Skimming**

The shoreline area downgradient of wells containing free product was inspected at low tide for the potential presence of seeps and sheens. Neither seeps nor sheens were observed. After groundwater sampling was completed, free product was skimmed from wells that contained free product of any quantity greater than a sheen.

Absorbent socks are currently being used in seven wells in the groundwater monitoring well network (MW10-23, MW10-24, MWT06-02, MWT05-02, MWT15-02, MWTB-01R, and MWT08-01). Absorbent socks have been used in wells MW10-23 and MW10-24 since August 2011 and in wells MWT06-02, MWT05-02, MWT15-02, MWTB-01R, and MWT08-01 since August 2014. In January 2015, a smaller-diameter absorbent sock was installed in well MWT08-01 to accommodate for a minor bend in the well casing.

The socks were slowly lowered into the wells to maximize exposure to the product layer, and were set to accommodate seasonal water level fluctuations. The absorbent sock in monitoring well MW10-24 was inspected biweekly and replaced as needed, i.e., if free product was

observed. The absorbent socks in other wells were inspected monthly and replaced as needed. Absorbent sock monitoring logs from the Reporting Period are presented in Appendix H.

### 3.5 Sample Analysis

Groundwater samples were analyzed for TPH fractions, estimated TPH with polar compounds (TPH+polars), and selected chlorinated VOCs.

In addition to the compounds listed above, the seven Contingency Trench wells and the five new Contingency Trench Upgradient monitoring wells in the IR Site 3 area were analyzed for the full list of Environmental Protection Agency (EPA) Method 8260 VOCs, as required by the FSRAP (Terraphase 2014).

#### 3.5.1 Total Petroleum Hydrocarbons

Groundwater samples were analyzed for the following TPH fractions:

1. TPH as diesel (TPH-diesel)
2. TPH as bunker fuel (TPH-bunker)
3. TPH as jet fuel (TPH-jet-fuel)

TPH fractions were quantified using EPA Method 8015B with SGC. Groundwater samples underwent a settling/filtering process prior to the analysis of TPH compounds. The settling/filtering process was used to reduce the effects of turbidity, which can be high in site samples. SGC is used to remove naturally occurring organic matter and other polar compounds, including polar compounds from TPH degradation. These processes were described in the *Final Addendum #1 to the Final Sampling and Analysis Plan* (Jonas and Associates 2006) and were approved by the RWQCB in a letter dated November 1, 2006.

#### 3.5.2 Estimated Total Petroleum Hydrocarbons Plus Polar Compounds

In accordance with the February 7, 2014, RWQCB comment letter, groundwater samples were also analyzed using EPA Method 8015B without SGC. Results for samples analyzed by EPA Method 8015B without SGC include TPH and polar compounds. Polar compounds include naturally occurring organic matter as well as metabolites from TPH degradation. EPA Method 8015B is calibrated to fresh, non-degraded, pure-phase petroleum products, e.g., diesel, bunker, and jet fuel. Therefore, polar compounds cannot be quantified using EPA Method 8015B. The difference between non-SGC and SGC analysis provides a *qualitative* indication of the presence of polar compounds but cannot be used to *quantify* polar compound concentrations. Therefore, apparent TPH concentrations measured in samples analyzed without SGC cannot be directly compared to FPALs. The results of groundwater analysis using EPA Method 8015B without SGC are described hereafter as “estimated TPH plus polar compounds” or “estimated TPH+polars.”

### 3.5.3 Chlorinated VOCs

Groundwater samples collected in the Drum Lot 2 area were analyzed for the following chlorinated VOCs, using EPA Method 8260B:

- chlorobenzene
- 1,1-dichloroethane
- 1,1-dichloroethene (1,1-DCE)
- 1,2-dichloroethane
- cis-1,2-dichloroethene (cis-1,2-DCE)
- trans-1,2-dichloroethene (trans-1,2-DCE)
- tetrachloroethene
- trichloroethene (TCE)
- vinyl chloride (VC)

## 4.0 GROUNDWATER MONITORING RESULTS FOR THE REPORTING PERIOD

This section provides a summary and discussion of the groundwater monitoring results for the Reporting Period, including groundwater elevations, groundwater flow direction, and groundwater analytical data.

### 4.1 Groundwater Elevations and Flow Direction

Site-wide groundwater elevation data are presented in Table 3 and on Figure 4. Table 3 also includes historical groundwater elevation data. Groundwater elevation data and contours for the Drum Lot 2 area are shown on Figure 5.

Groundwater elevation in the Perimeter wells ranged from 1.28 to 12.73 feet AMSL. Groundwater elevation in other wells varied substantially (from 2.36 to 366.64 feet AMSL) and generally reflected site topography. Dry-season 2016 groundwater elevations were compared with dry-season 2015 groundwater elevations. Out of 37 wells for which dry-season groundwater elevation data are available from both 2015 and 2016, five wells exhibited an increase in groundwater elevation of more than 0.5 foot, while 10 wells exhibited a decrease in groundwater elevation of more than 0.5 foot. The groundwater elevation measurements in the remaining 22 wells were within 0.5 feet of the dry-season 2015 measurements. The largest relative changes in groundwater elevation relative to October 2015 were observed in wells MWTB-01R and MW11-55R. The relative increase in groundwater elevation in well MWTB-01R was 4.80 feet. The groundwater elevation in well MW11-55R decreased by 3.54 feet relative to October 2015.

Based on the measured groundwater elevations, the predominant groundwater flow direction follows site topography, with groundwater moving from the hillside ridges toward the axes of drainage areas, and ultimately toward the Bay. Groundwater gradients vary depending on the proximity to the Bay shoreline, with highest gradients between wells situated on hillside ridges and wells in the axis of the drainages (i.e., drainage wells).

As mentioned earlier, only five wells exhibited a marked increase in groundwater elevation. The predominant trend is a decrease in groundwater elevation, relative to the dry-season measurements in 2016, which is likely due to the drought conditions during the Reporting Period at the Site.

### 4.2 Presence of Free Product

Free product was observed in one out of 51 wells during the dry-season sampling event (Tables 4 and 5; Figure 6). The thickness of the free product detected in this well (MWTB-01R) could not be measured due to the small quantity present. Well MWTB-01R contained free product during the dry-season sampling event and previously met criteria for the installation of

an absorbent sock, which was in place at the time of the sampling event and likely could have prevented an accurate product-thickness measurement.

During the most recent monthly field observation on December 14, 2016, free product was visible on the absorbent socks in six out of the seven wells monitored monthly. Free product was not detected in well MWT05-02 during the wet-season sampling event in May, but was observed when inspected on December 14. The presence of free product in well MWT05-02 in December is consistent with historical observations. Results of field monitoring and change-outs of absorbent socks are presented in Appendix H.

### 4.3 Groundwater Analytical Results

Analytical results for groundwater samples collected during the Reporting Period are presented below by well type and analytes. Data collected during the Reporting Period are presented on Figures 7 through 13. The RLs for TPH-bunker, TPH-diesel, and TPH-jet-fuel were generally 300, 50, and 50 micrograms per liter ( $\mu\text{g/L}$ ), respectively. Recent and historical analytical data for wells within the current monitoring network are summarized in Appendix A. Concentration trends graphs are presented in Appendix B. Analytical data reports are presented in Appendix C.

#### 4.3.1 Perimeter Wells

##### 4.3.1.1 Total Petroleum Hydrocarbons

All TPH concentrations in the Perimeter wells were below their respective FPALs. TPH was detected above reporting limits (RLs) in two out of 19 Perimeter wells sampled (Figure 7). The Perimeter well MW10-25 was not sampled during this dry season Reporting Period due to an insufficient quantity of water in the well. TPH-bunker was not detected above reporting limits (RLs) in any of the Perimeter wells.

TPH-diesel was reported in the following two Perimeter wells:

1. MW10-23
2. MW10-24

Reported TPH-diesel concentrations for these wells were 74 and 190  $\mu\text{g/L}$  respectively, which are below the FPAL for TPH-diesel (2,200  $\mu\text{g/L}$ ). Both sample concentrations were flagged by the analytical laboratory because the chromatograms did not match the laboratory diesel fuel standard.

TPH-jet-fuel was reported in the following Perimeter well:

1. MW10-24

The reported TPH-jet-fuel concentration for well MW10-24 was 86 µg/L, which is below the FPAL for TPH-jet-fuel (2,200 µg/L). This result was flagged by the analytical laboratory because the chromatogram did not match the laboratory jet fuel standard.

#### 4.3.1.2 *Estimated Total Petroleum Hydrocarbons Plus Polar Compounds*

Estimated TPH+polars were detected above RLs in 16 out of 19 Perimeter wells sampled. The perimeter monitoring well MW10-25 was not sampled during this dry-season Reporting Period due to an insufficient quantity of water in the well.

TPH+polars analyzed as TPH-bunker were reported in six out of 19 Perimeter wells sampled, at concentrations ranging from 520 to 23,000 µg/L (Figure 8). The result for well MW11-19 was flagged by the analytical laboratory because the chromatograms did not match the laboratory bunker fuel standard.

TPH+polars analyzed as TPH-diesel were reported in 16 out of 19 Perimeter wells sampled, at concentrations ranging from 51 to 9,600 µg/L (Figure 8). The results for all 16 wells were flagged by the analytical laboratory because the chromatograms did not match the laboratory diesel fuel standard.

TPH+polars analyzed as TPH-jet-fuel were reported in six out of 19 Perimeter wells sampled, at concentrations ranging from 62 to 4,100 µg/L (Figure 8). The results for all six samples were flagged by the laboratory because the chromatogram did not match the jet-fuel standard.

As noted in Section 3.5.2, polar compounds cannot be quantified using EPA Method 8015B. The difference between non-SGC and SGC analysis provides a *qualitative* indication of the presence of polar compounds but cannot be used to *quantify* polar compound concentrations. Therefore, apparent TPH concentrations measured in samples analyzed without SGC are not, and cannot be compared with FPALs.

### 4.3.2 IR Site 3 Contingency Trench Wells

#### 4.3.2.1 *Total Petroleum Hydrocarbons*

All TPH concentrations in the IR Site 3 Contingency Trench wells were below their respective FPALs. TPH was detected above RLs in two out of seven IR Site 3 Contingency Trench wells (Figure 9). TPH-bunker was not reported above the RLs in any of the IR Site 3 Contingency Trench wells.

TPH-diesel was reported in the following two Contingency Trench wells:

1. MW11-123
2. MW11-126

Reported TPH-diesel concentrations for these wells were 88 and 72 µg/L respectively, which are below the FPAL for TPH-diesel (2,200 µg/L). Both sample concentrations were flagged by the analytical laboratory because the chromatograms did not match the laboratory diesel fuel standard.

TPH-jet-fuel was reported in the following Contingency Trench well:

1. MW11-123

The reported TPH-jet-fuel concentration for well MW11-123 was 58 µg/L, which is below the FPAL for TPH-jet-fuel (2,200 µg/L). This result was flagged by the analytical laboratory because the chromatogram did not match the laboratory jet fuel standard.

#### 4.3.2.2 *Estimated Total Petroleum Hydrocarbons Plus Polar Compounds*

Concentrations of estimated TPH+polars were detected above RLs in all seven of the IR Site 3 Contingency Trench wells for all three TPH constituents (TPH-bunker, TPH-diesel, and TPH-jet-fuel) which were analyzed during the Reporting Period (Figure 10).

Concentrations for TPH+polars analyzed as TPH-bunker ranged from 3,700 to 16,000 µg/L.

Concentrations of TPH+polars analyzed as TPH-diesel ranged from 1,100 to 5,400 µg/L.

Concentrations for TPH+polars analyzed as TPH-jet-fuel ranged from 200 to 1,400 µg/L. All

detected concentrations of TPH+polars analyzed as TPH-diesel and TPH-jet-fuel were flagged by the analytical laboratory because the chromatograms did not match the laboratory standards for diesel and jet fuel.

As noted in Section 3.5.2, polar compounds cannot be quantified using EPA Method 8015B. The difference between non-SGC and SGC analysis provides a *qualitative* indication of the presence of polar compounds but cannot be used to *quantify* polar compound concentrations. Therefore, apparent TPH concentrations measured in samples analyzed without SGC are not, and cannot be compared with FPALs.

#### 4.3.2.3 *Volatile Organic Compounds*

The complete EPA Method 8260 list of VOCs were analyzed in samples collected from the seven wells installed in the IR Site 3 Contingency Trench (wells MW11-122 through MW11-128).

Benzene and ethylbenzene were detected in the sample collected from well MW11-123 at concentrations of 0.6 µg/L and 0.5 µg/L, respectively. Concentrations of VOCs were not detected above the respective RLs in any of the remaining Contingency Trench wells (Figure 12 and Appendix A, Table A-2).

### 4.3.3 IR Site 3 Contingency Trench Upgradient Wells

#### 4.3.3.1 Total Petroleum Hydrocarbons

All TPH results in the IR Site 3 Contingency Trench Upgradient wells were below their respective FPALs.

TPH was detected above RLs in one out of four IR Site 3 Contingency Trench Upgradient wells sampled (Figure 9). The upgradient well MW11-131 was dry at the time of the sampling event in October and therefore could not be sampled.

TPH-bunker, TPH-diesel, and TPH-jet-fuel were reported in one Contingency Trench Upgradient well, MW11-133, at concentrations of 1,300 µg/L, 770 µg/L, and 550 µg/L, respectively. All three results are below the FPAL of 2,200 µg/L. All three results were flagged by the analytical laboratory because the chromatograms did not match the laboratory diesel standard.

#### 4.3.3.2 Estimated Total Petroleum Hydrocarbons Plus Polar Compounds

Concentrations of estimated TPH+polars were detected above RLs in all four of the IR Site 3 Contingency Trench Upgradient wells sampled, for all three TPH constituents (TPH-bunker, TPH-diesel, and TPH-jet-fuel) which were analyzed during the Reporting Period (Figure 10). The upgradient well MW11-131 was dry at the time of the sampling event in October and therefore could not be sampled.

Concentrations for TPH+polars analyzed as TPH-bunker ranged from 1,600 to 24,000 µg/L. Concentrations of TPH+polars analyzed as TPH-diesel ranged from 530 to 9,400 µg/L. Concentrations for TPH+polars analyzed as TPH-jet-fuel ranged from 83 to 3,600 µg/L. Except for TPH+polars analyzed as TPH-diesel for well MW11-133, all detected concentrations of TPH+polars analyzed as TPH-diesel and TPH+polars analyzed as TPH-jet-fuel were flagged by the analytical laboratory because the chromatograms did not match the laboratory standard.

As noted in Section 3.5.2, polar compounds cannot be quantified using EPA Method 8015B. The difference between non-SGC and SGC analysis provides a *qualitative* indication of the presence of polar compounds but cannot be used to *quantify* polar compound concentrations. Therefore, apparent TPH concentrations measured in samples analyzed without SGC are not, and cannot be, compared with FPALs.

#### 4.3.3.3 Volatile Organic Compounds

The complete EPA Method 8260 list of VOCs was analyzed in samples collected from four out of the five wells upgradient of the IR Site 3 Contingency Trench. The upgradient well MW11-131 was dry at the time of the sampling event in October and therefore could not be sampled. VOCs were not detected above their respective RLs in wells MW11-129, MW11-130, or MW11-132. Six VOCs were detected in the sample collected from well MW11-133 (Figure 12).

The VOCs detected and the reported VOC concentrations in well MW11-133 were as follows:

- Isopropylbenzene: 6.3 µg/L
- m,p-Xylenes: 2.4 µg/L
- n-Butylbenzene: 1.6 µg/L
- Propylbenzene: 13 µg/L
- sec-Butylbenzene: 2.4 µg/L
- Toluene: 1.2 µg/L (µg/L)

Numerical cleanup goals for VOCs in groundwater for former NFD Point Molate are presented in Table 7 of the FSRAP (Terraphase 2014) and in the Fuel Product Action Level Development Report (TtEMI 2001). The VOCs include the following constituents and respective cleanup goal concentrations at a distance greater than 150 feet from wetland areas:

- Benzene: 650 µg/L
- Ethyl benzene: 1,000 µg/L
- Toluene: 2,100 µg/L
- Xylenes, total: 232,000 µg/L

The RWQCB Environmental Screening Level (ESL) Aquatic Habitat Goals for Saltwater Ecological Toxicity (RWQCB 2016) are as follows for the VOCs detected in well MW11-133:

- Isopropylbenzene: No ESL
- m,p-Xylenes: 100 µg/L (for total xylenes)
- n-Butylbenzene: No ESL
- Propylbenzene: No ESL
- sec-Butylbenzene: No ESL
- Toluene: 2,500 µg/L

VOC concentrations in well MW11-133 were below their respective cleanup goals for IR Site 3 and applicable RWQCB Environmental Screening Levels (RWQCB 2016) noted above.

#### 4.3.4 UST Wells

The dry-season event does not include the sampling of UST wells.

#### 4.3.5 Drainage Area Wells

The dry-season event does not include the sampling of drainage area wells.

#### 4.3.6 Drum Lot 2 Area

VOCs were analyzed in samples collected from seven wells in the Drum Lot 2 area, including two Perimeter wells (MW10-11 and MW10-12). Concentrations of VOCs were detected above RLs in four out of seven wells in the Drum Lot 2 area: MW01-03, MW10-11, MW29-01, and MW30-08

(Figure 11). The detected VOCs were TCE and TCE degradation products, including cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and VC.

The highest concentrations of TCE in Drum Lot 2 Area groundwater were detected in samples from wells MW29-01 and MW30-08, at 1.0 and 1.1 µg/L, respectively. The sample collected from well MW29-01 contained the highest concentrations of cis-1,2-DCE (17 µg/L), VC (16 µg/L), and trans-1,2-DCE (0.8 µg/L). The sample collected from well MW01-03 contained the highest concentration of 1,1-DCE (0.1 µg/L). VOC concentrations were below their respective Estuarine Environmental Screening Levels.

## 5.0 QUALITY CONTROL

The sampling and analysis activities for the Reporting Period sampling events were performed according to procedures described in the GWMP (Terraphase 2011b). The laboratory analyses were performed according to analytical methods, detection limits, and QA/QC procedures described in the GWMP.

In addition to laboratory QC samples, the following field QC samples were collected and analyzed:

1. Four field duplicate samples
2. Five equipment blanks
3. Two source water blanks
4. Four trip blank samples analyzed for VOCs

The QC procedures and data quality assessment are described in Sections 5.1 and 5.2, respectively. The QC evaluation of the analytical data, including results of laboratory and field QC samples, is summarized in Section 5.3. Appendix G includes the complete data validation reports.

### 5.1 QC Procedures

#### 5.1.1 Data Verification

Data collected were subjected to the data verification process that includes proofreading and editing hard copy data reports to ensure that data correctly represent the analytical measurement. In general, verification identifies non-technical errors in the data package that can be corrected (e.g., typographical errors). Data verification also includes verifying that the sample identifiers on laboratory reports (hard copy) match those on the chain-of-custody record.

#### 5.1.2 Laboratory QC Samples

Laboratory QC samples are used to:

1. Verify that procedures, such as sample handling, storage, and preparation, are not introducing variables into the process that could render the validity of samples questionable; and
2. Assess data quality in terms of precision and accuracy.

Laboratory QC samples included laboratory duplicates, laboratory blanks, matrix spike/matrix spike duplicates, and laboratory control sample/laboratory control sample duplicates, as

applicable, and other method-required QC samples. Each type of laboratory-based QC sample was analyzed at a rate of 5% or one per batch (a batch is a group of up to 20 samples analyzed together), whichever was more frequent. Results are included in the QC package for each analytical report (Appendix C).

### 5.1.3 Field QC Samples

Field QC samples were collected in general accordance with the GWMP, to evaluate the ambient sampling conditions, the thoroughness of the decontamination process, and the reproducibility of the field sampling techniques.

#### 5.1.3.1 *Field Duplicate Samples*

Field duplicate samples were collected from the same source and at the same time as the primary sample. Field duplicate results are used to evaluate the precision of the overall sampling and analytical system by comparing the relative percent difference (RPD) with the established RPD limit of 20%. Field duplicates were submitted to the laboratory and analyzed for the same parameters as the primary samples. Five groundwater field duplicate samples were collected and analyzed in the Reporting Period sampling event.

#### 5.1.3.2 *Trip Blank Sample*

Trip blank samples provided by the subcontracted laboratory accompanied the samples inside the coolers during the sampling event. At the end of each day of the sampling event, one set of the trip blank samples was submitted to the laboratory, along with the samples collected on that day, for VOC analysis to demonstrate that contamination was not originating from sample containers or other factors during sample transport.

#### 5.1.3.3 *Source Water Blank*

Two source water blank samples were collected during the Reporting Period event. Laboratory-supplied deionized water was used for both decontaminating equipment and the source-water blank samples. The source-water blank samples were analyzed to demonstrate that contamination was not originating from the laboratory-supplied deionized water.

#### 5.1.3.4 *Equipment Blank*

Six equipment blank samples were collected with reusable sampling equipment using the laboratory-supplied distilled water. The equipment blank samples were analyzed to demonstrate that contamination was not originating from decontamination procedures.

## 5.2 Data Quality Assessment

### 5.2.1 General Data Review

Field and laboratory data collected during the Reporting Period were reviewed per the criteria described in the GWMP. The laboratory analytical reports and case narratives were reviewed to verify correct sample designation, identification, and chain-of-custody records, and to ensure that analytical method, holding time, and detection limit requirements were met.

### 5.2.2 Laboratory Data Validation

Analytical data were reviewed and data validation reports were prepared by Terraphase (Appendix G). Analytical data were reviewed in general accordance with the principles for data validation presented in the *U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Data Review* (U.S. EPA 2008) and the *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Laboratory Data Review* (U.S. EPA 2004). The data were reviewed in the following areas to evaluate potential impact on data quality:

1. Data Completeness
2. Analytical Holding Times and Sample Preservation
3. Field and Laboratory Blank Samples
4. Laboratory Control Samples
5. Matrix Spike/Matrix Spike Duplicate Samples
6. Surrogate Compound Recovery
7. Compound Quantitation

Except as noted in the data validation reports, the analytical data obtained during this sampling event are valid for the intended monitoring purposes.

## 5.3 QC Evaluation of the Analytical Data

This section presents the results of the evaluation of both field and laboratory QC checks. The evaluation of the validated data sets includes a comparison of the targeted data results with the data results through the use of precision, accuracy, representativeness, completeness, and comparability parameters.

### 5.3.1 Field QC Samples

All field QC sample results (duplicates, equipment blanks, trip blanks, and source blanks) have been reviewed. No contaminants were found in the trip blank samples or equipment blank samples.

Source blank sample SB-10192016 was submitted in laboratory job number 282368. TPH+polars analyzed as TPH-bunker and TPH-bunker were detected in the source blank sample at concentrations of 500 µg/L and 330 µg/L, respectively. Sample SB-10192016 is associated with both the equipment blank sample EB-10192016 in laboratory job number 282368 and the equipment blank sample EB-102016 under laboratory job number 282415. TPH+polars analyzed as TPH-bunker was detected in the associated sample MW11-19, but was not detected in the associated equipment blank, EB-10192016. Because SB-10192016 and EB-10192016 were derived from the same source, the detections in the source blank are considered an anomaly, and no results were qualified.

For all field duplicate samples, RPDs were within 20% for reported compounds, with the exception of samples MW11-128-D and MW11-129-D. Sample MW11-128-D, a field duplicate of sample MW11-128, had a calculated RPD of 24% for TPH-diesel. Sample MW11-129-D, a field duplicate of MW11-129, had a calculated RPD of 22% for TPH-bunker.

### 5.3.2 Precision and Accuracy

The procedures in this section are designed to assess QC data for blanks, duplicates, spikes, and surrogates. The review of these data provides information concerning the precision and accuracy measurements conducted by the laboratories and field procedures.

#### 5.3.2.1 Laboratory Method Blanks

In laboratory report 282694, N-butylbenzene was detected above the reporting limit in the method blank for batch 240832 and batch 240872; this analyte was not detected in the associated samples above the reporting limit.

#### 5.3.2.2 Surrogate Spikes

All percent recovery values for surrogate compounds were within acceptable criteria established by the laboratory for the respective testing methods.

#### 5.3.2.3 Blank Spike/Blank Spike Duplicates

Results for blank spike/blank spike duplicates that were prepared and analyzed by the laboratory were within control limits.

#### 5.3.2.4 *Matrix Spike/Matrix Spike Duplicates*

Percent recovery results for matrix spike samples that were prepared and analyzed by the laboratory were within control limits, with the following exception:

- Low recovery was observed for 1,1-dichloroethene in the matrix spike for batch 240871. The parent sample was not a project sample, the LCS was within limits, and the associated RPD was within limits.

#### 5.3.3 Representativeness

Representativeness is the reliability with which a measurement or measurement system reflects the true conditions under investigation (U.S. EPA 2008). Representativeness is influenced by the number and location of the sampling points, sampling timing and frequency of monitoring efforts, and the field and laboratory sampling procedures (U.S. EPA 1996).

The representativeness of data was enhanced using established field and laboratory procedures and their consistent application. Samples that were collected are considered to be representative of the location of sample collection.

#### 5.3.4 Completeness

The completeness of the data is described as a ratio of the amount of data expected from the field program versus the amount of valid data received. Valid data are considered to be data that have not been rejected (were not R-qualified) either from data validation or internal data review. Completeness can be expressed as the percentage of valid results relative to the total number of requested results.

Based on the data validation reports, none of the results were rejected in the Reporting Period sampling event. The completeness of the sample sets submitted for analysis is 100%, which exceeds the completeness goal of 90% set for this project.

#### 5.3.5 Comparability

Comparability evaluates whether the reported data are comparable with similar data reported by other organizations. The comparability of the laboratory results was found to be acceptable. All units were consistent and appropriate for the matrix sampled.

Comparability also involves comparing data to previous sampling events at the same locations. Results from the Reporting Period sampling event generally indicate good comparability with previous sampling events.

## 6.0 SUMMARY OF FINDINGS AND DISCUSSION OF TEMPORAL TRENDS

Data collected during the Reporting Period are summarized in the following sections and compared with historical data. A comprehensive summary of historical and Reporting Period data is presented in Appendix A and concentration trend graphs are presented in Appendix B.

### 6.1 Free Product

Historical and Reporting Period free-product-thickness data are presented in Table 5. This table includes only wells that (a) are part of the current monitoring network, and (b) contain, or have in the past contained, free product. Temporal graphs of free product thickness were prepared for wells that contained free product during the Reporting Period (Appendix F).

As presented in Section 4.2, free product was detected in one out of 51 wells during the Reporting Period sampling event. Absorbent socks have been installed in seven wells which have historically had free product detections, which limits the ability to accurately measure free product thickness. A summary of the free product detection in this well is presented below.

1. Free product was detected in well MWTB-01R during the Reporting Period, but product thickness could not be determined due to the small quantity of free product. Since 2008, free product thickness in this well has ranged from 0 to 0.72 foot, with an average thickness of 0.08 foot during the past 17 years.

Of the current monitoring network wells, wells MWT02-03, MWT13-02, MWT18-01, MWT19-01, MWTC-01R, MW02-07, and MW03-02 previously contained free product but did not contain free product during the Reporting Period.

### 6.2 Total Petroleum Hydrocarbons

Of the total 37 wells, 32 were scheduled to be sampled for TPH during the Reporting Period (five of seven Drum Lot 2 wells were sampled for VOCs only). Two of those 32 wells contained insufficient water for sampling (MW10-25 and MW11-131). Therefore, 30 wells were sampled site-wide for TPH. Of these 30 samples, all TPH concentrations measured following SGC were either below their respective laboratory reporting limits or below FPALs.

In some cases, a large difference in concentrations was observed between the SGC and non-SGC results. Also, the chromatograms for the non-SGC samples generally did not resemble the laboratory standards. These observations are consistent with the presence of polar compounds, resulting from TPH degradation. TPH concentration trends from 2011 through the Reporting Period are graphically presented in Appendix B.

TPH concentrations generally decreased or remained stable relative to the October 2015 sampling results.

### 6.3 Total Petroleum Hydrocarbons Plus Polar Compounds

Estimated TPH+polars concentration data are also presented in Appendix B. At this time, at most nine data points exist for each well since dry-season 2014. Therefore, trends are based only on the most recent data points for TPH+polars concentration. TPH+polars concentrations generally decreased or remained stable relative to the October 2015 sampling results for the wells sampled. There was an increase in TPH+polars concentrations in wells MW10-10 and MW10-24.

### 6.4 Volatile Organic Compounds

Seven wells in the Drum Lot 2 Area were sampled for VOCs in October 2016. VOCs were detected above the RLs in four of these wells, with cis-1,2-DCE being the VOC present at highest concentrations, ranging from non-detect to 17 µg/L. TCE was detected in four of the seven wells with concentrations ranging from 0.3 J (J indicates analyte was detected at a concentration below the RL) to 1.1 µg/L, which is lower than the range of TCE concentrations measured in these wells since May 2013.

The TCE concentration in well MW29-01 during the Reporting Period (1.0 µg/L) was lower than that detected in May 2015 (6.5 µg/L) and was consistent with the dry-season 2015 Reporting Period result (0.9 µg/L), which was the lowest concentration measured in this well in the past 14 years. The TCE concentration in well MW01-03 during the Reporting Period (0.3 µg/L) was the lowest concentration measured in this well since May 2014.

The presence of TCE degradation products in Drum Lot 2 wells indicates that reductive dechlorination is taking place. In well MW29-01, the ratio of cis-1,2-DCE to TCE steadily increased from 0.25 in May 2013 to 8.1 in the May 2014 event, and 12.46 in May 2015, to 20 in May 2016. The ratio of VC to cis-1,2-DCE in MW29-01 increased from 0.10 in the October 2014 event to 2.48 in the October 2015 event and then decreased to 0.94 during this Reporting Period.

The ratio of cis-1,2-DCE to TCE increased in well MW30-08, from 3.25 in May 2014, then decreased to 1.85 during the May 2015 event and increased again to 4.67 in May 2016. The ratio of VC to cis-1,2-DCE in well MW30-08 (1.05) has increased since the October 2015 event (0.52) but has decreased slightly since the May 2016 event (1.5).

The general decrease in VOC concentrations in Drum Lot 2 Area wells and the increases in cis-1,2-DCE and VC concentrations are indicative of continuing enhanced reductive dechlorination, resulting from the implementation of the IRM completed between November 5, 2012, and January 4, 2013 (Terraphase 2013). Subsequent decreases in cis-1,2-DCE and VC indicate that reductive dechlorination is proceeding towards completion. Data from performance monitoring in Drum Lot 2 were presented in the IRM Performance Evaluation, submitted to the RWQCB in October 2015 (Terraphase 2015). All VOC concentrations measured

during the Reporting Period were below the Estuarine Environmental Screening Levels, which were the cleanup goals for the IRM.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Annual Data Summary

Groundwater elevation in the Perimeter wells ranged from 0.97 to 14.77 feet AMSL during the wet-season event and from 1.28 to 12.73 feet AMSL during the dry-season event. Groundwater elevation in other wells varied substantially during both events, from 3.20 to 368.80 feet AMSL and from 2.36 to 366.64 feet AMSL, respectively, and generally reflected the Site topography.

Free product was observed in the wet-season and dry-season events in five wells and one well, respectively. Only one well (MWTB-01R) contained free product during both the wet-season and dry-season events. The free product thickness could not be measured in any of the wells in which it was detected, likely due to the free product being absorbed by the absorbent socks, which are installed and maintained in those wells containing free product.

During the wet-season and dry-season events, all TPH concentrations were either below their respective laboratory reporting limits or below FPALs, with the exception of the TPH-diesel concentration in UST well MWT13-02 in May 2016. The concentration was 22,000 µg/L, which was equal to the FPAL of 22,000 µg/L. TPH concentrations in 2016 generally either decreased or remained stable relative to those detected in 2015.

Chlorinated VOCs were detected in four of the seven monitoring network wells sampled during both the wet-season and dry-season events. Chlorinated VOCs were detected in wells MW01-03, MW10-11, MW29-01, and MW30-08. Cis-1,2-DCE was present at the highest concentration of all VOCs, ranging from non-detect to 24 µg/L during the wet-season event and from non-detect to 17 µg/L during the dry season event. VC was present at concentrations ranging from non-detect to 19 µg/L during the wet-season event and from non-detect to 16 µg/L during the dry season event. TCE was also present at concentrations ranging from non-detect to 1.3 µg/L during the wet-season event and from non-detect to 1.1 µg/L during the dry-season event. In general, a long-term decreasing trend has been observed in the TCE concentrations. In addition, an increase in cis-1,2-DCE and VC concentrations in 2016 is indicative of reductive dechlorination of VOCs occurring at the site. The concentrations of VOCs in samples collected from the IR Site 3 Contingency Trench wells and Contingency Trench Upgradient wells were largely non-detect.

### 7.2 Conclusions

Groundwater elevations and groundwater flow direction measured during the Reporting Period were similar to historical measurements. Minor amounts of free product were detected in one out of 46 wells during the groundwater monitoring event within the Reporting Period. The thickness of free product detected in this well could not be measured due to the small quantity. This observed free product thickness is lower than the free product thickness measured during previous reporting periods, and is in part due to the presence of absorbent socks.



February 9, 2017

Ms. Margarete Beth  
California Regional Water Quality Control Board  
San Francisco Bay Region  
1515 Clay Street, Suite 1400  
Oakland, California 94612

Subject: Fourth Quarter 2016 Underground Storage Tank (UST) Monitoring Report, Former Naval Fuel Depot Point Molate, Richmond, California

Dear Ms. Beth,

On behalf of the City of Richmond, Terraphase Engineering Inc. (Terraphase) has prepared the attached Fourth Quarter 2016 Underground Storage Tank (UST) Monitoring Report. This report describes the activities and status for the ongoing monitoring and maintenance program for USTs 1 through 20 at the former Naval Fuel Depot Point Molate located in Richmond, California. The inspections were conducted in accordance with the Final Post-Closure UST Maintenance and Monitoring Plan (PMMP) (ITSI 2005).

If you have any question or comments regarding this report, please contact Tomer Schetrit at (510) 645-1850.

Sincerely,  
For Terraphase Engineering Inc.

A handwritten signature in black ink, appearing to read 'T.S.', located below the typed name Tomer Schetrit.

Tomer Schetrit, P.E. (C81411)  
Senior Project Engineer

A handwritten signature in black ink, appearing to read 'Jennifer Repa', located below the typed name Jennifer Repa.

Jennifer Repa  
Senior Staff Engineer

cc: Carlos Privat, City of Richmond  
Craig Murray, City of Richmond  
Jim Whitcomb, BRAC Program Management Office  
Jim Hanson, PMCAC  
Joan Garrett, PMCAC  
Lori Braunesreither, Contra Costa County Environmental Health Services

Attachments: 4th Quarter 2016 Underground Storage Tank (UST) Monitoring Report



**4<sup>th</sup> QUARTER 2016 MONITORING REPORT  
UNDERGROUND STORAGE TANKS  
FORMER NAVAL FUEL DEPOT POINT MOLATE,  
RICHMOND, CALIFORNIA**

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*Prepared on Behalf of*

City of Richmond  
450 Civic Center Plaza  
Richmond, California

*Prepared by*

Terraphase Engineering Inc.  
1404 Franklin Street, Suite 600  
Oakland, California

February 9, 2017

Project Number 0078.001.033





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## Acronyms and Abbreviations

bbf	barrel
BAI	Barajas and Associates, Inc.
BRAC	Base Realignment and Closure
CCHSD	Contra Costa Health Services Department
FOSET	Finding of Suitability for Early Transfer
ITSI	Innovative Technical Solutions, Inc.
JP-5	jet propellant grade 5 fuel
MSL	mean sea level
NFD	Naval Fuel Depot
ORS	oil recovery system
PMMP	Post-Closure UST Maintenance and Monitoring Plan
RWQCB	California Regional Water Quality Control Board, San Francisco Bay Region
Terraphase	Terraphase Engineering Inc.
TtEMI	Tetra Tech EM Inc.
UST	underground storage tank
VP	valve pit



## 1.0 INTRODUCTION

On behalf of the City of Richmond, Terraphase Engineering Inc. (Terraphase) has prepared this Underground Storage Tank (UST) Quarterly Monitoring Report to summarize the monitoring conducted on a monthly and quarterly basis as part of the ongoing monitoring and maintenance of USTs 1 through 20 at the former Naval Fuel Depot (NFD) Point Molate in Richmond, California. The inspections were conducted in accordance with the final Post-Closure UST Maintenance and Monitoring Plan (PMMP) (ITSI 2005).

## 2.0 HISTORY OF UST OPERATIONS AT NFD POINT MOLATE

The former NFD Point Molate was a fuel storage facility that had the capacity to store more than 40 million gallons of fuel. Prior to closure, the facility mainly held jet propellant grade 5 fuel (JP-5) and marine diesel fuel. Historically, other fuels were stored at the depot, including bunker fuel and aviation gasoline. Fuel was transferred to and from the facility by offloading and onloading ships and barges at the depot fuel pier, as well as through the Santa Fe Pacific Pipeline transfer station.

The former NFD Point Molate is on the San Pablo peninsula (Figure 1), approximately 1.5 miles north of the Richmond-San Rafael Bridge in the City of Richmond, Contra Costa County, California. Former NFD Point Molate covers approximately 412 acres in the Potrero Hills along the northeastern shore of San Francisco Bay of which 140 acres are submerged within San Francisco Bay. The San Pablo peninsula is the land mass between San Pablo Bay and San Francisco Bay. Former NFD Point Molate contains approximately 1.6 miles of shoreline, and its property extends into the adjacent hillsides to the top of the San Pablo ridge. Topography at the facility ranges from flat, filled areas (reclaimed tidal areas) near the Bay to steep, dissected slopes of nearly 500 feet above mean sea level (MSL) in elevation. The facility is bordered to the north, south, and east by the Chevron Corp. Richmond refinery (Chevron Richmond refinery) and to the west by San Francisco Bay.

Fuel storage and transfer operations at the facility ceased in May 1995. Former NFD Point Molate became a closing base under the Base Realignment and Closure (BRAC) IV program in September 1995, and operational closure of the facility occurred in September 1998. In September 2003, approximately 372 acres of the depot were transferred to the City of Richmond under a Finding of Suitability to Transfer (Navy 2003). The remaining 40 acres of the 412-acre federal facility were transferred to the City on March 29, 2010 on the basis of a Finding of Suitability for Early Transfer (FOSET; Navy 2008).

The Navy closed in place (without filling with concrete or other material) USTs 1 through 20, due to the large size and the good condition of the USTs. Tanks B and C were removed due to their relatively smaller size, central location, and history of bunker fuel releases near Tank B. The *Underground Storage Tank and Hillside Pipeline Closure Conceptual Design* (TtEMI, 1999), was reviewed by the Hazardous Materials Programs office at the Contra Costa Health Services Department (CCHSD), the City of Richmond, and the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). CCHSD, the agency overseeing structural closure of the USTs, officially approved the conceptual plan in a letter dated 23 July 1999.

CCHSD approved final closure in place of USTs 1 through 20 in a letter dated 24 February 2005; CCHSD also recognized that associated fuel product pipelines and valves were cleaned and rendered inoperable, and that Tanks B and C were completely removed. To date, USTs 1, 4, 7, 9, 10, 11, 12, 14, 16, 17 and 20 have received environmental closure (NFA) letters from the RWQCB. The remaining USTs (USTs 2, 3, 5, 6, 8, 13, 15, 18, and 19) have not received

environmental closure from the RWQCB. Regardless of the closure status of the USTs with the RWQCB, they require on-going maintenance and monitoring to reduce the chances that they will become a physical hazard. This report describes the monitoring and maintenance for USTs 1 through 20.

USTs 1 through 20 each have a capacity of approximately 50,000 barrels (bbls), which is equivalent to 2.1 million gallons. Figure 2 is a site plan showing the locations of the USTs and appurtenances at the former NFD Point Molate.

Between 1943 and 1975, bunker fuel, marine diesel fuel, and JP-5 were stored at the former NFD Point Molate. Between 1975 and 1995, the northern portion of the facility (USTs 1, 2 and 5 through 13) was used to store and transfer diesel fuel. The southern portion of the facility (USTs 3, 4 and 14 through 19) was used to store and transfer JP-5. UST 20 stored bunker fuel from 1943 to 1975, and stored naval ballast, sediment and wastewater from 1975 to 1995.

USTs 1 through 20 were constructed between 1942 and 1943 by blasting bedrock in the hillside to create "benches" for the USTs. Concrete was poured into wooden forms built on the benches, apparently in direct contact with bedrock. The UST floors, walls, and roof support columns were constructed; the concrete roofs were then installed. Completed USTs were covered with varying amounts of fill (four to eight feet); fill materials were presumably blasted rock and locally-derived excavated fill. Appendix A includes a more detailed description of UST construction, as excerpted from the *Final Report, Structural Integrity Evaluation of Underground Storage Tanks at Naval Fuel Depot, Point Molate, Richmond, California* (AGS, 2000).

Approximate dimensions of USTs 1-20 are as follows:

- Each tank has an interior clear diameter of 135'-4".
- Each tank has an interior clear height of 20'-0".
- Each tank has roof and floor slabs 1'-4" and 1'-6" thick, respectively.
- Tank walls are 1'-6" thick up to 10'-0" in height and 1'-3" thick above that.

Each UST was constructed with a perimeter drain surrounding the tank bottom. Original design drawings indicate that each drain consisted of open joint tiles placed in a gravel bed. Each drain was laid on a slope to fall approximately 12 inches from the upper (uphill side) UST perimeter to the lower (downhill side) perimeter. Water collected by these drains was to the oil recovery system (ORS; TtEMI, 2002). The purpose of the perimeter drains was to prevent infiltrating surface water from accumulating in the backfill outside of the UST walls. Figure 3 is a typical cross section of a UST at former NFD Point Molate.

### 3.0 SITE INSPECTIONS

The PMMP requires:

- Monthly inspections of the gates, locks, and fences.
- Quarterly inspections of the vegetation for erosion control; surface grade for erosion control; UST systems (ground surface, French drain outfalls, and tank vents); and groundwater monitoring wells.
- Biannual (Two-year) inspections of the UST interiors for standing water.
- Five-year structural inspections, structural inspections after significant loading events, and structural inspections after major seismic events. The next 5 year inspection is scheduled for 2017.

The purpose of the site inspections is to conduct the inspection tasks established in the Final PMMP (ITSI 2005), including: security, erosion control, condition of the UST systems, and condition of the groundwater monitoring wells to identify conditions that may warrant maintenance or repair. Appendix A provides an overview of systems observations of the USTs made during the inspections. Recommendations for repairs that could not be completed during the site inspection are provided at the end of page 2 in Appendix A. Individual UST sites are referred to by tank number (e.g., UST 6). Appendix B provides an overview of erosion control/ground surface observations of the USTs made during the inspections. Recommendations for repairs that could not be completed during the site inspection are provided on page 2 in Appendix B.

The location of tanks, monitoring wells, and French drains are shown on Figure 2. Summary table of the inspection field notes are provided in Appendix A.

Observations made during the quarterly inspection can be found in Appendices A, B and C.

#### 3.1 Monthly Inspection of Gates, Locks, and Fences

The gates, locks, and fences along Stenmark Drive that provide security for the UST sites are inspected to make sure they are in good condition, locked, and secure.

If locks are rusted or are missing, or if gates or fences are in disrepair, the City of Richmond must be notified that repairs should be made.

Observations recommendations for the monthly inspections of the gates, locks, and fences performed on October 20, November 17, and December 14, 2016:

- The gates, locks, and fences for gates 7 and 15 through 19 are in good condition, locked, and secure.
- Gate 23 is under constant surveillance as it is located next to the guard house (Building 123).

## 3.2 Quarterly Inspection of Erosion Control

### 3.2.1 Vegetation

Vegetation protects the soil surface from wind and water erosion, improves slope stability, and improves visual aesthetics. A site-specific hydroseed mix that includes drought-tolerant native plant seeds has been used for providing a vegetative cover at the UST sites.

Vegetation on UST sites are inspected for bare spots, signs of stress, color changes, etc. and areas of both healthy and sickly growth are noted on a quarterly basis.

If significant bare spots are found, the bare spots must be reseeded or planted in accordance with the specification for hydroseeding. Irrigation during the establishment period must be provided, as necessary.

#### Recommended actions:

None

### 3.2.2 Surface Grade

Uniformity of the slight grade on top of the USTs mitigates erosion and reduces surface water infiltration.

The soil cover is inspected for erosion, visible depressions, ponded water, cracks, slope failure, and grade on top of the USTs to see if there was a uniformity of the slight (0.5 percent to 1 percent) grade on a quarterly basis.

Erosion must be mitigated. Visible depressions and cracks must be backfilled. Slope failures must be mitigated by backfilling and placing rip-rap or other erosion-limiting engineered control.

#### Recommended actions:

Monitor SW side of tank 4 lacking vegetation. Monitor southern edge of Tank 5, loose dirt is visible, vegetation is uprooted and rebar visible. Dirt is accumulated in the French Drains of USTs 11, 12, 13, 14 and 20, monitor slope erosion.

## 3.3 Quarterly Inspection of UST Systems

### 3.3.1 Ground Surface

The structural integrity of the USTs can be compromised by surface loads. Loading by structures, vehicles, and debris is prohibited. Overloading is a serious condition that could lead to catastrophic failure and must be addressed by a licensed structural engineer.

Ground surfaces of the USTs are inspected for surface loads including structures, signs of vehicle traffic, and dumping of debris on a quarterly basis.

Any objects, debris, or material that represents a load to the USTs must be removed. If a UST has been significantly overloaded, a structural inspection must be conducted.

Recommended actions:

Monitor animal burrows on Tanks 3, 4 and 19. Monitor 3" wide 3' long fissure in topsoil on top of tank 14 near the SE French drain path. Re-install the "Keep off" sign on UST 7.

### 3.3.2 Tank Vents

The aboveground vent at each UST provides equilibrium of the UST atmosphere with the outside atmosphere and allows for humidity to escape the UST interior.

The vents are inspected for signs of vandalism and to assure that the vent opening was intact on a quarterly basis.

Vents must be repaired as required. Any object in the vent opening must be removed.

Recommended Actions:

The vents on USTs 1, 18 and 19 show minor indications of vandalism and are in need of repair. The remainder of the UST vent openings were intact and unobstructed.

### 3.3.3 French Drain Outfalls

French drains at each UST are intended to direct surface water infiltration away from the structural joint between the tank ceiling and upper sidewalls. Rip-rap is located at each outfall to reduce erosion. French drain outfalls are inspected for vandalism or displacement on a quarterly basis.

Blockages of the drain pipe must be removed. Riprap must be replaced in kind. Small vegetation growing into the rip-rap is beneficial and should not be removed.

Recommended Actions:

The West Drain at UST 6 and the South drain at UST 15 could not be located. It is suspected that they were previously destroyed or were never constructed by the Navy. The west drain at UST 16 was not located due to overgrowth. Detailed observations of the tanks can be found in Appendix A.

Loose vegetation and sediment have accumulated near the French drain outlets at a number of USTs including: 1, 6, 7, 11, 12, 13, 14, 15,19 ,20. Vegetation and sediment should be cleared to allow for proper drainage.

### **3.4 Quarterly Inspection of Groundwater Monitoring Wells**

There are groundwater monitoring wells adjacent to many of the USTs. The well casings are typically completed aboveground and protected with a standpipe. The wells are locked with keyed padlocks.

The surface completions of the monitoring wells are inspected for general condition on a quarterly basis. The standpipe covers are opened, well casings and well caps are inspected, and grout surrounding each casing is inspected.

If standing water is present in the well standpipes, it must be removed from the standpipe and the condition allowing water to accumulate should be mitigated. If casing caps are missing, they should be replaced. If grout is cracked, it should be removed and replaced.

#### Recommended Actions:

None

### **3.5 Biannual Interior Inspections for Standing Water**

Every two years the manhole covers are removed on each UST and the interiors are inspected for standing water and sheen.

The biannual observations for standing water in USTs 1 through 20 were not conducted as part of this second quarter monitoring period. The biannual interior investigation was conducted in the 3<sup>rd</sup> quarter of 2015.

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