

Final

# ANNUAL LANDFILL CAP OPERATION AND MAINTENANCE REPORT FOR 2010-2011

Parcel E-2, Industrial Landfill

Hunters Point Naval Shipyard, San Francisco, California

August 17, 2011

Prepared for:



**Base Realignment and Closure  
Program Management Office, West**  
1455 Frazee Road, Suite 900  
San Diego, California 92108

Prepared under:

**Naval Facilities Engineering Command Southwest**  
1220 Pacific Highway  
San Diego, California 92132  
Contract Number N68711-05-D-6403, CTO-0012  
Navy Document Control Number ITSI-6403-0012-0167



---

Brett Womack, Project Manager

# TABLE OF CONTENTS

TABLE OF CONTENTS.....	i
LIST OF FIGURES .....	i
APPENDICES .....	i
ACRONYMS AND ABBREVIATIONS.....	ii
1.0 INTRODUCTION .....	1
2.0 OPERATION AND MAINTENANCE PROCEDURES.....	1
2.1 OPERATION OF THE CAP IRRIGATION SYSTEM.....	1
2.2 MAINTENANCE .....	2
2.2.1 General Site Inspection.....	3
2.2.2 Vegetative Cover Inspection.....	5
2.2.3 Soil Erosion Control .....	6
2.3 HEALTH AND SAFETY.....	6
3.0 CONTINGENCY PLANS .....	7
3.1 EARTHQUAKES.....	7
3.2 FLOODS OR MAJOR STORMS.....	7
3.3 FIRE.....	7
4.0 REFERENCES .....	7

## LIST OF FIGURES

- 1 Site Location and Layout
- 2 Parcel E-2 Landfill Cap

## LIST OF APPENDICES

- A General Site Inspection Checklists
- B Vegetative Cover Inspection Checklists
- C Inspection Photos

## ACRONYMS AND ABBREVIATIONS

29 CFR	Title 29 of the Code of Federal Regulations
BRAC	Base Realignment and Closure
CFR	Code of Federal Regulations
CSO	Caretaker Site Office
HPNS	Hunters Point Naval Shipyard
IR-01/21	Installation Restoration Site 01/21
ITSI	Innovative Technical Solutions, Inc.
Navy	U.S. Department of the Navy
O&M	operation and maintenance
OMP	Operation and Maintenance Plan
OSHA	Occupational Safety and Health Administration
P.G. & E.	Pacific Gas and Electric
PVC	polyvinyl chloride
TtECI	Tetra Tech EC, Inc.
Tetra Tech	Tetra Tech EM, Inc.

## 1.0 INTRODUCTION

Innovative Technical Solutions, Inc. (ITSI), was awarded Task Order CTO-0005 from the U.S. Department of the Navy (Navy), Base Realignment and Closure Program Management Office West, under Contract Number N68711-02-D-8303, to provide technical support at Hunters Point Naval Shipyard (HPNS) in San Francisco, California. A brush fire occurred at the Industrial Landfill in Installation Restoration Site 01/21 (IR-01/21) within Parcel E-2 at HPNS (Figure 1 and Figure 2) in August 2000. During the fire, some subsurface smoldering occurred, and an interim landfill cap was constructed to cut off the oxygen supply to combustible materials in the landfill. Under CTO-0012, ITSI is maintaining this interim cap.

The Operation and Maintenance Plan (OMP; Tetra Tech, E.M., Inc. [Tetra Tech], 2003) describes the procedures required to ensure the integrity of the interim landfill cap, as well as contingency plans associated with earthquakes, floods or major storm events, and fires. This report discusses the maintenance events performed during the period from August 2010 through July 2011, and contains the documents generated during those activities, as directed by the OMP.

## 2.0 OPERATION AND MAINTENANCE PROCEDURES

This section discusses the operation and maintenance (O&M) procedures performed to ensure maintenance of the landfill cap.

### 2.1 LANDFILL CAP IRRIGATION

The landfill cap formerly was equipped with an irrigation system that was designed to provide sufficient moisture for vegetative growth on the landfill cap as well as to minimize the risk of fire.

During a routine inspection performed on the irrigation system in April 2007, it was found that numerous repairs were necessary before system operation could be initiated for the dry season. The required repairs included:

- repairing or replacing broken/ruptured polyvinyl chloride (PVC) water lines and fittings;
- replacing broken or missing sprinkler heads;
- replacing failed solenoid valves; and
- correcting wiring faults and other electrical problems.

When repairs were completed on April 9, 2007, the system was fully operational, with the automatic timer programmed to water the landfill cap vegetative cover four days a week (Monday through Thursday), for six hours a day (18 rows of sprinklers are installed, with

each row operating for 20 minutes). The sprinkler system was active until November 2, 2007, by which time the vegetative cover was receiving enough moisture from rainfall to keep fire risk at a minimum.

Annual repairs similar to those described above were conducted in April 2008, and the system was reactivated on April 21 2008, as rainfall had decreased significantly and irrigation was again necessary.

During the periods when the irrigation system was operational, inspections were performed two to four times a week, to identify any weak points or malfunctions in the system. As much as possible during these inspections, appropriate repairs were made immediately to any non-operational items such as sprinkler heads, PVC lines, or solenoids, in order to keep the cap irrigation system functional and the vegetative cover adequately watered.

Beginning in May 2008, a series of vandalisms and thefts by unauthorized personnel trespassing on the site rendered the irrigation system inoperable. Initially, the damage was limited to minor vandalism of the pump assembly, which required repair three times in May 2008. Then, over the weekend of May 24, 2008, the entire network of copper wiring was stolen and the Pacific Gas & Electric (P.G. & E.) service drop was damaged, leaving the irrigation system without power. It was decided by the Navy that a temporary solution of irrigating the landfill cap with a water truck would be employed until a permanent security system was in place to prevent future vandalism and/or thefts.

Since June 26, 2008, the entire cap has been watered by water truck, with a common frequency of once per week during dry seasons, and on an as-needed basis during wet seasons.

## **2.2 MAINTENANCE**

Personnel conducting maintenance activities are compliant with the following requirements:

- 40-hour health and safety training in accordance with the hazardous waste training requirements specified in Title 29 of the Code of Federal Regulations (29 CFR), Part 1910.120.
- Maintain up-to-date records that demonstrate compliance with Occupational Safety and Health Administration (OSHA) requirements, including 8-hour refresher training and site health and safety records.
- Follow all site safety protocols and are compliant with the basewide HPNS health and safety plan (Tetra Tech, 2002).
- Completed the site-specific radiation training offered by Tetra Tech EC, Inc. (TtECI).

Maintenance activities for the cap during the 2010-2011 reporting period were conducted using the inspection checklists provided in the OMP (Tetra Tech, 2003). Copies of the completed forms are included in Appendix A (General Site Inspection) and Appendix B

(Vegetative Cover Inspection) of this report. Additional details are included in the following subsections.

### **2.2.1 General Site Inspection**

During the period covered by this report, general site inspections of the landfill area were conducted quarterly (September 30 and December 30, 2010, and March 31 and June 30, 2011) (Appendix A). Completed forms were submitted to the Navy Base Realignment and Closure (BRAC) Office and the HPNS Caretaker Site Office (CSO). During these quarterly inspections, the site was examined to verify that the following conditions were maintained:

- Proper warning signs were present.
- The property fence was in good condition and secured.
- The irrigation system sprinkler heads were upright and functioning properly (see Section 2.1).
- No large trees, brush, or weeds (with deep taproots) that may penetrate the cap were present on the cap.
- No soil erosion was evident on the cap or in adjacent areas (See Section 2.2.3).
- Erosion control measures, where applicable, were intact and functioning properly.
- No excessive vegetation was growing in the central gravel drainage ditch.
- No noticeable depressions or ponded water were present on the cap.
- No noticeable sliding, slope failure, or desiccation cracks were present in the soil cover.
- The landfill liner was not protruding, exposed, or torn.
- The landfill passive vents and turbines were in good working order.
- There were no large areas (greater than 20 square feet) bare of vegetation.
- All electronic devices for repelling burrowing animals had charged batteries and were functioning properly.

The Parcel E property fence restricts public access to the landfill site. During general site inspections, the fences were checked for any damage that might allow public access to the site (Appendix A). One breach in the fenceline was noted during the June 30, 2011, inspection; the CSO was notified that day of the breach. Photos of that damage, as well as some of the previous fence line repairs, are included in Appendix C (Inspection Photos).

During the general inspections, all Molecontrol<sup>®</sup> electronic animal-repelling devices were inspected to determine if they were in working condition and batteries were properly charged. Batteries are replaced as required, and new batteries were placed in all of the devices either during the week of October 4, 2010, or the week of December 30, 2010, when

new devices were installed to complete a ring around the perimeter of the landfill cap. All Molecontrol<sup>®</sup> devices were functioning properly during the remaining general inspections.

As part of the routine inspection process, settlement marker locations and elevations were surveyed at specific intervals, as discussed below. The datum used to survey the settlement markers is control point BM1-E. The northing, easting, and elevation of the datum and settlement markers are summarized in the two tables presented below. The first table includes original data from the OMP; the second, third, and fourth tables include data as surveyed on May 17, 2006, May 2, 2007, and June 11, 2008, respectively.

The OMP (Tetra Tech, 2003) stipulates that settlement marker locations and elevations are to be surveyed once every 6 months for the first year after construction, and once per year thereafter. When a settlement of 0.1 foot or less has been measured for two consecutive years, surveys can be scaled back to once every 5 years. Survey data indicate that Settlement Marker A has settled a total of 0.37 feet and Settlement Marker B has settled 0.80 feet since the data in the OMP were collected. Based on data collected from 2006 through 2008, both settlement markers had settled less than 0.1 foot per year for two consecutive years, as indicated in the tables below. Therefore, per the OMP, further settlement marker surveys have been scaled back to once every 5 years, with the next required survey due in the year 2013.

### Operation and Maintenance Plan, 2003

Type	Location	Northing (OMP)	Easting (OMP)	Elevation (OMP)
Settlement Marker	SM-A	451749.7	1457597.8	31.0 (top of marker)
Settlement Marker	SM-B	451415.3	1457999.5	27.7 (top of marker)

### Survey Data, May 17, 2006

Type	Location	Northing (5/17/06)	Easting (5/17/06)	Elevation (5/17/06)
Datum	BM1-E	451372.630	1458440.180	10.47
Settlement Marker	SM-A	451749.583	1457597.423	30.65 (top of marker)
Settlement Marker	SM-B	451415.186	1457999.031	26.91 (top of marker)
Monitoring Well	MW-60-1	450982.551	1457652.660	14.47 (top of casing)

### Survey Data, May 2, 2007

Type	Location	Northing (5/2/07)	Easting (5/2/07)	Elevation (5/2/07)
Datum	BM1-E	451372.630	1458440.180	10.47
Settlement Marker	SM-A	451749.583	1457597.423	30.63 (top of marker)
Settlement Marker	SM-B	451415.186	1457999.031	26.90 (top of marker)

### Survey Data, June 11, 2008

Type	Location	Northing (6/11/08)	Easting (6/11/08)	Elevation (6/11/08)
Datum	BM1-E	451372.630	1458440.180	10.47
Settlement Marker	SM-A	451749.583	1457597.423	30.62 (top of marker)
Settlement Marker	SM-B	451415.186	1457999.031	26.90 (top of marker)

## Settlement Data, 2006-2008

Type	Location	Elevation (5/17/06)	Elevation (6/11/08)	Settlement (feet)
Settlement Marker	SM-A	30.65 (top of marker)	30.62 (top of marker)	0.03
Settlement Marker	SM-B	26.91 (top of marker)	26.90 (top of marker)	0.01

### 2.2.2 Vegetative Cover Inspections

Semi-annual inspections of the vegetative cover of the landfill cap and adjacent areas were performed on December 30, 2010, and on June 30, 2011, to record and ensure that the vegetation growing over the landfill cap was sufficient to prevent soil erosion, without damaging the underlying geosynthetic membrane. The vegetative cover was inspected for the following:

- Areas of stressed or missing vegetation;
- Areas of continual poor growth despite regrowth efforts;
- Invasive or deep-rooting species on the cap;
- Impacts from burrowing animals on the cap;
- Maturity of plants to allow for mowing.

The inspection checklists (Appendix B) were filed with the CSO and Navy BRAC Office in San Diego after completion. In addition to these formal inspections, informal inspections were conducted throughout the year to evaluate changing conditions and assess their possible effects on operation of the irrigation system.

At the beginning of the contractual period, there was widespread presence of invasive species on the landfill cap and surrounding areas, including but not limited to:

- Cocklebur (*Xanthium strumarium*)
- Black mustard (*Brassica nigra*)
- Short-pod mustard (*Hirschfeldia incana*)
- Wild radish (*Raphanus raphanistrum*)
- Cultivated radish (*Raphanus sativus*)
- Sour clover (*Melilotus indica*)
- Sweet clover (*Melilotus officinalis*)
- Cheeseweed (*Malva parviflora*)
- Pampas grass (*Cortaderia sp.*)
- Sweetfenne1 (*Foeniculum vulgare*).



As of the June 2011 inspection, all of these species were still present on or around the landfill cap.

The vegetation on the landfill cap and surrounding areas was mowed with a tractor-pulled rotary mower on May 31-June 6, 2011, to reduce fire hazards on the site and allow grass to reclaim areas where invasive species had been present. This mowing event was focused primarily on the areas surrounding the landfill cap, where the heaviest concentrations of invasive species were found, as frequent mowing has allowed grass to reclaim most of the cap proper, thereby significantly reducing the presence of invasive species in that area. Photos of the area prior to and following these mowing events are included in Appendix C.

### **2.2.3 Soil Erosion Control**

The storm water collection system (riprap central drainage swale) on the cap was inspected during each quarterly event to ensure that it continues to provide adequate erosion control (Appendix A). When large stalks of vegetation that could impede water flow were encountered, they were removed by hand during the inspection, or with blade-type brush cutters during the next mowing event. Figure 2 of the OMP details two areas of the Parcel E-2 shoreline that are inspected for erosion, to ensure the integrity of the landfill cover.

## **2.3 HEALTH AND SAFETY**

The Parcel E property fence restricts public access to the landfill site. Only OSHA-trained personnel who have completed the 40-hour health and safety training course or are trained in accordance with the hazardous waste training requirements specified in 29 CFR 1910.120 are authorized on the site. Personnel must be familiar with and comply with the basewide health and safety plan (Tetra Tech, 2002a). In addition, Tetra-Tech EC, Inc., instructs all site personnel in radiation safety before they perform work at the site.

As the security fencing around the landfill is a safety issue according to the OMP, the fences were checked during general site inspections, and informally throughout the year for any damage that might allow public access to the site (Appendix A). Whenever breaches were encountered, the HPNS CSO was notified of the situation and the fence was repaired. Photos of some of these repairs are included in Appendix C.

Signs to control traffic and public access to the site are prominently displayed around the perimeter of the landfill. During general site inspections, the signs at the two entrance gates and at the northern edge of the cap, shown on Figure 2, were checked to ensure that they were visible and in good condition (Appendix A). Photos of some of these signs are included in Appendix C.

## **3.0 CONTINGENCY PLANS**

The OMP provides emergency response inspection procedures to be implemented in the event of any natural disaster likely to occur in the San Francisco Bay area that may affect the Industrial Landfill at IR-01/21. Potential natural disasters include earthquakes, floods or major storms, or fire, as described below.

### **3.1 EARTHQUAKES**

The OMP states that in the event of a significant earthquake (7.0 magnitude or higher centered within 40 miles of the site, 6.0 magnitude or higher within 10 miles, or 4.0 magnitude or higher within 1 mile), the landfill cap will be visually inspected for damage. During the 2010-2011 monitoring period, no earthquakes meeting these conditions occurred.

### **3.2 FLOODS OR MAJOR STORMS**

The OMP states that in the event of a major storm (defined as 4.17 inches of precipitation or more over a 24-hour period), the landfill cap will be visually inspected for damage. During the 2010-2011 monitoring period, no such storm occurred.

### **3.3 FIRE**

In the event of a surface fire near the landfill cap, the Navy's integrated contingency plan would be implemented, and the fire would be followed by a thorough inspection of the landfill cap to ensure that the integrity of the synthetic layers had not been compromised. During the 2010-2011 monitoring period, no such fire occurred.

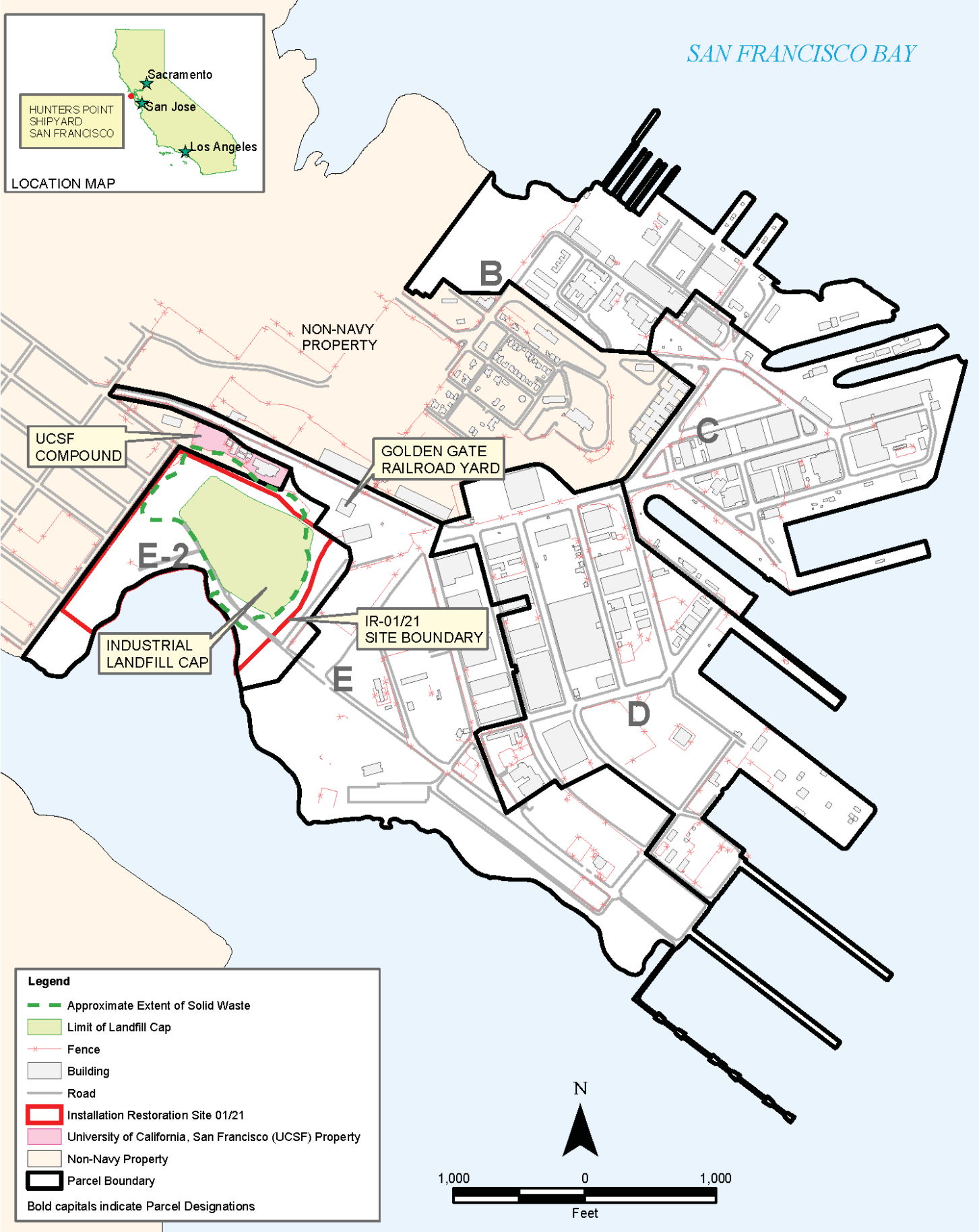
## **4.0 REFERENCES**

Tetra Tech EM Inc. (Tetra Tech), 2003. Operation and Maintenance Plan, IR-01/21, Industrial Landfill, Parcel E, Hunters Point Shipyard, San Francisco, CA, Final. June 12.

Tetra Tech EM Inc. (Tetra Tech), 2002a. Basewide Health and Safety Plan, Hunters Point Shipyard (HPS), San Francisco, California. March 21.

This page intentionally blank

## FIGURES



SAN FRANCISCO BAY



HUNTERS POINT SHIPYARD  
SAN FRANCISCO

LOCATION MAP

**B**

**C**

NON-NAVY PROPERTY

UCSF COMPOUND

GOLDEN GATE RAILROAD YARD

**E-2**

IR-01/21 SITE BOUNDARY

INDUSTRIAL LANDFILL CAP

**E**

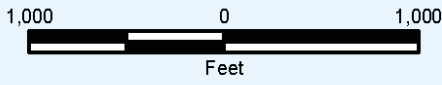
**D**

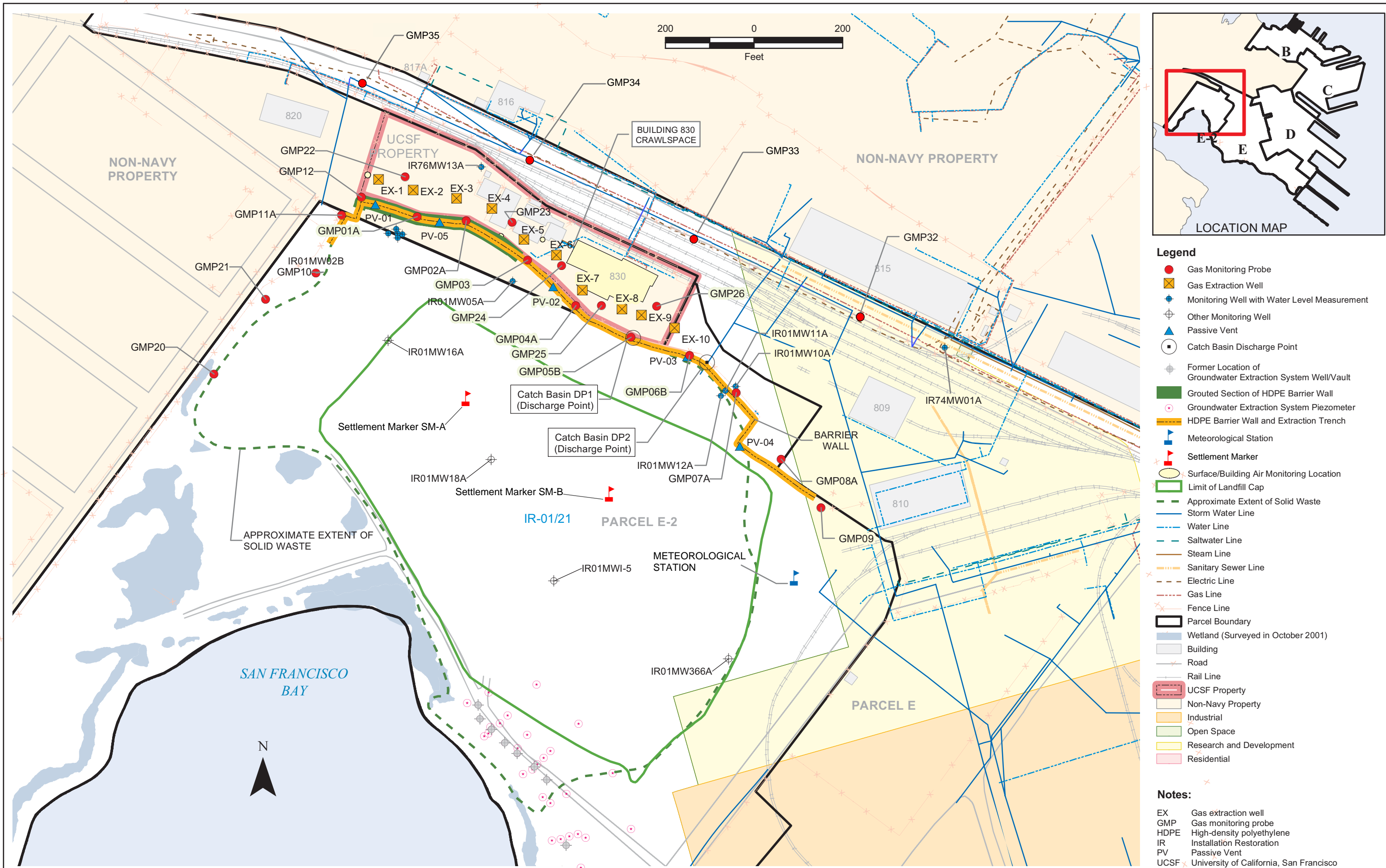
**Legend**

- Approximate Extent of Solid Waste
- Limit of Landfill Cap
- x- Fence
- Building
- Road
- Installation Restoration Site 01/21
- University of California, San Francisco (UCSF) Property
- Non-Navy Property
- Parcel Boundary

Bold capitals indicate Parcel Designations

N





- Legend**
- Gas Monitoring Probe
  - ⊠ Gas Extraction Well
  - ⊕ Monitoring Well with Water Level Measurement
  - ⊕ Other Monitoring Well
  - ▲ Passive Vent
  - ⊙ Catch Basin Discharge Point
  - ⊕ Former Location of Groundwater Extraction System Well/Vault
  - Grouted Section of HDPE Barrier Wall
  - ⊙ Groundwater Extraction System Piezometer
  - HDPE Barrier Wall and Extraction Trench
  - ⊕ Meteorological Station
  - ⚑ Settlement Marker
  - Surface/Building Air Monitoring Location
  - Limit of Landfill Cap
  - Approximate Extent of Solid Waste
  - Storm Water Line
  - Water Line
  - Saltwater Line
  - Steam Line
  - Sanitary Sewer Line
  - Electric Line
  - Gas Line
  - ⊕ Fence Line
  - ▭ Parcel Boundary
  - Wetland (Surveyed in October 2001)
  - ▭ Building
  - Road
  - Rail Line
  - ▭ UCSF Property
  - ▭ Non-Navy Property
  - ▭ Industrial
  - ▭ Open Space
  - ▭ Research and Development
  - ▭ Residential
- Notes:**
- EX Gas extraction well
  - GMP Gas monitoring probe
  - HDPE High-density polyethylene
  - IR Installation Restoration
  - PV Passive Vent
  - UCSF University of California, San Francisco

**APPENDIX A**

**GENERAL SITE INSPECTION CHECKLISTS**

# GENERAL SITE INSPECTION CHECKLIST

3rd Quarter 2010

*File completed forms with the Navy Base Realignment and Closure Office in San Diego, California, and the Hunters Point Shipyard Caretaker Site Office (CSO). To contact the CSO, call (415) 743-4720.*

1. Does the soil on the cap appear to be disturbed to the point that the geosynthetic layers underneath could be damaged (deeper than 18 inches below cap surface) or are there areas of exposed geosynthetic liner material?  
 Yes \*  
 No  
*\* If yes, uncover the area and visually inspect the drainage net and underlying geosynthetics. If damaged, repair in accordance with manufacturer's instructions.*
2. Are there open holes in the soil on the cap that may be caused by burrowing animals?  
**\*\*See note page A-3**  
 Yes \*  
 No  
*\* If yes, fill up the hole with clean soil (contains no analytes of concern) and report to the CSO. Suggested corrective action: install a Molecontrol® device or similar system.*
3. Are there noticeable depressions or ponding of surface water on the landfill cover?  
 Yes \*  
 No  
*\* If yes, backfill the depression with the soil type described in Appendix E, Landfill Cap Construction, of the operation and maintenance (O&M) plan to restore grade of the cap as shown on Figure 5 of Appendix E. Where soil erosion seems excessive and continual, corrective action may be needed (contact the CSO).*
4. Are there large (more than 2 inches wide or extend to cap liner) cracks in the soil cover?  
 Yes \*  
 No  
*\* If yes, notify the CSO to assess whether the cracks are due to desiccation or slope failure. Note the orientation, location, and frequency of cracks, and photograph areas of concern, if possible.*
5. Have any trees or shrubs grown on the landfill cover?  
 Yes \*  
 No  
*\* If yes, remove the tree(s) or shrub(s).*
6. If applicable, inspect all Molecontrol® devices (or similar system to ward off burrowing animals). Is each device functioning properly?  
 Yes  
 No \*  
*\* If no, first replace the batteries of the inoperative device. If the Molecontrol® device is still not functioning, replace the device by contacting D&D Chemical, Inc. ([800] 434-0221) or visiting <http://www.ddchem.com/molecontrol.htm>. Mark new devices, so they can be easily located during future inspections.*
7. Is each sprinkler head upright?  
**\*\*See note page A-3**  
 Yes  
 No \*  
*\* If no, adjust pipes so that sprinkler heads stand vertically.*



8. Operate the sprinkler system by opening the water source (Figure 2 of the O&M plan for the approximate location of the water service). Is each sprinkler head functioning properly (adequate pressure so that arcs of spray overlap)?
- \*\*See note page A-3**
- Yes  
 No \*
- \* If no, repair defects (that is, adjust pressure at the hydrant, remove clogs, and replace broken sprinkler heads).*
9. Are landfill passive vents and turbines in good working order (for example, vents are not damaged, valves are open, turbines are free to spin from wind force)?
- Yes  
 No \*
- \* If no, notify the CSO to repair vents or turbines.*
10. Are silt fences, hay bales, fiber rolls, gravel or sand bags, and other erosion control measures (Figure 2) intact and functioning properly?
- Yes  
 No \*
- \* If no, notify the CSO to repair the silt fence and hay bales.*
11. Is there excessive accumulation of sediment (buildup of more than one-third of the height of the fence)?
- Yes \*  
 No
- \* If yes, clear the excessive buildup of sediment and notify the CSO to have the sediment characterized and properly disposed of off site.*
12. Is there excessive vegetation (large stalks that would impede surface water flow) in the central gravel drainage ditch?
- Yes \*  
 No
- \* If yes, remove the vegetation by spraying it with herbicides that contain no analytes of concern.*
13. Inspect areas that channel water runoff at the site (landfill cap and adjacent areas), including the gully (Figure 2), ditches, slope edges, and pipe outlets. Are there signs of erosion from storm water runoff?
- Yes \*  
 No
- \* If yes, notify the CSO to assess the appropriate course of action for repair.*
14. Inspect condition of gravel roads (Figure 2). Are any ruts or potholes large enough to hinder vehicular traffic?
- Yes \*  
 No
- \* If yes, notify the CSO to assess the appropriate course of action for repair.*
15. Are posted signs in place and in good condition (legible)? See Figure 2 of the O&M plan for locations of signs and Photographs A-1 and A-2 of this appendix for examples of posted signs.
- Yes  
 No \*
- \* If no, mark location(s) of damaged or missing signs on Figure 2 and notify the CSO for repairs or replacements.*

16. Is the landfill adequately secured by a perimeter fence that is in good condition and shows no signs of having been trespassed?

Yes  
 No \*

*\* If no, secure the perimeter fence with locks obtained from the CSO. If the fence is damaged, mark location of damage and notify the CSO for repairs.*

**Additional Notes (Time, temperature, and wind direction, and other observations)**

#2) There is evidence of burrowing animals. Some Molecontrol batteries have died; all will be replaced during the week of October 4, 2010. Will explore adding more devices.

#7/8) Sprinkler system is no longer operational; watering is performed via water truck.

**Brett Womack**

Name of Inspector

**Innovative Technical Solutions, Inc.**

Company

**September 30, 2010, 1100 hours**

Signature of Inspector

Time and Date of Inspection

# GENERAL SITE INSPECTION CHECKLIST

4th Quarter 2010

*File completed forms with the Navy Base Realignment and Closure Office in San Diego, California, and the Hunters Point Shipyard Caretaker Site Office (CSO). To contact the CSO, call (415) 743-4720.*

1. Does the soil on the cap appear to be disturbed to the point that the geosynthetic layers underneath could be damaged (deeper than 18 inches below cap surface) or are there areas of exposed geosynthetic liner material?  
 Yes \*  
 No  
*\* If yes, uncover the area and visually inspect the drainage net and underlying geosynthetics. If damaged, repair in accordance with manufacturer's instructions.*
2. Are there open holes in the soil on the cap that may be caused by burrowing animals?  
**\*\*See note page A-3**  
 Yes \*  
 No  
*\* If yes, fill up the hole with clean soil (contains no analytes of concern) and report to the CSO. Suggested corrective action: install a Molecontrol® device or similar system.*
3. Are there noticeable depressions or ponding of surface water on the landfill cover?  
 Yes \*  
 No  
*\* If yes, backfill the depression with the soil type described in Appendix E, Landfill Cap Construction, of the operation and maintenance (O&M) plan to restore grade of the cap as shown on Figure 5 of Appendix E. Where soil erosion seems excessive and continual, corrective action may be needed (contact the CSO).*
4. Are there large (more than 2 inches wide or extend to cap liner) cracks in the soil cover?  
 Yes \*  
 No  
*\* If yes, notify the CSO to assess whether the cracks are due to desiccation or slope failure. Note the orientation, location, and frequency of cracks, and photograph areas of concern, if possible.*
5. Have any trees or shrubs grown on the landfill cover?  
 Yes \*  
 No  
*\* If yes, remove the tree(s) or shrub(s).*
6. If applicable, inspect all Molecontrol® devices (or similar system to ward off burrowing animals). Is each device functioning properly?  
**\*\*See note page A-3**  
 Yes  
 No \*  
*\* If no, first replace the batteries of the inoperative device. If the Molecontrol® device is still not functioning, replace the device by contacting D&D Chemical, Inc. ([800] 434-0221) or visiting <http://www.ddchem.com/molecontrol.htm>. Mark new devices, so they can be easily located during future inspections.*
7. Is each sprinkler head upright?  
**\*\*See note page A-3**  
 Yes  
 No \*  
*\* If no, adjust pipes so that sprinkler heads stand vertically.*

8. Operate the sprinkler system by opening the water source (Figure 2 of the O&M plan for the approximate location of the water service). Is each sprinkler head functioning properly (adequate pressure so that arcs of spray overlap)?
- \*\*See note page A-3**
- Yes  
 No \*
- \* If no, repair defects (that is, adjust pressure at the hydrant, remove clogs, and replace broken sprinkler heads).*
9. Are landfill passive vents and turbines in good working order (for example, vents are not damaged, valves are open, turbines are free to spin from wind force)?
- Yes  
 No \*
- \* If no, notify the CSO to repair vents or turbines.*
10. Are silt fences, hay bales, fiber rolls, gravel or sand bags, and other erosion control measures (Figure 2) intact and functioning properly?
- Yes  
 No \*
- \* If no, notify the CSO to repair the silt fence and hay bales.*
11. Is there excessive accumulation of sediment (buildup of more than one-third of the height of the fence)?
- Yes \*  
 No
- \* If yes, clear the excessive buildup of sediment and notify the CSO to have the sediment characterized and properly disposed of off site.*
12. Is there excessive vegetation (large stalks that would impede surface water flow) in the central gravel drainage ditch?
- Yes \*  
 No
- \* If yes, remove the vegetation by spraying it with herbicides that contain no analytes of concern.*
13. Inspect areas that channel water runoff at the site (landfill cap and adjacent areas), including the gully (Figure 2), ditches, slope edges, and pipe outlets. Are there signs of erosion from storm water runoff?
- Yes \*  
 No
- \* If yes, notify the CSO to assess the appropriate course of action for repair.*
14. Inspect condition of gravel roads (Figure 2). Are any ruts or potholes large enough to hinder vehicular traffic?
- Yes \*  
 No
- \* If yes, notify the CSO to assess the appropriate course of action for repair.*
15. Are posted signs in place and in good condition (legible)? See Figure 2 of the O&M plan for locations of signs and Photographs A-1 and A-2 of this appendix for examples of posted signs.
- Yes  
 No \*
- \* If no, mark location(s) of damaged or missing signs on Figure 2 and notify the CSO for repairs or replacements.*



# GENERAL SITE INSPECTION CHECKLIST

1st Quarter 2011

*File completed forms with the Navy Base Realignment and Closure Office in San Diego, California, and the Hunters Point Shipyard Caretaker Site Office (CSO). To contact the CSO, call (415) 743-4720.*

1. Does the soil on the cap appear to be disturbed to the point that the geosynthetic layers underneath could be damaged (deeper than 18 inches below cap surface) or are there areas of exposed geosynthetic liner material?  
 Yes \*  
 No  
*\* If yes, uncover the area and visually inspect the drainage net and underlying geosynthetics. If damaged, repair in accordance with manufacturer's instructions.*
2. Are there open holes in the soil on the cap that may be caused by burrowing animals?  
**\*\*See note page A-3**  
 Yes \*  
 No  
*\* If yes, fill up the hole with clean soil (contains no analytes of concern) and report to the CSO. Suggested corrective action: install a Molecontrol® device or similar system.*
3. Are there noticeable depressions or ponding of surface water on the landfill cover?  
 Yes \*  
 No  
*\* If yes, backfill the depression with the soil type described in Appendix E, Landfill Cap Construction, of the operation and maintenance (O&M) plan to restore grade of the cap as shown on Figure 5 of Appendix E. Where soil erosion seems excessive and continual, corrective action may be needed (contact the CSO).*
4. Are there large (more than 2 inches wide or extend to cap liner) cracks in the soil cover?  
 Yes \*  
 No  
*\* If yes, notify the CSO to assess whether the cracks are due to desiccation or slope failure. Note the orientation, location, and frequency of cracks, and photograph areas of concern, if possible.*
5. Have any trees or shrubs grown on the landfill cover?  
 Yes \*  
 No  
*\* If yes, remove the tree(s) or shrub(s).*
6. If applicable, inspect all Molecontrol® devices (or similar system to ward off burrowing animals). Is each device functioning properly?  
 Yes  
 No \*  
*\* If no, first replace the batteries of the inoperative device. If the Molecontrol® device is still not functioning, replace the device by contacting D&D Chemical, Inc. ([800] 434-0221) or visiting <http://www.ddchem.com/molecontrol.htm>. Mark new devices, so they can be easily located during future inspections.*
7. Is each sprinkler head upright?  
**\*\*See note page A-3**  
 Yes  
 No \*  
*\* If no, adjust pipes so that sprinkler heads stand vertically.*

8. Operate the sprinkler system by opening the water source (Figure 2 of the O&M plan for the approximate location of the water service). Is each sprinkler head functioning properly (adequate pressure so that arcs of spray overlap)?
- \*\*See note page A-3**
- Yes  
 No \*
- \* If no, repair defects (that is, adjust pressure at the hydrant, remove clogs, and replace broken sprinkler heads).*
9. Are landfill passive vents and turbines in good working order (for example, vents are not damaged, valves are open, turbines are free to spin from wind force)?
- Yes  
 No \*
- \* If no, notify the CSO to repair vents or turbines.*
10. Are silt fences, hay bales, fiber rolls, gravel or sand bags, and other erosion control measures (Figure 2) intact and functioning properly?
- Yes  
 No \*
- \* If no, notify the CSO to repair the silt fence and hay bales.*
11. Is there excessive accumulation of sediment (buildup of more than one-third of the height of the fence)?
- Yes \*  
 No
- \* If yes, clear the excessive buildup of sediment and notify the CSO to have the sediment characterized and properly disposed of off site.*
12. Is there excessive vegetation (large stalks that would impede surface water flow) in the central gravel drainage ditch?
- Yes \*  
 No
- \* If yes, remove the vegetation by spraying it with herbicides that contain no analytes of concern.*
13. Inspect areas that channel water runoff at the site (landfill cap and adjacent areas), including the gully (Figure 2), ditches, slope edges, and pipe outlets. Are there signs of erosion from storm water runoff?
- Yes \*  
 No
- \* If yes, notify the CSO to assess the appropriate course of action for repair.*
14. Inspect condition of gravel roads (Figure 2). Are any ruts or potholes large enough to hinder vehicular traffic?
- Yes \*  
 No
- \* If yes, notify the CSO to assess the appropriate course of action for repair.*
15. Are posted signs in place and in good condition (legible)? See Figure 2 of the O&M plan for locations of signs and Photographs A-1 and A-2 of this appendix for examples of posted signs.
- Yes  
 No \*
- \* If no, mark location(s) of damaged or missing signs on Figure 2 and notify the CSO for repairs or replacements.*





# GENERAL SITE INSPECTION CHECKLIST

June 30, 2011

*File completed forms with the Navy Base Realignment and Closure Office in San Diego, California, and the Hunters Point Shipyard Caretaker Site Office (CSO). To contact the CSO, call (415) 743-4720.*

1. Does the soil on the cap appear to be disturbed to the point that the geosynthetic layers underneath could be damaged (deeper than 18 inches below cap surface) or are there areas of exposed geosynthetic liner material?  
 Yes \*  
 No  
*\* If yes, uncover the area and visually inspect the drainage net and underlying geosynthetics. If damaged, repair in accordance with manufacturer's instructions.*
2. Are there open holes in the soil on the cap that may be caused by burrowing animals?  
**\*\*See note page A-3**  
 Yes \*  
 No  
*\* If yes, fill up the hole with clean soil (contains no analytes of concern) and report to the CSO. Suggested corrective action: install a Molecontrol® device or similar system.*
3. Are there noticeable depressions or ponding of surface water on the landfill cover?  
 Yes \*  
 No  
*\* If yes, backfill the depression with the soil type described in Appendix E, Landfill Cap Construction, of the operation and maintenance (O&M) plan to restore grade of the cap as shown on Figure 5 of Appendix E. Where soil erosion seems excessive and continual, corrective action may be needed (contact the CSO).*
4. Are there large (more than 2 inches wide or extend to cap liner) cracks in the soil cover?  
 Yes \*  
 No  
*\* If yes, notify the CSO to assess whether the cracks are due to desiccation or slope failure. Note the orientation, location, and frequency of cracks, and photograph areas of concern, if possible.*
5. Have any trees or shrubs grown on the landfill cover?  
 Yes \*  
 No  
*\* If yes, remove the tree(s) or shrub(s).*
6. If applicable, inspect all Molecontrol® devices (or similar system to ward off burrowing animals). Is each device functioning properly?  
 Yes  
 No \*  
*\* If no, first replace the batteries of the inoperative device. If the Molecontrol® device is still not functioning, replace the device by contacting D&D Chemical, Inc. ([800] 434-0221) or visiting <http://www.ddchem.com/molecontrol.htm>. Mark new devices, so they can be easily located during future inspections.*
7. Is each sprinkler head upright?  
**\*\*See note page A-3**  
 Yes  
 No \*  
*\* If no, adjust pipes so that sprinkler heads stand vertically.*

8. Operate the sprinkler system by opening the water source (Figure 2 of the O&M plan for the approximate location of the water service). Is each sprinkler head functioning properly (adequate pressure so that arcs of spray overlap)?
- \*\*See note page A-3**
- Yes  
 No \*
- \* If no, repair defects (that is, adjust pressure at the hydrant, remove clogs, and replace broken sprinkler heads).*
9. Are landfill passive vents and turbines in good working order (for example, vents are not damaged, valves are open, turbines are free to spin from wind force)?
- Yes  
 No \*
- \* If no, notify the CSO to repair vents or turbines.*
10. Are silt fences, hay bales, fiber rolls, gravel or sand bags, and other erosion control measures (Figure 2) intact and functioning properly?
- Yes  
 No \*
- \* If no, notify the CSO to repair the silt fence and hay bales.*
11. Is there excessive accumulation of sediment (buildup of more than one-third of the height of the fence)?
- Yes \*  
 No
- \* If yes, clear the excessive buildup of sediment and notify the CSO to have the sediment characterized and properly disposed of off site.*
12. Is there excessive vegetation (large stalks that would impede surface water flow) in the central gravel drainage ditch?
- Yes \*  
 No
- \* If yes, remove the vegetation by spraying it with herbicides that contain no analytes of concern.*
13. Inspect areas that channel water runoff at the site (landfill cap and adjacent areas), including the gully (Figure 2), ditches, slope edges, and pipe outlets. Are there signs of erosion from storm water runoff?
- Yes \*  
 No
- \* If yes, notify the CSO to assess the appropriate course of action for repair.*
14. Inspect condition of gravel roads (Figure 2). Are any ruts or potholes large enough to hinder vehicular traffic?
- Yes \*  
 No
- \* If yes, notify the CSO to assess the appropriate course of action for repair.*
15. Are posted signs in place and in good condition (legible)? See Figure 2 of the O&M plan for locations of signs and Photographs A-1 and A-2 of this appendix for examples of posted signs.
- Yes  
 No \*
- \* If no, mark location(s) of damaged or missing signs on Figure 2 and notify the CSO for repairs or replacements.*

16. Is the landfill adequately secured by a perimeter fence that is in good condition and shows no signs of having been trespassed?

See note below

Yes  
 No \*

*\* If no, secure the perimeter fence with locks obtained from the CSO. If the fence is damaged, mark location of damage and notify the CSO for repairs.*

**Additional Notes (Time, temperature, and wind direction, and other observations)**

- #2) There is evidence of burrowing animals, however it does not appear to be fresh since the Molecontrol batteries were replaced during 1st Quarter 2011 inspection.
- #7/8) Sprinkler system is no longer operational; watering is performed via water truck.
- #16) One breach was discovered in the northwest E-2 perimeter fence; CSO notified on 6/30/11.

**Brett Womack**

Name of Inspector

**Innovative Technical Solutions, Inc.**

Company



Signature of Inspector

**6/30/11 1430 hours**

Time and Date of Inspection

**APPENDIX B**

**VEGETATIVE COVER INSPECTION CHECKLISTS**

**VEGETATIVE COVER INSPECTION CHECKLIST**

4th Quarter 2010

*File completed forms with the Navy Base Realignment and Closure Office in San Diego, California, and the Hunters Point Shipyard Caretaker Site Office (CSO). To contact the CSO, call (415) 743-4720.*

1. Are there areas larger than 20 square feet of stressed or missing vegetation at the site (both landfill cover and adjacent areas)?

- Yes \*
- No

*\* If yes, re-establish vegetative growth by watering or reseeded in accordance with Appendix E, Landfill Cap Construction, of this operation and maintenance (O&M) plan.*

2. Are there known areas of continual poor growth despite reseeded efforts?

- Yes \*
- No

*\* If there are areas of continual poor growth on the cap and if sprinkler system is still in operation, inspect the sprinkler system while it is active to assess whether poor growth is caused by a lack of water. If this is the case, notify the CSO, so repairs can be made to the sprinkler system. If poor growth does not seem to be caused by a lack of water, consider testing the soil for pH, heavy metals, or other potential causes. If areas adjacent to the cap have areas of continual poor growth, notify the CSO so that reseeded efforts can be made to better establish growth.*

3. Have invasive or deep-rooting species that may penetrate the cap membrane taken root on the cap soil cover?

**\*\*See note page B-2**

- Yes \*
- No

*Previously found species with taproots potentially able to penetrate membrane are (see plant identification guide included in this appendix):*

On Cap Cover

Around Perimeter of Cap

- Cocklebur (*Xanthium strumarium*)
- Black mustard (*Brassica nigra*)
- Short-pod mustard (*Hirschfeldia incana*)
- Wild radish (*Raphanus raphanistrum*)
- Cultivated radish (*Raphanus sativus*)
- Sour clover (*Melilotus indica*)
- Sweet clover (*Melilotus officinalis*)

- Cheeseweed (*Malva parviflora*)
- Pampas grass (*Cortaderia sp.*)
- Sweet fennel (*Foeniculum vulgare*)

*\* If yes, identify the affected area and observed plant species, develop a strategy to remove the invasive plants (permanently if possible), and make recommendations to the CSO. One recommended approach is to spot spray the species with an herbicide that contains no analytes of concern; this approach may take up to 4 days, depending on the extent of removal. Roots can also be cut out. Inspect the area every 2 weeks following removal to ensure that invasive species have not returned.*

*Additionally, for inspections performed during the summer:*

4. Have the desired seeds (see Appendix E, Landfill Cap Construction) matured sufficiently to allow for mowing?

Yes \*  
 No

*\* If yes, determine an appropriate time and frequency for mowing and recommend this schedule to the CSO. Be sure to have cuttings gathered and taken off of the vegetative cover following mowing.*

*Additional Notes (Time, temperature, and wind direction, and other observations)*

#3) Invasive species were present, however not in large amounts as the grass is overtaking the cap area.

**Brett Womack**

Name of Inspector

**Innovative Technical Solutions, Inc.**

Company



Signature of Inspector

**12/30/10 1430 hours**

Time and Date of Inspection

**VEGETATIVE COVER INSPECTION CHECKLIST**

June 30, 2011

*File completed forms with the Navy Base Realignment and Closure Office in San Diego, California, and the Hunters Point Shipyard Caretaker Site Office (CSO). To contact the CSO, call (415) 743-4720.*

1. Are there areas larger than 20 square feet of stressed or missing vegetation at the site (both landfill cover and adjacent areas)?

- Yes \*
- No

*\* If yes, re-establish vegetative growth by watering or reseeding in accordance with Appendix E, Landfill Cap Construction, of this operation and maintenance (O&M) plan.*

2. Are there known areas of continual poor growth despite reseeding efforts?

- Yes \*
- No

*\* If there are areas of continual poor growth on the cap and if sprinkler system is still in operation, inspect the sprinkler system while it is active to assess whether poor growth is caused by a lack of water. If this is the case, notify the CSO, so repairs can be made to the sprinkler system. If poor growth does not seem to be caused by a lack of water, consider testing the soil for pH, heavy metals, or other potential causes. If areas adjacent to the cap have areas of continual poor growth, notify the CSO so that reseeding efforts can be made to better establish growth.*

3. Have invasive or deep-rooting species that may penetrate the cap membrane taken root on the cap soil cover?

- Yes \*
- No

**\*\*See note page B-2**

*Previously found species with taproots potentially able to penetrate membrane are (see plant identification guide included in this appendix):*

On Cap Cover

Around Perimeter of Cap

- Cocklebur (*Xanthium strumarium*)
- Black mustard (*Brassica nigra*)
- Short-pod mustard (*Hirschfeldia incana*)
- Wild radish (*Raphanus raphanistrum*)
- Cultivated radish (*Raphanus sativus*)
- Sour clover (*Melilotus indica*)
- Sweet clover (*Melilotus officinalis*)

- Cheeseweed (*Malva parviflora*)
- Pampas grass (*Cortaderia sp.*)
- Sweet fennel (*Foeniculum vulgare*)

*\* If yes, identify the affected area and observed plant species, develop a strategy to remove the invasive plants (permanently if possible), and make recommendations to the CSO. One recommended approach is to spot spray the species with an herbicide that contains no analytes of concern; this approach may take up to 4 days, depending on the extent of removal. Roots can also be cut out. Inspect the area every 2 weeks following removal to ensure that invasive species have not returned.*

*Additionally, for inspections performed during the summer:*

4. Have the desired seeds (see Appendix E, Landfill Cap Construction) matured sufficiently to allow for mowing?

Yes \*  
 No

**\*\*See note below**

*\* If yes, determine an appropriate time and frequency for mowing and recommend this schedule to the CSO. Be sure to have cuttings gathered and taken off of the vegetative cover following mowing.*

*Additional Notes (Time, temperature, and wind direction, and other observations)*

#3/4) Invasive species were present, and seeds had matured, so cap and surrounding areas were mowed 5/31/11 to 6/6/11.

**Brett Womack**

Name of Inspector

**Innovative Technical Solutions, Inc.**

Company



Signature of Inspector

**6/30/11 1430 hours**

Time and Date of Inspection



## **APPENDIX C**

### **PHOTOS**



Facing west from landfill cap,  
December 30, 2010 quarterly inspection.



Facing west from hill overlooking Parcel E-2,  
December 30, 2010 quarterly inspection.



Facing west from landfill cap,  
March 31, 2011 quarterly inspection.



Facing west from hill overlooking landfill cap,  
March 31, 2011 quarterly inspection.



Facing west from landfill cap,  
June 30, 2011 quarterly inspection.



Facing west from hill overlooking landfill cap,  
June 30, 2011 quarterly inspection.



Signs at main entrance to Parcel E-2



Signs at main entrance to Parcel E-2



Repaired section of northwest perimeter fence for Parcel E-2.



Breached section of northwest perimeter fence for Parcel E-2,  
June 30, 2011 quarterly inspection.