



APPROVED
ORIGINAL

Response Action Plan
Center for Aquatic Life and Conservation
101 West Cromwell Street
2400 Clarkson Street
Baltimore, Maryland 21230

Prepared for

Center for Aquatic Life and Conservation
Pier 3
501 East Pratt Street
Baltimore, Maryland 21202-3194

Prepared by

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Revised September 2009

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LIST OF ACRONYMS AND ABBREVIATIONS

AWQC	Ambient Water Quality Criteria
CALC	Center for Aquatic Life and Conservation
COC	Certificate of Completion
COPC	Chemical of Potential Concern
DCMF	Dredge Material Containment Facility
DPW	Department of Public Works
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ft	Foot or Feet
HI	Hazard Index
MCL	Maximum Contaminant Level
mg/kg	Milligram(s) Per Kilogram
mg/m ³	Milligram(s) Per Cubic Meter
MDE	Maryland Department of the Environment
MES	Maryland Environmental Service
MPA	Maryland Port Administration
NAIB	National Aquarium in Baltimore
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit
PPE	Personnel Protective Equipment
PPL	Priority Pollutant List
QA/QC	Quality Assurance/Quality Control
RAP	Response Action Plan
RBC	Risk-Based Concentration
RK&K	Rummel Klepper & Kahl, LLP
SSHASP	Site Specific Health and Safety Plan
SVOC	Semivolatile Organic Compound
TPH	Total Petroleum Hydrocarbons
TWA	Time Weighted Average

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

USGS United States Geological Survey
UST Underground Storage Tank

VCP Voluntary Cleanup Program
VOCs Volatile Organic Compounds

1.0 INTRODUCTION

This document provides the detail of the Response Action Plan (RAP) for the Center for Aquatic Life and Conservation (CALC) site located at the following addresses in Baltimore, Maryland 21230 (the "site").

- 101 West Cromwell Street (Lot 6) consisting of approximate 7.043 acres, and
- 2400 Clarkson Street (Lot 1A) consisting of approximately 4.29 acres.

The parcels are generally located adjacent to the Middle Branch of the Patapsco River just west of South Hanover Street in the City of Baltimore, and can be accessed from West Cromwell Street on the northeast side.

The proposed redevelopment plan for the site includes use as a publically accessible park with natural plantings and designated walkways. Therefore, based on existing conditions at the site and the proposed future use, Level 2: Public Recreational Area (Moderate Frequency Use) requirements will be applied as part of the RAP.

1.1 PURPOSE AND SCOPE

This RAP has been prepared to evaluate potential migration pathways and potentially exposed populations of each contaminant / medium of concern under the present and future use scenarios. Based on current and future use scenarios, engineering controls and response measures are recommended to mitigate associated risks to human health and the environment.

The property owner will comply with all local, state, and federal laws and regulations by obtaining all necessary approvals and permits to conduct the activities pursuant to an approved response action plan. If during the implementation of this RAP, any previously undiscovered contamination, changes to the remediation schedule, previously undiscovered storage tanks and other oil-related issues, or citation from regulatory entities related to health and safety practices are identified, the Department will be verbally notified immediately (within 24 hours) by the property owner. In addition, written notification will be submitted within 3 days.

2.0 SITE OVERVIEW

2.1 SITE DESCRIPTION

The site is located within the City of Baltimore and consists of two parcels located at the following addresses:

- 101 West Cromwell Street (Lot 6) is known as Ward 23, Section 10, Block 1060, lot 6, and
- 2400 Clarkson Street (Lot 1A) is known as Ward 23, Section 10, Block 1060, lot 1A.

The site can be accessed on the east side via West Cromwell Street. The site location is depicted on Figure 2-1. The Proposed Redevelopment Plan is included as Figure 2-2, and the Proposed Grading Plan is shown as Figure 2-3.

2.2 SITE HISTORY

Originally the site was open water and used as a fill location between 1977 and 1986 for the disposal of fill material and construction/demolition debris from construction of the Baltimore Subway and other sites throughout Baltimore City. The project is comprised of two adjoining parcels of land known as Lot 1A and Lot 6. Lot 1A is a 4.29-acre parcel that currently consists of an asphalt parking lot for the Former Department of Public Works (DPW) Garage structure located on the northerly adjacent parcel address as 101 West Dickman Street. No structures occupy the site, but there is electricity running to the lampposts located in the asphalt parking lot. Lot 6 is a 7.043-acre parcel that is currently vegetated, undeveloped land, with no structures or utilities serving the site. A perimeter fence secures both parcels from trespassers, and both parcels are currently owned by the CALC. A Tax Map is provided as Figure 2-4, which designates the boundaries of the current site.

In addition, the CALC site has been entered into the Voluntary Cleanup Program (VCP) through two separate applications. The original application consisted of the following parcels:

- Lot 6 – 101 West Cromwell Street, 7.043 acres,
Entered and accepted in the VCP in September 2003 under National Aquarium in Baltimore (NAIB).
- Lot 1 - 101 West Dickman Street, 11.06 acres.
- Lot 4 – 2300 South Hanover Street, 1.039 acres,
Entered and accepted into the VCP April 2006 under CALC.

Since that time, the site has been reconfigured after the original application submittal. Lot 4 has been removed from the application and is not included in the proposed RAP. Lot 1 has been reconfigured into

two separate parcels (Lot 1 and Lot 1A). The current configuration of Lot 1 has been subdivided in the following way:

- Lot 1 – 101 West Dickman (northern portion) – owned by Dickman Street Development LLC, 6.77 acres; not included as part of this RAP.
- Lot 1A – 2400 Clarkson Street (southern portion) – Owned by CALC, 4.29 acres; included in this RAP.

Mercury and elemental mercury were detected in samples collected from Lot 4. The levels observed on Lot 4 caused the potential risk in the original DPW toxicological evaluation. Lot 4 is not included in this RAP and further sampling conducted by EA in the area of current parking lot (Lot 1A) had no detects of mercury (<0.12 mg/kg). Due to the fact that the samples collected from Lot 4 that were the drivers for the high toxicological risk are not factored into the equation, mercury inhalation does not provide a toxicological risk to future commercial and industrial workers; however, field monitoring for mercury vapor will be conducted for future construction workers.

2.3 SITE SETTING

The site is bounded by West Cromwell Street to the northeast, and a Baltimore City DPW Central Garage is located adjacent to the north. The Hanover Street Bridge is located along the eastern boundary of the site. To the south and west the site is bordered by the Middle Branch of the Patapsco River and a rip-rap buffer. In addition, the site is bisected by a 300-ft drainage ditch which directs run-off from the garage parking lot directly to the Middle Branch.

Review of the United States Geological Survey (USGS) Baltimore, Maryland 7.5-Minute Topographic Quadrangle, dated July 1974, showed that the elevation of the site is approximately 16 ft above mean sea level. The regional topography slopes gently to the southwest.

Visual observations of the site indicate that the northern portion is an asphalted parking lot. The southern portion of the site is undeveloped land with wetland areas located intermittently throughout. A drainage ditch runs along the east/west portion of the site, with rip-rap located along the shoreline. Parcel C is located to the northeast, and consists of an asphalt parking lot with a fence along the perimeter.

2.3.1 Environmental Conditions

According to the *Physiographic Provinces and Their Subdivisions in Maryland Map* (Maryland Geological Survey 2001), the site is located within the Western Lowlands Region of the Atlantic Coastal Plain Physiographic Province and is underlain by artificial fill material. Artificial fill material is described as consisting of heterogeneous materials such as rock, unconsolidated sediments, slag, refuse, and dredge spoil.

2.4 PRIOR ENVIRONMENTAL INVESTIGATIONS

Multiple environmental investigations have been performed across the site in the time period between 1999 and 2004. In December 1999, a Site Investigation Report was prepared by Maryland Environmental Service (MES) for the Maryland Port Administration (MPA) to determine if the site could be used as a wetlands mitigation site for the Cox Creek Dredge Material Containment Facility (DCMF) renovations. A Phase I Investigation of the site was performed in April 2001 by Rummel Klepper & Kahl, LLP (RK&K) for NAIB. Following the Phase I Environmental Site Assessment (ESA), Maryland Department of the Environment (MDE) performed a Phase II ESA for NAIB at the site. In 2002 RK&K prepared a Supplemental Investigation for NAIB. A Toxicological Evaluation was prepared by MDE in August 2003. EA performed a Phase II ESA in June 2004 and a Supplemental Phase II ESA in March 2006. The reports are summarized herein:

- The 1999 Dickman Street Potential Mitigation Site-Site Investigation was performed by MES for MPA on the site in December 1999. The investigation was performed to determine if the site could be used as a wetland mitigation location for the Cox Creek DCMF renovations. The results determined the site should be pursued as a potential mitigation site for the impacts proposed at Cox Creek. However, due to the detection of high levels of metals and organics, there is some concern of the suitability of the fill material for use in a construction project. If the material is used, MES recommended that the fill be used for construction activities within the containment cells. Also, if rubble fragments greater than 6 inches in diameter are removed from the fill, MES recommends that the fill can be used for construction of interior dike slopes or stabilizing berms for Cox Creek.
- The 2001 Phase I Investigation was performed by RK&K for NAIB in April 2001. The purpose was to determine if the site had been impacted with environmental contamination by current or historical site activities. The investigation determined the potential for contamination across the site. The site was originally created using fill placement consisting of soil and construction/demolition debris from various Baltimore City projects. MES had previously collected soil samples as part of a site investigation in 1999 and found concentrations of several toxic metals and polycyclic aromatic hydrocarbons (PAHs) that exceeded MDE's Residential and Non-Residential Cleanup Standards. RK&K concluded that there is a minor level of site contamination due to illegal dumping of construction debris, and a limited risk of potential contamination from migration of an upgradient maintenance garage with documented releases of petroleum products.
- The 2001 Phase II Environmental Assessment of the Dickman Street Site was performed by MDE for NAIB in May 2001. The report further characterized the site through the collection of onsite surface and subsurface soils, surface water, sediments, and groundwater grab samples that were

laboratory analyzed. MDE concluded that non-carcinogenic and carcinogenic risks to human health exceeded U.S. Environmental Protection Agency (EPA) recommended ranges for ingestion of surface and subsurface soil, sediment, and groundwater. MDE also found there was a non-carcinogenic risk to human health from dermal contact with sediment which exceeded the EPA recommended ranges, and a carcinogenic risk to human health from dermal contact with sediment, and surface and subsurface soil which exceeded EPA recommended ranges. The non-carcinogenic exposure risks are primarily due to heavy metal contamination (arsenic, antimony, cadmium, chromium, manganese, thallium, and zinc), whereas the carcinogenic exposure risks are primarily due to arsenic contamination. Further findings showed that risk estimates from volatilization of detected non-carcinogenic soil contaminants into indoor air exceeded acceptable levels of risk, groundwater and surface water contaminant concentrations exceeded Maryland Ambient Water Quality Criteria (AWQC), and sediment contaminant concentrations exceeded effects range-median values to evaluate potential risk to sediment dwelling receptors.

- The 2002 Supplemental Investigation was performed by RK&K for NAIB in September 2002. The purpose of the supplemental investigation was to further investigate areas of concern where unusual site conditions were present or where contamination was suspected. RK&K found that the site contained three main contaminants of concern. Arsenic, mercury, and benzo(a)pyrene were found throughout the site at levels above the Non-Residential Soil Cleanup Standard. Arsenic presented the greatest risk to human health due to high concentrations and a wide distribution in shallow soils. Groundwater appeared to have a relatively low human health risk. RK&K recommended more detailed surface soil sampling to delineate extent of contamination.
- The 2004 Phase II Environmental Site Assessment was performed by EA Engineering, Science, and Technology in June 2004. The purpose of the Phase II ESA was to gather site characterization information in support of the site's potential application into the VCP. Arsenic, mercury, and benzo(a)pyrene were found throughout the site at levels above the Non-Residential Soil Cleanup Standard.
- The 2006 Supplemental Phase II Environmental Site Assessment was performed by EA Engineering, Science, and Technology in March 2006. The purpose of the Supplemental Phase II ESA was to collect additional environmental data pertaining to the subject properties. Of the samples collected in the original Parcel B portion of the project site, samples SB-3hg and SB-4hg are now located within the reconfigured parcel 1A identified as 2400 Clarkson Street. Soil samples were collected, and elevated levels of antimony, arsenic, lead, and thallium were observed across the site. Levels of elemental mercury were non-detect for this portion of the site.

2.5 MDE RISK ANALYSIS

In Summer 2003, MDE performed a risk analysis at the Middle Branch Park Property using a commercial use scenario for estimating risk to potentially exposed populations.

The following were MDE and EPA exceedances found for non-carcinogenic contaminant risk estimates:

- Incidental ingestion of surface soil contaminants exceeded MDE and EPA recommended levels of risk for child visitor and construction worker commercial populations
- Ingestion of subsurface soil contaminants exceeded MDE and EPA recommended risk levels for all commercial populations
- Dermal contact with surface soil contaminants exceeded MDE and EPA recommended risk levels for child visitor commercial population
- Dermal contact with subsurface soil contaminants exceeded MDE and EPA recommended risk levels for all commercial populations
- Ingestion of groundwater contaminants significantly exceeded MDE and EPA recommended risk levels for all commercial populations
- Dermal contact with detected groundwater contaminants exceeded MDE and EPA recommended risk levels for adult worker commercial populations
- Inhalation of mercury in subsurface soil exceeded MDE and EPA recommended risk levels for adult construction worker

The following were MDE and EPA exceedances found for carcinogenic contaminants risk estimates:

- Incidental ingestion of surface soil contaminants exceeded MDE recommended risk ranges for all commercial populations and EPA recommended risk ranges for child visitor commercial populations
- Ingestion of subsurface soil contaminants exceeded MDE recommended risk ranges for all commercial populations and EPA recommended risk ranges for child visitor commercial populations
- Dermal contact with surface soil contaminants exceeded MDE recommended risk ranges for child visitor and adult worker commercial populations

- Dermal contact with subsurface soil contaminants exceeded MDE recommended risk ranges for child visitor commercial populations
- Ingestion of groundwater contaminants exceeded MDE recommended risk ranges for all commercial populations and EPA recommended risk ranges for adult worker commercial populations

Lead concentrations in surface soil ranged from 12 to 540 milligrams per kilograms (mg/kg) with a mean surface soil lead concentration of 162 mg/kg. The concentration of lead in subsurface soils ranged from 5 to 4,100 mg/kg with a mean concentration of 432 mg/kg. A total mean of surface and subsurface lead concentration was 297 mg/kg. MDE concluded that lead contamination should not pose a threat to the health of sensitive populations and the environment, with the exception of a hotspot at sample location SS-4RE. Mercury was detected in concentrations in the soil resulting in a risk from vapor intrusion to indoor air in excess of MDE or EPA recommended levels of a hazard index of one.

Lead concentrations in sediment were found at a maximum level of 470 mg/kg, which exceeds the 400 mg/kg residential soil screening value. MDE concluded that the concentration of lead in the sediment should not pose a threat to human health under a commercial use scenario; however, sediment contamination may pose a threat to sediment-dwelling animal and plant species. Multiple detected and non-detected contaminants in surface soil, subsurface soil, and sediment exceeded their respective MDE non-residential soil cleanup.

Four contaminants found in the groundwater were found to exceed the State of Maryland AWQC or the recommended EPA AWQC for the protection of aquatic life, and three contaminants were found to exceed the State of Maryland AWQC or the recommended EPA AWQC for the protection of human health via fish consumption. Based upon maximum contaminant level (MCL) exceedances and MDE groundwater cleanup standards comparison, it was determined that a groundwater use deed restriction be recommended for the site.

Three contaminants were detected in surface water in excess of the State of Maryland AWQC or the recommended EPA AWQC for the protection of aquatic life. Multiple detected and non-detected groundwater and surface water contaminants exceeded their respective MDE groundwater cleanup standard.

2.6 PROPOSED REDEVELOPMENT PLAN

The proposed redevelopment plan for the site involves use as a publically accessible park, planted with native or naturalized species of the Chesapeake Bay watershed. Pathways will be provided for walking, hiking, and biking activities (See Figure 2-2 Proposed Redevelopment Plan). No areas of soil contact are being provided (playgrounds, picnic areas, etc) and no buildings or structures are planned. Therefore, based on existing conditions at the site and the proposed future use, Level 2: Public Recreational Area

(Moderate Frequency Use) requirements will be applied as part of the RAP. This proposed future use also allows for commercial and/or industrial future uses of the property. Future exposed populations at the property will include: child and youth recreational users, and construction, commercial, or industrial workers.

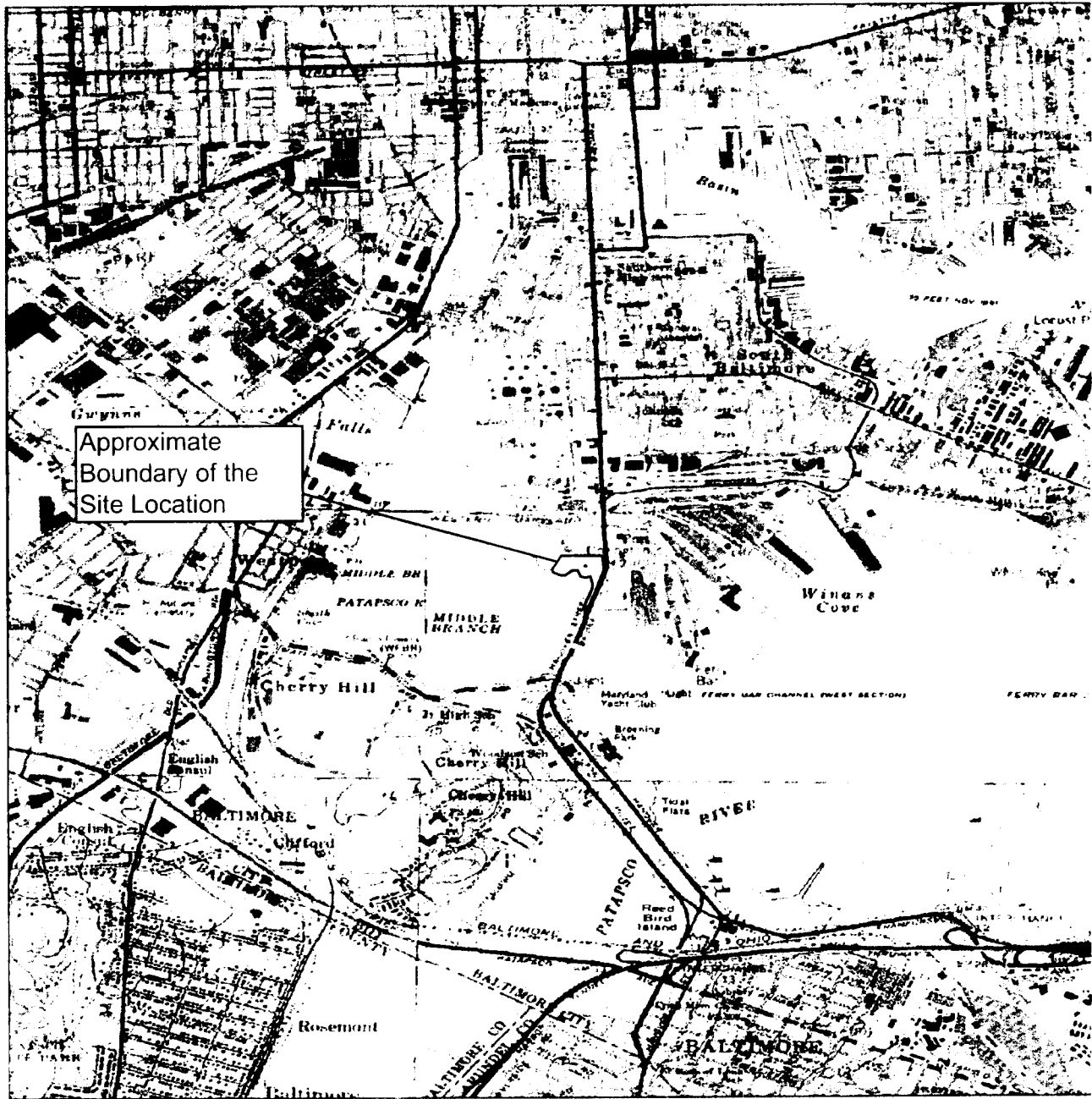
The objective is to perform a RAP as part of an ongoing VCP project at the site. It should be noted that some of the development activities on the site will be completed at a yet to be determined future date.

The development is to include capping of existing natural areas with MDE-approved clean imported fill material and future construction of a research facility and associated landscaping and parking facilities.

2.7 PROPOSED RESPONSE ACTIONS

The entire property will be subject to this proposed RAP. This proposed RAP is a method of development that the participant has selected to eliminate the potential for unacceptable levels of environmental risk to future recreational, commercial, and onsite visitor populations. The RAP will be implemented by regrading the site (as needed) and constructing a containment remedy above the existing surface. The containment remedy will consist of MDE-approved clean imported fill soil, concrete, and asphalt cover material placed in appropriately designated areas. The site cap will affect all portions of the property.

Following implementation of the containment remedy, institutional controls include groundwater use deed restriction, excavation deed restriction, soil disposal requirements, and annual cap inspections and maintenance for pavement, pavers, gravel, soil, and rip-rap. These will be recorded for the site in order to maintain the integrity of the containment remedy and mitigate exposure to human health and the environment.



Reference: United States Geological Survey, Baltimore, Maryland 7.5-Minute Topographic Quadrangle, July 1974

Figure 2-1

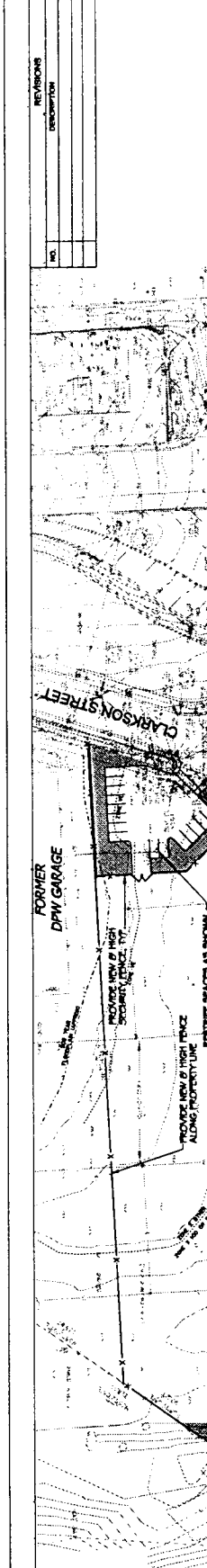
Site Location
Center for Aquatic Life Conservation
Baltimore, MD 21230

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Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152

Scale: unknown

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62874.04

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GENERAL NOTES

1. THE TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ON THIS PLAN WAS OBTAINED FROM AERIAL PHOTOGRAPHS, RECORDS MAINTAINED BY R&K, L.P., THIS INFORMATION IS NOT GUARANTEED BY R&K, L.P. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE DATA TO BE USED IN CONSTRUCTION AND UTILITY INFORMATION TO HIS OWN SATISFACTION.
2. EXISTING UTILITY FALLS WITHIN 1,000' CIRCUMFERENCE RAY CRITICAL ZONE.
3. EXISTING SITE FALLS WITHIN 3' FLOODPLAIN ZONES BASED ON 100-YEAR FLOOD RISE RATE MAP PER FEMA MAP 15201-100-0100-100-YEAR FLOODPLAIN ELEVATION 9.81' BALTIMORE CITY (HULL) AND ELEVATION 10.61' BALTIMORE CITY (DALL) OF 1955 YEAR FLOOD OR 100-YEAR FLOOD WITH EXISTING UTILITY FALLS WITHIN 1,000' CIRCUMFERENCE RAY CRITICAL ZONE PER BALTIMORE CITY OF BALTIMORE DATED JANUARY 3, 1999.
4. APPROXIMATE 100-YEAR FLOODPLAIN LOCATION AND 500-YEAR FLOODPLAIN LOCATION BASED ON ELEVATION STUDY BY CITY OF BALTIMORE DATED JANUARY 3, 1999.
5. SURVEY CONTROL - BALTIMORE CITY SURVEY CONTROL SYSTEM HORIZONTAL CONTROL - COORDINATES
#31477 N = 12,101,592 E = 309,346
#31476 N = 12,950,214 E = 325,275
VERTICAL CONTROL - BENCHMARKS
BM 8982 ELEV. = 20.95'
BM 8124 ELEV. = 16.62'
6. RECONSTRUCT ALL SOIL DISTURBING ACTIVITY WITH VOLUNTARY CLEAR-UP PROGRAM.
7. RECONSTRUCTION GRAVELS MUST BE FOR ASPHALT PATHWAYS AS REQUIRED; PROPOSED TO 55% COMPACTION.

LEGEND

- DOTTING TREE / BRUSH LINE (APPROXIMATE)
- DOTTING TREE
- DOTTING CONTOUR
- DOTTING STORM DRAIN
- DOTTING SANITARY SEWER
- DOTTING WATER
- DOTTING UNDERGROUND ELECTRIC
- DOTTING OVERHEAD ELECTRIC
- DOTTING UNDERGROUND TELEPHONE
- PROPERTY LINE
- DOTTING UNDERGROUND GAS
- DOTTING EASEMENT
- DOTTING WETLANDS / EDGE OF WATER
- ASPHALT PATHWAY (PEDESTRIAN)
- GRAVEL PAVEMENT (VEHICULAR)
- CONCRETE LIMIT PAVEMENT (VEHICULAR)
- CONCRETE LIMIT PAVEMENT (PEDESTRIAN)
- LANDSCAPED AREA AND TOPSOIL
- PROPOSED SECURITY FENCE AND GATE
- DOTTING RIF RAMP
- DOTTING VEGETATED SWALE
- DOTTING STORM DRAIN

DRAFT: TS&L / 65% SUBMISSION
FOR REVIEW ONLY
NOT FOR CONSTRUCTION

CITY OF BALTIMORE
DEPARTMENT OF ENVIRONMENTAL CONSTRUCTION

NATIONAL AQUARIUM
ACCESS IMPROVEMENTS
SITE PLAN

DATE: SEPTEMBER 11, 2008
SCALE: AS SHOWN
SHEET 1 OF 2

REVISIONS

NO.	REVISIONS	DATE	BY

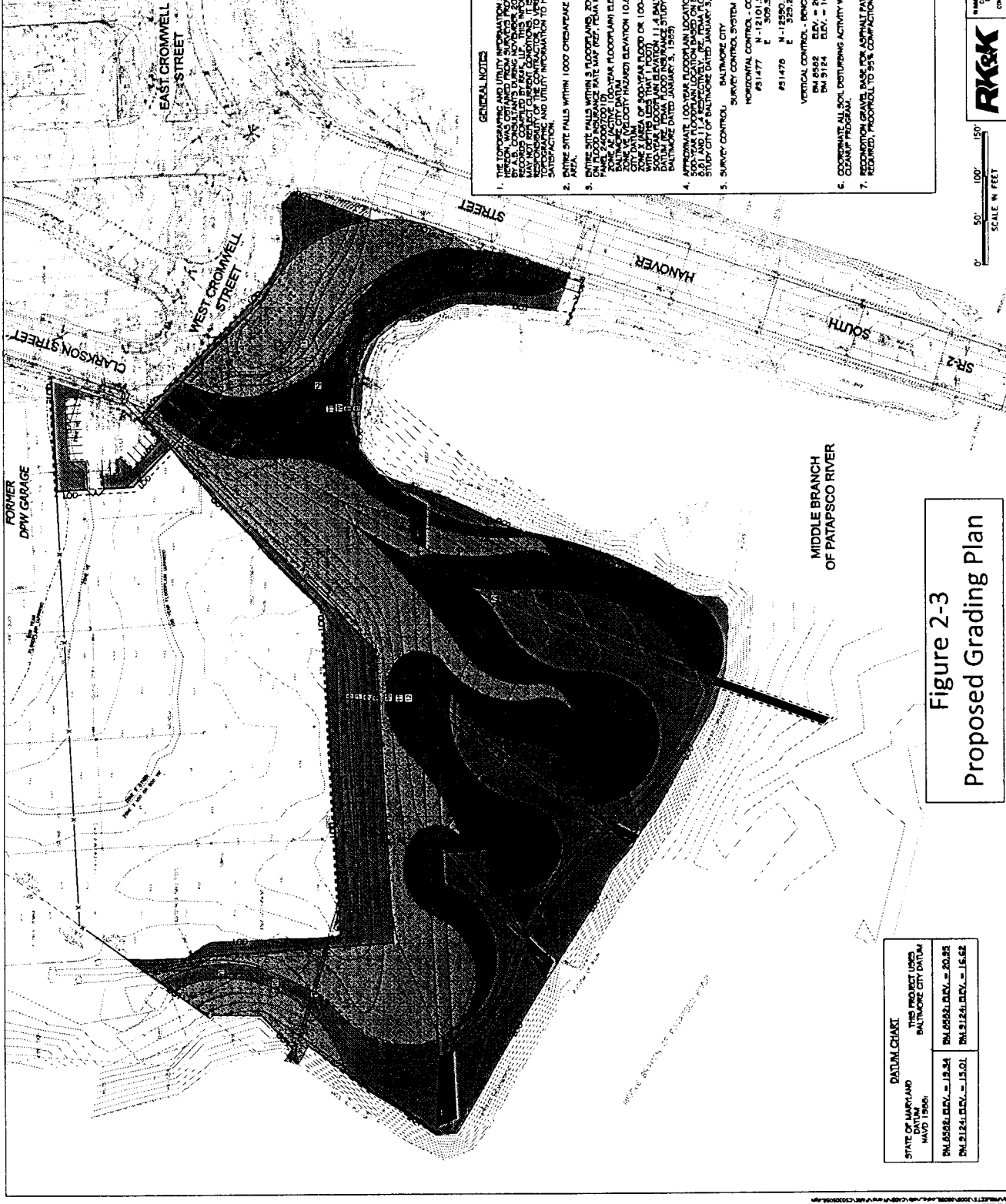
SCALE IN FEET
0 50 100 150

R&K
R&K CONSULTANTS, L.P.
2000 LIGHT STREET
BALTIMORE, MD 21202
TEL: 410-752-7000
FAX: 410-752-7001
WWW.RKCONSULTANTS.COM

Figure 2-2
Proposed Development
Plan

DATUM CHART	
STATE OF MARYLAND DATUM MAYO 1966)	THIS PROJECT USES BALTIMORE CITY DATUM
BM 8592 ELEV. = 19.24	BM 8582 ELEV. = 20.95
BM 8124 ELEV. = 15.01	BM 8124 ELEV. = 16.62

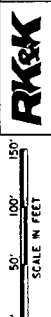
NO.	REVISIONS	DATE	BY



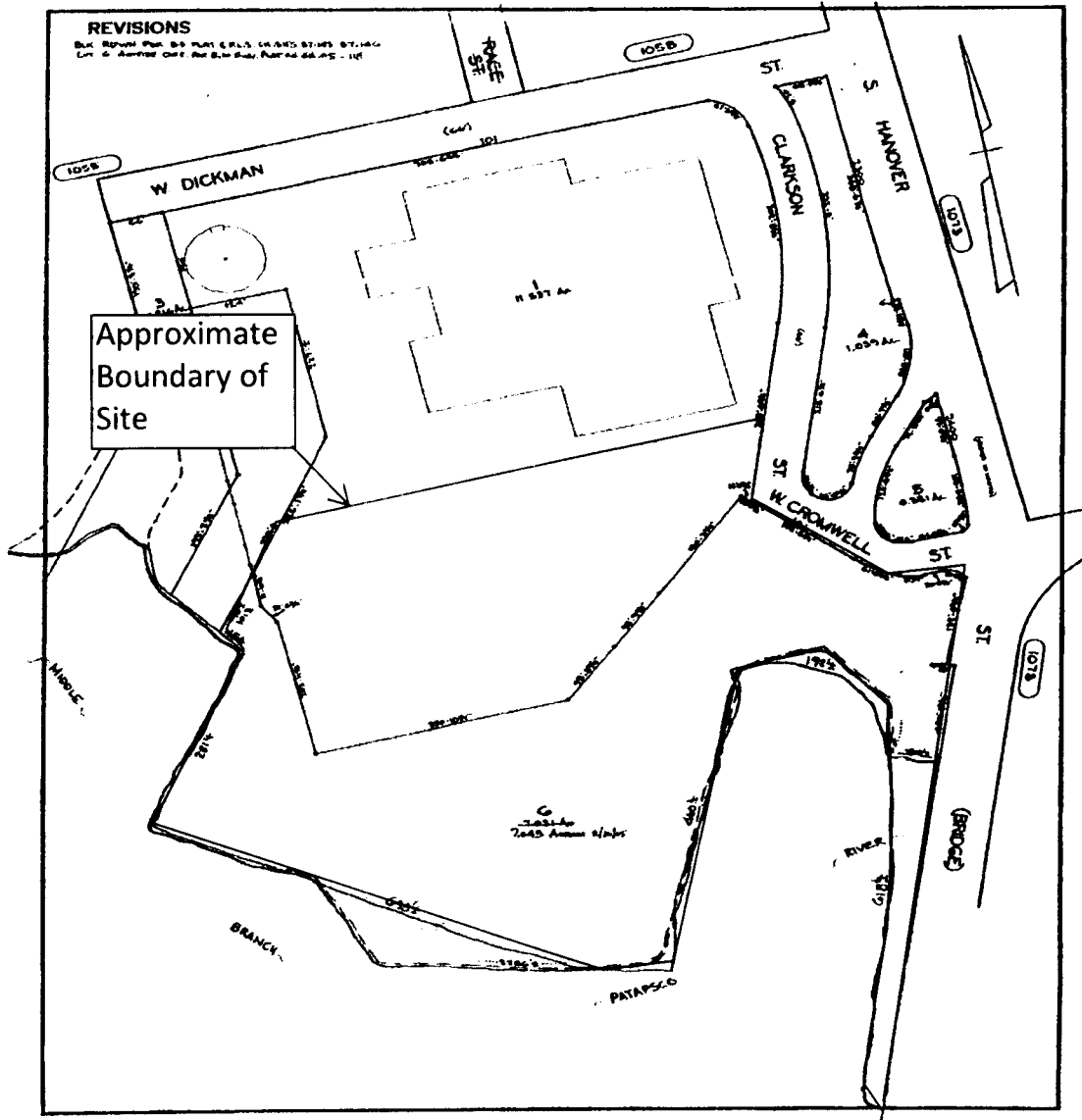
STATE OF MARYLAND DATUM MAYO 1966	THIS PROJECT USES BALTIMORE CITY DATUM
BM 5582 ELEV. = 13.24	BM 5582 ELEV. = 20.95
BM 5124 ELEV. = 15.01	BM 5124 ELEV. = 16.62

Proposed Grading Plan

Figure 2-3



DATE: SEPTEMBER 11, 2008
SHEET 8 OF 8



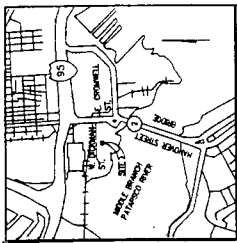
Reference: City of Baltimore Department of Public Works, dated October 1986.

Figure 2-4
 Tax Map
 Response Action Plan
 Center for Aquatic Life and Conservation
 Baltimore, MD 21230

EA® EA Engineering, Science, and
 Technology, Inc.
 15 Loveton Circle
 Sparks, Maryland 21152

Scale: unknown

EA Project No.
 62874.04



BOUNDARY COORDINATES
SCALE: 1"=200'

POINT #	SOUTH	EAST/WEST	ELEVATION
1	127.00	127.00	127.00
2	127.00	127.00	127.00
3	127.00	127.00	127.00
4	127.00	127.00	127.00
5	127.00	127.00	127.00
6	127.00	127.00	127.00
7	127.00	127.00	127.00
8	127.00	127.00	127.00
9	127.00	127.00	127.00
10	127.00	127.00	127.00
11	127.00	127.00	127.00
12	127.00	127.00	127.00
13	127.00	127.00	127.00
14	127.00	127.00	127.00
15	127.00	127.00	127.00
16	127.00	127.00	127.00
17	127.00	127.00	127.00
18	127.00	127.00	127.00
19	127.00	127.00	127.00
20	127.00	127.00	127.00
21	127.00	127.00	127.00
22	127.00	127.00	127.00
23	127.00	127.00	127.00
24	127.00	127.00	127.00
25	127.00	127.00	127.00
26	127.00	127.00	127.00
27	127.00	127.00	127.00
28	127.00	127.00	127.00
29	127.00	127.00	127.00
30	127.00	127.00	127.00
31	127.00	127.00	127.00
32	127.00	127.00	127.00
33	127.00	127.00	127.00
34	127.00	127.00	127.00
35	127.00	127.00	127.00
36	127.00	127.00	127.00
37	127.00	127.00	127.00
38	127.00	127.00	127.00
39	127.00	127.00	127.00
40	127.00	127.00	127.00
41	127.00	127.00	127.00
42	127.00	127.00	127.00
43	127.00	127.00	127.00
44	127.00	127.00	127.00
45	127.00	127.00	127.00
46	127.00	127.00	127.00
47	127.00	127.00	127.00
48	127.00	127.00	127.00
49	127.00	127.00	127.00
50	127.00	127.00	127.00

SURVEY TRAVERSE

POINT #	SOUTH	EAST/WEST	DESCRIPTION
1	127.00	127.00	START OF TRVERSE
2	127.00	127.00	...
3	127.00	127.00	...
4	127.00	127.00	...
5	127.00	127.00	...
6	127.00	127.00	...
7	127.00	127.00	...
8	127.00	127.00	...
9	127.00	127.00	...
10	127.00	127.00	...
11	127.00	127.00	...
12	127.00	127.00	...
13	127.00	127.00	...
14	127.00	127.00	...
15	127.00	127.00	...
16	127.00	127.00	...
17	127.00	127.00	...
18	127.00	127.00	...
19	127.00	127.00	...
20	127.00	127.00	...
21	127.00	127.00	...
22	127.00	127.00	...
23	127.00	127.00	...
24	127.00	127.00	...
25	127.00	127.00	...
26	127.00	127.00	...
27	127.00	127.00	...
28	127.00	127.00	...
29	127.00	127.00	...
30	127.00	127.00	...
31	127.00	127.00	...
32	127.00	127.00	...
33	127.00	127.00	...
34	127.00	127.00	...
35	127.00	127.00	...
36	127.00	127.00	...
37	127.00	127.00	...
38	127.00	127.00	...
39	127.00	127.00	...
40	127.00	127.00	...
41	127.00	127.00	...
42	127.00	127.00	...
43	127.00	127.00	...
44	127.00	127.00	...
45	127.00	127.00	...
46	127.00	127.00	...
47	127.00	127.00	...
48	127.00	127.00	...
49	127.00	127.00	...
50	127.00	127.00	END OF TRVERSE

GENERAL NOTES

1. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
3. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
4. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
6. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
8. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
9. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.
10. ALL DIMENSIONS ARE TO CENTER OF CURVE UNLESS OTHERWISE NOTED.

OWNERS CERTIFICATION

I, the undersigned, being the owner of the above described property, do hereby certify that the information furnished herein is true and correct to the best of my knowledge and belief.

Signature: *[Signature]*
Name: *[Name]*
Date: *[Date]*

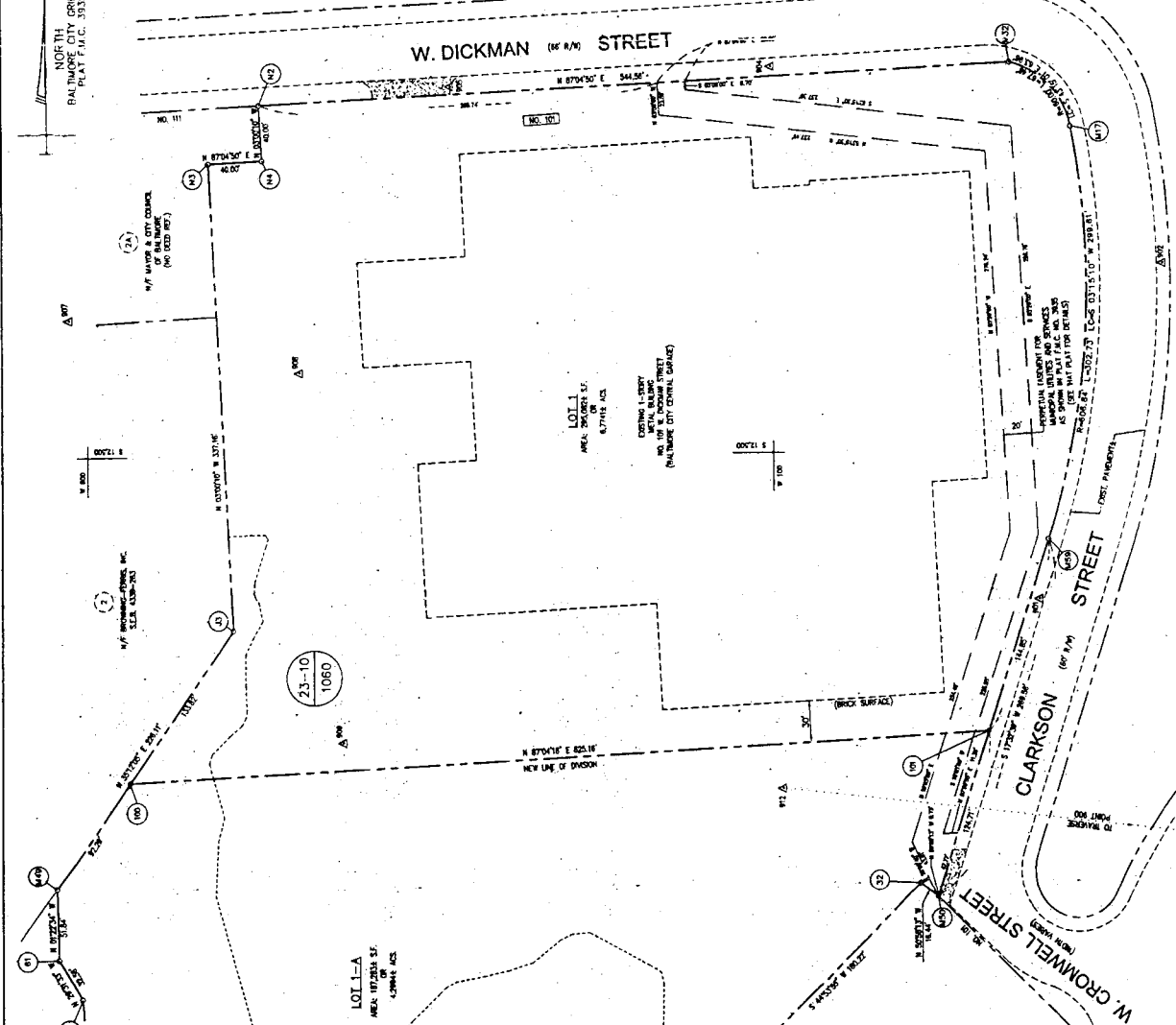
SURVEYOR'S CERTIFICATION

I, the undersigned, being a duly licensed Professional Engineer in the State of Maryland, do hereby certify that the information furnished herein is true and correct to the best of my knowledge and belief.

Signature: *[Signature]*
Name: *[Name]*
Date: *[Date]*

APPROVED

CITY OF BALTIMORE
PLANNING COMMISSION
COMMITTEE ON SUBDIVISIONS
APPROVED AS TO STREET AND SUBDIVISION PLAN ONLY
ON THIS DATE: *[Date]*
BY: *[Signature]*



RESUBDIVISION OF NO. 101 W. DICKMAN STREET
CENTER FOR AQUATIC LIFE AND CONSERVATION, INC. (PREVIOUSLY RECORDED F.A.C. NO. 3033)
101 WEST DICKMAN STREET
BALTIMORE, MARYLAND
MAP NO. 23 SECTION 10, BLOCK 1000, LOT 1

PLAN PREPARATION

Prepared by:	N. P. HANOVER
Date:	JULY 15, 2007
Scale:	1" = 20'
Checked by:	M. J. BOYLE
Date:	7-23-07

REVISIONS

NO.	DATE	DESCRIPTION

GRAPHIC SCALE

1" = 20'

PROPERTY LOCATION HISTORY

APPROVED AS DECEASED

Street Name: *[Name]*
House Number: *[Number]*
Date: *[Date]*

Figure 2-5
Re-subdivision Plan

Hanover Land Services, Inc.
SURVEYING & ENGINEERING
100 W. BALTIMORE STREET, BALTIMORE, MD 21201
PH: 410-528-1111 FAX: 410-528-1112

3.0 ADDITIONAL INVESTIGATORY INFORMATION

3.1 MERCURY IN SUBSURFACE SOIL

Mercury vapor from the subsurface soil is considered to be a potential concern at the site based upon elevated detection of total mercury on Lot 6. As mentioned previously, Lot 1A was evaluated for elemental mercury in 2006 at which time no elemental mercury was detected in the samples collected. Any future development involving structures will be limited to Lot 1A. Therefore, the primary potential receptor is construction worker inhalation of mercury vapor from subsurface soil during earth movement activities on Lot 6. As a result, mercury vapor will be monitored during construction activities by using a Jerome 431-X Mercury Vapor Analyzer to accurately detect and measure toxic mercury vapor in the air.

3.2 CLEAN FILL CHARACTERIZATION PLAN

Clean fill brought onto the site must be characterized to determine that it meets engineering specifications for particular use and passes screening analysis to ensure that it is not impacted in accordance with the MDE *Facts About...VCP – Clean Imported Fill Material*. It is necessary to verify through documentation that the fill source is clean. Documentation should include detailed information on the previous use of land where clean fill is obtained, whether an environmental site assessment was performed and any findings of the assessment, and the results of any testing performed. It is recommended that the documentation be signed by an environmental professional.

Clean fill material should be analyzed based on the source of the fill and knowledge of the prior land use. MDE recommends using the following analytical methods to determine whether potential contaminants are present in fill source areas.

Fill Source	Target Compounds / Recommended Analysis*
Land near an existing highway	Lead and PAHs
Land near a mining area or rock quarry	Heavy metals, asbestos, and pH
Agricultural land	Pesticides, herbicides, and Heavy metals
Residential/acceptable commercial land	Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), heavy metals including lead, and asbestos

* The recommended analyses should be performed in accordance with EPA SW-846 methods (1996). Other possible analyses include hexavalent chromium.

Representative samples should be collected while the clean fill material is still in place and analyzed prior to removal. An appropriate number of samples should be determined based on the approximate volume or area of the soil to be used as clean fill material. MDE recommends using the following guide to determine the number of samples needed to adequately characterize the clean fill material.

Area of Individual Borrow Area	Sampling Requirements
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every ½ acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	Samples per Volume
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1,000 cubic yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

If the clean fill contains detectable amounts of chemicals of potential concern (COPCs), they should be evaluated for risk in accordance with the *MDE Cleanup Standards for Soil and Groundwater Interim Final Guidance (Update No. 2.1)* dated June 2008. A standard laboratory package, including a summary of the quality assurance / quality control (QA/QC) sample results should accompany all analytical reports.

To account for a recreational use of the site, site-specific goals for the fill material are calculated. These goals are presented in Table 3-1. The site-specific fill goals account for a moderate use recreational user who will be at the site for a total of 182 days/year. Based upon MDE guidance for clean fill material, only site-specific goals for metals on the Priority Pollutant List (PPL) and PAHs are calculated. The site-specific goals present risk-based levels that correspond to a carcinogenic risk of 10^{-6} or non-carcinogenic hazard of 0.1. An exceedance of the site-specific goals does not necessarily mean the fill material is not acceptable for use at the site. Sample results will be evaluated to establish an overall acceptable carcinogenic risk level of 10^{-5} or non-carcinogenic hazard index (target organ dependent) of 1.

TABLE 3-1
Calculation of Acceptable Clean Fill Levels
CALC Site

Constituent ⁽¹⁾	Oral		GI ABS ⁽⁴⁾	ABS ⁽⁴⁾	Inhalation Slope Factor ⁽²⁾ ($\mu\text{g}/\text{m}^3\text{-y}$)	Inhalation RfC ⁽³⁾ (mg/m^3)	ATC ⁽⁵⁾ (mg/kg)	Calculated Concentration		Acceptable Soil Concentration ⁽⁶⁾ (mg/kg)
	Slope Factor ⁽²⁾ ($\text{mg}/\text{kg}\text{-day}$) ¹	RfD ⁽³⁾ ($\text{mg}/\text{kg}\text{-day}$)						Cancer (mg/kg)	Non-Cancer (mg/kg)	
Primary Pollutant Metals										
Antimony	NA	4.00E-04	0.15	NA	NA	NA	1.10E+04	NA	6.02E+00	6.02E+00
Arsenic	1.50E+00	3.00E-04	1	0.03	4.30E-03	1.50E-05	3.60E+00	1.09E+00	4.21E+00	1.09E+00
Beryllium	NA	2.00E-03	0.007	NA	2.40E-03	2.00E-05	6.60E-01	4.22E+03	3.00E+01	3.00E+01
Cadmium	NA	1.00E-03	0.05	NA	4.20E-03	1.00E-05	7.30E-01	2.41E+03	1.50E+01	1.50E+01
Chromium	NA	3.00E-03	0.025	NA	8.40E-02	1.00E-04	2.80E+01	5.98E+02	4.51E+01	4.51E+01
Copper	NA	4.00E-02	1	NA	NA	NA	1.20E+01	NA	6.02E+02	6.02E+02
Cyanide, Total	NA	2.00E-02	1	NA	NA	NA	NA	NA	3.01E+02	3.01E+02
Lead	NA	NA	1	NA	NA	NA	4.50E+01	NA	NA	4.00E+02
Mercury	NA	1.00E-04	1	NA	NA	NA	5.10E-01	NA	1.50E+00	1.50E+00
Nickel	NA	2.00E-02	0.04	NA	2.40E-04	9.00E-05	1.30E+01	2.09E+05	2.99E+02	2.99E+02
Selenium	NA	5.00E-03	1	NA	NA	2.00E-02	2.20E+00	NA	7.52E+01	7.52E+01
Silver	NA	5.00E-03	0.04	NA	NA	NA	9.40E-01	NA	7.52E+01	7.52E+01
Thallium	NA	6.50E-05	1	NA	NA	NA	3.90E+00	NA	9.78E-01	9.78E-01
Zinc	NA	3.00E-01	1	NA	NA	NA	6.30E+01	NA	4.51E+03	4.51E+03
Polycyclic Aromatic Hydrocarbons (PAHs)										
Acenaphthene	NA	6.00E-02	1	0.13	NA	NA	NA	NA	6.91E+02	6.91E+02
Anthracene	NA	3.00E-01	1	0.13	NA	NA	NA	NA	3.46E+03	3.46E+03
Benz[a]anthracene ⁽⁷⁾	7.30E-01	NA	1	0.13	1.10E-04	NA	NA	4.25E-01	NA	4.25E-01
Benz[a]pyrene ⁽⁷⁾	7.30E+00	NA	1	0.13	1.10E-03	NA	NA	4.25E-02	NA	4.25E-02
Benz[b]fluoranthene ⁽⁷⁾	7.30E-01	NA	1	0.13	1.10E-04	NA	NA	4.25E-01	NA	4.25E-01
Benz[k]fluoranthene ⁽⁷⁾	7.30E-02	NA	1	0.13	1.10E-04	NA	NA	4.25E+00	NA	4.25E+00
Chrysene ⁽⁷⁾	7.30E-03	NA	1	0.13	1.10E-05	NA	NA	4.25E+01	NA	4.25E+01
Dibenz[a,h]anthracene ⁽⁷⁾	7.30E+00	NA	1	0.13	1.20E-03	NA	NA	4.25E-02	NA	4.25E-02
Dimethylbenz[a]anthracene, 7,12- Fluoranthene	2.50E+02	NA	1	0.13	7.10E-02	NA	NA	3.02E-03	NA	3.02E-03
Fluorene	NA	4.00E-02	1	0.13	NA	NA	NA	NA	4.61E+02	4.61E+02
Indeno[1,2,3-cd]pyrene ⁽⁷⁾	NA	4.00E-02	1	0.13	NA	NA	NA	NA	4.61E+02	4.61E+02
Methylnaphthalene, 1- Methylnaphthalene, 2- Naphthalene	7.30E-01 2.90E-02 NA	NA 7.00E-02 4.00E-03	1 1 1	0.13 NA NA	1.10E-04 NA NA	NA NA NA	NA NA NA	4.25E-01 6.05E+01 NA	NA 1.05E+03 6.02E+01	4.25E-01 6.05E+01 6.02E+01
Pyrene	NA	2.00E-02	1	0.13	3.40E-05	3.00E-03	NA	1.48E+06	2.30E+02	2.30E+02
	NA	3.00E-02	1	0.13	NA	NA	NA	NA	3.46E+02	3.46E+02

Notes:

- (1) Primary Pollutant Metals and PAHs are the constituents addressed for this site.
- (2) Toxicity Parameters for cancer, Oral Slope Factor and Inhalation Slope Factor, taken from EPA IRIS database.
- (3) Toxicity Parameters for non-cancer, Oral RfD and Inhalation RfC, taken from EPA IRIS database.
- (4) Gastrointestinal absorption factor (GI ABS) and ABS (absorption factor) taken from RSL table.
- (5) Anticipated Typical Concentration (ATC) taken from MDE Cleanup Standards for Soil and Groundwater Guidance for Eastern Maryland, March 2008.
- (6) Acceptable Soil Concentration based on the lower of the Hazard Quotient of 0.1 or a Cancer Risk of 1E-6; the same levels used for MDE Cleanup Standards. Calculation based on reasonable maximum recreational exposure for the site; parameters differ from MDE Residential (Appendix 1, Tables 3, 4, and 6 of the MDE Cleanup Standards for Soil and Groundwater Guidance, March 2008) only for exposure frequency reduced to 182 days for moderate recreational use.
- (7) Constituents considered to be potentially mutagenic had their toxicity values adjusted by a factor of 10 for children aged 0-2 and by a factor of 3 for children aged 2-6. ATC can be used if calculated for specific contaminants.

4.0 EXPOSURE ASSESSMENT

To mitigate future exposure to COPCs, as part of RAP activities, onsite soils will be capped with either an MDE-approved clean imported material or existing/new pavement or concrete materials. The property is currently used as vacant land and parking lot. Future property use will be Level 2: Public Recreational Areas – Moderate Frequency Use. No buildings or structures are planned at this time.

4.1 MEDIA OF CONCERN

4.1.1 Soil

Soil is considered to be a potential medium of concern at the site. Future construction, commercial, or industrial workers, and child and youth recreational users are likely to contact surface soil at the site. Construction workers are likely to contact surface and subsurface soil during earth-movement activities associated with construction activities. Construction workers have the potential to be exposed to mercury in the subsurface soils, particularly through inhalation of mercury vapor.

The proposed containment remedy and institutional controls will mitigate the potential for future receptors (commercial and industrial workers, and child or youth recreational users) from contacting impacted soil at the site; the proposed health and safety controls outlined in Section 8.1 and the Site-Specific Health and Safety Plan (SSHASP) will mitigate the potential risk to construction workers from contacting impacted soil at the site. Potential human exposure pathways are summarized in Section 4.2.

4.1.2 Groundwater and Soil to Groundwater

Groundwater is considered to be a potential medium of concern at the site. However, groundwater is not used as a potable water supply at the site and in the surrounding area; further, the Participant will file a deed restriction prohibiting the use of groundwater at the site in the future. As such, groundwater is not considered to be a potential medium of concern for future receptors (child and youth recreational users, and construction, commercial, or industrial workers).

Groundwater is considered to be a potential medium of concern for construction workers. However, as groundwater is situated at depths ranging from 3 to 7 ft below ground surface, it is not considered an exposure pathway for child and youth recreational users, and construction, commercial, or industrial workers. Potential impact with groundwater by construction workers will be handled through health and safety protocols addressed in the SSHASP.

4.1.3 Surface Water / Sediment

Surface water is not considered to be a potential medium of concern at the site. Sediment is also not considered to be a potential medium of concern at the site.

4.2 POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS OF CONCERN

The site currently consists of primarily asphalt and gravel-covered areas, and undeveloped vegetated land. Under the proposed future use, potential human receptors include: future onsite commercial and industrial workers, child and youth recreational users, and future construction workers. Potential exposure pathways include: incidental ingestion, dermal contact, inhalation of mercury vapor, and dermal contact / incidental ingestion of groundwater.

Future commercial and industrial workers, and child and youth recreational users are likely to contact impacted soils unless a containment remedy that eliminates the exposure pathway is applied to the site.

Construction workers are likely to contact groundwater and impacted soils during earth-movement activities associated with future construction activities.

In the *absence* of the containment remedy, the following potential human exposure pathways were identified for evaluation at the site:

Future Construction Worker

- Incidental ingestion of soil
- Dermal contact with soil
- Inhalation of mercury in subsurface soils
- Incidental ingestion of groundwater
- Dermal contact with groundwater

Future Adult Onsite Commercial or Industrial Worker

- Incidental ingestion of soil
- Dermal contact with soil

Future Recreational Visitor (Youth, Child)

- Incidental ingestion of soil
- Dermal contact with soil

4.3 RISK-BASED SCREENING AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

A toxicological evaluation of the Dickman Street Garage was performed by MDE in August 2003. The toxicological evaluation included the estimation of risk to potentially exposed human receptors at the site. The toxicological evaluation evaluated a commercial use scenario. Potential human receptors included construction workers, adult workers, youth intermittent visitors (6-17 years), and child intermittent visitors (1-6 years). Potentially exposed populations were assumed to have contact with surface soil, subsurface soil, sediment, groundwater, and surface water media.

For the risk evaluation, potential risk for human exposure to the site was quantitatively evaluated for incidental ingestion of surface and subsurface soil and sediment, dermal contact with surface and subsurface soil and sediment, and inhalation of volatiles and fugitive dust from surface and subsurface soil and sediment. The subsurface vapor intrusion of volatile and semivolatile compounds in soils and groundwater into buildings was evaluated using the Johnson & Ettinger vapor intrusion model for potential adult workers at the site. Groundwater was evaluated for ingestion and dermal exposure, even though public water is available to the site and groundwater is not used as a potable water source. Surface water was evaluated for incidental ingestion while swimming and wading.

Risks for human receptors exposure to site media were determined using the maximum concentration for chemicals that exceed risk-based screening values. Risk-based screening values used in the risk evaluation included the EPA Region III Risk-Based Concentrations (RBCs) and the MDE Soil and Groundwater Cleanup Standards. Results of the risk evaluation were compared to the EPA and MDE recommended level of a non-carcinogenic hazard index (HI) of 1, and carcinogenic risks were compared to the EPA risk range of 10^{-6} to 10^{-4} and MDE recommended range of risk of 10^{-6} to 10^{-5} .

As noted in the risk evaluation, "When determining whether an increased risk to human health exists at this site, it is important to understand that this evaluation incorporates many conservative assumptions. This evaluation was developed with the understanding that if the estimated risk with the conservative assumptions does not exceed EPA's recommended levels, then risk estimate using more realistic scenarios would also not exceed these levels. Since this evaluation includes many conservative assumptions, a risk that exceeds EPA's recommended level of risk does not necessarily indicate an increased risk to human health." Therefore, risk results (presented below) are not actual risks for human receptors exposure to site media. The risk results are used to make a risk management decision about potential remedial actions to allow for planned future use of the site.

A summary of non-carcinogenic and carcinogenic endpoints that exceed EPA/MDE recommended risk levels are presented in Table 4-1.

Table 4-1 Non-Carcinogenic and Carcinogenic Endpoints That Exceed EPA/MDE Recommended Risk Levels

Detected Non-Carcinogenic Endpoints			
Commercial Population	Pathway	Hazard Index	Risk Drivers
Child visitor	Ingestion-surface soil	5	Arsenic
Construction worker	Ingestion-surface soil	5	Arsenic
Adult worker	Ingestion-subsurface soil	5	Antimony
Child visitor	Ingestion-subsurface soil	45	Antimony, Arsenic, Zinc
Youth visitor	Ingestion-subsurface soil	8	Antimony
Construction worker	Ingestion-subsurface soil	44	Antimony, Arsenic, Zinc
Adult worker	Inhalation-subsurface soil	2	Mercury
Construction worker	Inhalation-subsurface soil	3	Mercury
Child visitor	Dermal Contact-surface soil	3	Chromium
Child visitor	Dermal Contact-subsurface soil	28	Antimony, Cadmium, Chromium
Construction worker	Dermal Contact-subsurface soil	3	Antimony
Adult worker	Dermal Contact-subsurface soil	2	Antimony
Youth visitor	Dermal Contact-subsurface soil	3	Antimony
Adult worker	Ingestion-groundwater	4	Antimony
Child visitor	Ingestion-groundwater	9	Antimony, Arsenic, Manganese
Youth visitor	Ingestion-groundwater	7	Antimony, Manganese
Construction worker	Ingestion-groundwater	11	Antimony, Arsenic, Manganese
Adult worker	Dermal Contact-groundwater	2	Potential additive effects
Detected Carcinogenic Endpoints			
Commercial Population	Pathway	Cancer Risk	Risk Drivers
Adult worker	Ingestion-surface soil	8.4×10^{-5}	Arsenic
Child visitor	Ingestion-surface soil	2.0×10^{-4}	Arsenic, Benzo(a)pyrene
Youth visitor	Ingestion-surface soil	7.5×10^{-5}	Arsenic
Construction worker	Ingestion-surface soil	3.2×10^{-5}	Arsenic
Adult worker	Ingestion-subsurface soil	4.8×10^{-5}	Arsenic
Child visitor	Ingestion-subsurface soil	1.1×10^{-4}	Arsenic
Youth visitor	Ingestion-subsurface soil	4.3×10^{-5}	Arsenic
Construction worker	Ingestion-subsurface soil	1.8×10^{-5}	Arsenic
Adult worker	Dermal Contact-surface soil	1.5×10^{-5}	Arsenic
Child visitor	Dermal Contact-surface soil	4.7×10^{-5}	Arsenic, Benzo(a)pyrene
Child visitor	Dermal Contact-subsurface soil	2.5×10^{-5}	Arsenic
Child visitor	Ingestion-sediment	1.2×10^{-5}	Arsenic
Adult worker	Ingestion-groundwater	1.0×10^{-4}	Arsenic
Child visitor	Ingestion-groundwater	6.2×10^{-5}	Arsenic
Youth visitor	Ingestion-groundwater	9.3×10^{-5}	Arsenic
Construction worker	Ingestion-groundwater	1.3×10^{-5}	Arsenic

4.4 COMPLETE EXPOSURE PATHWAYS

The following complete exposure pathways have been identified at the site:

- **Future Construction Worker:** Incidental ingestion of soil and groundwater; dermal contact with soil and groundwater; inhalation of mercury in subsurface soils.
- **Future Onsite Commercial or Industrial Worker:** Incidental ingestion of soil; dermal contact with soil.
- **Future Child and Youth Recreational Visitor:** Incidental ingestion of soil and dermal contact with soil.

5.0 CLEANUP CRITERIA

The numeric cleanup criteria outlined in the MDE VCP guidance documents and Brownfields Redevelopment Reform Act are not applicable for the remedy proposed within this RAP. Specifically, the containment remedy presented herein is a presumptive remedy as outlined by the MDE VCP in the *MDE Cleanup Standards for Soil and Groundwater Interim Final Guidance (Update No. 2.1)*, dated June 2008, and will eliminate the exposure pathway from the media of concern (surface and subsurface soil) to the potential receptors (future commercial or industrial occupant, child and youth recreational users, and construction worker). The pathway for construction worker mercury inhalation hazard will be addressed through air monitoring during construction activities. An Action Level of 0.01 mg/m³ has been established.

The future use of this property will be restricted to Level 2: Public Recreational Areas (Moderate Frequency Use) land uses. A clean fill characterization plan (referenced in Section 3.2) will be used to verify that no contaminated soils are brought onto the site. Acceptable clean fill will be determined by evaluation of the COPCs using the soil concentrations provided in Table 3-1. Health and Safety protocols are outlined in Section 8.1 and the SSHASP, which will be provided to MDE prior to remedial activities.

6.0 SELECTED TECHNOLOGIES AND LAND USE CONTROLS

In summary, future redevelopment of the site is for recreational activities. At this time, a formal redevelopment plan has not been completed.

All approved engineering plans (i.e., foundations, utilities, etc.) which would require additional material handling procedures (i.e., movement/replacement of soil) beneath the proposed containment remedy will be provided as an addendum to the RAP and prior to start of construction activities at the site for MDE review and approval. The final construction documents, subject to MDE approval, will be equally protective of human health and the environment. At a minimum, the final construction documents will include the site grading plan, utility plans, and the sediment and erosion control plan.

The rationale for selecting the containment remedy is to effectively mitigate the threat to human health by eliminating potential contact of the onsite receptors with the impacted media (soil and groundwater). The capping technologies presented in this section will provide an adequate cap and eliminate these potential exposure pathways. Institutional controls presented herein will be placed on the site to ensure that the potential exposure pathways are mitigated in the future. The potential for vapor inhalation during construction activities exists due to elevated detections of mercury on Lot 6. This will be addressed by air monitoring during construction activities.

The containment remedy will minimize the threat to human health by eliminating potential contact with the impacted media (soil and groundwater). This containment remedy will consist of one of the following capping techniques across the entire site:

- Asphalt/concrete paved areas: New asphalt parking areas and pedestrian paths will be capped using placement of 5 inches of asphalt and 6 inches of certified road base. Existing asphalt areas will be inspected and repaired, as necessary. Concrete areas will consist of 4 inches of concrete surface, 4 inches of certified clean fill base, and a 1-inch sand layer over existing soils and geotextile marker fabric.

A nine- inch asphalt section is proposed for the area of land adjacent to the bridge. This area is primarily a bridge maintenance easement held by the City of Baltimore and therefore cannot be planted.

The entrance to the park site will be capped with concrete unit pavers engineered to withstand vehicular traffic. A cross-section detail is provided for this feature.

- Landscaped areas: The landscaped areas will be capped with the placement of a minimum 24-inch combination certified clean imported fill and/or certified top soil over an MDE-approved certified marker geotextile fabric material. The thickness of the cap will be adjusted to accommodate the planting of different species in order to ensure the root systems do not disturb the cap/soil interface. The proposed landscape cap cross-sections are provided in the attachments

and include details for meadow planting, shrub planting, and tree planting. In addition, a small landscape area in the proposed parking lot will be capped with concrete unit pavers. This is currently a grassy median between the existing parking lot and the Cromwell Street. A cross-section detail is provided for this area.

- Shoreline containment – The existing shoreline rip-rap will serve as the shoreline containment. The existing shoreline will be inspected and repaired, as necessary. There are two existing areas that require repair and stabilization, one area at the point near the cove where rock was removed in the past, and the eastern/northern shoreline of the cove where the stabilization methods are failing. These areas will be repaired with rip-rap designed to withstand the anticipated wave action over a marker geotextile fabric.

The Site Development Plan includes riverward containment which will consist of existing rip-rap that is currently present along the shoreline. The rip-rap will not be disturbed during construction activities and is sufficient as a containment remedy for the shoreline. The integrity of the rip-rap shoreline will be verified through visual inspection and areas will be repaired as necessary.

Stormwater management systems will be onsite during construction activities to reduce potentially contaminated runoff from the property. Upon completion of final construction, these systems will remain. The proposed containment remedy will prevent contaminated groundwater migration to the Middle Branch. Adequate measures will also be taken to prevent potentially contaminated sediments from being discharged from the property during construction.

The institutional controls proposed herein will provide an effective means of mitigating potential exposure to impacted media. Specifically, a restriction will be placed on the deed to prevent excavation activities at depths greater than 24 inches below the ground surface in landscaped areas and 6 inches below the ground surface in asphalt paved areas. All excess soil will be removed from the site, categorized, and properly disposed in accordance with applicable local, state, and federal laws and regulations. Contaminated excavated soils will not be placed on residential property.

MDE will be verbally or electronically notified within 24 hours following the discovery of unplanned emergency conditions at the site which will penetrate the cap, and will be provided with written documentation within 10 days of the repair. In addition, MDE will be provided written notice a minimum of 5 business days prior to planned activities at the site that will penetrate the cap, with the repairs completed within 15 days, and written documentation submitted to MDE within 10 days of the repair. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation(s), health and safety protocols (as required), clean fill source and documentation (as required), and proposed characterization and disposal requirements (as required).

Lastly, a Site-Specific Health and Safety Plan will identify the means and methods to protect construction workers engaged in intrusive activities at the site. A copy of the SSHASP will be provided to MDE and will also be present onsite during all RAP construction activities.

The site will be serviced by municipal water, municipal sewer, natural gas, and electric. Because the site is serviced by municipal water, groundwater will not be used as a potable water supply, nor is it planned for use as a non-potable water supply. To ensure and maintain this use, a groundwater restriction will be placed on the site prior to occupancy.

The selected remedy is intended to eliminate exposure pathways and does not reduce the toxicity and volume of the COPCs. Continued maintenance of the containment remedy will limit the mobility of site contaminants in the future.

No additional activities, other than those specified below, are anticipated to develop this remedial design. This containment remedy has been incorporated into the development plan for the site. The response actions proposed for the site are detailed in the following sections.

6.1 PAVED AND CONCRETE COVERED AREAS

During development, the site will be regraded and certain areas will be paved with asphalt, pavers, or concrete in accordance with the following procedures:

- Regrading the site.
- Placement of asphalt pavement and certified clean imported fill sub-base, or placement of a paver layer or concrete slab and certified clean imported fill sub-base.
- Deed restriction to maintain the cap and require future excavations at the site to be approved by MDE prior to any disturbance to the subsurface.

Cross-sections detailing the composition of the impervious surface layers for asphalt paved and concrete covered areas are presented in the attachments. Limited construction activities will be performed in the area of existing pavement. Activities planned for the existing paved area include the installation of fencing and landscaped areas. Most of the existing pavement will remain in place and therefore does not require the above capping activities.

6.2 LANDSCAPED/NATURAL AREAS

The current development plans include the creation of a publically accessible park, predominately comprised of landscaped natural areas with pathways. In landscaped areas, construction will adhere to the following protocols:

- Regrading the site.

- Placement of an MDE-approved geotextile fabric as a marker/warning barrier.
- Placement of a minimum 24-inch certified clean imported fill layer and top soil.
- Deed restriction to maintain the cap and require future excavations at the site to be approved by the MDE prior to any disturbance to the subsurface.

A cross-section detailing the composition of the landscaped areas is presented in the attachments. Landscape plants will be limited to those with root systems which will not penetrate the geotextile/marker barrier. The thickness of the cap will be adjusted to accommodate the planting of different species in order to ensure the root systems do not disturb the cap/soil interface. All excess soil will be removed from the site, categorized, and properly disposed in accordance with applicable local, state, and federal laws and regulations. Contaminated excavated soils will not be placed on residential property.

It is anticipated that the entire existing natural area of the site will be capped with certified clean fill material. To account for a recreational use of the site, site-specific goals for the fill material are calculated. These goals are presented in Table 3-1. The methods for determining the scope of work for the clean fill determination is provided in Section 3.2.

6.3 SHORELINE CONTAINMENT

Shoreline containment will consist of existing rip-rap that is currently present along the shoreline. The rip-rap will not be disturbed during construction activities and is sufficient as a containment remedy for the shoreline. The integrity of the rip-rap shoreline will be verified through visual inspection and areas will be repaired as necessary.

The rip-rap shoreline will be re-established in areas that exhibit failure or erosion. The repaired shoreline will consist of an MDE-approved marker geotextile fabric overlain by 19 to 32 inches of rip-rap (depending on predicted wave action) obtained from a certified clean fill source.

6.4 SITE ACCESS AND CONTROL

Prior to and during implementation of the response action, site access will be limited through maintenance of the existing site perimeter fencing. In addition, CALC will comply with all local, state, and federal laws and regulations by obtaining all necessary approvals and permits to conduct the activities pursuant to an approved RAP. Copies of the written agreement and certified zoning statement and public notifications to be submitted concurrent with this RAP are provided in Appendix F, G, and H.

In addition, as previously discussed in Section 4.0, during construction and development, the potential exists for exposure to COPCs by construction workers through incidental ingestion, inhalation, and dermal contact. Therefore, future construction contractors must comply with all requirements of the SSHASP (to be developed prior to implementation of the RAP) and the health and safety protocols

described herein. The primary actions taken to mitigate potential exposures to future construction workers will be environmental monitoring and the appropriate use of personal protective equipment (PPE) during construction activities. If risk from mercury soil vapor is still present after conducting initial testing, the site will be evacuated and PPE will be upgraded to Level C.

6.5 INSTITUTIONAL CONTROLS (FUTURE LAND USE CONTROLS)

Long-term conditions will be placed on the RAP approval and Certificate of Completion (COC) regarding future uses of the site, which will be restricted to Level 2: Public Recreational Areas – Moderate Frequency Use. These conditions are expected to include the following:

- 1) Restrictions prohibiting the use of groundwater at the site.
- 2) Notice to MDE prior to any future planned soil disturbance activities at the site below areas designated for engineering controls. This written notice will be submitted a minimum of 5 days prior to any planned excavation activities at the site that will penetrate the cap.
- 3) Complete appropriate characterization and disposal of any future material excavated from beneath the cap in accordance with applicable local, state, and federal requirements. Excavated soils will not be placed on residential property.
- 4) Complete appropriate annual maintenance and inspection activities of the containment remedy.

CALC, or its successors and assigns, will file the above deed restrictions as defined in the COC. CALC will maintain ownership and control of the site during all phases of redevelopment. All exterior areas of the site are subject to the proposed response action, a containment remedy (site cap), and institutional controls (deed restrictions). Restrictions on the future use and maintenance of the site cap will be subject to the control of the property owner. An Environmental Covenant will also be written and recorded for the properties.

6.6 POST-REMEDATION REQUIREMENTS

Post-remediation care requirements will include compliance with the conditions placed on the COC and the deed restrictions recorded for the site. In accordance with the MDE VCP guidance, deed restrictions will be recorded within 30 days of issuance of the COC. The participant will send a copy of the COC determination to the public utility one-call system.

Physical maintenance requirements will include maintenance of the capped areas to prevent degradation of the environmental cap and unacceptable exposure to the underlying soil. Annual inspections of the cap will be conducted each year in the spring, targeting April. The property owner will be responsible for onsite cap maintenance inspections, performing maintenance to the cap, and maintaining all cap inspection records. Maintenance records will include, at a minimum, the date of the inspection, name of

the inspector, any noted issues, and subsequent resolution of the issues. Areas of the cap that have degraded to a Pavement Condition Index of 4.0 will be repaired in a timely manner. The Pavement Condition Index is attached in Appendix D. MDE will be verbally or electronically notified within 24 hours following the discovery of unplanned emergency conditions at the site which will penetrate the cap, and will be provided with written documentation within 10 days of the repair. In addition, MDE will be provided written notice a minimum of 5 business days prior to planned activities at the site that will penetrate the cap, with the repairs completed within 15 days, and written documentation submitted to MDE within 10 days of the repair. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation(s), health and safety protocols (as required), clean fill source and documentation (as required), and proposed characterization and disposal requirements (as required).

7.0 EVALUATION CRITERIA FOR THE SELECTED TECHNOLOGIES

7.1 ANTICIPATED REMEDIAL ACTIONS

Based on the information evaluated from the various characterization events, the remedial options for the site are quite limited. The concentrations and distribution of metals and PAHs require the removal of exposure pathways to the proposed future site user. Considering that future site recreational users will have unrestricted access to the site, the entire site must be addressed. Remedial alternatives are considered for the surface soil only, as future users are not anticipated to have access to soils at depths greater than 2 ft below ground surface or below pavement. Subsurface soil exposure will be addressed through construction worker Health and Safety Protocols. Inhalation of mercury vapor from subsurface soils is a pathway of concern to construction workers; therefore, monitoring of mercury vapor will be conducted during construction activities. Three remedial alternatives are presented below:

Option 1 – No Action

This alternative involves allowing the site to remain in its current condition for future site access and use. Considering the identified human health risks associated with the environmental impacts, it is unlikely that this alternative would be considered successful by regulatory agencies and therefore is not considered a viable option at this time.

Option 2 – Impacted Material Removal

The removal of impacted material would remove the exposure pathway to future site users. However, this option has considerable drawbacks when evaluating the soil and chemical composition of the site. The site was created by placing material in open water to create land. Subsurface results are similar to surface results at the site, and both shallow and deep soils represent unacceptable human health risk scenarios. As such, in order to remove the impacted materials from the site, it is anticipated that the entire soil column would need to be excavated from surface to below water. In the absence of proper engineering controls, the total excavation, removal, and transportation of impacted material from the 7-acre undeveloped parcel could expose construction workers to unsafe work conditions. In addition, the removal of material may have structural implications for the adjacent properties. Clean replacement material would need to be brought in to recreate these areas, resulting in an unrealistic expense to CALC.

When considering the anticipated removal, disposal, and replacement cost for removing impacted material, worker safety and structural concerns with removing material from the site, the removal option is not considered a viable option at this time.

Option 3 – Site Capping with Clean Fill

Capping the site with certified clean imported fill material would remove the exposure pathway for future site users. This option involves placing certified clean imported fill over areas determined to be impacted. Results from the site indicate that there are pervasive impacts to surface soils and therefore the entire surface area would need to be addressed through a clean fill cap. Once the impacted areas are addressed, the risk criteria fall below acceptable levels and the remainder of the site can be accessed by future site users.

Both Options 2 and 3 require that clean fill be imported to the site. Option 3 would require much less material placement and earthwork than Option 2 and provides a more realistic alternative. The placement of a certified clean imported fill cap over impacted material has been demonstrated to be a cost-effective method of removing the exposure pathways on development sites and presents the best alternative for the project.

7.2 CRITERIA FOR CERTIFICATE OF COMPLETION

CALC will document successful completion of the RAP through the following means and methods, from which the COC can be issued:

- 1) Completion of capping activities that protect future populations from the existing contamination at the site.
- 2) CALC will notify MDE that the RAP has been completed and requests issuance of the COC from the VCP.
- 3) At the completion of RAP activities, a RAP Completion report will be submitted to MDE for review and approval. The RAP Completion report will include documentation regarding field visits, photographic documentation of RAP activities, documentation of health and safety monitoring during RAP construction activities, and as-built site plans illustrating all excavation and capped areas for the site. All clean fill documentation, as well as copies of the certificates of disposal or manifests, as applicable, for environmental media and solid waste generated during performance of the RAP will be included in the RAP Completion report.

7.3 CRITERIA FOR CONTINGENCY MEASURES

MDE will be notified immediately of any previously undiscovered contamination, changes to the RAP schedule, previously undiscovered storage tanks and other oil-related issues, and citations from regulatory entities related to health and safety practices. Any significant change to the implementation schedule will be submitted in writing to the VCP within 7 days of the change. Notifications will be provided to the VCP at the following address:

MDE Land Restoration Program
Voluntary Cleanup Program
c/o Division Chief
1800 Washington Boulevard, Suite 625
Baltimore, Maryland 21230
Phone: 410-537-3493

In addition to verbal notifications, the VCP will be provided with all documentation and analytical reports generated as a result of newly identified conditions. This includes manifests for contaminated material disposed offsite.

8.0 PROPOSED RESPONSE ACTION IMPLEMENTATION

The following section includes plans and protocols for implementation of the proposed Response Action, including general health and safety protocols, reporting requirements, maintenance, excavation protocols, and specifications for clean fill characterization. Adequate measures will be taken to prevent potentially contaminated sediments from being discharged from the property during construction. Soil and erosion controls plan will be approved by the City of Baltimore.

8.1 GENERAL HEALTH AND SAFETY PROTOCOLS

During construction and redevelopment, the potential exists for exposure to COPCs (incidental ingestion, dermal contact, inhalation) by construction workers. Therefore, construction contractors will comply with all requirements of the RAP health and safety protocols, Occupational Safety and Health Administration (OSHA) guidelines for managing contaminated materials, and the SSHASP. A copy of the SSHASP will be maintained onsite in the construction trailer.

The primary actions to mitigate potential exposure to future construction workers will be environmental air monitoring and the appropriate use of PPE (e.g., hard hats and steel-toed boots) during construction activities. Construction workers will be informed on the proper measures (e.g., PPE) and protocols upon incidental contact with groundwater according to the SSHASP. A summary of the procedures for addressing potential exposure to airborne dust or soil is provided in the following section.

8.2 AIR MONITORING REQUIREMENTS

Air monitoring will be conducted during excavation activities in the immediate work zones and surrounding areas to assess levels of exposure to site workers for dust and mercury levels. The air monitoring will also be performed to ensure that contaminants are not migrating. Air monitoring will be conducted as follows for mercury vapor and if visible dust is generated in the breathing zone:

- At the start of intrusive activities.
- Periodically during intrusive activities (30-minute intervals).
- When work begins on a different portion of the site.
- When contaminants other than those previously identified are being handled.
- When a different type of operation is initiated or conditions have changed.
- If personnel are working in areas with obvious particulate and/or liquid contamination.
- If a sufficient reasonable interval has passed so that exposures may have significantly increased.

Air monitoring will be conducted during intrusive operations involving soil excavation, grading, and soil relocation operations. Air monitoring instrumentation will include a mercury vapor analyzer and dust

monitor. Environmental monitoring requirements including action levels and potential response actions are included in Table 8-1. Protective measures will be employed to prevent construction worker exposure to potentially contaminated groundwater.

As specified in the SSHASP, air monitoring will be conducted initially and at interval frequencies of 30 minutes. If the action level is exceeded, operations will be shut down, and dust suppression will be implemented. Operations will only be resumed once retesting shows that dust concentrations are below the action level.

8.3 REPORTING REQUIREMENTS

Reporting required during implementation of the RAP will consist of RAP addenda, including construction documents, the initial written notification and construction schedule, Baltimore City grading permits, monthly progress reporting, and submission of the Response Action Completion Report. Any significant changes to the implementation schedule will be submitted immediately in writing to the VCP.

The RAP implementation schedule, construction documents, and City of Baltimore grading permits will be forwarded to MDE prior to beginning RAP activities. Monthly progress reports will be submitted to MDE documenting the RAP implementation. At the completion of RAP activities, a Response Action Completion Report will be submitted to MDE for review and approval. The Response Action Completion Report will include documentation regarding field visits, photo-documentation as each RAP milestone is completed (i.e., clean fill capping, landscaping, and paving), health and safety monitoring during RAP implementation activities, and as-built site plans illustrating all paved areas, open landscaped areas, and final elevations of the capped site. Copies of certificates of disposal or manifests, as applicable, for environmental media and solid waste generated during the performance of the RAP will be included in the Response Action Completion Report.

TABLE 8-1 ENVIRONMENTAL MONITORING REQUIREMENTS

Instrument	Location of Monitoring	Frequency	Action Level	Response
Mercury Vapor Analyzer	Breathing Zone	Initially and every 30 minutes	Above 0.01 mg/m ³	Evacuate or modify Health and Safety Plan and upgrade to Level C PPE
Dust Monitoring	Breathing zone	Initially and every 30 minutes	See below	Dust suppression will be implemented

Dust Monitoring

SVOCs/PAHs – total for all
 Approximately 39,000 mg/kg or 3.9%
 0.039 x Total Dust Concentration = 0.2 mg/m³ OSHA PEL
 Total Dust Concentration = 5.1 mg/m³, the total dust concentration in air needed to reach the OSHA PEL

These calculations assume that the concentration in the soil is the same as the concentration in the air. Arsenic is present at a concentration such that the nuisance dust level (or particulates not otherwise classified) of 15 mg/m³ would be exceeded prior to reaching the OSHA action levels or PELs. Therefore, total SVOCs/PAHs will be used to establish an airborne action level for total dust measured in the field with a direct-reading dust monitor. The action level will be 2 mg/m³. Also, the PEL is based upon an 8-hour TWA, and any visible dust exposure or dust at significant levels would be for a very short time period (matter of seconds in the breathing zone) prior to being suppressed.

PPE = Personnel Protective Equipment
 mg/kg = Milligrams per Kilogram
 mg/m³ = Milligrams per cubic meter
 OSHA = Occupational Safety and Health Administration
 PEL = Permissible Exposure Limit
 SVOC = Semivolatile Organic Compound
 PAH = Polycyclic Aromatic Hydrocarbon
 TWA = Time Weighted Average

8.4 MAINTENANCE REQUIREMENTS

Physical maintenance requirements will include maintenance of the capped areas to prevent degradation of the environmental cap and unacceptable exposure to the underlying soil. Annual inspections will be scheduled for the spring, targeting April. The property owner will be responsible for conducting the annual inspections. Contaminated excavated soils will not be disposed on residential property.

MDE will be verbally or electronically notified within 24 hours following the discovery of unplanned emergency conditions at the site which will penetrate the cap, and will be provided with written documentation within 10 days of the repair. In addition, MDE will be provided written notice a minimum of 5 business days prior to planned activities at the site that will penetrate the cap, with the repairs completed within 15 days, and written documentation submitted to MDE within 10 days of the repair. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation(s), health and safety protocols (as required), clean fill source and documentation (as required), and proposed characterization and disposal requirements (as required).

8.5 OFFSITE DISPOSAL OF SOILS

If there is "excess" soil such that offsite disposal is necessary, this "excess" soil will be placed in a designated stockpile area of the site and/or live-loaded for transport to an MDE-approved disposal facility. Stockpiled soil will be placed on plastic or impervious surfaces, covered completely with 6-mil plastic, so that the entire stockpile is encapsulated, and anchored to prevent the elements from affecting the integrity of the plastic containment. The number of representative samples will be selected using the criteria from an appropriate disposal facility. Each composite sample must be submitted to a fixed laboratory for the following analyses: PAHs and PPL metals, and any additional analysis required by the selected disposal facility.

Based on the results of waste characterization, an appropriate hazardous or non-hazardous disposal facility will be selected for the transport and offsite disposal of the "excess" soil. Upon receipt of the waste characterization analytical results, an addendum to this RAP requesting approval of the selected disposal methodology and the selected disposal facility will be submitted to MDE. All waste manifests generated during the implementation of the RAP will be incorporated in a completion report for submittal to MDE.

All "excess" soil, rubble, or debris excavated from the site will be disposed in accordance with applicable local, state, and federal laws and regulations.

8.6 CLEAN FILL

In general, the RAP proposes containment remedies to mitigate exposure to impacted soil. In order to implement this remedy, certified clean fill materials from a designated offsite location(s) will be utilized for construction of the cap in paved areas and landscaped areas.

If another clean fill source is to be used at the site which has not already been identified, a certification letter will be submitted to MDE for review and approval. If a certification letter cannot be obtained from the supplier, a clean fill sampling and analysis plan, outlining the source and quantity of clean fill proposed, and the protocols for sampling frequency, analysis, and quantification of the material as clean fill, will be submitted for MDE review and approval in accordance with Section 3.2. All MDE clean fill requirements will be met prior to transporting on site. Clean fill documents will be submitted to MDE for review and approval, and will also be included in the RAP Completion report.

As clean fill materials are transported to the site they will be placed in designated stockpile areas. Clean fill material stockpiles will be maintained and secured separately onsite from impacted soils during RAP activities. Clean fill documentation will be submitted to MDE in the RAP Completion report.

8.7 ASBESTOS, LEAD, AND OIL

No RAP activities which would require the removal of asbestos or lead-based paint are anticipated. Should undocumented underground storage tanks (USTs) be discovered during intrusive site activities, or a release of petroleum occurs at the site, notification will be submitted to the VCP and MDE Oil Control Program.

8.8 GROUNDWATER

Although not anticipated, in the event groundwater is encountered during construction activities, dewatering of the excavation area(s) may be necessary. If required, MDE will be properly notified, necessary permits will be obtained, and impacted groundwater will be removed from the excavation area(s) and hauled and treated and/or disposed in accordance with applicable federal, state, and local regulations. Health and safety protocols for handling incidental contact with groundwater are outlined in the SSHASP.

9.0 PERMITS, NOTIFICATIONS, AND CONTINGENCIES

CALC will comply with all federal, state, and local laws and regulations by obtaining all necessary approvals and permits to conduct the activities and implement the RAP. If during the implementation of this RAP, any previously undiscovered contamination, changes to the remediation schedule, previously undiscovered storage tanks and other oil-related issues, or citation from regulatory entities related to health and safety practices are identified, MDE will be verbally notified immediately (within 24 hours) by the property owner. In addition, written notification will be provided to MDE within 3 days.

Notifications will be provided to the following:

MDE Land Restoration Program
Voluntary Cleanup Program
c/o Division Chief
1800 Washington Boulevard
Baltimore, Maryland 21230
410-537-3493

MDE Oil Control Program (storage tanks and oil-related issues only)
1800 Washington Boulevard
Baltimore, Maryland 21230
410-537-3386

In addition to verbal and written notifications, the VCP will be provided with all documentation and analytical reports generated as a result of newly identified conditions. This includes manifests for contaminated material transported for offsite disposal.

Through the proper use of approved sediment and erosion control techniques, adequate measures will be taken to prevent potentially contaminated sediments from being discharged from the property during construction.

9.1 IMPLEMENTATION SCHEDULE

The final design and construction plans for the site will be forwarded to MDE upon completion. These plans will incorporate the response action engineering controls as outlined in Section 5. A specific construction schedule for the site has not been developed as of the date of this RAP. Please note that throughout the implementation of the Response Action, access to the site will continue to be restricted and will be controlled.

CALC understands that a detailed implementation schedule must be provided to MDE for review and approval prior to initiating RAP activities on all or any portion of the site. The following table provides the initial construction schedule.

Table 9.1
Remedial Action Plan Implementation Schedule

Work Element	Month/Year	Comments
RAP Approval	10/2009	
Letter of Credit issued to MDE	10/2009	Within 10 days of RAP Approval
Construction Mobilization	10/2009	
Subgrade Preparation (grading, excavation, and geotextile) and Shoreline Repair	11/2009 -4/2010	
Storm Drain Placement	11/2009 -12/2009	
Soil Cap Placement	12/2009 -3/2010	
Asphalt Repair and Parking Area	3/2010 -4/2010	
Topsoil Placement	1/2011 - 4/2011	
Pedestrian Trails	4/2011 -5/2011	
Pier Construction	5/2011 -6/2011	
Planting and Hydroseeding	7/2011	
Fencing and Site Finishes	7/2011	
Contractor Demobilization	7/2011	
Closure report and COC Request	8/2011 -9/2011	
COC Received	9/2010	
COC Recorded in Land Records	10/2011	Within 30 days of Receipt of COC
Proof of COC Recording Provided to MDE	10/2011	Within 15 days of Recording

Monthly Progress Reports will be provided to MDE throughout the course of construction activities at the CALC site.

As the construction schedule progresses, any changes will be forwarded to MDE for review and approval as a RAP addendum. Materials prepared as part of the RAP addendum(s) (final development plans, deed restrictions, etc.) will be forwarded to MDE. Furthermore, RAP addenda prepared prior to initiating RAP activities will be compiled into one RAP addendum document for submittal to MDE. In summary, the following RAP addenda are anticipated:

RAP Addendum #1: Final Construction Schedule

RAP Addendum #2: Baltimore City Grading Permit and Site
Grading Plans

RAP Addendum #3: Clean fill Certification Letters

9.2 ADMINISTRATIVE REQUIREMENTS

A copy of the written agreement and certified zoning statement and public notifications to be submitted concurrent with this RAP are provided in Appendix F, G, and H. The written agreement is in accordance with Section 7-512 of the Environmental Article, Annotated Code of Maryland, and states that the Participant will comply with the provisions of this RAP. Further, the Participant acknowledges that there are significant penalties for falsifying any information required by MDE under Title 7, Subtitle 5 of the Environmental Article, Annotated Code of Maryland, and that the certified zoning statement is required to be included in the RAP for the VCP pursuant to Title 7, Subtitle 5 of the Environmental Article, Annotated Code of Maryland.

The Participant will provide a financial security for securing the site in the event the RAP cannot be completed. Specifically, the Center for Aquatic Life and Conservation will provide a Letter of Credit in the sum of \$38,052 at least ten days after RAP approval. This sum was calculated for the cost of hydroseeding and erecting a fence around the perimeter of the property. The following shows how the sum was calculated:

Fencing site perimeter with six foot high security fencing and hydro-seeding (includes mulching) entire vegetated portion of site:

Fencing entire site $1400 \text{ lf} \times 17.50/\text{lf} = \$24,500$

Hydroseeding 7 acres: $40/\text{cf} \times 33880 \text{ cf} = \$13,552$

Total \$38,052

10.0 REFERENCES

- EA Engineering, Science, and Technology, Inc. 2004. *Phase II Environmental Site Assessment Report DPW Garage Site 101 West Dickman Street Baltimore, Maryland 21230*. June.
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- Maryland Department of the Environment. 2008. *Cleanup Standards for Soil and Groundwater Interim Final Guidance (Update No. 1)*.
- Maryland Department of the Environment. 2008. *State of Maryland Department of the Environment Cleanup Standards for Soil and Groundwater Interim Final Guidance, Update No. 1*.
- Maryland Environmental Service. 1999. *Dickman Street Potential Mitigation Site, Site Investigation Report*. 2 December.
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- United States Geological Survey. 1974. *Baltimore, Maryland 7.5-Minute Topographic Quadrangle*. July.

APPENDIX A

SPECIFICATIONS FOR FILL MATERIALS

Specifications for Fill Materials

All materials used in construction of the Environmental Cap must be properly characterized as clean fill or certified as clean fill.

Capping soil

Satisfactory Soils: ASTM D 2487 soil classification groups SC, GW, GP, GM, SW, GC, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

Unsatisfactory Soils: ASTM D 2487 soil classification groups ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.

Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

Backfill and Fill: Satisfactory soil materials.

Gravel (CR-6)

Aggregate Base Course/Crusher Run (CR-6): Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2- inch sieve and not more than 12 percent passing a No. 200 sieve.

Drainage Fill

Drainage Fill: For placement under the new storm drain. Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch sieve and 0 to 5 percent passing a No. 8 sieve.

Topsoil

Imported Topsoil:

Topsoil shall be fertile, friable soil containing 1.5 to 5 percent by weight organic matter; free from subsoil, refuse, stones larger than 1/2 inch, noxious seeds, sticks, brush, litter, and other deleterious substances; suitable for the germination of seeds and support of vegetative growth.

Composition: All topsoil shall be sandy loam, or loamy sand soil as classified by the Soil conservation Service USDA, Soil Classification System.

Soil pH (non Buffered) shall be in the range of 5.5 to 7.0

Mechanical Analysis, shall fall within the following particle ranges, and percentages by volume, and contractor shall perform soil tests with the following particle size analysis:

Gravel, +2mm size, 15% max.

Coarse to Medium Sand, 0.25-2mm size, 50% max.

Fine Sand, 0.05-0.25mm size, 20% max.

Silt/Clay, 0.002-0.05mm size, 20% max.

Clay, minus 0.002mm, size 20% max.

Silt and clay combined shall not exceed 30% of the total volume. The minimum water permeability rate shall be 1.25 inches per hour. The minimum percent total pore space shall be 25% with a minimum aeration pore space of 12%. The minimum bulk density shall be 1.70 grams per cubic centimeter. The minimum percent moisture retention shall be 9%.

Minerals and salts shall be as follows:

Magnesium (Mg) 100+ units,

Phosphorus (P_2O_5) 150+ units,

Potassium (K_2O) 120+ units,

Soluble salts/conductivity, shall not exceed 900
ppm/0.9mmhos/cm (in soil), and 3000
ppm/2.5mmhos/cm (in high organic mix).

Riprap

Riprap for shoreline shall conform to the requirements specified in the MDSHA Standard Specifications for Construction and Materials Section 901 for Class 1 and 2 riprap.

Use field or quarry stone of approved quality. Stone may be certified from a source previously approved. Ensure that maximum dimension does not exceed four times the minimum dimension.

Ensure that stone riprap is uniformly graded from the smallest to the largest pieces as specified in the Contract Documents. The stone will be accepted upon visual inspection at the point of usage, as follows:

Class of Riprap	Size	% of total by weight
0	Heavier than 33 lb	0
	Heavier than 10 lb	50
	Less than 1 lb	10 max
I	Heavier than 150 lb	0
	Heavier than 40 lb	50
	Less than 2 lb	10 max
II	Heavier than 700 lb	0
	Heavier than 200 lb	50
	Less than 20 lb	10 max
III	Heavier than 2000 lb	0
	Heavier than 600 lb	50
	Less than 40 lb	10 max

SAND

Landscape Paver Sand:

Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate.

Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.

Vehicular Paver Sand:

Fine Aggregate for Setting Bed: ASTM D 1073, No. 2 or No. 3.

Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.

Geotextile

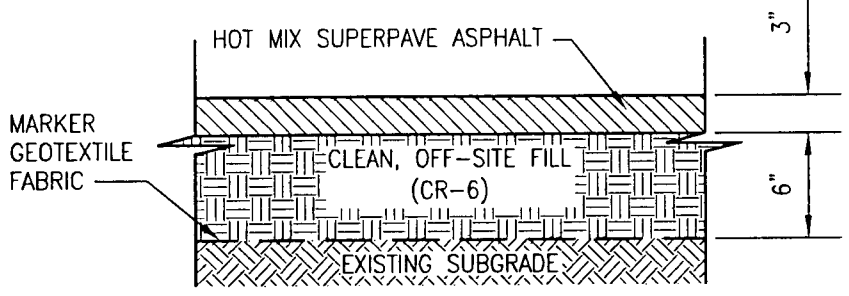
Marker Geotextile:

Provide geotextile that is a nonwoven pervious sheet of polymeric material consisting of long-chain synthetic polymers composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. The use of woven slit film geotextiles (i.e. geotextiles made from yarns of a flat, tape-like character) will not be allowed. Add stabilizers and/or inhibitors to the base polymer, as needed, to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Re grind material, which consists of edge trimmings and other scraps that have never reached the consumer, may be used to produce the geotextile. Post-consumer recycled material may be used. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. Geotextiles shall meet the requirements specified in Table 1. Where applicable, Table 1 property values represent minimum average roll values (MARV) in the weakest principal direction. Values for AOS represent maximum average roll values. Geotextile shall be bright orange color.

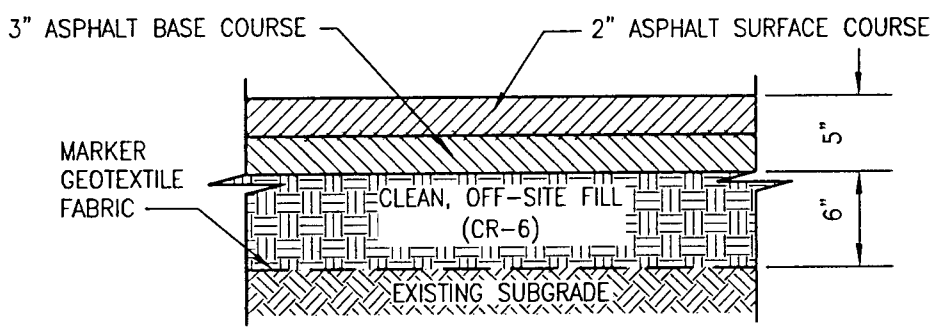
MINIMUM PHYSICAL REQUIREMENTS FOR MARKER GEOTEXTILE

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
Grab Strength	lbs	205	ASTM D 4632
Seam Strength	lbs	195	ASTM D 4884
Puncture	lbs	135	ASTM D 4833
Trapezoid Tear	lbs	80	ASTM D 4533
Apparent Opening Size	U.S. sieve	80	ASTM D 4751
Permittivity	Sec -1	1.1	ASTM D 4491
Ultraviolet Degradation	Percent	90 at 500 hrs	ASTM D 4355
Color		Orange	

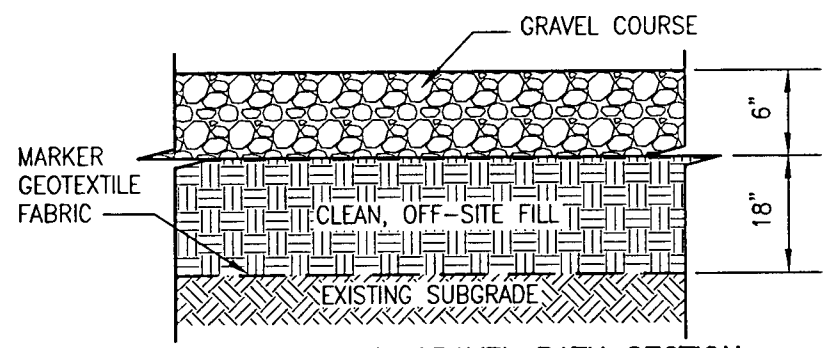
APPENDIX B
CROSS-SECTION DETAILS



TYPICAL ASPHALT ADJACENT TO BRIDGE
NOT TO SCALE



TYPICAL ASPHALT SECTION
(FOR PARKING LOT, PARKING LOT PATCH, AND PEDESTRIAN ASPHALT TRAIL)
NOT TO SCALE



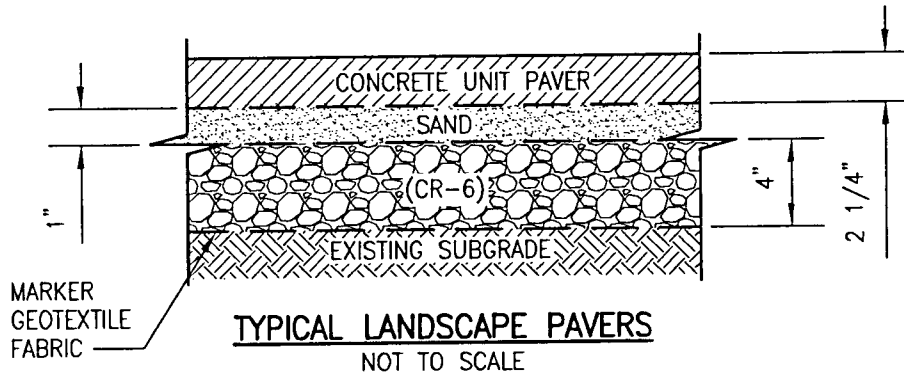
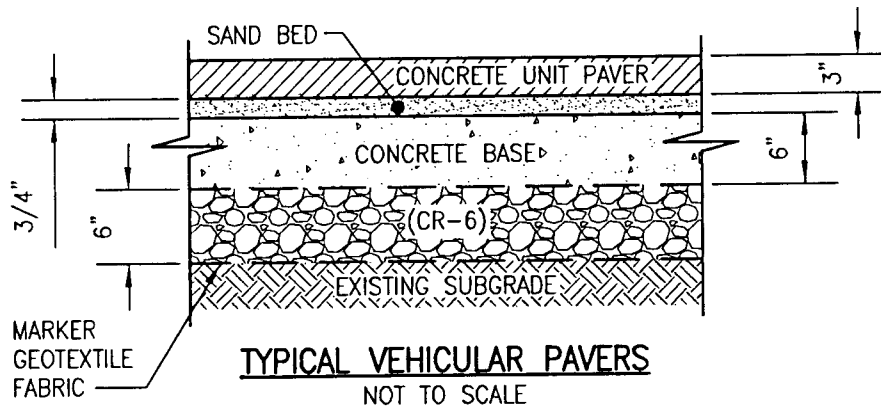
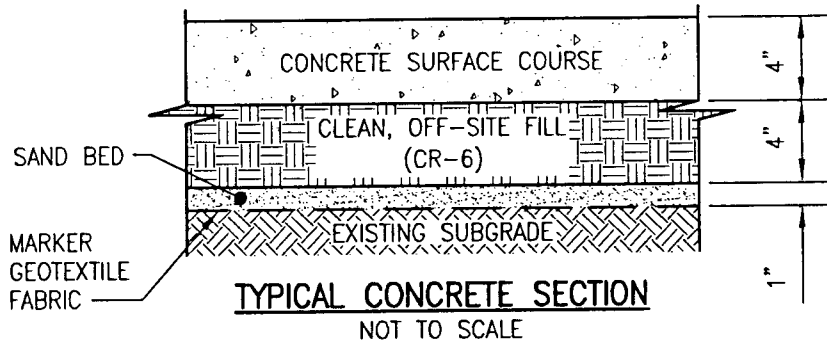
TYPICAL VEHICULAR GRAVEL PATH SECTION
NOT TO SCALE

NOTES:

1. DETAIL NOT FOR CONSTRUCTION.
2. DETAIL ADDRESSES ENVIRONMENTAL CONCERNS AND DOES NOT ADDRESS CIVIL OR GEOTECHNICAL CONCERNS. ENGINEER SHOULD EVALUATE FOR CONSTRUCTION PURPOSES.
3. CLEAN OFF-SITE FILL REQUIRED. RECOMMEND CR-6 OR EQUIVALENT FROM APPROVED SOURCE OF VIRGIN LIMESTONE MATERIAL.

FILE PATH: (L:\NETWORK) G:\PROJECTS\6187404 - CALC\DETAILS.DWG [DRIVE DETAIL] 9/29/09

		CENTER FOR AQUATIC LIFE AND CONSERVATION BALTIMORE, MD		ASPHALT AND GRAVEL PATH CAPPING DETAIL			
PROJECT MGR JMH	DESIGNED BY -	DRAWN BY MP	CHECKED BY JH	SCALE NOT TO SCALE	DATE SEPT. 2009	PROJECT NO 61874.04	FIGURE A



NOTES:

1. DETAIL NOT FOR CONSTRUCTION.
2. DETAIL ADDRESSES ENVIRONMENTAL CONCERNS AND DOES NOT ADDRESS CIVIL OR GEOTECHNICAL CONCERNS. ENGINEER SHOULD EVALUATE FOR CONSTRUCTION PURPOSES.
3. CLEAN OFF-SITE FILL REQUIRED. RECOMMEND CR-6 OR EQUIVALENT FROM APPROVED SOURCE OF VIRGIN LIMESTONE MATERIAL.

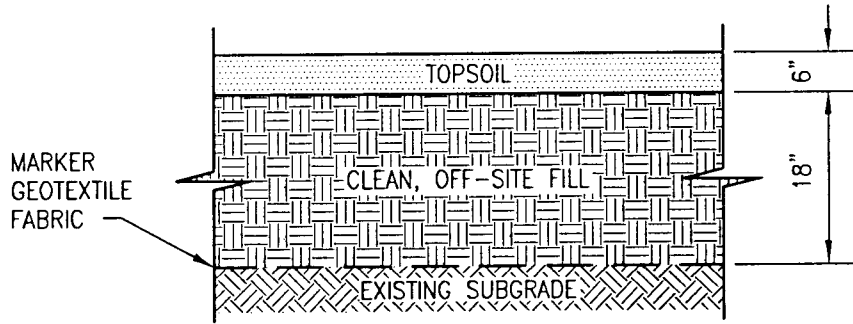
FILE PATH: (LONDON) G:\PROJECTS\6187404 - CALC\DETAILS.DWG (ORIVE DETAIL (2)) 9/29/09



**CENTER FOR AQUATIC LIFE
AND CONSERVATION**
BALTIMORE, MD

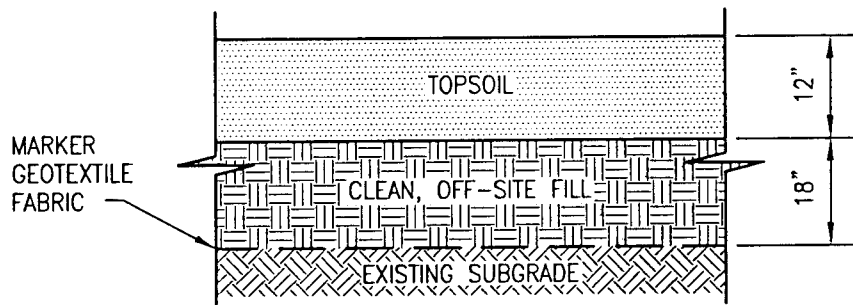
**CONCRETE AND PAVER CAPPING
DETAIL**

PROJECT MGR JMH	DESIGNED BY -	DRAWN BY MP	CHECKED BY JH	SCALE NOT TO SCALE	DATE SEPT. 2009	PROJECT NO 61874.04	FIGURE B
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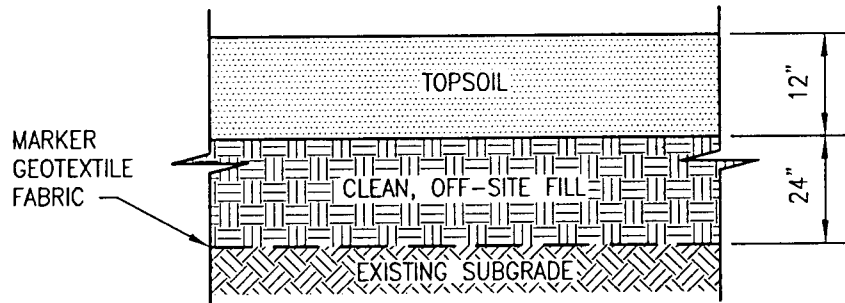
TYPICAL MEADOW SECTION

NOT TO SCALE



TYPICAL SHRUB SECTION

NOT TO SCALE



TYPICAL TREE SECTION

NOT TO SCALE

NOTES:

1. DETAIL NOT FOR CONSTRUCTION.
2. DETAIL ADDRESSES ENVIRONMENTAL CONCERNS AND DOES NOT ADDRESS CIVIL OR GEOTECHNICAL CONCERNS. ENGINEER SHOULD EVALUATE FOR CONSTRUCTION PURPOSES.

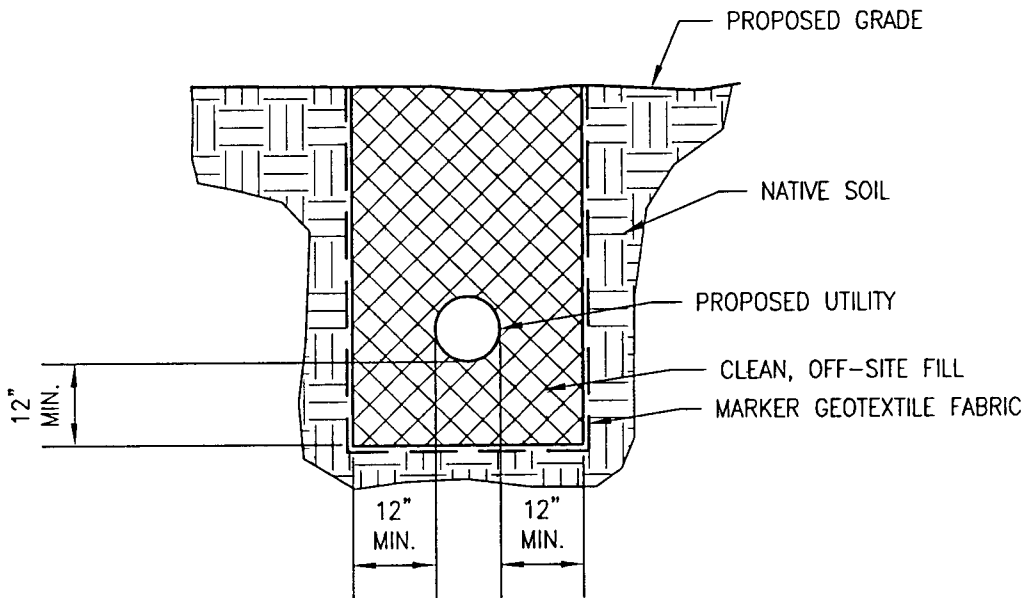
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**CENTER FOR AQUATIC LIFE
AND CONSERVATION**
BALTIMORE, MD

ENVIRONMENTAL/NATURAL AREA DETAIL

PROJECT MGR JMH	DESIGNED BY -	DRAWN BY MP	CHECKED BY DS	SCALE NOT TO SCALE	DATE SEPT. 2009	PROJECT NO 61874.04	FIGURE C
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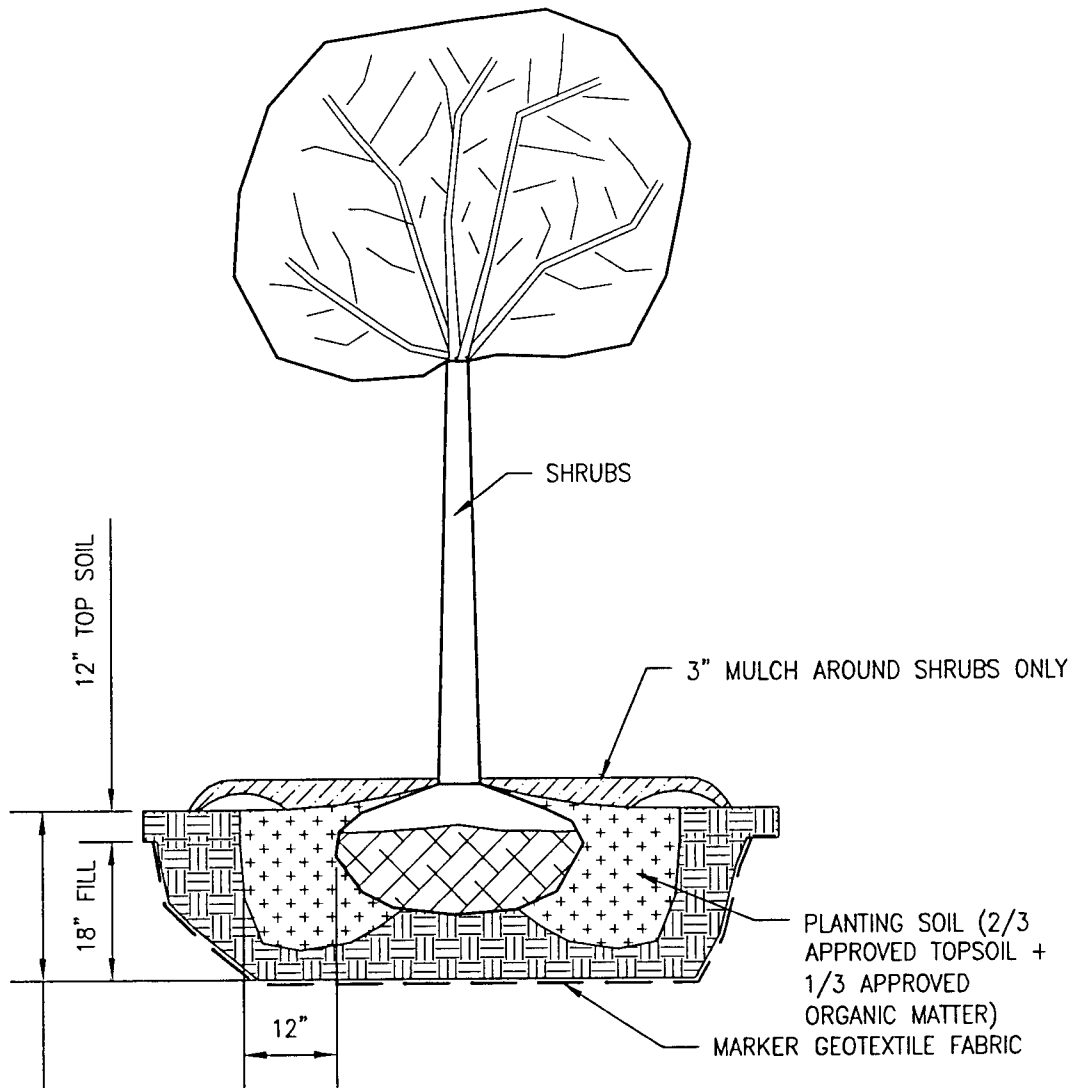
TYPICAL UTILITY INSTALLATION DETAIL
NOT TO SCALE

NOTES:

1. DETAIL NOT FOR CONSTRUCTION.
2. DETAIL ADDRESSES ENVIRONMENTAL CONCERNS AND DOES NOT ADDRESS CIVIL OR GEOTECHNICAL CONCERNS. ENGINEER SHOULD EVALUATE FOR CONSTRUCTION PURPOSES.
3. CLEAN OFF-SITE FILL REQUIRED. RECOMMEND CR-6 OR EQUIVALENT FROM APPROVED SOURCE OF VIRGIN LIMESTONE MATERIAL.

FILE PATH: (C:\GEOCON) G:\PROJECTS\61874.04 - CALC\DETAILS.DWG (UTILITY) 9/29/09

 EA ENGINEERING, SCIENCE, AND TECHNOLOGY		CENTER FOR AQUATIC LIFE AND CONSERVATION BALTIMORE, MD			TYPICAL UTILITY INSTALLATION DETAIL		
PROJECT MGR JMH	DESIGNED BY -	DRAWN BY MP	CHECKED BY DS	SCALE NOT TO SCALE	DATE SEPT. 2009	PROJECT NO 61874.04	FIGURE D



30" MIN CLEAN
COMPACTED OFF-SITE
FILL MATERIAL TO
BE USED IN PAVEMENT
LANDSCAPE AREAS

LANDSCAPE AREA TYPICAL DETAIL

NOT TO SCALE

NOTES:

1. DETAIL NOT FOR CONSTRUCTION.
2. DETAIL ADDRESSES ENVIRONMENTAL CONCERNS AND DOES NOT ADDRESS CIVIL OR GEOTECHNICAL CONCERNS. ENGINEER SHOULD EVALUATE FOR CONSTRUCTION PURPOSES.
3. CLEAN FILL REQUIRED.
4. APPROVED TOPSOIL MEETS OR EXCEEDS MDE RECREATIONAL SOIL CRITERIA.

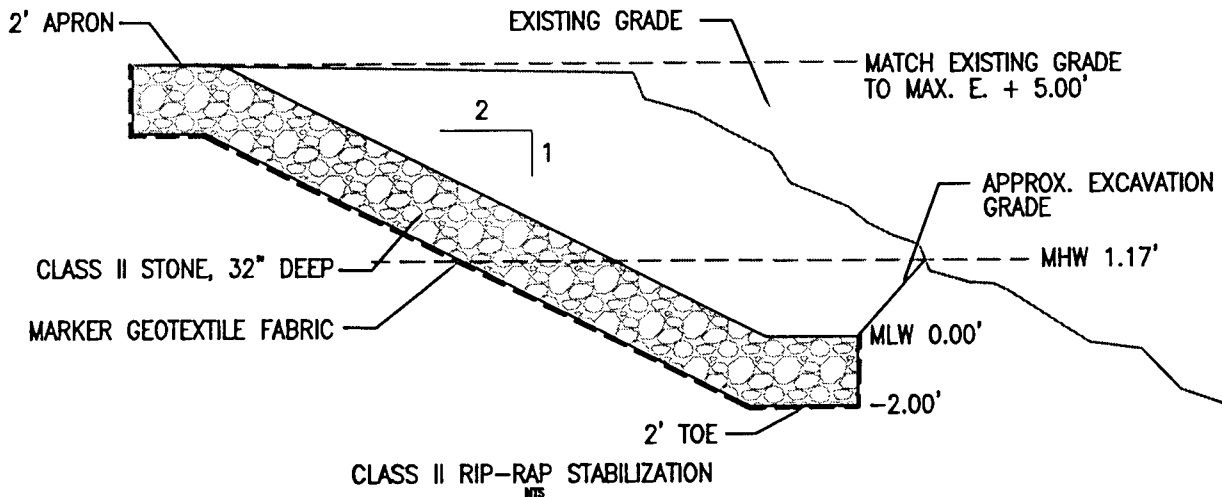
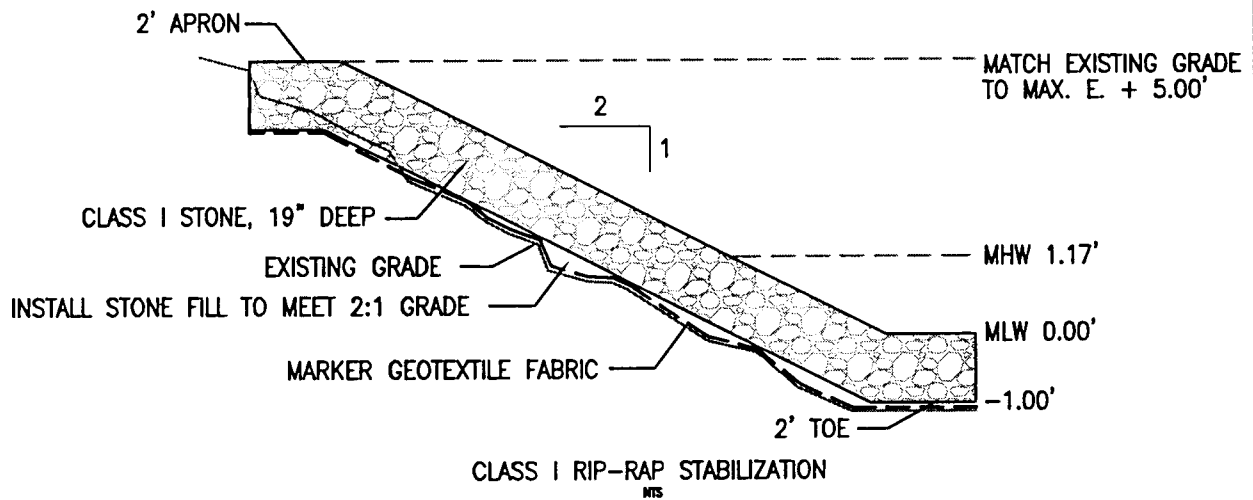
FILE PATH: (L:\ORION) G:\PROJECTS\61874.04 - CALC\DETAILS.DWG [LANDSCAPE] 9/29/09



CENTER FOR AQUATIC LIFE
AND CONSERVATION
BALTIMORE, MD

LANDSCAPE SHRUB AREA
TYPICAL DETAIL

PROJECT MGR JMH	DESIGNED BY -	DRAWN BY MP	CHECKED BY DS	SCALE NOT TO SCALE	DATE SEPT. 2009	PROJECT NO 61874.04	FIGURE E
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NOTES:

1. DETAIL NOT FOR CONSTRUCTION.
2. DETAIL ADDRESSES ENVIRONMENTAL CONCERNS AND DOES NOT ADDRESS CIVIL OR GEOTECHNICAL CONCERNS. ENGINEER SHOULD EVALUATE FOR CONSTRUCTION PURPOSES.

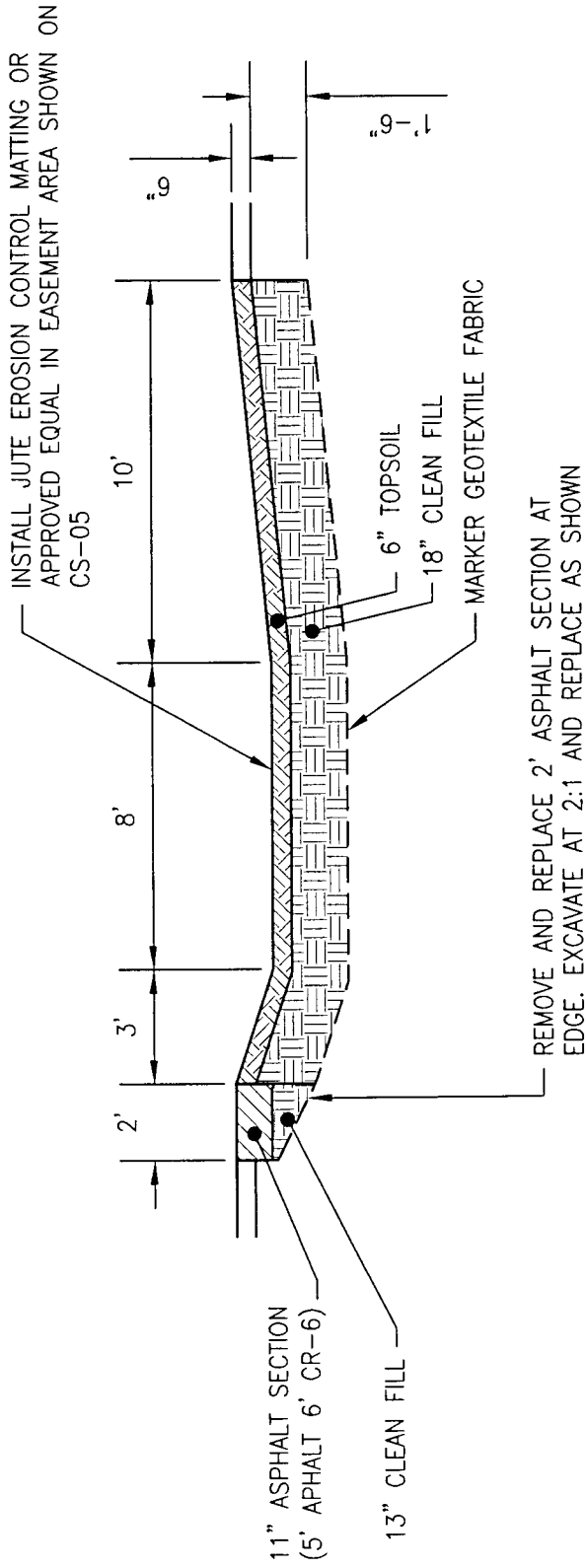
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EA EA ENGINEERING, SCIENCE, AND TECHNOLOGY


CENTER FOR AQUATIC LIFE AND CONSERVATION
BALTIMORE, MD

SHORELINE STABILIZATION GENERAL DETAILS

PROJECT MGR JMH	DESIGNED BY -	DRAWN BY MP	CHECKED BY DS	SCALE NOT TO SCALE	DATE SEPT. 2009	PROJECT NO 61874.04	FIGURE F
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TYPICAL SECTION - GRASS CHANNEL
NOT TO SCALE

 EA ENGINEERING, SCIENCE, AND TECHNOLOGY	CENTER FOR AQUATIC LIFE AND CONSERVATION BALTIMORE, MD		GRASS CHANNEL DETAIL		DESIGNED BY -	DRAWN BY JAP	DATE SEPT. 2009	PROJECT NO. 61874.04
	CHECKED BY DS		PROJECT MGR. JH		SCALE -	FIGURE C		

APPENDIX C
CAP INSPECTION FORMS

Inspector Name: _____

Firm: _____

PAVEMENT INSPECTION FORM		Center for Aquatic Life and Conservation 101 West Cromwell Street 2400 Clarkson Street Baltimore, MD 21230	
Date: _____		Time: _____	
<u>Weather Condition:</u>			
<u>General Pavement Conditions:</u>			
PAVEMENT CONDITIONS INDEX (PCI) ¹			
PCI	Characterization	Description	
1	New crack-free surface	Black in color, smooth texture.	
2	Oxidation has started	Short hairline cracks start to develop. Dark gray color.	
3	Oxidation in advanced state	Hairline cracks are longer and wider. Gray in Color.	
Response Required	4	Oxidation complete	Crack area 0.25 inch wide and crack lines have found base faults.
	5	Moisture penetrating through 0.25 inch cracks. Loose material, stone and sand, evident.	Texture of surface becoming rough. Preventative maintenance.
	6	Cracks widen and join	Cracks and shrinkage evident at curb and gutter Lines.
	7	Potholes develop in low spots	Gatoring areas begin to break up. Overall texture very rough.
	8	Potholes developing	Pavement breaking up.
	9	Heaving due to excessive moisture in base	Distorts entire surface.
	10	General breakup of surface	

¹ The above system is based on a numerical rating of pavement distresses as published by the US Army Corps of Engineers (USACE). This system is based on professional assessment and judgment. Inspections are performed by viewing the paved area (either on foot or via vehicle) and observing the surface condition. A field inspection is then performed on areas judged to be in need of maintenance.

PAVEMENT INSPECTION FORM

Center for Aquatic Life and Conservation
101 West Cromwell Street
2400 Clarkson Street
Baltimore, MD 21230

CURB CONDITION

- Exists Sound Cracked Root Intrusion
 Deteriorated

Comments: _____

SIDEWALK CONDITION

- Exists Sound Cracked Root Intrusion
 Deteriorated

Comments: _____

RESPONSE REQUIRED

WORK COMPLETED²

PHOTOGRAPHS / FIGURES
ATTACHED

RESPONSE CONTRACTOR

Work Completed By: _____

Date: _____

Signature: _____

² Any paved areas of the cap that have degraded to a PCI of 4.0 will be repaired in a timely manner. MDE shall be notified if damage to the cap

Inspector Name: _____

Firm: _____

LANDSCAPE, PAVERS, GRAVEL PATH AND RIP- RAP INSPECTION FORM		Center for Aquatic Life and Conservation 101 West Cromwell Street 2400 Clarkson Street Baltimore, MD 21230
Date: _____		Time: _____
Weather Condition: _____		
General Landscaping Description: 		
GENERAL LANDSCAPE CONDITION	<input type="checkbox"/> Exists <input type="checkbox"/> Sound <input type="checkbox"/> Erosion <input type="checkbox"/> Root Intrusion <input type="checkbox"/> Healthy Plan Condition <input type="checkbox"/> Signs of Mortality <input type="checkbox"/> Animal Burrows Comments: _____ _____ _____	
GROUND COVER	<input type="checkbox"/> Dry <input type="checkbox"/> Damp <input type="checkbox"/> Wet Comments: _____ _____	
TREES	<input type="checkbox"/> Exists <input type="checkbox"/> Healthy <input type="checkbox"/> Poor Health <input type="checkbox"/> Dead <input type="checkbox"/> Fallen Comments: _____ _____	
SHRUBS	<input type="checkbox"/> Exists <input type="checkbox"/> Healthy <input type="checkbox"/> Poor Health <input type="checkbox"/> Dead <input type="checkbox"/> Fallen Comments: _____	

LANDSCAPE, PAVERS, GRAVEL PATH AND RIP-RAP INSPECTION FORM

Center for Aquatic Life and Conservation
101 West Cromwell Street
2400 Clarkson Street
Baltimore, MD 21230

EROSION

Exists Slight Moderate Significant

Comments: _____

HOLES

Exists Depth of Holes: _____

Comments: _____

PAVERS

Exists Erosion Depth/Thickness: _____

Comments: _____

RIP-RAP

Exists Erosion Depth/Thickness: _____

Comments: _____

GRAVEL PATH

Exists Erosion Depth/Thickness: _____

Comments: _____

WORK COMPLETED

PHOTOGRAPHS / FIGURES
ATTACHED

RESPONSE CONTRACTOR

Work Completed By: _____

Date: _____

Signature: _____

APPENDIX D

PAVEMENT CONDITION INDEX

Pavement Condition Index (PCI)
Containment Remedy/Environment Cap Monitoring
Center for Aquatic Life and Conservation (CALC)

PCI	Characterization	Description
1	New crack-free surface.	Black in color, smooth texture.
2	Oxidation has started.	Short hairline cracks start to develop. Dark gray color.
3	Oxidation in advanced state.	Hairline cracks are longer and wider. Gray in color.
4	Oxidation complete.	Crack area 0.25 inch wide and crack lines have found base faults.
5	Moisture penetrating through 0.25 inch cracks. Loose material, stone and sand evident.	Texture of surface becoming rough. Preventative maintenance.
6	Cracks widen and join.	Cracks and shrinkage evident at curb and gutter lines.
7	Potholes develop in low spots.	Gatoring areas begin to break up. Overall texture very rough.
8	Potholes developing.	Pavement breaking up.
9	Heaving due to excessive moisture in base.	Distorts entire surface.
10	General breakup of surface.	

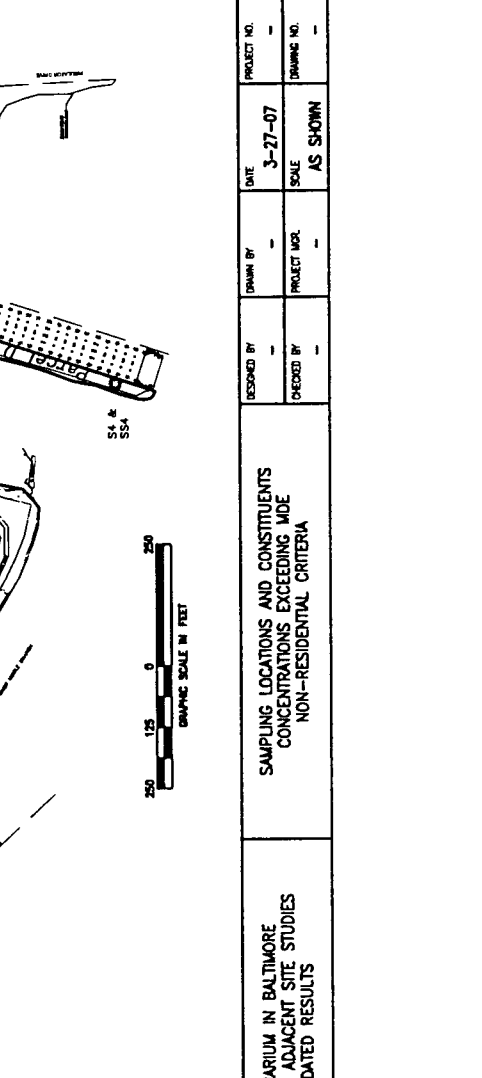
The above system is based on a numerical rating of pavement distresses as published by the US Army Corps of Engineers. This system is based on professional assessment and judgement. Inspections are performed by viewing the paved area (either on foot or via vehicle) and observing the surface condition. A field inspection is then performed on areas judged to be in need of maintenance.

APPENDIX E

SUMMARY OF SAMPLE EXCEEDANCE LOCATIONS

Concentrations of Constituents Exceeding Non-Residential Criteria

Sample ID	Sample Type	As	Al	Cd	Cu	Cr	Hg	Mn	Ni	Pb	Zn	Antimony	Sr
Sample ID	Sample Type	7.8	0.76	7.8	0.78	7.8	3.8	0.12	0.12	400	81,000	82	100
Sample ID	Sample Type	6.3%											
SB-3/TW1	Soil Boring	230											
SB-3/HO	Soil Boring	190											
SB-4/TW2	Soil Boring	974	0.774										
SB-5	Soil Boring	540	0.174										
SB-6	Soil Boring	24	0.714										
SB-7	Soil Boring	7.4	0.174										
SB-8	Soil Boring	89	0.8										
SB-9	Soil Boring	54.3	0.48										
SB-10	Soil Boring	2.61	1.454										
SB-11	Soil Boring	77.18	0.574										
SB-12	Soil Boring	1800	20										
SB-13	Soil Boring	2900	0.550										
SB-14	Soil Boring	80.7	0.704										
SB-15	Soil Boring	386	0.584										
SB-16	Soil Boring	1130	0.844										
SB-17	Soil Boring	85	1										
SB-18	Soil Boring	1400	1										
SB-19	Soil Boring	850	0.580										
SB-20	Soil Boring	74	0.174										
SB-21	Soil Boring	110	0.710										
SB-22	Soil Boring	284	0.364										
SB-23	Soil Boring	880											
SB-24	Soil Boring	2.5	0.21										
SB-25	Soil Boring	4.30	0.30										
SB-26	Soil Boring	5.8	0.30										
SB-27	Soil Boring	6.10	0.64										
SB-28	Soil Boring	7.1											
SB-29	Soil Boring	4.50											
SB-30	Soil Boring	4.8											
SB-31	Soil Boring	4.60											
SB-32	Soil Boring	11000											
SB-33	Soil Boring	12	870										
SB-34	Soil Boring	8	8										
SB-35	Soil Boring	13	160										
SB-36	Soil Boring	19	2000										
SB-37	Soil Boring	16	110										
SB-38	Soil Boring	9	500										
SB-39	Soil Boring	12	50										
SB-40	Soil Boring	3.8											



LEGEND:

- WETLAND AREA
- SOIL BORING MW-1 GROUNDWATER SAMPLE
- SOIL BORING SOIL BORING W/ TEMP. WELL
- SO 1 SOIL SAMPLE TP 1 TEST BIT
- SO 2 SOIL SAMPLE OP 1 GROUNDWATER
- DSTP-1 TEST PIT
- SOIL SAMPLE S1 SOIL SAMPLE GW - GROUNDWATER
- DEVELOPMENT PARCEL

**NATIONAL AQUARIUM IN BALTIMORE
CITY GARAGE AND ADJACENT SITE STUDIES
CONSOLIDATED RESULTS**

**EA ENGINEERING,
SCIENCE, AND
TECHNOLOGY**

SAAMPLING LOCATIONS AND CONSTITUENTS
CONCENTRATIONS EXCEEDING WIDE
NON-RESIDENTIAL CRITERIA

DATE: 3-27-07
SCALE: AS SHOWN
PROJECT NO.:
DRAWING NO.:
FILE NAME:

* Elements Missing
 1 = high concentration found at or near surface of soil boring
 d = high concentration found in subsurface layer

Concentrations of Constituents Exceeding Residential Criteria in Surface Soil Sample

SOILS	B(a)a	B(a)b	B(b)1	D(a)a	1,2,3,4,p	As	Hg*	Pb	Zn	Arnony
MDE Residential Standard	0.22	0.022	0.22	0.22	0.22	0.43	0.51	400	2,300	3.1
Sample ID										
Lot 1A										
SB-3/TW1		6.3					0.8			
SO 5	0.63	0.57				24	0.77			
SO 6	4.3	4.4	3.1	1	2.1	2.9				
TP 2		0.57				24				
SO 3	0.78	0.71	0.54			7.4				
Lot 6										
DSTP-4	1.5	1.3	1.6		0.43	89.8	0.8			5.5
DSTP-5	0.55	0.61	0.49		0.33	54.3				
DSTP-6	1.6	1.7	1.9		0.59	105				4.4
DSTP-7	1	1.2	0.96		0.47	72.1	0.57			5.25
S-5	0.57	0.65	0.27			180				
DSTP-1	0.36	0.49	0.44	0.49		92.7				5.13
DSTP-2	0.59	0.8	0.74	0.82		36	0.58			
DSTP-3	1.1	1.5	1.3		0.5	113	0.84	435		3.35
S-1	0.25	0.3	0.27			85	1			
S-2	0.32	0.35	0.33			110	1			
S-3	0.42	0.47	0.48			140		540		
SO 2	2.9s	2.9s	2.2s		1s	8.5	0.59		7,100	3.9
SO 7	0.94	1.1	0.64			17				
SO 1	0.74	1.4	1.1		0.74	8.9				
SO 4						11				
GROUNDWATER										
Sample ID	As	Zn	Arnony	Mn	Ni					
MDE Type I and II Aquifer Standard	5	100	5	50	73					
GP-1			12	670						
GP-2	8		8							
GP-3	8			160						
GW-1	13				120					
GW-2	19			2000	110					
GW-3	16				88					
GW-4		1100		900						
GW-5	12			90						

* Elemental Mercury

APPENDIX F
PUBLIC NOTIFICATION

PUBLIC NOTICE OF A RESPONSE ACTION PLAN
AND PUBLIC INFORMATION MEETING
Center for Aquatic Life and Conservation (CALC)

The property located at 101 West Cromwell Street, 2400 Clarkson Street, and 2300 South Hanover Street in the City of Baltimore, Maryland has been accepted into Maryland's Voluntary Cleanup Program. A proposed response action plan (RAP) has been submitted to the Maryland Department of the Environment (MDE) for approval.

Results of the environmental investigations at the property revealed elevated concentrations of metals and semi-volatile organic compounds (SVOCs), primarily polycyclic aromatic hydrocarbons (PAHs), in surface soils, elevated concentrations of metals in the subsurface soils and sediments, and elevated concentrations of metals and SVOCs in groundwater at the site.

The remedies to be implemented as part of the proposed RAP include capping (pavement or building foundation, clean fill material over a woven geotextile fabric) existing site soils, implementing institutional controls (deed restriction) to maintain capped areas, and prohibiting groundwater use from beneath the property.

This RAP is based upon the future use of the property for commercial purposes.

Participant: Center for Aquatic Life and Conservation, Inc.
501 East Pratt Street, Pier 3
Baltimore, Maryland 21202

Contact: David Pittenger
(410)576-3821

Eligible Property: Center for Aquatic Life and Conservation, Inc.
101 Cromwell Street
2400 Clarkson Street
2300 South Hanover Street
Baltimore, MD 21230

Public Informational Meeting: Baltimore Rowing Club
3301 Waterview Avenue
Baltimore, MD 21202
July 29, 2009, 7:00pm

Any person wishing to request further information or make comments regarding the proposed RAP must do so in writing. Comments or requests should be submitted to the attention of the Voluntary Cleanup Program project manager, Mr. Jeff Harp, at the Maryland Department of the Environment, 1800 Washington Boulevard, Suite 625, Baltimore, Maryland 21230, telephone 410-537-3493.

All comments and requests must be received by the Department in writing no later than August 3, 2009.

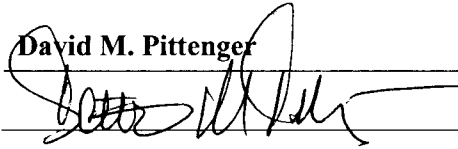
APPENDIX G
WRITTEN AGREEMENT

Written Agreement

CALC – 101 West Cromwell Street Baltimore, Maryland 21230

2400 Clarkson Street Baltimore, Maryland 21230

The participant agrees that this response action plan, if approved by the Maryland Department of the Environment, becomes a binding agreement pursuant to Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland. Subject to the withdrawal provisions of the Voluntary Cleanup Program, the participant agrees to perform the actions identified herein by the dates specified. Participant understands that if it fails to perform the actions identified herein by the dates specified, the Maryland Department of the Environment may withdraw approval of the response action plan.

Printed Name:	<u>David M. Pittenger</u>	Title:	<u>Executive Director</u>
Signature:	<u></u>	Date:	<u>9.11.09</u>

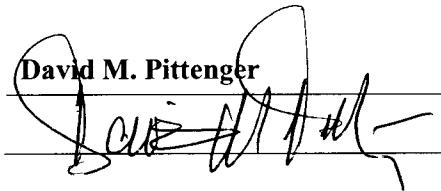
APPENDIX H

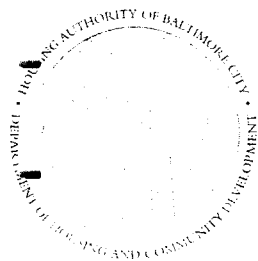
CERTIFIED STATEMENT OF ZONING REQUIREMENTS

Certified Statement Re: Municipal Zoning Requirements
CALC – 101 West Cromwell Street Baltimore, Maryland 21230
2400 Clarkson Street Baltimore, Maryland 21230

The participant hereby certifies under penalty of law that the current use and proposed use of the eligible property upon which the response action plan is based, are in conformance with all applicable zoning requirements.

The participant acknowledges that there are significant penalties for falsifying any information required by the Department under Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland, and that this certification is required to be included in a response action plan for the Voluntary Cleanup Program pursuant to Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland.

Printed Name:	<u>David M. Pittenger</u>	Title:	<u>Executive Director</u>
Signature:		Date:	<u>9.11.09</u>



BALTIMORE HOUSING

HEILA DIXON

Mayor

PAUL T. GRAZIANO
Executive Director, HABC
Commissioner, HCD

June 16, 2009

David Pittenger
Ex-Officio Board Officer
Center for Aquatic Life and Conservation, Inc.
501 East Pratt Street
Pier 3
Baltimore, MD 21202

RE: 101 West Cromwell Street – Zoning Conformance

Dear David,

It is our understanding that the National Aquarium in Baltimore (NAIB), in connection with its affiliate Center for Aquatic Life and Conservation, Inc. (CALC), is preparing to construct landscape improvements on real property known as 101 West Cromwell Street in Baltimore City (the Property). Upon completion of the improvements, the public will have access to the improved area via trails, pathways, and a recreational pier.

Further, we understand that, due to a funding limitation, the construction activities currently planned are limited to the landscape improvements identified above. It is believed that the construction of these improvements will begin in the fall of 2009. The timeframe for construction of the future building(s) on the Property is not known at this time.

In connection with the immediate construction activities, we are alerted to your potential zoning conformance concern as it relates to the timing of the landscape improvements relative to the construction of the future building(s).

The property is located in an M-3 Industrial zoning district. Depending on future CALC uses, the future building(s) may either be compatible with the existing zoning or may be constructed in accordance with a Planned Unit Development (PUD) – to be initiated by CALC. (Other methods for obtaining zoning conformance may also be pursued.)



In light of this information, your proposed construction would be viewed as landscape improvements for the site, in connection and in conjunction with the future buildings and uses proposed at this location, and therefore, not subject to zoning conformance at this time. As a result, we will not require the zoning conformance for the future building(s) to be satisfied or "in-place" before construction of the landscape improvements can begin.

If there are any questions or comments regarding this matter, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Geoffrey A. Veale". The signature is fluid and cursive, with the first name being the most prominent.

Geoffrey Veale
Acting Zoning Administrator
Baltimore City

Cc: Paul Clary, Baltimore Development Corporation
Eric Tiso, Baltimore City Department of Planning
Russ Robertson, Cap Ex Advisory Group