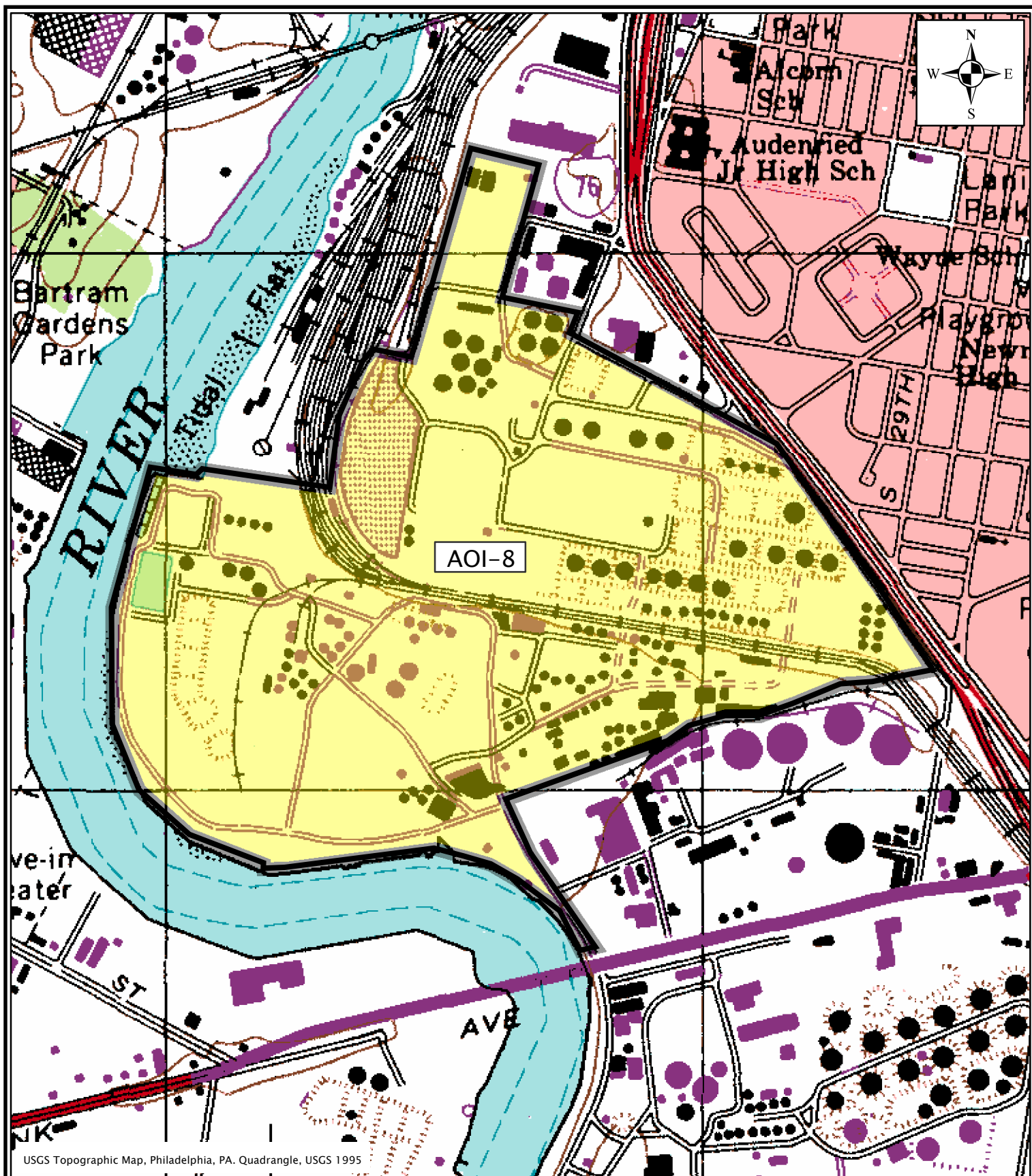
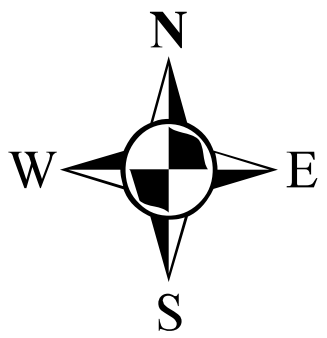




Sunoco, Inc. (R&M)
Philadelphia Refinery
 3144 Passyunk Avenue
 Philadelphia, PA. 19145

Figure 1: Site Location Map: AOI 8
 AOI 8 Site Characterization Report/
 Remedial Investigation Report
 Philadelphia Sunoco Philadelphia Refinery Pennsylvania

Job Number	Scale: 1" = 800'	Date
2574601	0 400 800 Feet	April 6, 2011



Legend

- Steel Bulkhead
- Wooden Bulkhead
- AOI 8 Boundary

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Bulkhead referenced from Remedial Action Plan for the North Yard Bulkhead, ENSR Consulting and Engineering, October 1993.

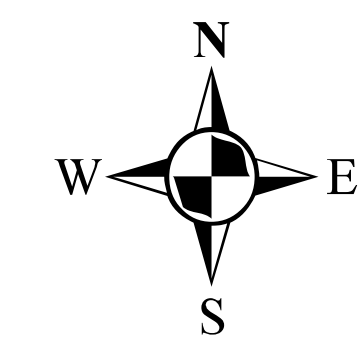
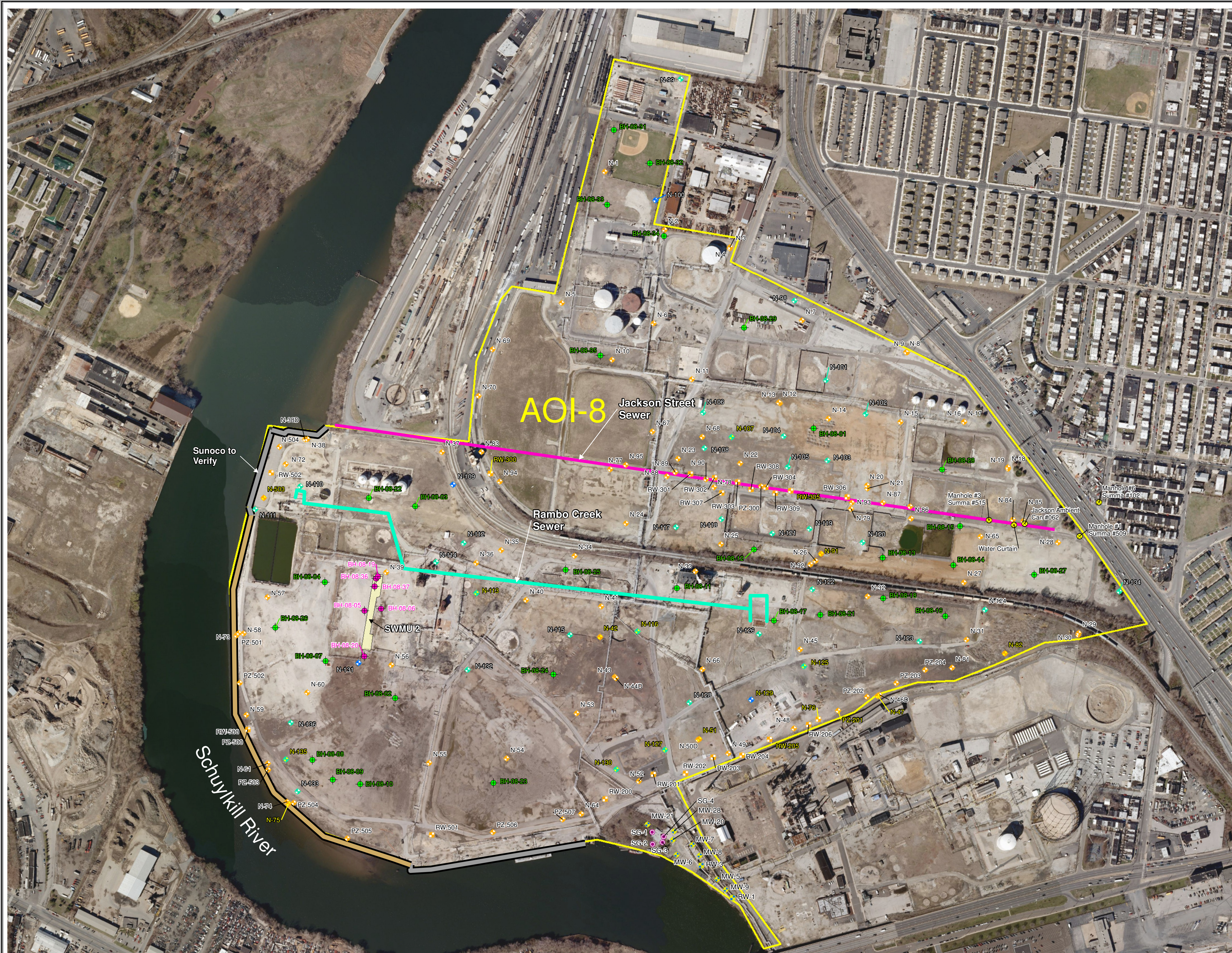
Figure 2: Site Plan
AOI 8 Site Characterization Report/
Remedial Investigation Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania



Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500 Feet

SCALE: 1"=300'
DATE: April 13, 2011
DRA: BY: MPA
CKD: BY: DW
JOB#: 2574601



Legend

- Shallow Soil Boring and Sample Locations (0-2 feet)
- SWMU Soil Boring and Sample Locations (6-8 feet)
- Soil Gas Sample Location
- Jackson St. Sewer Air Gas Sample Location
- New Shallow/Intermediate Groundwater Monitoring Well with Shallow Soil Sample
- New Shallow/Intermediate Groundwater Monitoring Well with Shallow Soil and LNAPL Samples
- New Shallow/Intermediate Groundwater Monitoring Well with Deep Soil Borings and Shallow Soil Samples
- Existing Monitoring Well
- Existing Monitoring Well with LNAPL Sample
- Existing Recovery Well
- Existing Recovery Well with LNAPL Sample
- PGW Monitoring Well
- PGW Recovery Well
- Steel Bulkhead
- Wooden Bulkhead
- Jackson Street Sewer
- Rambo Creek Sewer
- Lead Weathering Pad Solid Waste Management Unit (SWMU 2)
- AOI Boundary

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Bulkhead referenced from Remedial Action Plan for the North Yard Bulkhead, ENSR Consulting and Engineering, October 1993.
3. Boundary of SWMUs referenced from the RCRA Facility Investigation Chevron Refinery Vol 1, Dames and Moore, 11-24-93.

Figure 3: Completed Activities
AOI 8 Site Characterization Report/
Remedial Investigation Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

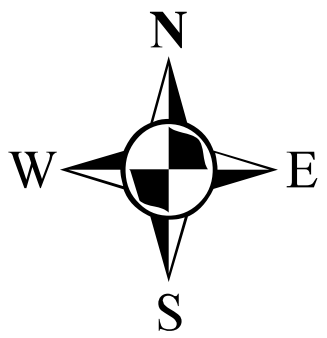


Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500 Feet

SCALE: 1" = 500'
DATE: April 13, 2011
DRAWN BY: MTH
CHECKED BY: DWH
JOB#: 2574801

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Legend

- N-1 All Existing Monitoring Points
- MW-5 PGW Monitoring Well Location
- R-1 PGW Recovery Well Location
- S S' AOI 8 Cross Section Location
- T T' AOI 8 Cross Section Location
- U U' AOI 8 Cross Section Location
- Steel Bulkhead
- Wooden Bulkhead
- AOI 8 Boundary

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Bulkhead referenced from Remedial Action Plan for the North Yard Bulkhead, ENSR Consulting and Engineering, October 1993.

Figure 4: Cross Section Location Plan
AOI 8 Site Characterization Report/
Remedial Investigation Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania



Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500 Feet

SCALE: 1"=300'
DATE: April 13, 2011
DRA: BY: MPA
CKD: BY: DW
JOB#: 2574601

- LEGEND:
- FILL

ALLUVIUM

CLAY

SAND

WEATHERED BEDROCK / BEDROCK

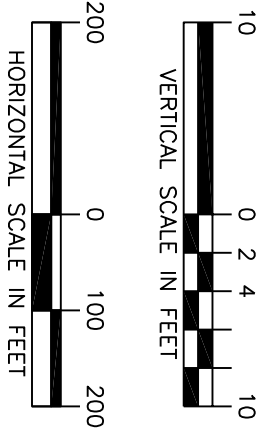
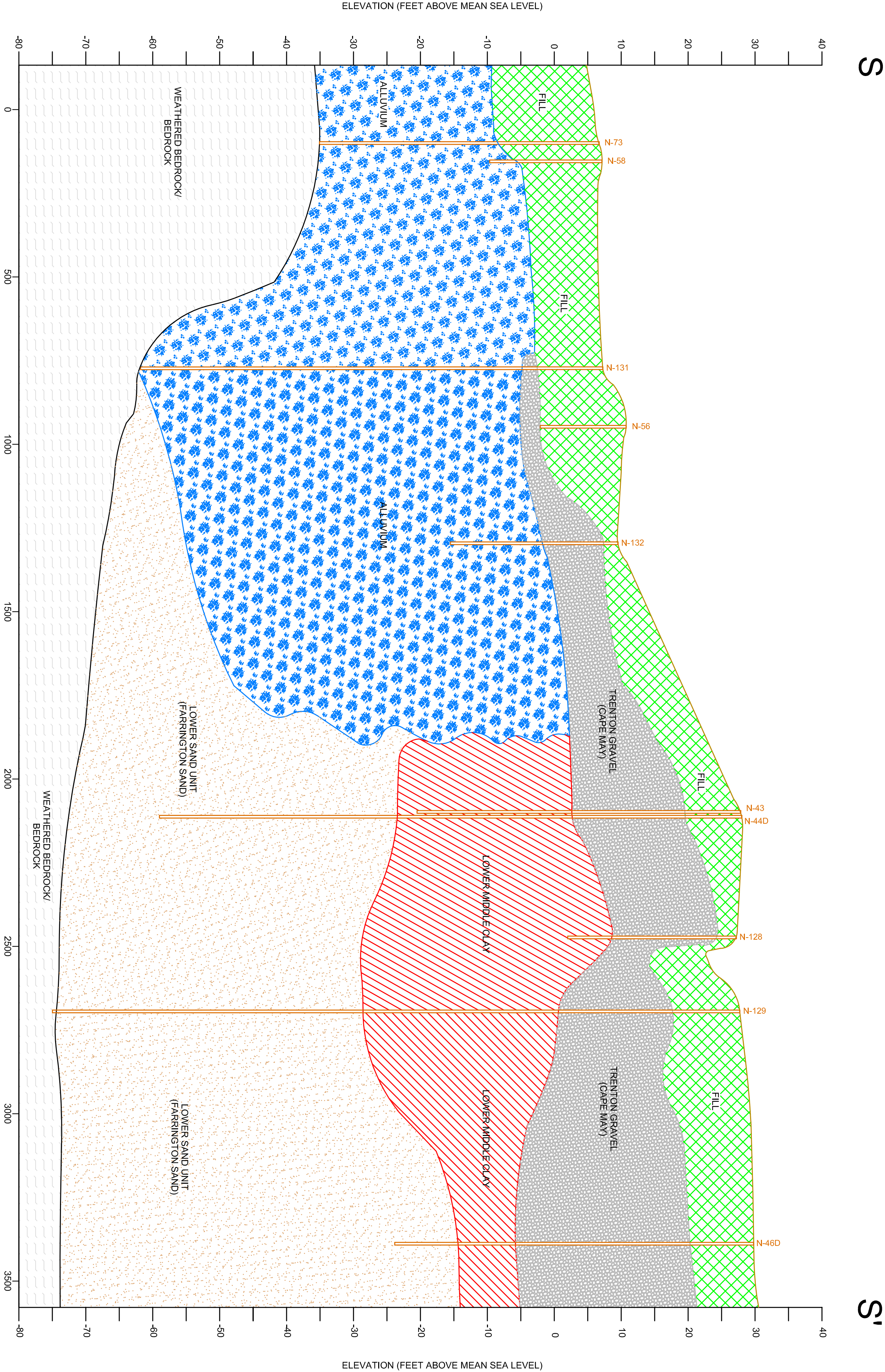
GRAVEL

B-129 LOCATION ID

WELL BORE HOLE

NOTES:

1. LITHOLOGY BASED ON INTERPOLATION FROM AVAILABLE NEW AND HISTORIC WELLBORING LOGS.
2. WELL CONSTRUCTION INFORMATION IS NOT AVAILABLE FOR ALL WELLS. ONLY THE WELL BOREHOLE IS ILLUSTRATED ON THIS SECTION.





Project

SUNOCO PHILADELPHIA REFINERY

PHILADELPHIA COUNTY PENNSYLVANIA

Drawing Title

GEOLOGIC CROSS SECTION S-S' AOI 8 SITE CHARACTERIZATION REPORT

Project No. 2574601

Date 14 AUGUST 2007

Scale 1"=200' HOR. 1"=10' VER.

Dwn. By DMW/TS

Lost Revised X

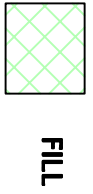
Drawing No.

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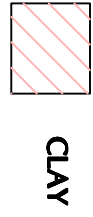
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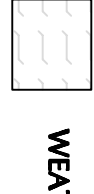
© 2006 Langan Engineering and Environmental Services Inc.

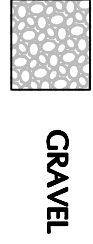
- LEGEND:
-  FILL

 ALLUVIUM

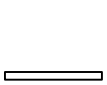
 CLAY

 SAND

 WEATHERED BEDROCK / BEDROCK

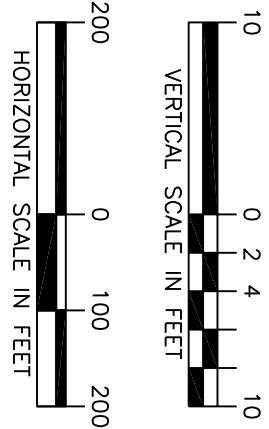
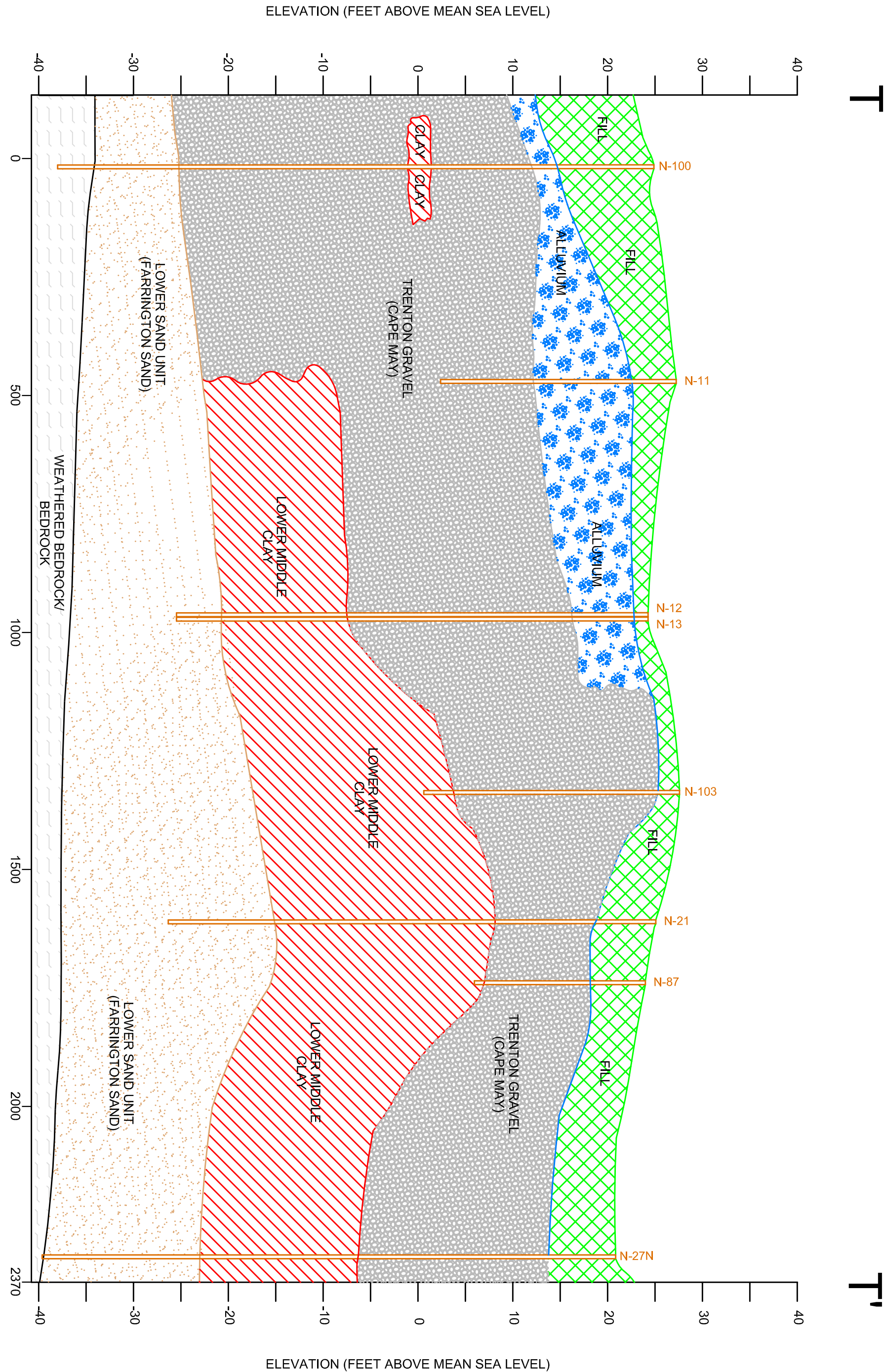
 GRAVEL

B-129 LOCATION ID

 WELL BORE HOLE

- NOTES:
1. LITHOLOGY BASED ON INTERPOLATION FROM AVAILABLE NEW AND HISTORIC WELL/BORING LOGS.

2. WELL CONSTRUCTION INFORMATION IS NOT AVAILABLE FOR ALL WELLS. ONLY THE WELL BOREHOLE IS ILLUSTRATED ON THIS SECTION.



Project SUNOCO PHILADELPHIA REFINERY PENNSYLVANIA		Drawing Title GEOLOGIC CROSS SECTION T-T' AOI 8 SITE CHARACTERIZATION REPORT	
Project No.	2574601	Drawing No.	
Date	14 AUGUST 2007		
Scale	1"=200' HOR. 1"=10' VER.		
Dwn. By	DMW/TS		
Lost Revised	X		
			1 Of 1

FILL

ALLUVIUM

CLAY

SAND

WEATHERED BEDROCK / BEDROCK

GRAVEL

B-129

LOCATION ID

?

?

INFERRED CONTACTS

WELL BORE HOLE

U

U'

The geologic cross-section U-U' displays the subsurface geology between two points. The vertical axis represents ELEVATION (FEET ABOVE MEAN SEA LEVEL), ranging from -70 to 40. The horizontal axis represents distance in feet, from 0 to 3835. The stratigraphic units shown are: FILL (green cross-hatch), ALLUVIUM (blue star pattern), TRENTON GRAVEL (CAPE MAY) (grey stipple), LOWER SAND UNIT (FARRINGTON SAND) (orange stipple), and WEATHERED BEDROCK (white). Well locations are marked with orange lines and labels: N-100, N-69, N-70, N-83, N-109, N-131, and N-135. A dashed line indicates the inferred contact between the Alluvium and the underlying units.

NOTES:

LITHOLOGY BASED ON INTERPOLATION FROM AVAILABLE NEW OR HISTORIC WELL/BORING LOGS.

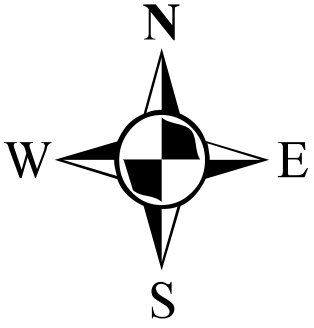
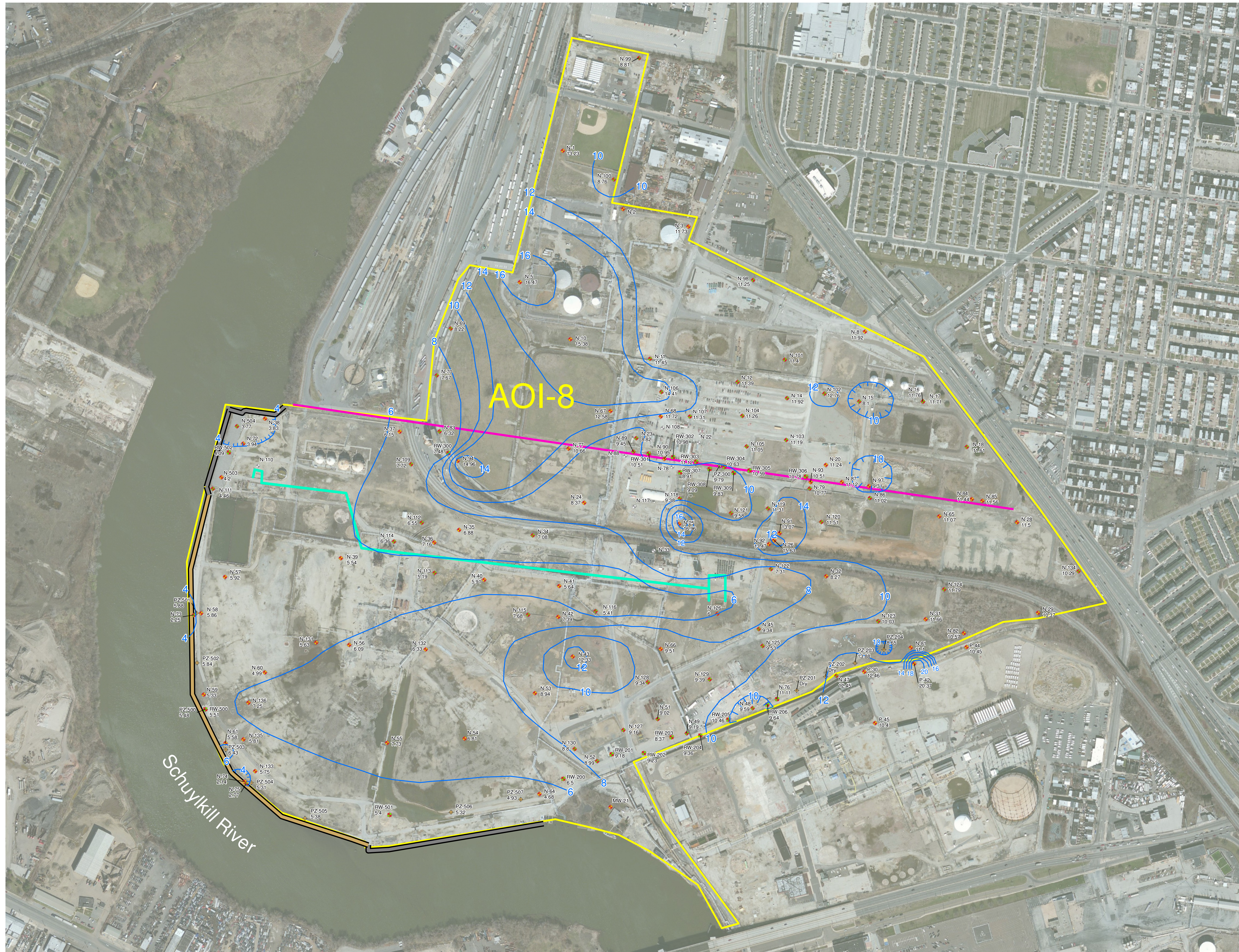
1. WELL CONSTRUCTION INFORMATION IS NOT AVAILABLE FOR ALL WELLS. ONLY THE WELL BOREHOLE IS ILLUSTRATED ON THIS SECTION.

VERTICAL SCALE IN FEET: 0, 2, 4, 10
HORIZONTAL SCALE IN FEET: 0, 100, 200

Project		Drawing Title	
SUNOCO PHILADELPHIA REFINERY		GEOLOGIC CROSS SECTION U-U' AOI 8 SITE CHARACTERIZATION REPORT	
PHILADELPHIA COUNTY		Project No. 2574601	
PENNSYLVANIA		Drawing No. 5C	
Date 14 AUGUST 2007		Scale 1"=200' HOR. 1"=10' VER.	
Dwn. By DMW/TS		Lost Revised X	
1 OF 1		1 OF 1	

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© 2006 Langan Engineering and Environmental Services Inc.



Legend

- Fill / Alluvium Wells and Groundwater Elevations (ft amsl)
- Trenton Gravel Wells and Groundwater Elevations (ft amsl)
- Trenton Gravel Recovery Wells and Groundwater Elevations (ft amsl)
- Piezometer
- Abandoned Well
- Steel Bulkhead
- Wooden Bulkhead
- Jackson Street Sewer
- Rambo Creek Sewer
- AOIs

- Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
 2. Bulkhead referenced from Remedial Action Plan for the North Yard Bulkhead, ENSR Consulting and Engineering, October 1993.
 3. Groundwater elevations and contours based on groundwater gauging data provided by Stantec, May 2011.
 4. Only those wells accessible during the gauging were used for contouring.
 5. ft amsl = feet above mean sea level.

Figure 6: Fill / Alluvium
Groundwater Elevations (May 2011)
AOI 8 Site Characterization Report/
Remedial Investigation Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania



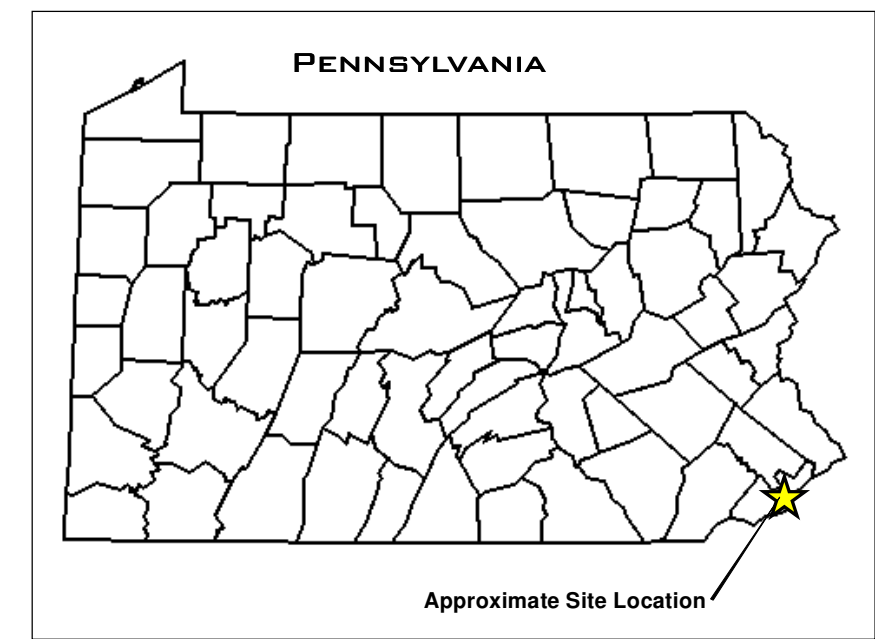
Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500 Feet

SCALE: 1" = 200'
DATE: November 3, 2011
DRAWN BY: MPA
CHECKED BY: DW
JOB#: 2014001



Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Deep groundwater elevations provided by Aquaterra, June/July 2011.



- Legend**
- | | | |
|-----------------------|--|-------------------------------|
| S-119D
0.41 | Deep Groundwater Monitoring Well and Groundwater Elevation | 26th Street Sewer |
| N-46D | Damaged/Abandoned/Unable to Locate | Rambo Creek Sewer |
| — | Deep Groundwater Contour | Jackson Street Sewer |
| — | Penrose Avenue Sewer | Area of Interest (AOI) |
| — | Pollock Street Sewer | N-30
3.77 |
| — | Passyunk Avenue Sewer | Wells Omitted From Contouring |
| — | Shunk Street Sewer | |

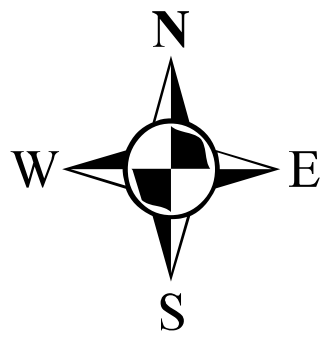
Figure 7 - Deep (Lower Sand) Groundwater Elevation Contour Plan - June/July 2011
AOI-8 Site Characterization Report/
Remedial Investigation Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania



Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500 1,000
Feet

SCALE: 1" = 500'
DATE: November 7, 2011
DRAWN BY: SHW
CHECKED BY: SHW
JOB# 2014601



Legend

- Shallow Soil Boring Location with No Exceedance of PADEP Non-Residential Soil MSCs
- Shallow Soil Boring Location with Exceedance of PADEP Non-Residential Soil MSCs
- Fill/Alluvium Monitoring Well with Soil Sample Not Exceeding PADEP Non-Residential Soil MSCs
- Fill/Alluvium Monitoring Well with Soil Sample Exceeding PADEP Non-Residential Soil MSCs
- Existing Monitoring Point
- Existing Recovery Well
- Steel Bulkhead
- Wooden Bulkhead
- Solid Waste Management Unit (SWMU) No. 2
- AOI Boundary

PADEP Non-Residential Soil Sample Exceedance Limits (mg/kg)

Benzene = .5 mg/kg
Naphthalene = 25 mg/kg
Benzo(a)pyrene = 11 mg/kg
Lead = 450 mg/kg

Site-Specific Standards Derived From Risk Assessment Analysis:

Benzene = 2,160 mg/kg
Naphthalene = 56,780 mg/kg
Benzo(a)pyrene = 109 mg/kg
Lead = 1,708 mg/kg

Notes:

1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.

2. Bulkhead referenced from Remedial Action Plan for the North Yard Bulkhead, ENSR Consulting and Engineering, October 1993.

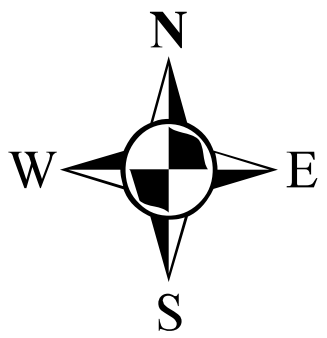
Figure 8: Summary of Soil Sample Exceedances
Non SWMU Areas
AOI 8 Site Characterization Report/
Remedial Investigation Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania



Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500 Feet

SCALE: 1" = 350'
DATE: April 13, 2011
DRA: BY: MPA
CDS: BY: DW
JOB#: 2574601



Legend

- BH-08-05
BH-08-05_6.0-8.0
Metals in mg/kg
Lead (Total) - 63.4
- Shallow SWMU Soil Boring
Locations with Leaded Tank Bottom
Materials
- BH-08-06
- Shallow SWMU Soil Boring
Locations with No Leaded Tank
Bottom Materials
- Existing Monitoring
Point
- Existing Recovery Well
- Steel Bulkhead
- Wooden Bulkhead
- Lead Weathering Pad Solid
Waste Management Unit
(SWMU 2)
- AOI Boundary

PADEP Non-Residential Used Aquifer TDS <2,500 mg/L Soil MSCs
Lead = 450 mg/kg

Site-Specific Standards Derived From Risk Assessment Analysis:
Lead = 1,708 mg/kg

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Bulkhead referenced from Remedial Action Plan for the North Yard Bulkhead, ENSR Consulting and Engineering, October 1993.

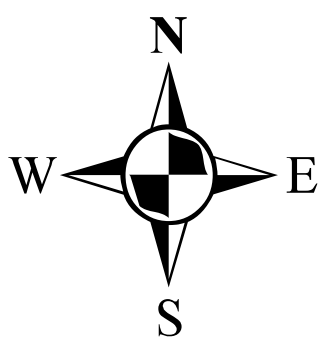
Figure 9: Summary of Soil Sample Exceedances
SWMU Areas
AOI 8 Site Characterization Report/
Remedial Investigation Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania



Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500
Feet

SCALE: 1" = 330'
DATE: April 13, 2011
DRA: BY: MPA
CDD: BY: DW
JOB#: 2574801



Legend

- Approximate extent of impervious surfaces
- Approximate extent of impervious surfaces
- Rambo Creek Sewer
- Jackson Street Sewer
- Steel Bulkhead
- Wooden Bulkhead
- AOI Boundary



SCHUYLKILL RIVER

AOI-8

Notes:
1. Bing Maps aerial imagery provided by © 2010 Microsoft Corporation and its data suppliers and obtained under the licensing agreement with ESRI.
2. Bulkhead referenced from Remedial Action Plan for the North Yard Bulkhead, ENSR Consulting and Engineering, October 1993.

Figure 12: Impervious Surfaces and Sewers
AOI 8 Site Characterization Report/
Remedial Investigation Report
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania



Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500 Feet

SCALE: 1"=200'
DATE: April 13, 2011
DRA. BY: MPA
CKD. BY: DW
JOB#: 2674801