

- LEGEND**
- AREA OF INTEREST (AOI) 8 BOUNDARY
 - PHILADELPHIA REFINING COMPLEX

0 1,100 2,200
Feet
1:26,400 (at original document size of 8.5x11)



Project Location 213402435
City of Philadelphia, Prepared by GWC on 3/31/2017
Philadelphia County, Technical Review by ADK on 10/18/2017
Pennsylvania Independent Review by JLM on 10/30/2017

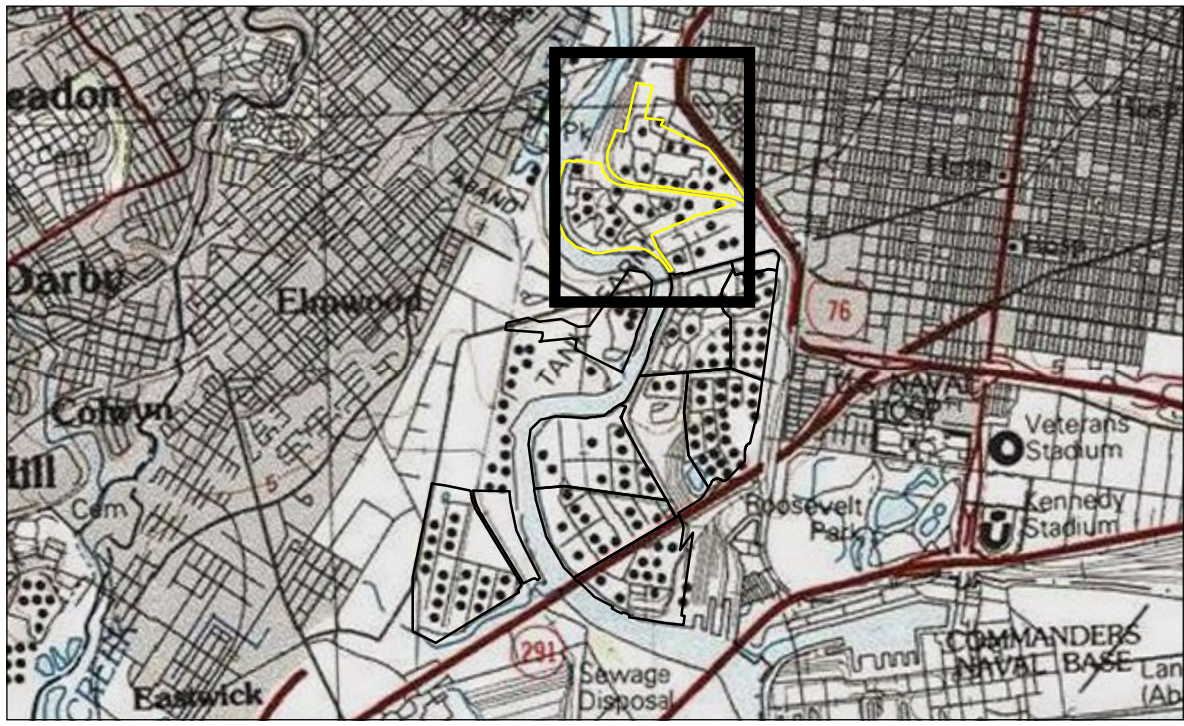
Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Figure No.
1-1

Title
AOI 8 SITE LOCATION MAP

- Notes**
1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
 2. Source: Stantec; Evergreen Resources Management
 3. Service Layer Credits: Copyright © 2013 National Geographic Society, i-cubed

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Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet North American Vertical Datum of 1988 (NAVD 88)
2. Data Sources: Stantec
3. NA = Groundwater elevation influenced by or representative of a localized perched condition.
4. * = Denotes PGW well located on PES property.
5. Aerial & Topo © 2017 DigitalGlobe ©CNES (2017) Distribution Airbus DS © 2017 Microsoft Corporation
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- LEGEND**
- OFFSITE MONITORING WELL - VERIZON SDWC PROPERTY AND PGW PASSUNK FACILITY
 - FACILITY MONITORING WELL (AREAS OUTSIDE OF AOI 8)
 - AOI 8 MONITORING WELL**
 - HYDROSTRATIGRAPHIC UNIT**
 - UNCONFINED AQUIFER
 - LOWER AQUIFER
 - NA
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
 - STEEL BULKHEAD
 - WOODEN BULKHEAD
 - PHILADELPHIA GAS WORKS (PGW) PASSUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI)
 - AOI 8
 - BELMONT TERMINAL
 - REMEDATION SYSTEMS DESIGNATED AS CURRENTLY ACTIVE
 - REMEDATION SYSTEMS DESIGNATED AS INACTIVE

0 250 500 Feet
1:3,000 (At original document size of 22x34)



Figure No.
1-2
Title
AOI 8 SITE PLAN

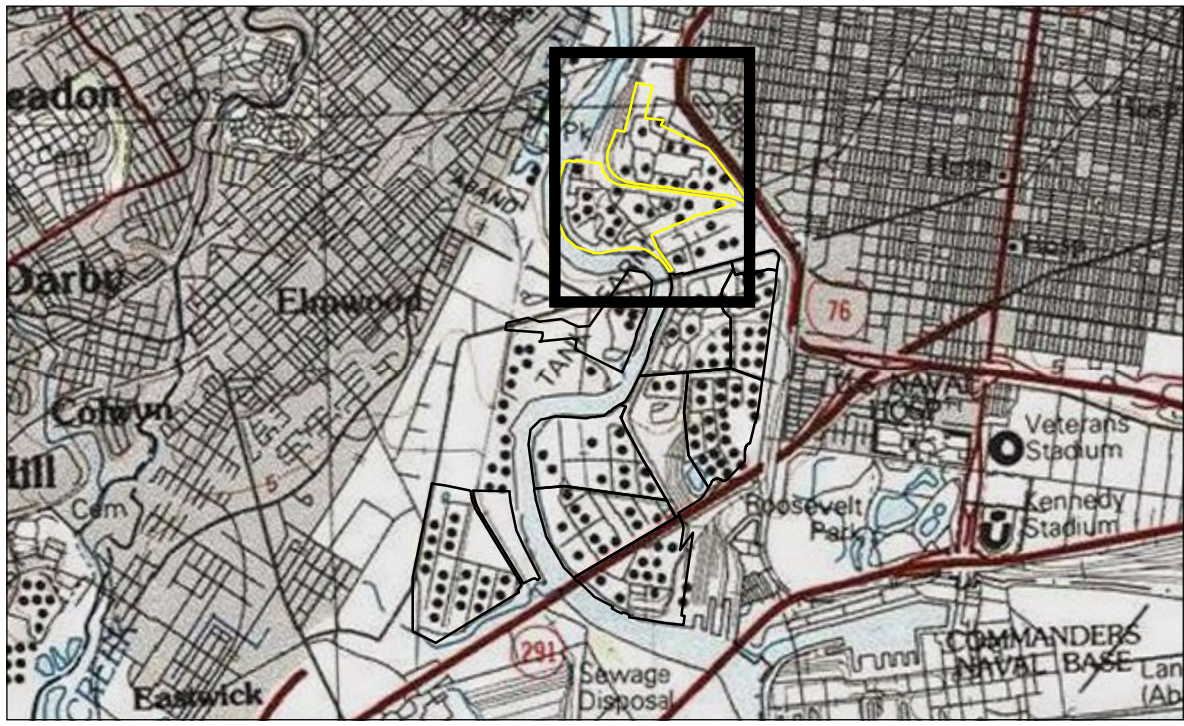
Client/Project
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EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSUNK AVENUE
PHILADELPHIA, PA 19145

Project Location

City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 12/20/2016
Technical Review by ADK on 10/18/2017
Independent Review by JLM on 10/30/2017





- LEGEND**
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
 - STEEL BULKHEAD
 - WOODEN BULKHEAD
 - IN-SERVICE AST
 - PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI)
 - AOI 8
 - BELMONT TERMINAL
 - CURRENT USE AREAS
 - HISTORIC USE AREAS

0 250 500 Feet
1:3,000 (At original document size of 22x34)



Figure No.

1-3

Title

AOI 8 CURRENT/HISTORIC OPERATIONS

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3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Project Location

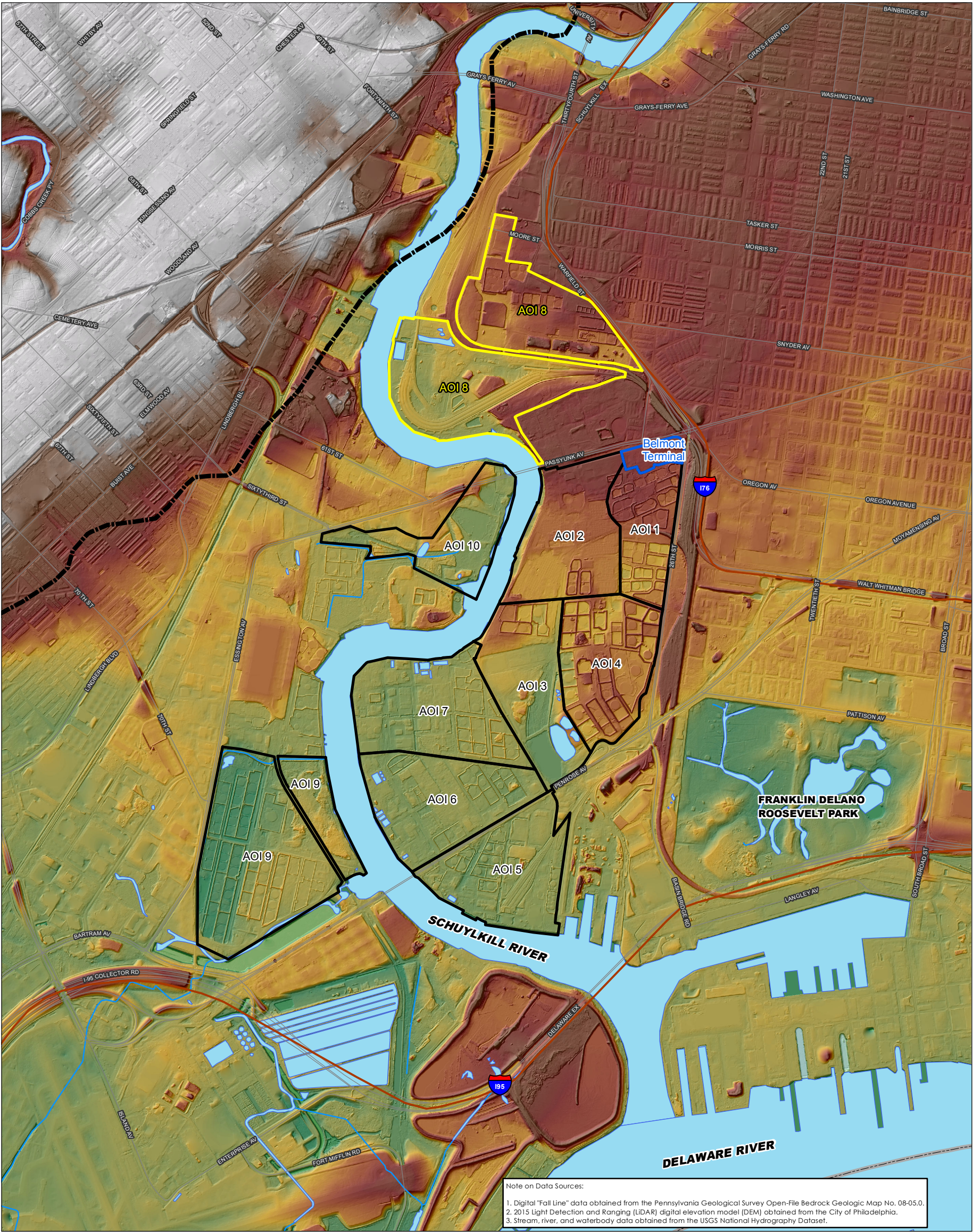
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 8/29/2017
Technical Review by ADK on 10/19/2017
Independent Review by JLM on 10/30/2017

Notes

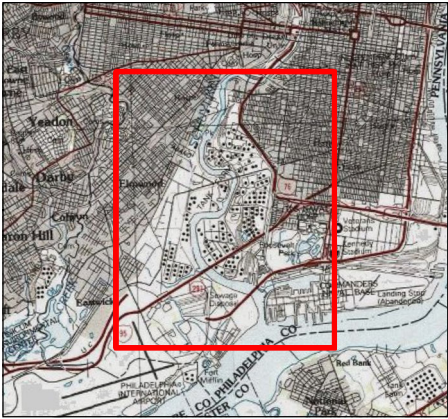
- Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
North American Vertical Datum of 1988 (NAVD 88)
- Data Sources: Stantec
- MEK = methyl ethyl ketone
- NGL = natural gas liquids
- Aerial & Topo © 2017 DigitalGlobe ©CNES (2017) Distribution Airbus DS © 2017 Microsoft Corporation
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Note on Data Sources:

1. Digital "Fall Line" data obtained from the Pennsylvania Geological Survey Open-File Bedrock Geologic Map No. 08-05.0.
2. 2015 Light Detection and Ranging (LiDAR) digital elevation model (DEM) obtained from the City of Philadelphia.
3. Stream, river, and waterbody data obtained from the USGS National Hydrography Dataset.



Notes

1. Vertical Datum: North American Vertical Datum of 1988 (NAVD 88)
2. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
3. Source: Stantec
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LEGEND

- "FALL LINE"
- STREAM
- WATERBODY
- PHILADELPHIA REFINING COMPLEX / AREA OF INTEREST (AOI) BOUNDARY
- AOI 8 BOUNDARY
- BELMONT TERMINAL
- STATE BOUNDARY

2015 LAND SURFACE ELEVATION MODEL

Value

- High : 110.55
- Low : -44.473

0.25 0 0.25 0.5 Miles
1:24,000 (At Original document size of 11x17)

Stantec

EVERGREEN

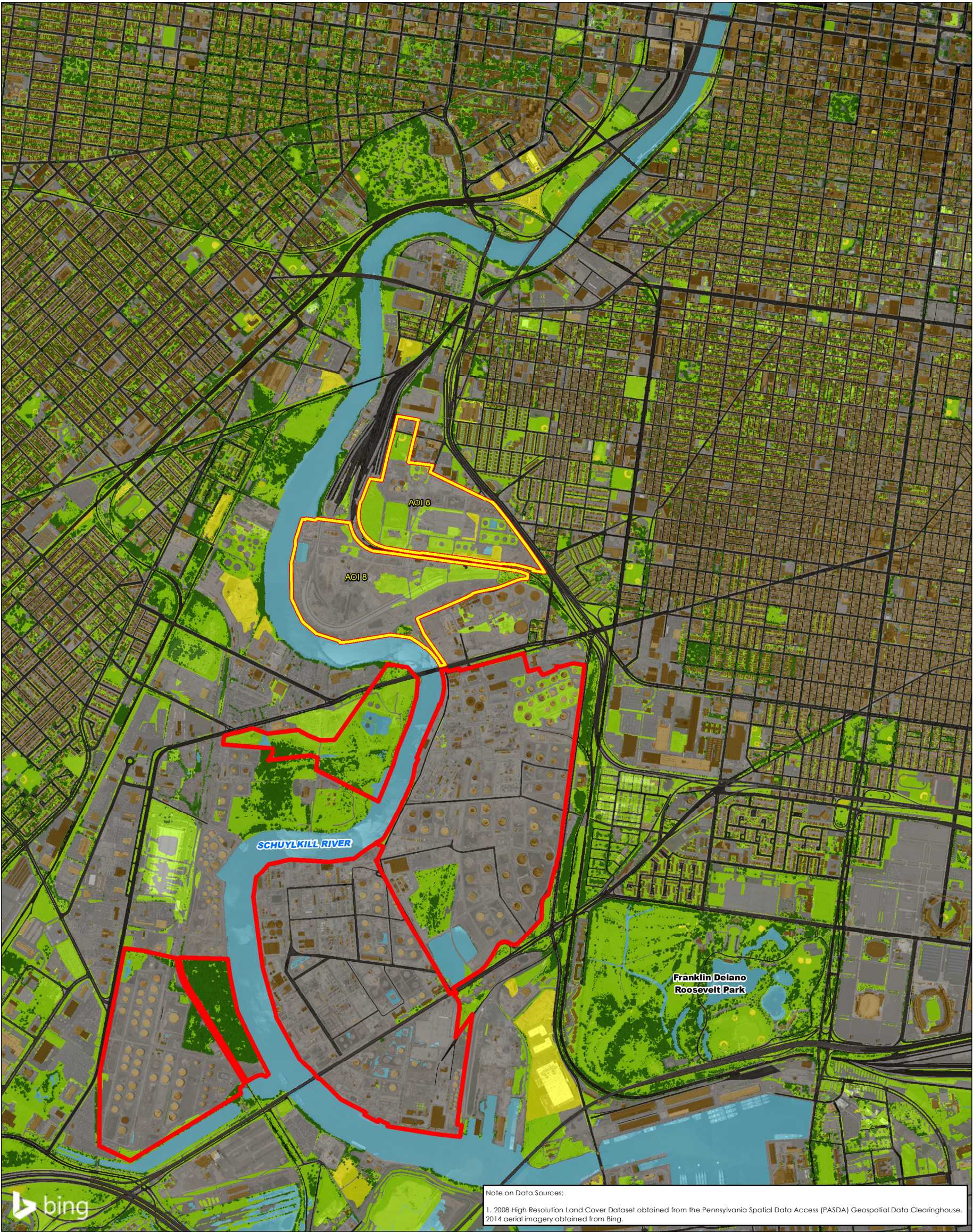
Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

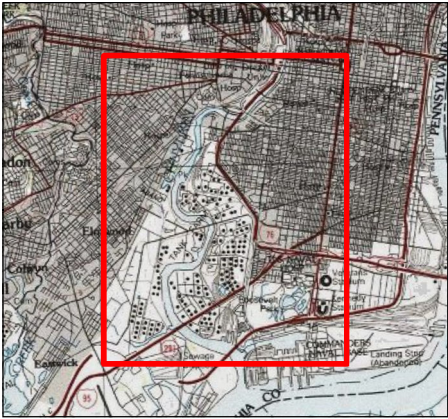
Figure No.
2-2

Title
GEOGRAPHIC SETTING

213402435
Prepared by GWC on 9/1/2017
Technical Review by ADK on 10/2/2017
Independent Review by JDK on 10/11/2017



Note on Data Sources:
1. 2008 High Resolution Land Cover Dataset obtained from the Pennsylvania Spatial Data Access (PASDA) Geospatial Data Clearinghouse.
2014 aerial imagery obtained from Bing.



Notes
1. Vertical Datum: North American Vertical Datum of 1988 (NAVD 88)
2. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
3. Source: Stantec and PASDA
4. Service Layer Credits: © 2017 DigitalGlobe © CNES (2017) Distribution Airbus DS © 2017 Microsoft Corporation
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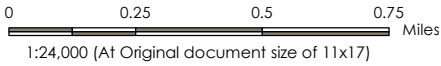
LEGEND

- AREA OF INTEREST (AOI) 8 BOUNDARY
- PHILADELPHIA REFINING COMPLEX

HIGH RESOLUTION LAND COVER DATASET (2008)

CLASSES

- TREE CANOPY
- GRASS/SHRUB
- BARE EARTH
- WATER
- BUILDINGS
- ROADS
- OTHER PAVED SURFACES



Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania
213402435
Prepared by GWC on 9/1/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017

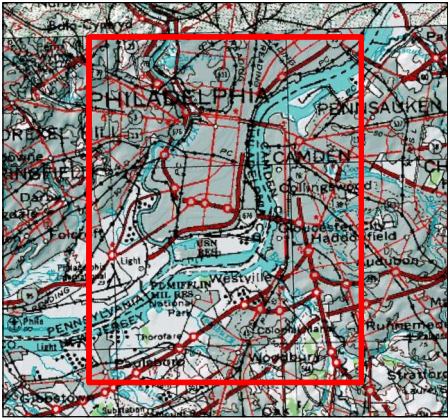
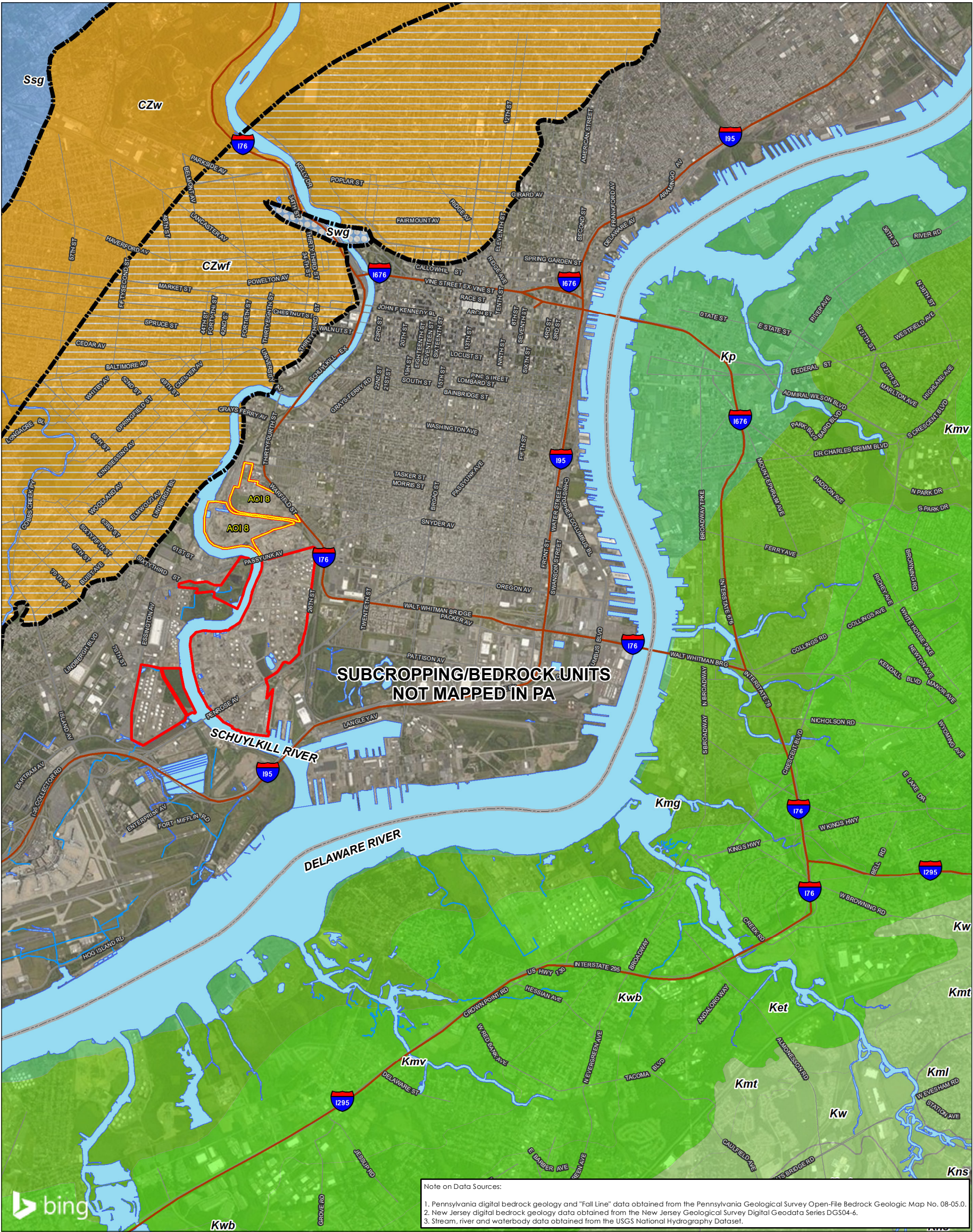
Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Figure No.

2-3

Title

**HIGH RESOLUTION LAND COVER
DATASET (2008)
CITY OF PHILADELPHIA**



Notes

1. Vertical Datum: North American Vertical Datum of 1988 (NAVD 88)
2. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
Source: Stantec
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LEGEND

- FALL LINE/INFERRED GEOLOGIC CONTACT
- STREAM
- WATERBODY
- AREA OF INTEREST (AOI) 8 BOUNDARY
- PHILADELPHIA REFINING COMPLEX
- STATE BOUNDARY
- SPRINGFIELD GRANODIORITE FORMATION (Ssg)
- WATERWORKS GNEISS FORMATION (Swg)
- WISSAHICKON FORMATION (CZw)
- WISSAHICKON FORMATION - FAIRMOUNT MEMBER (CZwf)

- MT. LAUREL FORMATION (Kml)
- WENONAH FORMATION (Kw)
- MARSHALLTOWN FORMATION (Kmt)
- ENGLISHTOWN FORMATION (Ket)
- WOODBURY FORMATION (Kwb)
- MERCHANTVILLE FORMATION (Kmv)
- MAGOTHY FORMATION (Kmg)
- POTOMAC FORMATION (Kp)

0.5 0 0.5 1 Miles
1:63,360 (At Original document size of 11x17)



Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/1/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

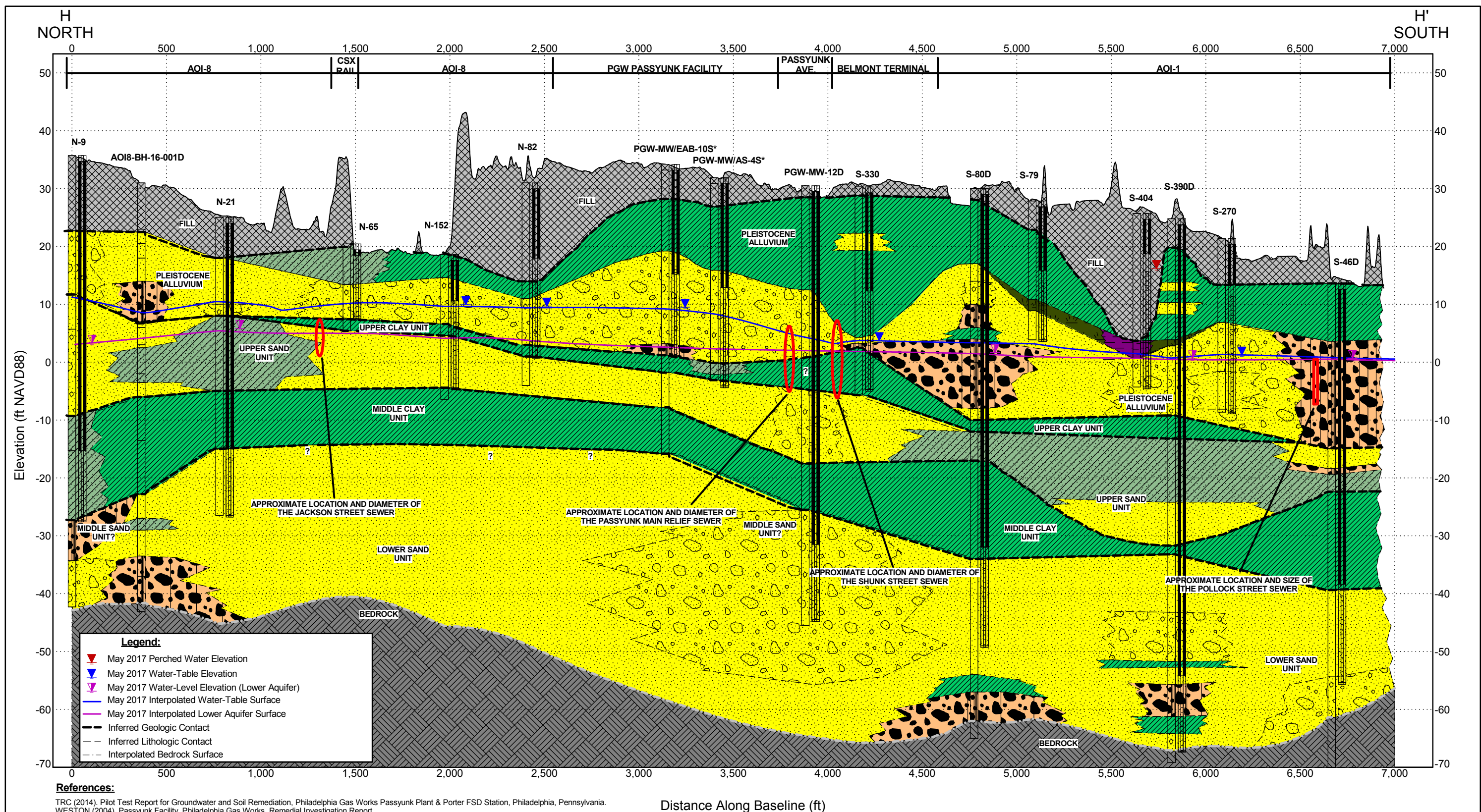
Figure No.

2-4

Title

**GENERALIZED BEDROCK
GEOLOGIC MAP**






STRATIGRAPHIC PROFILE INTERPRETED BY ANDREW D. KLINGBEIL,
 PENNSYLVANIA PROFESSIONAL GEOLOGIST PG005029

GENERALIZED LITHOLOGY GRAPHICS

Apparent Fill	Sand (incl. trace to silt/clay/gravel)	"Mud" (silt/clay, incl. trace to little sand/gravel)
Sandy Gravel	"Muddy" Sand	Bedrock (incl. saprolite where indicated)
Gravelly Sand	Organic-Rich "Mud" (silt/clay, incl. some organic material)	Peat

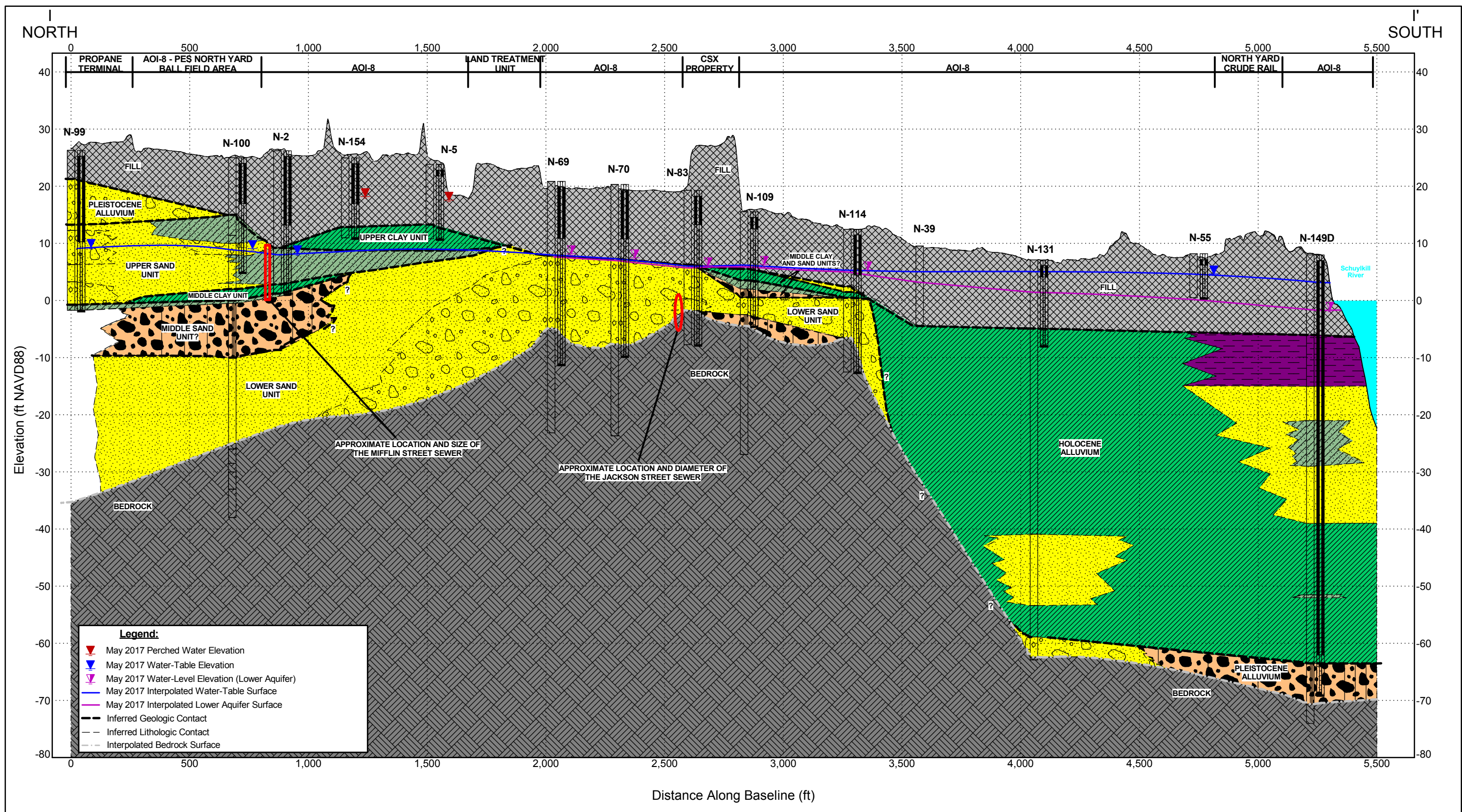
Notes:

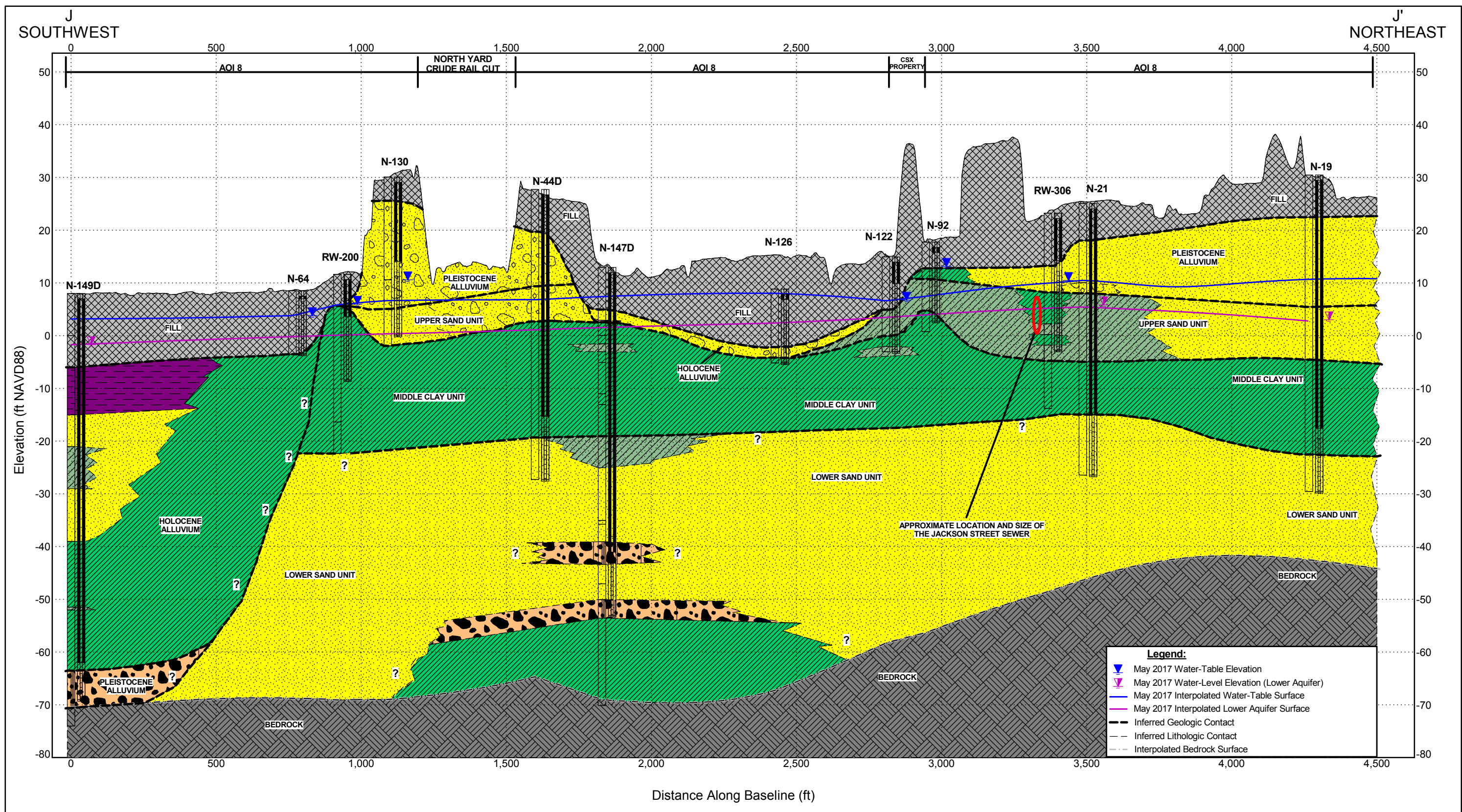
- Land surface profile obtained from a 2015 Light Detection and Ranging (LIDAR) elevation model available from the United States Geological Survey (USGS).
- Well logs for Philadelphia Gas Works (PGW) were obtained from Weston (2004). Asterisks denote where lithologic data was obtained from TRC (2014).
- Water-table, lower aquifer, and bedrock surfaces were interpolated from selected May 2017 gauging and stratigraphic "pick" data using block kriging (note block kriging is not an exact interpolator). Not all wells were gauged during May 2017. Screen lengths estimated for wells N-9 and N-21.
- Stantec generalized lithologic data from available borehole logs into 9 categories as indicated for interpretive purposes. "Mud" is utilized in these profiles to generally represent clay/silt mixtures, or clay and silt-rich sandy sediments.
- Correlation between lithologies and, where applicable, geologic units is based primarily on the straight-line method with additional stratigraphic interpretation where subsurface data is limited. Actual conditions between boreholes may vary from what is shown on this profile.
- Sewer data obtained from the Philadelphia Water Department Water Transport Records.
- North American Vertical Datum of 1988 = NAVD 88
- Vertical Exaggeration ~ 31 X


Figure 2-6. Stratigraphic Profile H - H'

Philadelphia Refinery Operations
 a series of Evergreen Resources Group, LLC
 3144 Passyunk Avenue
 Philadelphia, PA 19145

Project Number: 213402435
















STRATIGRAPHIC PROFILE INTERPRETED BY ANDREW D. KLINGBEIL,
PENNSYLVANIA PROFESSIONAL GEOLOGIST PG005029

GENERALIZED LITHOLOGY GRAPHICS

	Apparent Fill		Sand (incl. trace to little silt/clay/gravel)		"Mud" (silt/clay, incl. trace to little sand/gravel)
	Sandy Gravel		"Muddy" Sand		Bedrock (incl. saprolite where indicated)
	Gravelly Sand		Organic-Rich "Mud" (silt/clay, incl. some organic material)		Peat

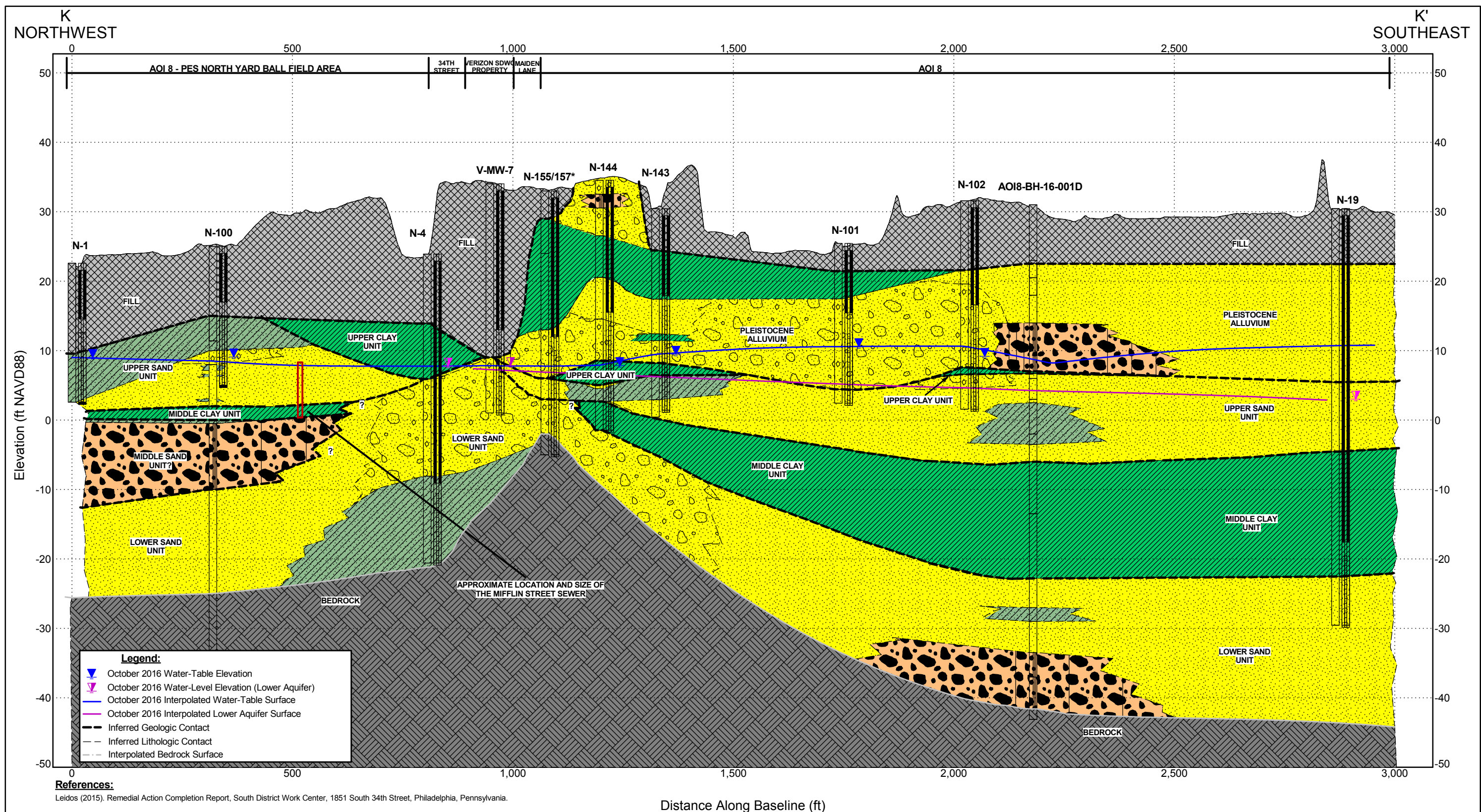
Notes:

1. Land surface profile obtained from a 2015 Light Detection and Ranging (LIDAR) elevation model available from the United States Geological Survey (USGS).
2. Water-table, lower aquifer, and bedrock surfaces were interpolated from selected May 2017 gauging and stratigraphic "pick" data using block kriging (note block kriging is not an exact interpolator). Not all wells were gauged during May 2017, and not all wells gauged were utilized for interpolation of the surfaces presented. Screen lengths estimated for wells N-44D, N-21, and N-19.
3. Stantec generalized lithologic data from available borehole logs into 9 categories as indicated for interpretive purposes. "Mud" is utilized in these profiles to generally represent clay/silt mixtures, or clay and silt-rich sandy sediments.
4. Correlation between lithologies and, where applicable, geologic units is based primarily on the straight-line method with additional stratigraphic interpretation where subsurface data is limited. Actual conditions between boreholes may vary from what is shown on this profile.
5. Sewer data obtained from the Philadelphia Water Department Water Transport Records.
6. North American Vertical Datum of 1988 = NAVD 88
7. Vertical Exaggeration ~ 17 X

Figure 2-8. Stratigraphic Profile J - J'

Philadelphia Refinery Operations
a series of Evergreen Resources Group, LLC
3144 Passyunk Avenue
Philadelphia, PA 19145

Project Number: 213402435



STRATIGRAPHIC PROFILE INTERPRETED BY ANDREW D. KLINGBEIL,
PENNSYLVANIA PROFESSIONAL GEOLOGIST PG005029

GENERALIZED LITHOLOGY GRAPHICS

	Apparent Fill		Sand (incl. trace to silt/clay/gravel)		"Mud" (silt/clay, incl. trace to little sand/gravel)
	Sandy Gravel		"Muddy" Sand		Bedrock (incl. saprolite where indicated)
	Gravelly Sand		Organic-Rich "Mud" (silt/clay, incl. some organic material)		Peat

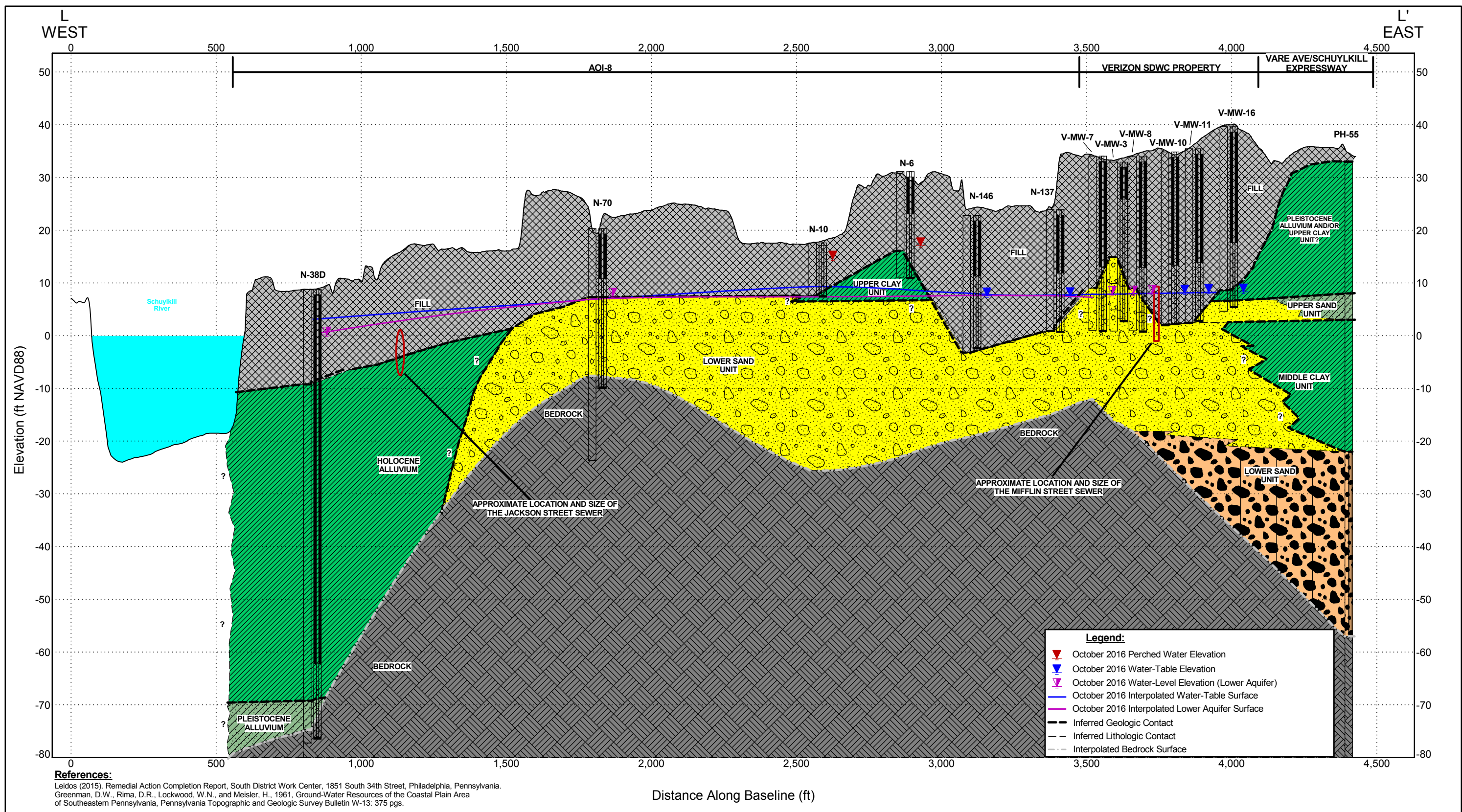
Notes:

- Land surface profile obtained from a 2015 Light Detection and Ranging (LIDAR) elevation model available from the United States Geological Survey (USGS).
- Verizon SDWC well log for V-MW-7 obtained from Leidos (2015).
- *Subsurface information was combined for wells N-155 and N-157.
- Water-table, lower aquifer, and bedrock surfaces were interpolated from selected October 2016 gauging and stratigraphic "pick" data using block kriging (note block kriging is not an exact interpolator). Not all wells were gauged during October 2016. Screen lengths estimated for wells N-1, N-4, and N-19.
- Stantec generalized lithologic data from available borehole logs into 9 categories as indicated for interpretive purposes. "Mud" is utilized in these profiles to generally represent clay/silt mixtures, or clay and silt-rich sandy sediments.
- Correlation between lithologies and, where applicable, geologic units is based primarily on the straight-line method with additional stratigraphic interpretation where subsurface data is limited. Actual conditions between boreholes may vary from what is shown on this profile.
- Sewer data obtained from the Philadelphia Water Department Water Transport Records.
- North American Vertical Datum of 1988 = NAVD 88
- Vertical Exaggeration ~ 16 X

Figure 2-9. Stratigraphic Profile K - K'

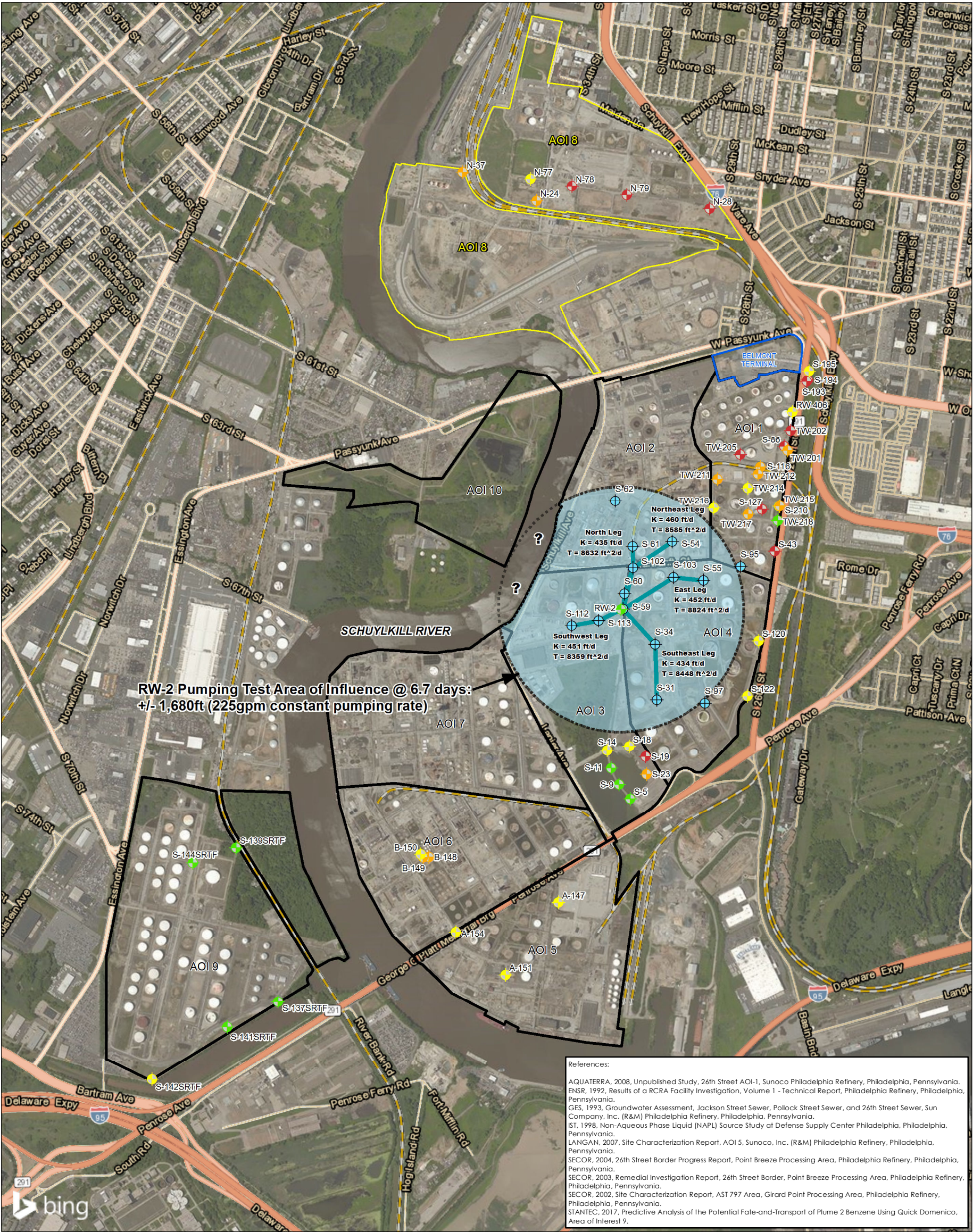
Philadelphia Refinery Operations
a series of Evergreen Resources Group, LLC
3144 Passyunk Avenue
Philadelphia, PA 19145

Project Number: 213402435



STRATIGRAPHIC PROFILE INTERPRETED BY ANDREW D. KLINGBEIL,
PENNSYLVANIA PROFESSIONAL GEOLOGIST PG005029

Figure 2-10. Stratigraphic Profile L - L'
Philadelphia Refinery Operations
a series of Evergreen Resources Group, LLC
3144 Passyunk Avenue
Philadelphia, PA 19145
Project Number: 213402435



Notes

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FIPS 3702 Feet
2. Sources: Stantec
3. Service Layer Credits: © 2017 DigitalGlobe ©CNES (2017)
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LEGEND

AVAILABLE ESTIMATES OF K (FT/D)

- 0 - 1
- 1 - 10
- 10 - 100
- 100+
- OBSERVATION WELL FOR RW-2 PUMPING TEST
- RW-2 PUMPING TEST LEG
- RW-2 TEST AREA OF INFLUENCE (APPROXIMATED)
- AREA OF INTEREST (AOI) BOUNDARY
- AOI 8 BOUNDARY
- BELMONT TERMINAL
- K
T
gpm
ft/d
ft²/d
- HYDRAULIC CONDUCTIVITY
- TRANSMISSIVITY
- GALLONS PER MINUTE
- SQUARE FEET PER DAY

0 1,400 Feet
1:16,800 (At Original document size of 11x17)



Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
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3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Figure No.
2-11
Title

SUMMARY OF AVAILABLE AQUIFER TESTING DATA FOR THE UNCONFINED AQUIFER AT THE PHILADELPHIA REFINING COMPLEX



Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Sources: Stantec
3. K values are rounded to the nearest ft/d for display purposes.
4. Service Layer Credits: © 2017 DigitalGlobe ©CNES (2017) Distribution Airbus DS © 2017 Microsoft Corporation
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- LEGEND**
- LOWER AQUIFER
 - AREA OF INTEREST (AOI) BOUNDARY
 - AOI 8 BOUNDARY
 - BELMONT TERMINAL
 - K HYDRAULIC CONDUCTIVITY
 - ft/d FEET PER DAY

0 1,300 Feet
1:15,600 (At Original document size of 11x17)

Stantec **EVERGREEN**

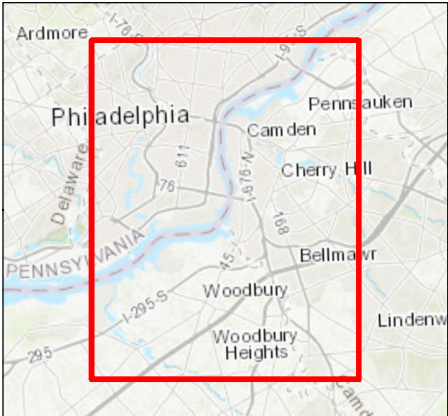
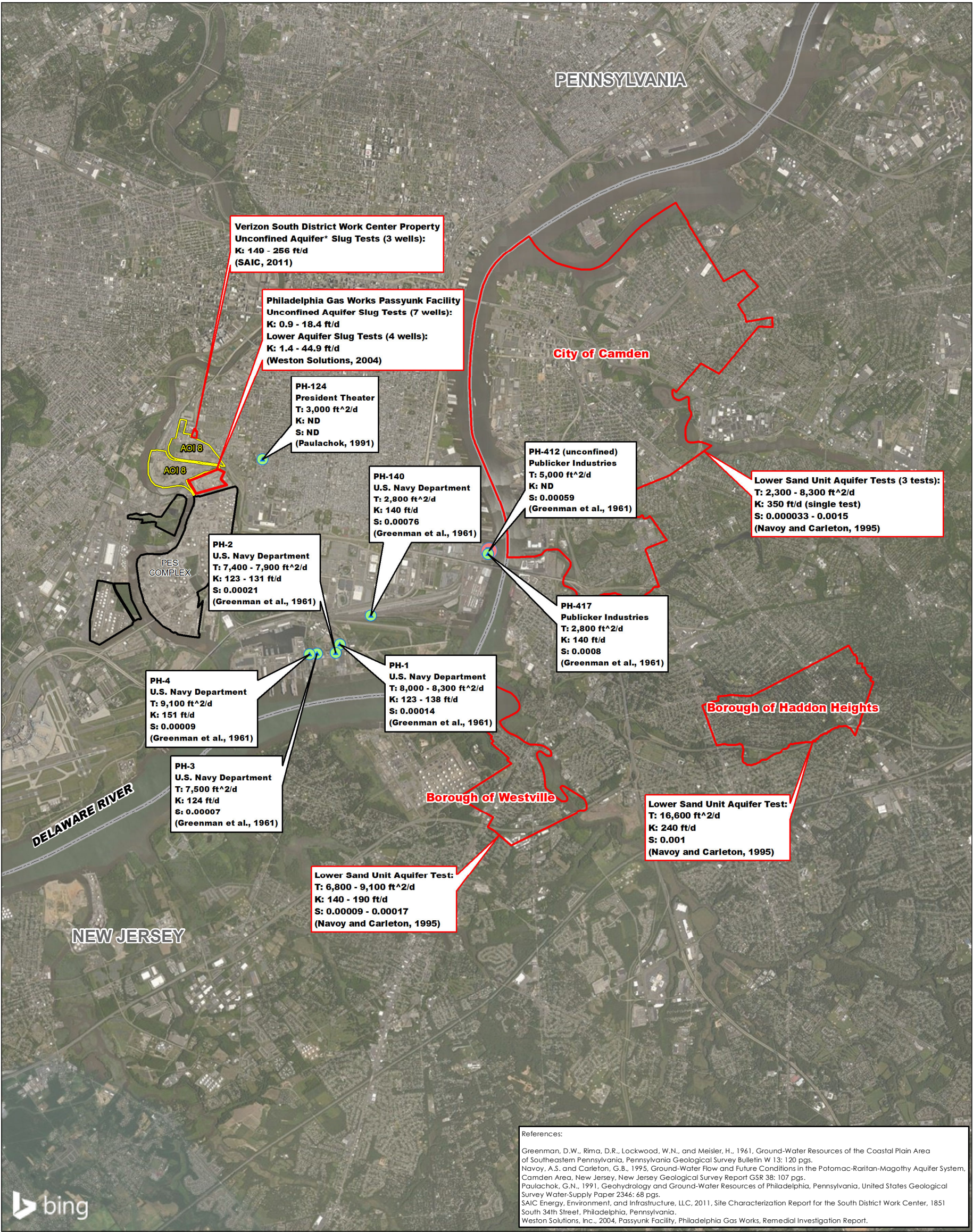
Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Figure No.
2-12

Title
**SUMMARY OF AVAILABLE AQUIFER
TESTING DATA FOR THE LOWER
AQUIFER AT THE PHILADELPHIA
REFINING COMPLEX**

213402435
Prepared by GWC on 9/1/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017



- LEGEND**
- LOWER SAND UNIT AQUIFER TEST LOCATION
 - UNCONFINED AQUIFER TEST LOCATION
 - AREA OF INTEREST (AOI) 8 BOUNDARY
 - PHILADELPHIA REFINING COMPLEX
 - GENERAL LOCATION OF AQUIFER TESTING
 - STATE BOUNDARY
 - K HYDRAULIC CONDUCTIVITY
 - T TRANSMISSIVITY
 - S STORATIVITY
 - ft/d FEET PER DAY
 - ft²/d SQUARE FEET PER DAY
 - ND NOT DETERMINED

Notes

- Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
- Source: Stantec
- The lower aquifer subcrops fill in this general area and as such the estimated K values are representative of both aquifers
- *Verizon SDWC slug test results may be influenced by the lower aquifer which subcrops locally
- Service Layer Credits: Earthstar Geographics SIO © 2017 Microsoft Corporation
- Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community
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0 1.25 2.5 Miles
1:79,200 (At Original document size of 11x17)

Stantec **EVERGREEN**

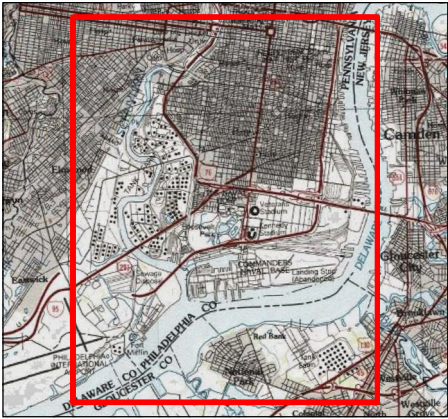
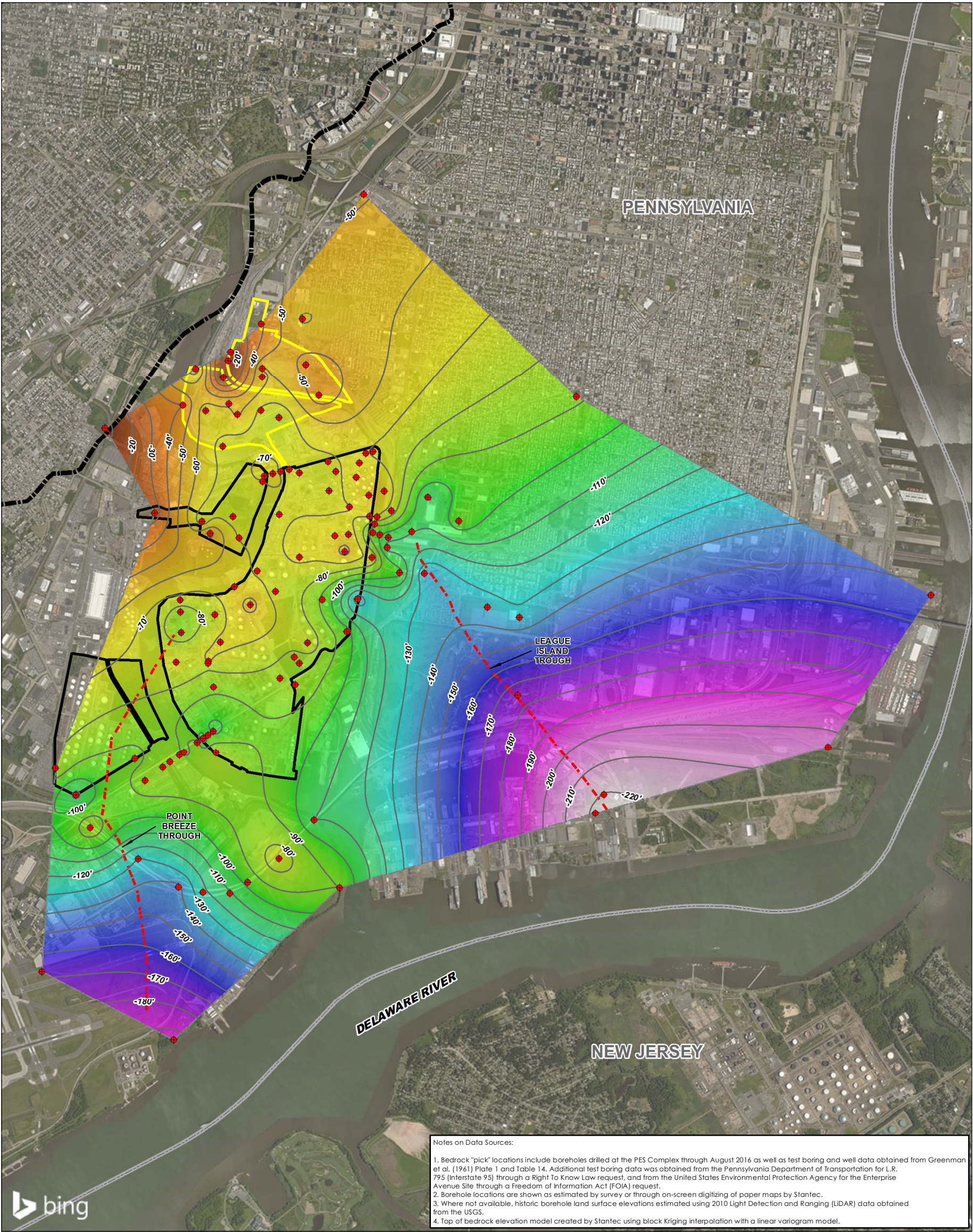
Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Figure No.
2-13

Title
**SUMMARY OF PUBLISHED AQUIFER
TESTING DATA FOR THE UNCONFINED
AND LOWER AQUIFERS NEAR THE
PHILADELPHIA REFINING COMPLEX**

213402435
Prepared by GWC on 9/1/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017



Notes

1. Vertical Datum: North American Vertical Datum of 1988 (NAVD 88)
2. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
3. Source: Stantec
4. Service Layer Credits: © 2017 DigitalGlobe ©CNES (2017) Distribution Airbus DS © 2017 Microsoft Corporation Copyright © 2013 National Geographic Society, i-cubed
5. Contour Interval = 10 feet

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LEGEND

- TOP OF BEDROCK "PICK" LOCATION
- ESTIMATED BEDROCK ELEVATION (ft NAVD 88)
- "FALL LINE"
- APPROXIMATE AXIS OF MAIN CHANNEL OF BEDROCK TROUGH
- AREA OF INTEREST (AOI) 8 BOUNDARY
- PHILADELPHIA REFINING COMPLEX
- EXTENT OF INTERPOLATED BEDROCK SURFACE
- STATE BOUNDARY
- BEDROCK ELEVATION MODEL (ft NAVD 88)**
High : -7
Low : -223

0 3,000 Feet
1:36,000 (At Original document size of 11x17)



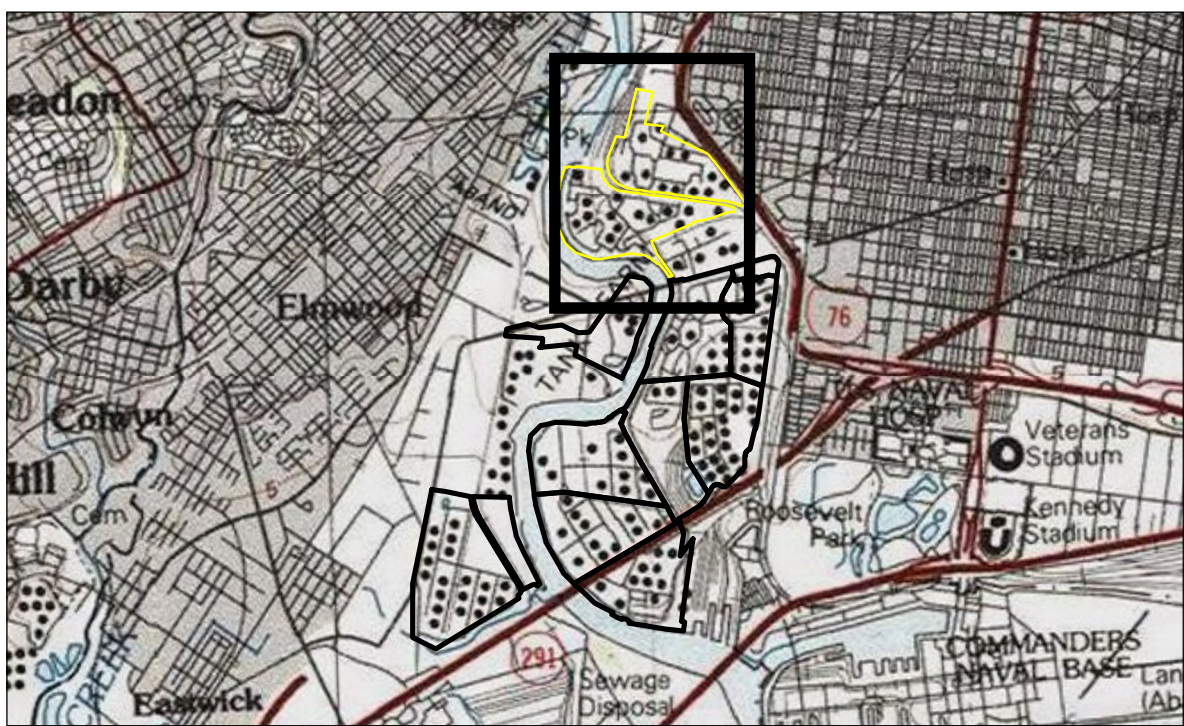
Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Figure No.

2-14

Title
**BEDROCK STRUCTURE CONTOUR MAP -
TOP OF BEDROCK**



Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Sources: Stantec
3. Belmont Terminal data shown for informational purposes only.
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Legend

- SHALLOW SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD 0-2'
- NO SHALLOW SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD 0-2'
- DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'
- NO DEEP SOIL EXCEEDANCE OF THE PADEP NON-RESIDENTIAL, UNSATURATED STATEWIDE HEALTH STANDARD GREATER THAN 2'
- MONITORING/RECOVERY WELL
- PROPOSED MONITORING WELL
- DAMAGED MONITORING WELL
- DESTROYED MONITORING WELL
- WELL UNABLE TO BE LOCATED
- PIEZOMETER
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
- AREA OF INTEREST (AOI)
- AOI 8
- BELMONT TERMINAL
- CONCENTRATION EXCEEDS THE NON-RESIDENTIAL DIRECT CONTACT MEDIUM-SPECIFIC CONCENTRATION OR THE SITE-SPECIFIC STANDARD FOR LEAD (2,240 MG/KG)
- ATTAINMENT OF REMEDIATION STANDARD HAS BEEN DEMONSTRATED VIA PATHWAY ELIMINATION (I.E. ENGINEERING CONTROLS).

0 250 500 Feet
1:3,000 (At original document size of 22x34)



Figure No.

3-1

Title

AOI 8 SOIL SAMPLE LOCATIONS AND RESULTS

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PHILADELPHIA, PA 19145

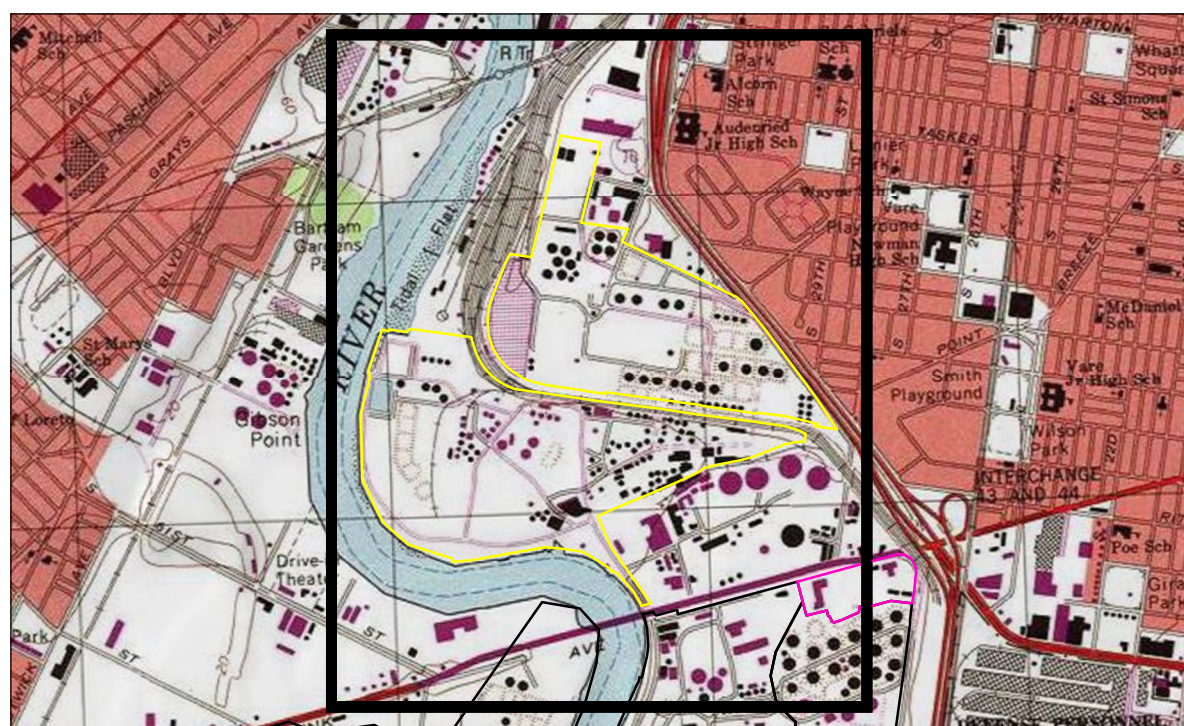
Project Location

City of Philadelphia,
Philadelphia County,
Pennsylvania

Prepared by GWC on 3/30/2017
Technical Review by JKD on 4/14/2017
Independent Review by JLM on 5/1/2017

213402435





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Callouts denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
4. Contour Interval = 1 foot
5. Groundwater elevation data was interpolated using black kriging with a linear variogram model in Surfer.
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LEGEND

- WATER TABLE MONITORING WELL
- RECOVERY WELL
- PIEZOMETER
- MAY 2017 GROUNDWATER ELEVATION CONTOUR (FEET NAVD 88)
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
- PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
- VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
- AREA OF INTEREST (AOI) BOUNDARY
- AOI 8 BOUNDARY
- BELMONT TERMINAL
- GROUNDWATER ELEVATION (FEET NAVD 88)

0 250 500 Feet
1:3,000 (At original document size of 24x36)



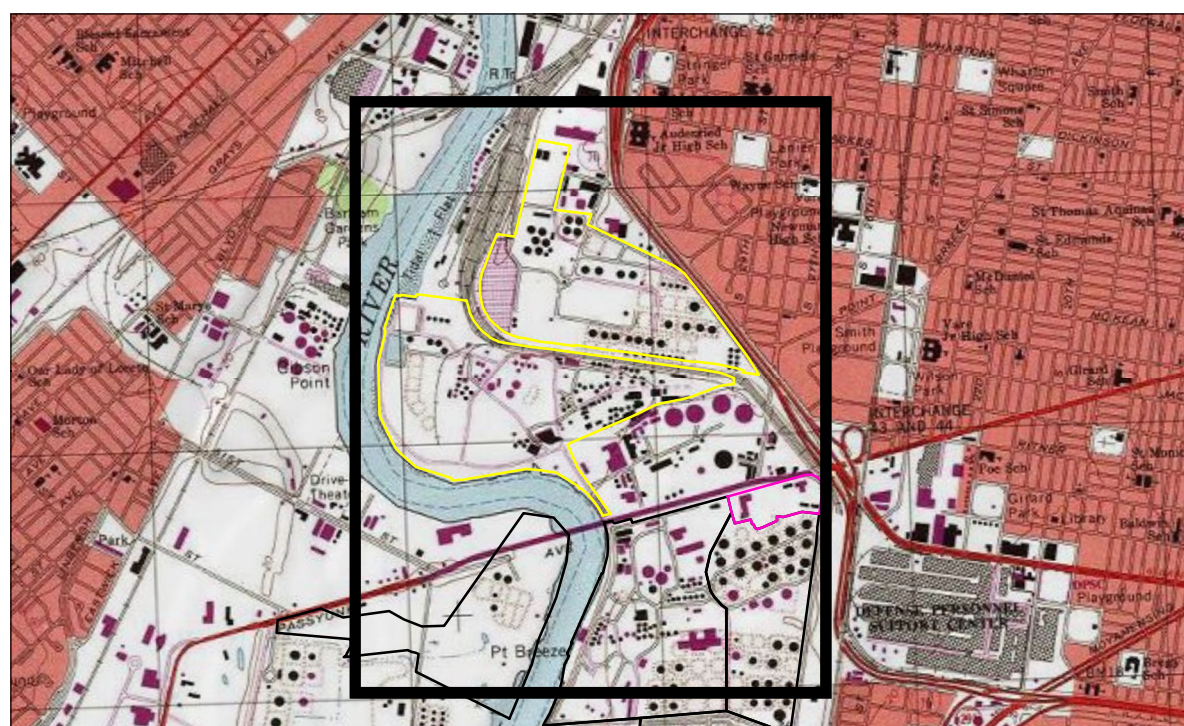
Figure No.
5-1
Title
MAY 2017 WATER-TABLE ELEVATION, INCLUDING AREAS OF APPARENT MOUNDING OR PERCHING (UNFILTERED)

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/8/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Labels denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
4. Contour Interval = 1 foot
5. Groundwater elevation data was interpolated using block kriging with a linear variogram model in Surfer.
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LEGEND

- MAY/JUNE 2008 WELL GAUGING DATA – WATER-TABLE (UNCONFINED) AQUIFER
- MAY/JUNE 2008 WATER-TABLE ELEVATION (FEET NAVD 88)
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
- LIMITS OF WATER-TABLE WELL CONTROL
- PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
- VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
- AREA OF INTEREST (AOI) BOUNDARY
- AOI 8 BOUNDARY
- BELMONT TERMINAL
- 2.55' GROUNDWATER ELEVATION (FEET NAVD 88)
- NM WELL WAS NOT MEASURED

0 275 550 Feet
1:3,300 (At original document size of 24x36)

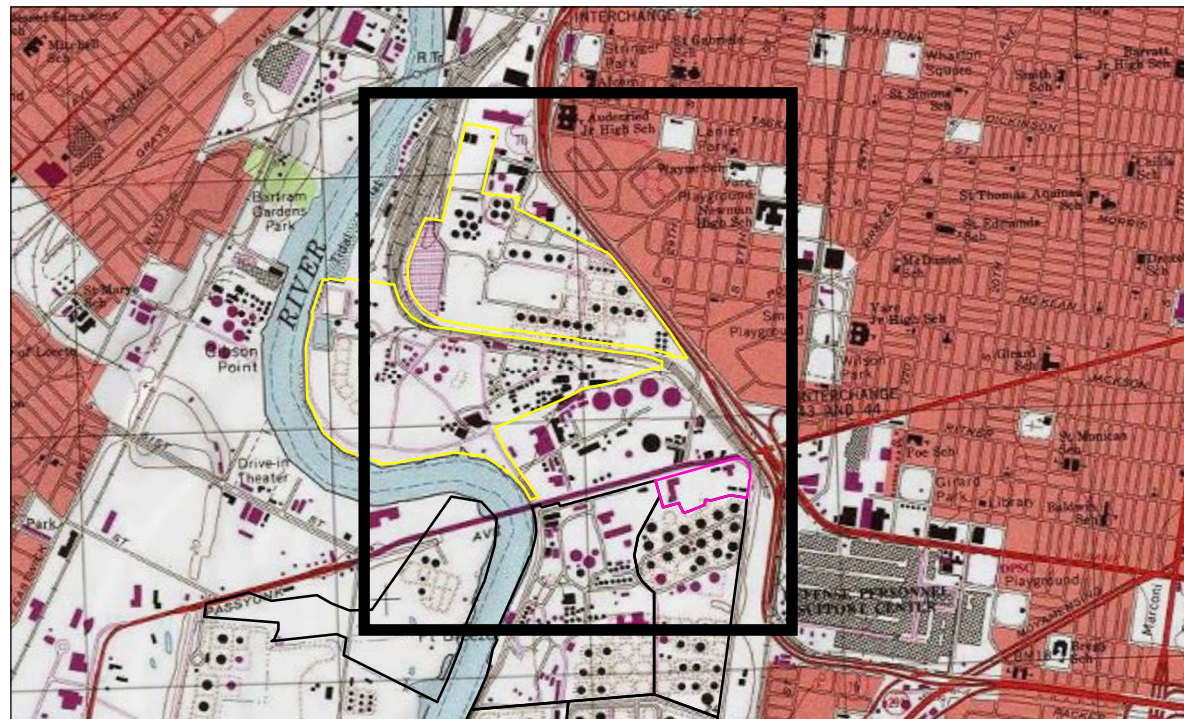
Figure No.
5-2
Title
MAY/JUNE 2008 WATER-TABLE ELEVATION

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/26/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Labels denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
4. Contour Interval = 1 foot
5. Groundwater elevation data was interpolated using block kriging with a linear variogram model in Surfer.
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- LEGEND**
- JUNE 2016 WELL GAUGING DATA – WATER-TABLE (UNCONFINED) AQUIFER
 - JUNE 2016 WATER-TABLE ELEVATION (FEET NAVD 88)
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
 - LIMITS OF WATER-TABLE WELL CONTROL
 - PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI) BOUNDARY
 - AOI 8 BOUNDARY
 - BELMONT TERMINAL
 - 3.36' GROUNDWATER ELEVATION (FEET NAVD 88)

0 250 500 Feet
1:3,000 (At original document size of 24x36)



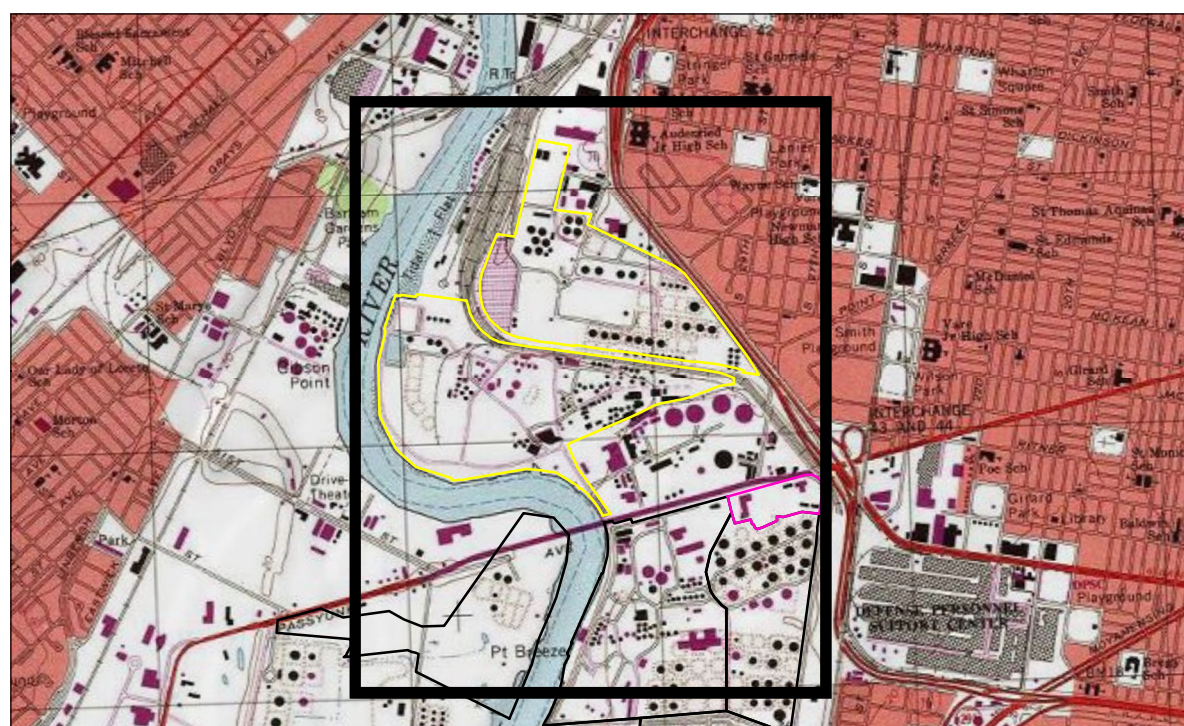
Figure No.
5-3
Title
JUNE 2016 WATER-TABLE ELEVATION

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/8/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South RPS 3702 Feet
North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Labels denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
4. Contour Interval = 0.5 feet
5. Groundwater elevation data was interpolated using block kriging with a linear variogram model in Surfer.
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- LEGEND**
- OCTOBER 2016 WELL GAUGING DATA – WATER-TABLE (UNCONFINED) AQUIFER
 - OCTOBER 2016 WATER-TABLE ELEVATION (FEET NAVD 88)
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
 - LIMITS OF WATER-TABLE WELL CONTROL
 - PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI) BOUNDARY
 - AOI 8 BOUNDARY
 - BELMONT TERMINAL
 - 3.32' GROUNDWATER ELEVATION (FEET NAVD 88)
 - NM WELL WAS NOT MEASURED

0 275 550 Feet
1:3,300 (At original document size of 24x36)



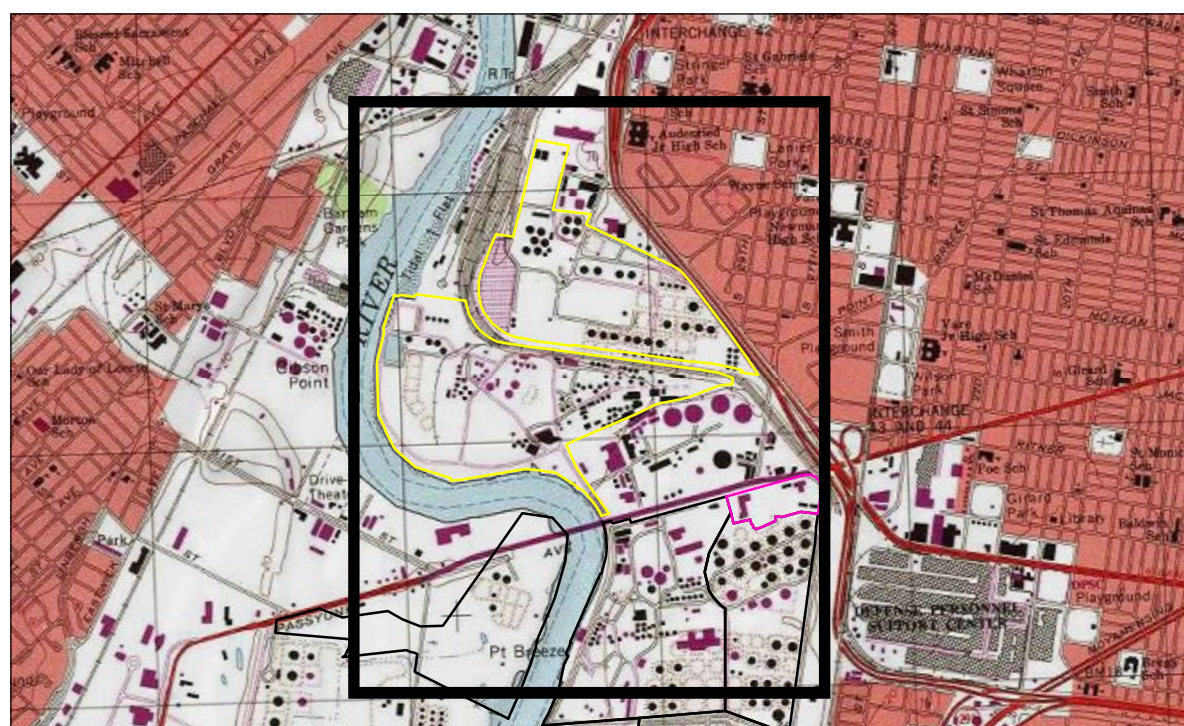
Figure No.
5-4
Title
OCTOBER 2016 WATER-TABLE ELEVATION

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/8/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Callouts denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
4. Contour Interval = 1 foot
5. Groundwater elevation data was interpolated using block kriging with a linear variogram model in Surfer.
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LEGEND

- MAY 2017 WELL GAUGING DATA – WATER-TABLE (UNCONFINED) AQUIFER
- MAY 2017 WATER-TABLE ELEVATION (FEET NAVD 88)
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
- LIMITS OF WATER-TABLE WELL CONTROL
- PHILADELPHIA GAS WORKS (PGW) PASSUNK FACILITY
- VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
- AREA OF INTEREST (AOI) BOUNDARY
- AOI 8 BOUNDARY
- BELMONT TERMINAL
- 3.35' GROUNDWATER ELEVATION (FEET NAVD 88)
- NM WELL WAS NOT MEASURED

0 250 500 Feet
1:3,300 (At original document size of 24x36)



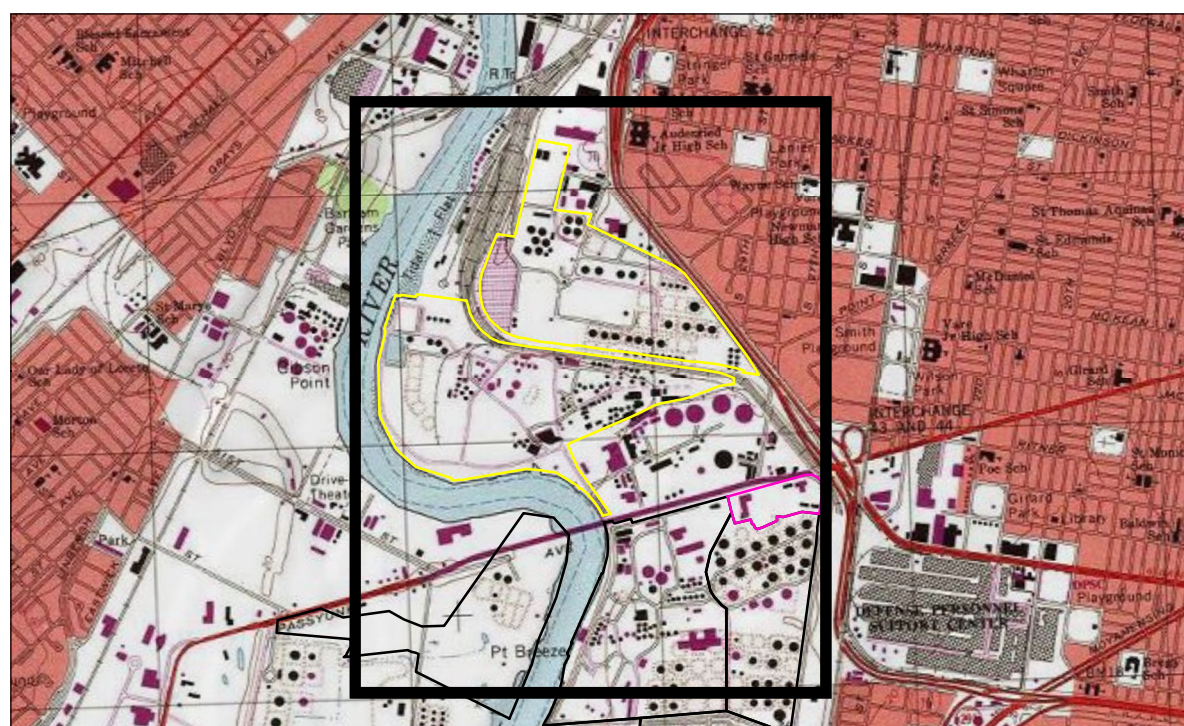
Figure No.
5-5
Title
MAY 2017 WATER-TABLE ELEVATION

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/29/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Labels denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
4. Contour Interval = 0.5 feet
5. Groundwater elevation data was interpolated using block kriging with a linear variogram model in Surfer.
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LEGEND

- MAY/JUNE 2008 WELL GAUGING DATA - LOWER (SEMI-CONFINED) AQUIFER
- MAY/JUNE 2008 LOWER AQUIFER ELEVATION (FEET NAVD 88)
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
- LIMITS OF LOWER AQUIFER WELL CONTROL
- PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
- VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
- AREA OF INTEREST (AOI) BOUNDARY
- AOI 8 BOUNDARY
- BELMONT TERMINAL
- 2.58' GROUNDWATER ELEVATION (FEET NAVD 88)
- NM WELL WAS NOT MEASURED

0 275 550 Feet
1:3,300 (At original document size of 24x36)



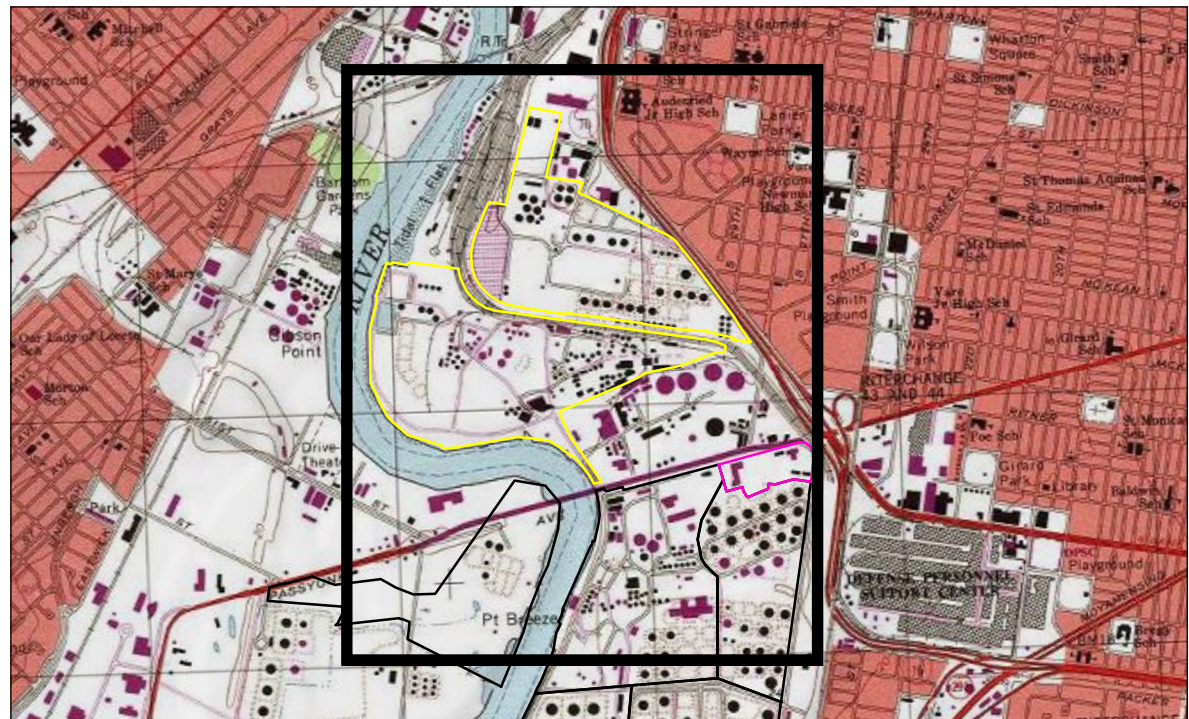
Figure No.
5-6
Title
MAY/JUNE 2008 LOWER AQUIFER ELEVATION

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/26/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Labels denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
4. Contour Interval = 0.5 feet
5. Groundwater elevation data was interpolated using block kriging with a linear variogram model in Surfer.
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- LEGEND**
- OCTOBER 2016 WELL GAUGING DATA - LOWER (SEMI-CONFINED) AQUIFER
 - OCTOBER 2016 LOWER AQUIFER ELEVATION (FEET NAVD 88)
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
 - LIMITS OF LOWER AQUIFER WELL CONTROL
 - PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI) BOUNDARY
 - AOI 8 BOUNDARY
 - BELMONT TERMINAL
 - 2.08' GROUNDWATER ELEVATION (FEET NAVD 88)

0 275 550 Feet
1:3,300 (At original document size of 24x36)



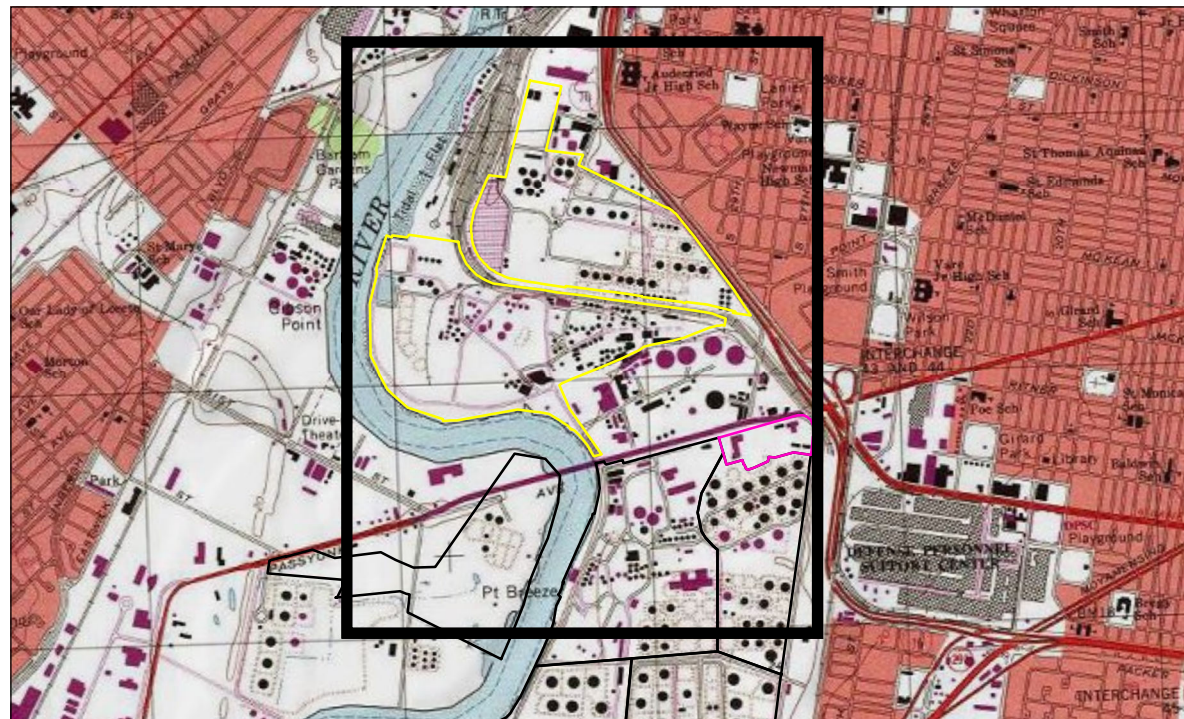
Figure No. **5-7**
Title **OCTOBER 2016 LOWER AQUIFER ELEVATION**

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/27/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Labels denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
4. Contour Interval = 0.5 feet
5. Groundwater elevation data was interpolated using block kriging with a linear variogram model in Surfer.
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LEGEND

- MAY 2017 WELL GAUGING DATA - LOWER (SEMI-CONFINED) AQUIFER
- MAY 2017 LOWER AQUIFER ELEVATION (FEET NAVD 88)
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
- LIMITS OF LOWER AQUIFER WELL CONTROL
- PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
- VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
- AREA OF INTEREST (AOI) BOUNDARY
- AOI 8 BOUNDARY
- BELMONT TERMINAL
- 3.35' GROUNDWATER ELEVATION (FEET NAVD 88)

0 250 500 Feet
1:3,300 (At original document size of 24x36)



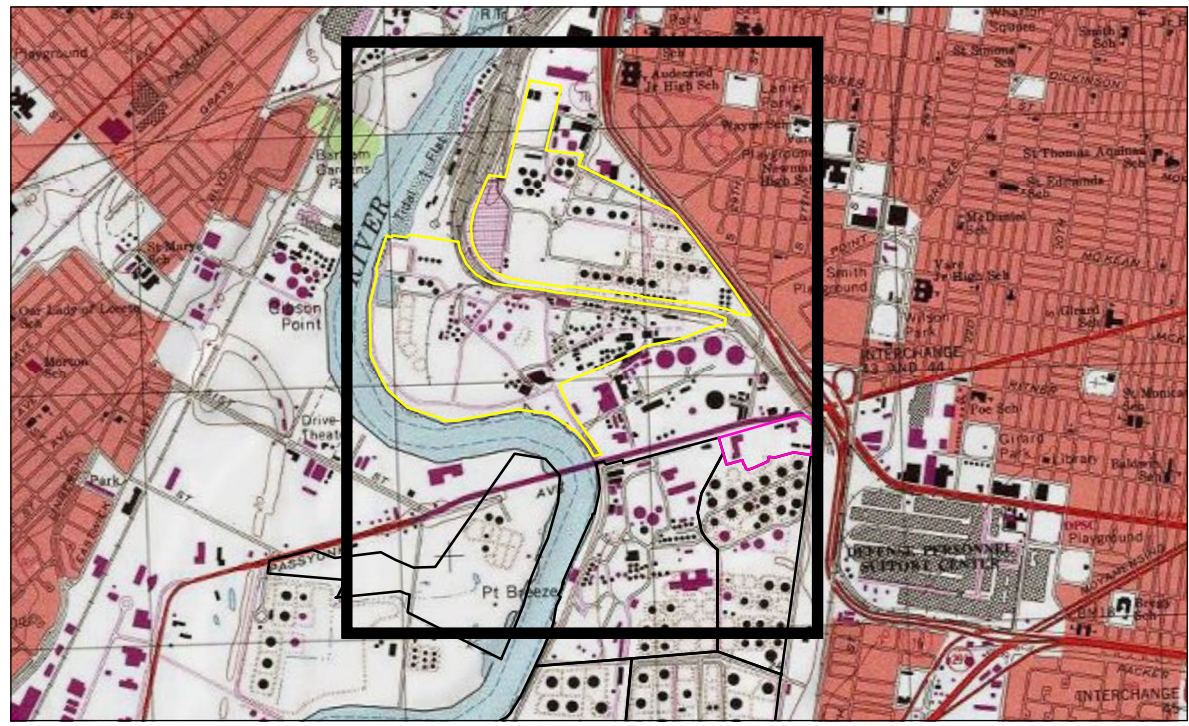
Figure No.
5-8
Title
MAY 2017 LOWER AQUIFER ELEVATION

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/27/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec and Philadelphia Gas Works (PGW)
3. Labels denote groundwater elevation in feet. Depth to groundwater was measured in each well to the nearest one-hundredth of a foot using an interface probe.
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- LEGEND**
- WATER-TABLE (UNCONFINED) AQUIFER
 - LOWER (SEMI-CONFINED) AQUIFER
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
 - PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI) BOUNDARY
 - AOI 8 BOUNDARY
 - BELMONT TERMINAL
 - GROUNDWATER ELEVATION (FEET NAVD 88) - WATER-TABLE AQUIFER
 - GROUNDWATER ELEVATION (FEET NAVD 88) - LOWER AQUIFER
 - WELL IS DAMAGED AND WILL BE REPAIRED

0 250 500 Feet
1:3,300 (At original document size of 24x36)



Figure No.
5-9
Title
**OCTOBER 2016 HEAD POTENTIALS -
WATER-TABLE AND LOWER AQUIFERS**

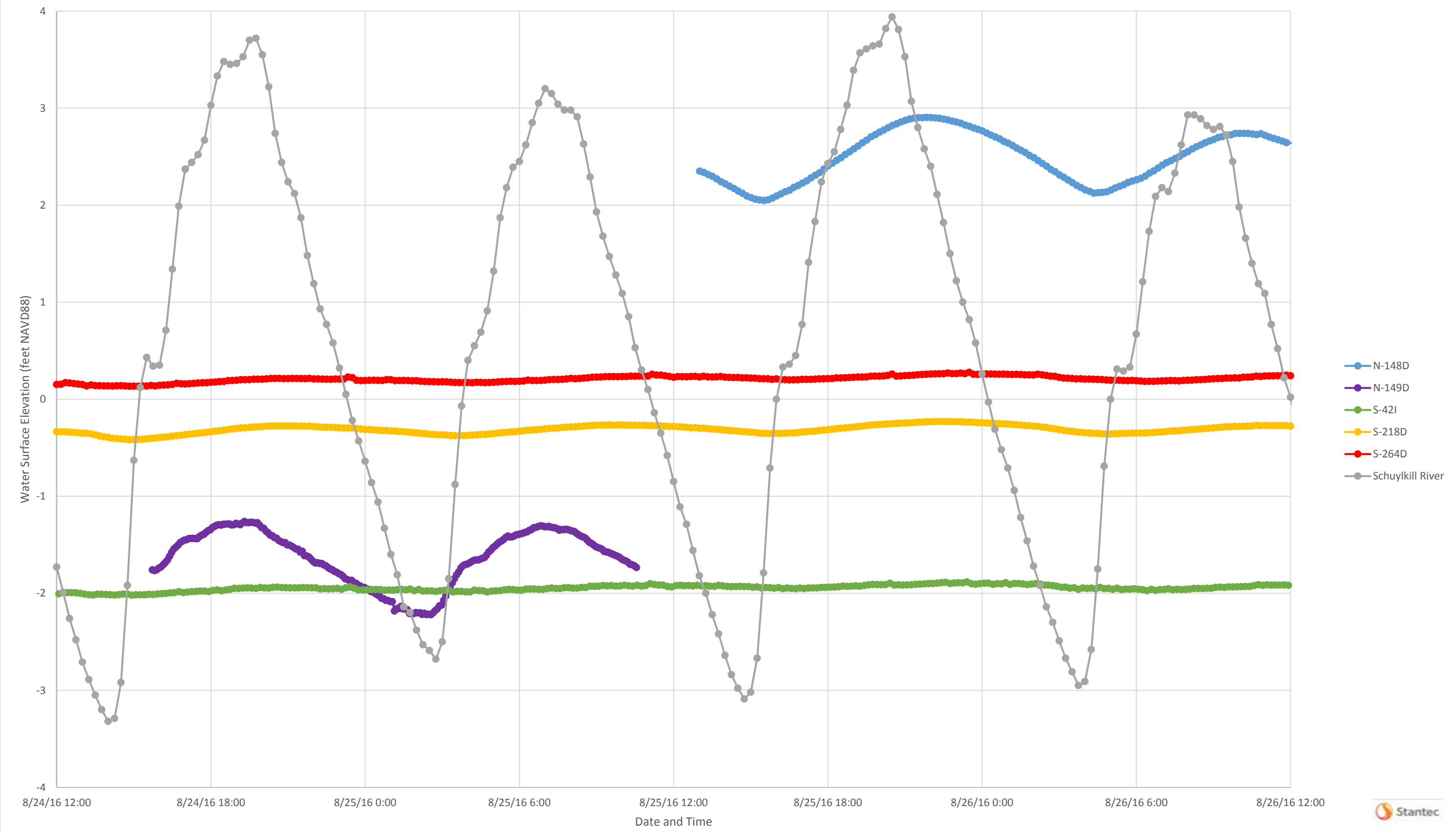
Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 9/8/2017
Technical Review by ADK on 10/2/2017
Independent Review by JKD on 10/11/2017

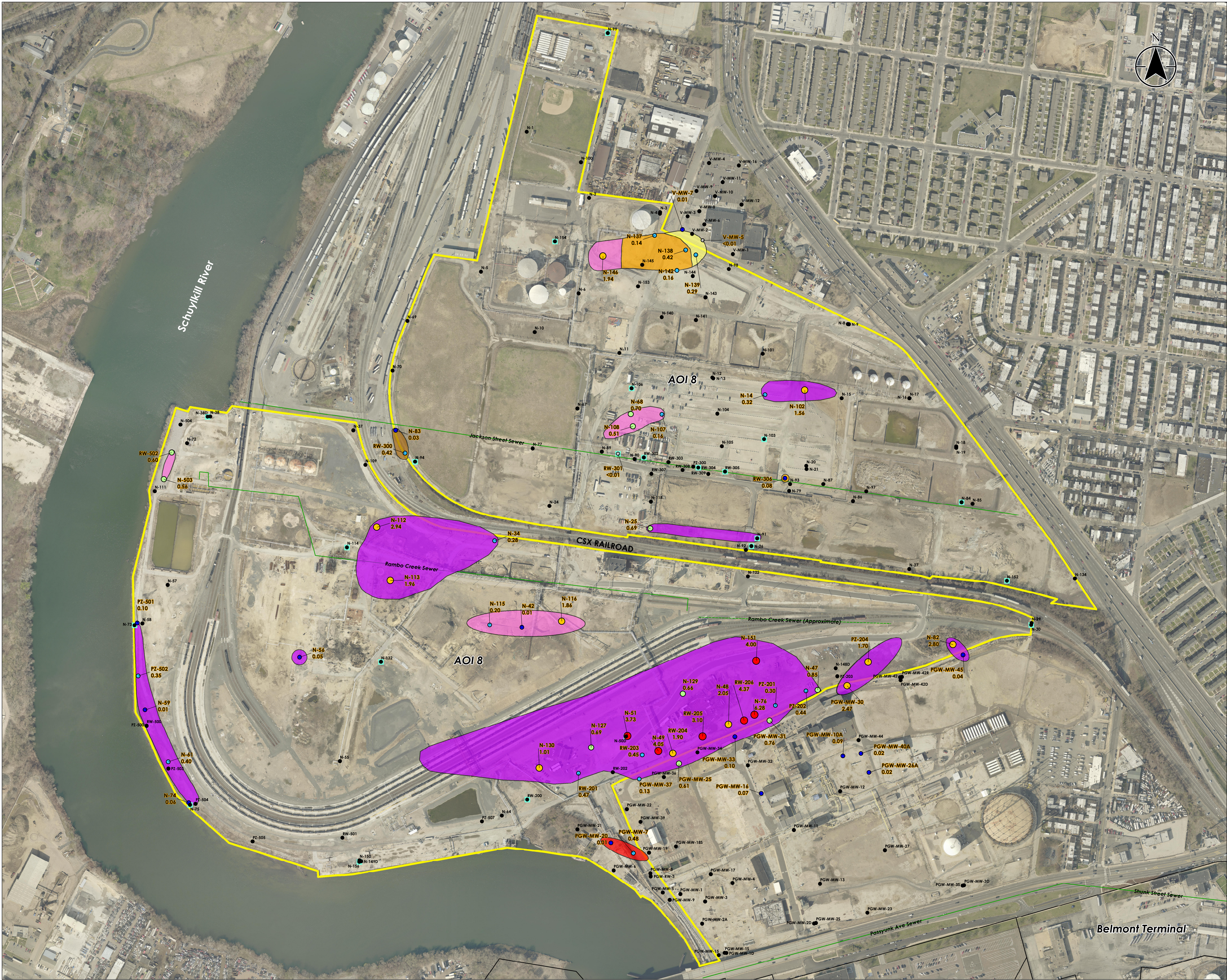


Figure 5-10. Influence of River Tides on Select PES Complex Lower Aquifer Wells



Schuylkill River tide gauge data obtained from the USGS for Station 1474501 located near 30th Street.
NAVD88 = North American Vertical Datum of 1988





Legend

2016 Gauging Location and Maximum Observed LNAPL Thickness*

- No Measurable LNAPL Thickness in 2016
- Observed Sheen in 2016
- 0.01 - 0.10
- 0.11 - 0.50
- 0.51 - 1.00
- 1.01 - 3.00
- 3.01 - 6.00+
- Submerged Screen

AOI 8

Area of Interest (AOI)

Sewer Line (dashed where approximate)

GENERALIZED LNAPL TYPE

LIGHT DISTILLATE

MIXES OF LIGHT/MIDDLE DISTILLATE

MIXES OF LIGHT/HEAVY DISTILLATE

MIDDLE DISTILLATE

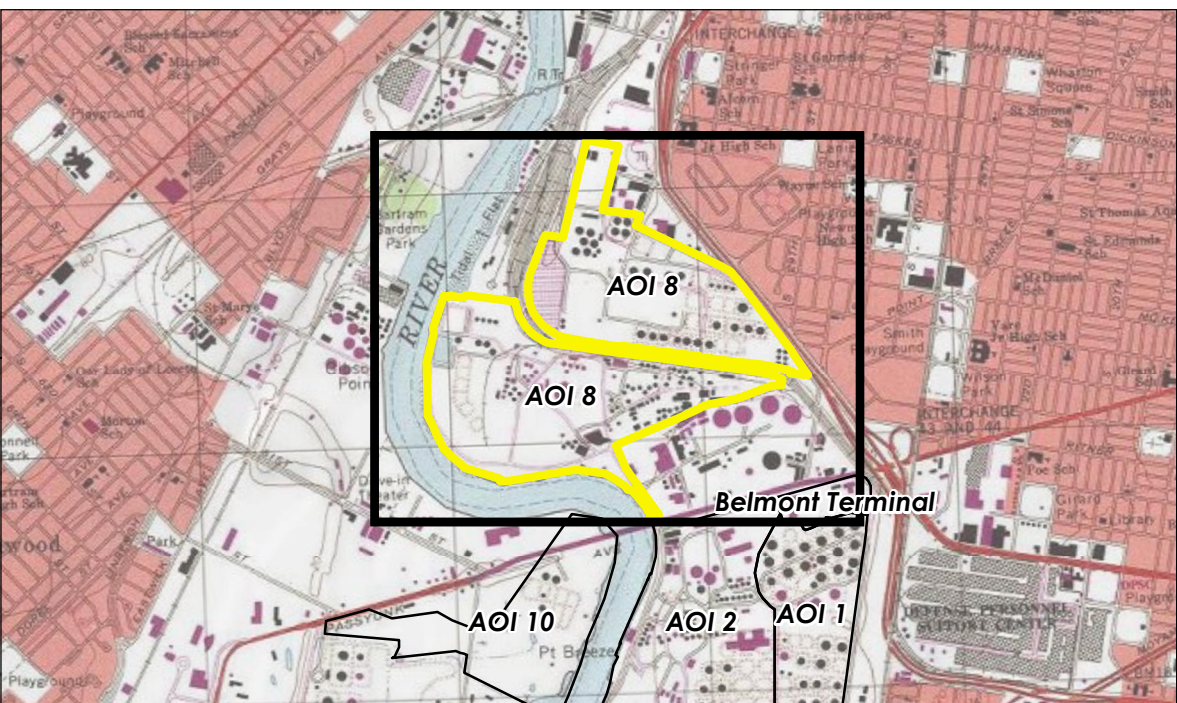
MIXES OF MIDDLE/HEAVY DISTILLATE

HEAVY DISTILLATE

0 500 1,000 Feet
1:3,000 (At original document size of 22x34)

Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Basemap: 2016 orthoimagery from <http://maps.psu.edu/ImageryNavigator/> (Main Map) and ArcGIS USA Topo Maps (Key Map).
3. *LNAPL plume outlines are generalized and based on 2015-2016 gauging data. Maximum LNAPL thickness observed in 2016 are depicted (in units of feet). The 2016 maxima were used in the LCSM for mobility evaluation.



Project Location 213402435
CITY OF PHILADELPHIA, PENNSYLVANIA
Prepared by LB on 2017-09-19
Technical Review by AP on 2017-09-22
Independent Review by JLM on 2017-11-02

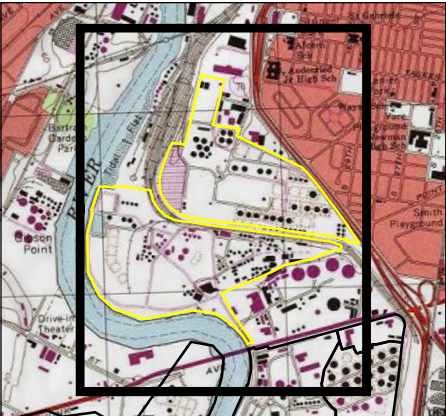
Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE
PHILADELPHIA, PA 19145

Figure No.

6-1

Title

Generalized LNAPL Type and Extent

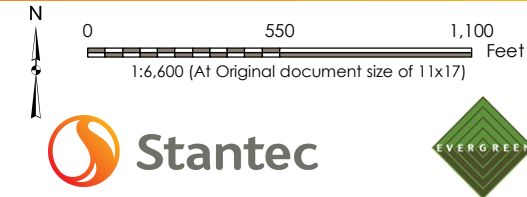


Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Sources: Provided by Langan Engineering and Environmental Services and Aquaterra Technologies, Inc.
3. Service Layer Credits: © 2017 DigitalGlobe ©CNES (2017) Distribution Airbus DS © 2017 Microsoft Corporation

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- LEGEND**
- SOIL GAS SAMPLE POINT
 - 2009 INDOOR AIR SAMPLING LOCATION
 - 2009 JACKSON STREET SEWER VAPOR INTRUSION INVESTIGATION
 - 2012 OUTDOOR AIR SAMPLING LOCATION
 - 2012 INDOOR AIR SAMPLING LOCATION
 - 2016 OUTDOOR AIR SAMPLING LOCATION
 - 2016 INDOOR AIR SAMPLING LOCATION
 - WATER CURTAIN
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
 - CURRENT LOCATION OF TRAILERS (BUILDING 6641 AND 6642)
 - AREA OF INTEREST (AOI)
 - AOI 8



Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
PHILADELPHIA REFINING COMPLEX
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Figure No.
7-1

Title
AOI 8 AIR SAMPLING LOCATIONS



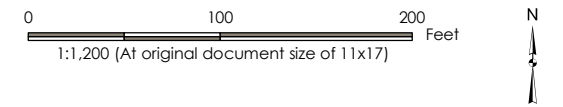
Figure No.
7-2

Title
**VERIZON PROPERTY
VAPOR INTRUSION INVESTIGATION**

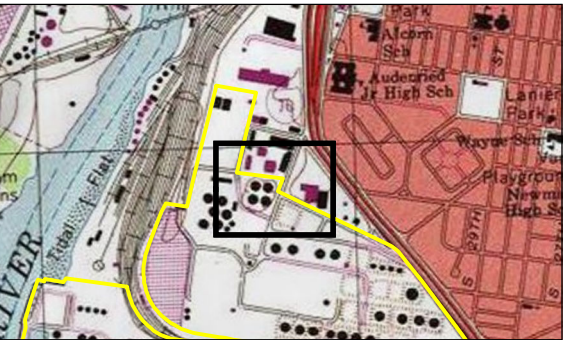
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3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402435
Prepared by GWC on 4/11/2017
Technical Review by JKD on 9/14/2017
Independent Review by JLM on 11/1/2017



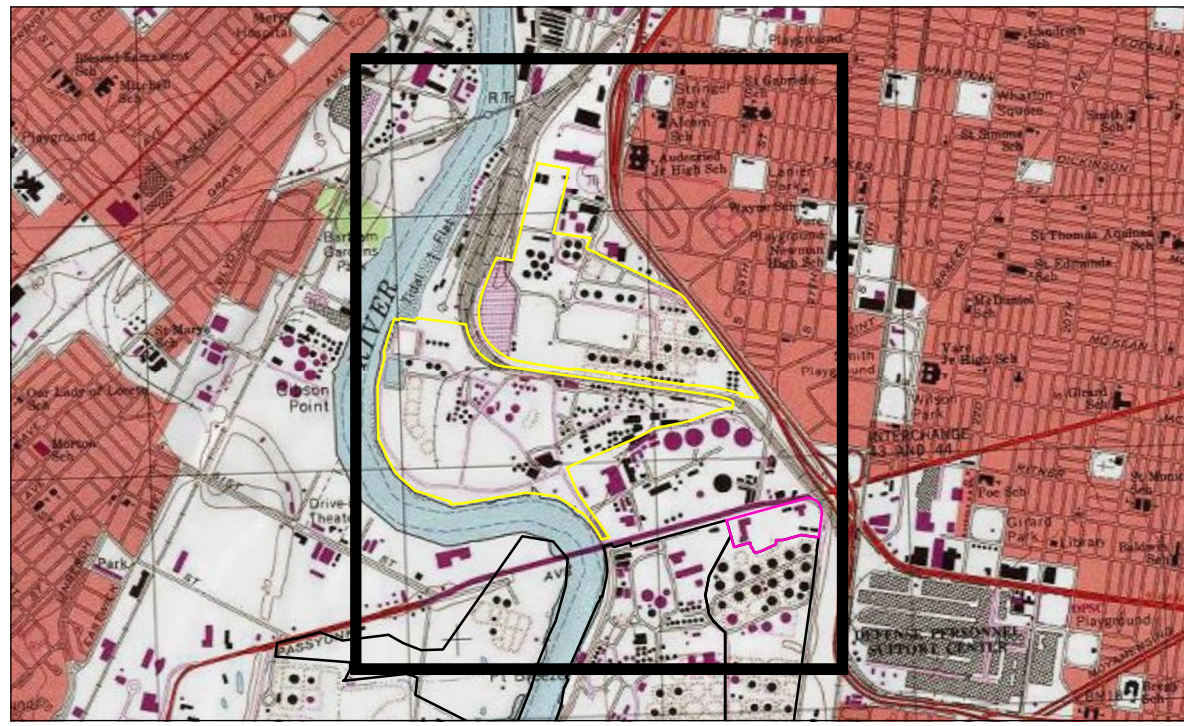
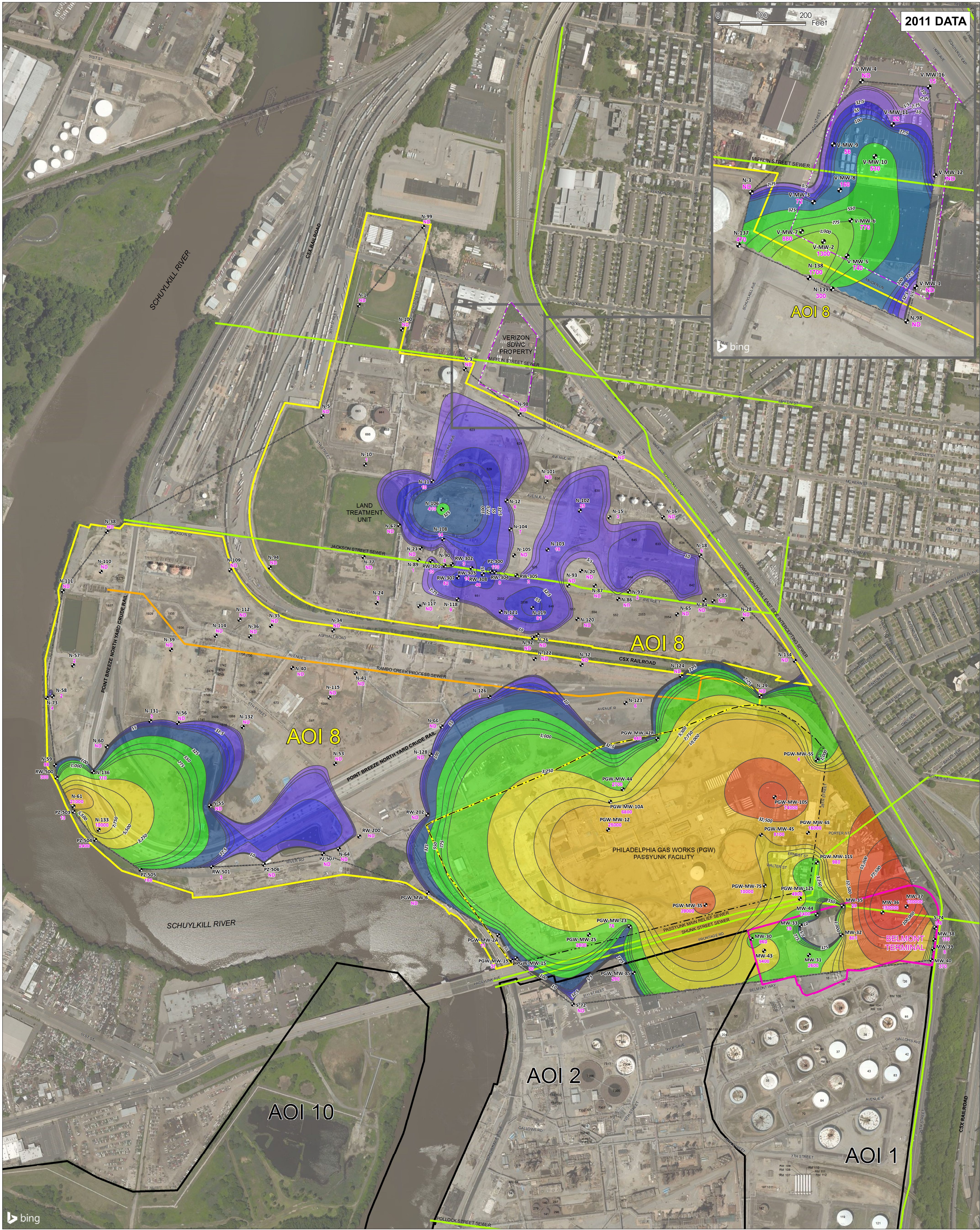
- LEGEND**
- INDOOR/AMBIENT AIR SAMPLE LOCATION
 - SOIL GAS SAMPLE POINT
 - SUB-SLAB SAMPLE POINT
 - VERIZON PROPERTY
 - PHILADELPHIA REFINING COMPLEX AREA OF INTEREST (AOI)



Notes

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Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec
3. Labels denote well identifier and benzene concentration in micrograms per liter (ug/L).
4. Contour Interval = Logarithmic (3 levels per log cycle)
5. Analytical data was interpolated using the Kriging gridding method in Surfer.
6. Aerial & Topo © 2017 DigitalGlobe ©CNES (2017) Distribution Airbus DS © 2017 Microsoft Corporation

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LEGEND

- MONITORING/RECOVERY WELL
- BENZENE MAXIMUM CONCENTRATION (ug/L)
- APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
- APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
- PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
- VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
- AREA OF INTEREST (AOI) BOUNDARY
- AOI 8 BOUNDARY
- BELMONT TERMINAL
- CROPPED GRID EXTENT
- 160 MAXIMUM CONCENTRATION OF BENZENE [ug/L]
- ND NOT DETECTED

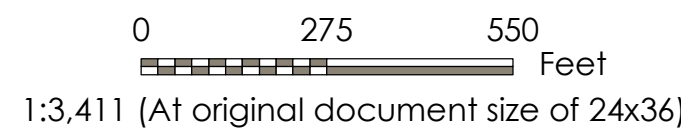
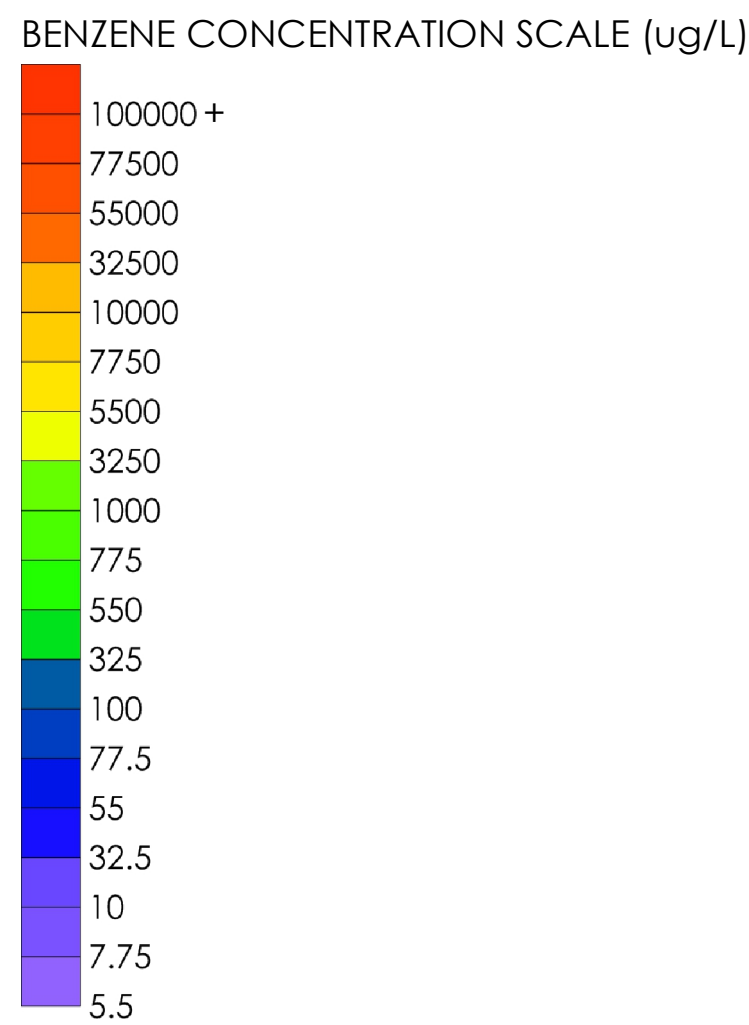


Figure No.
9-1

Title
UNCONFINED AQUIFER BENZENE MAXIMUM CONCENTRATION - 2002 TO 2008 DATA (WITH 2011 INSET MAP)

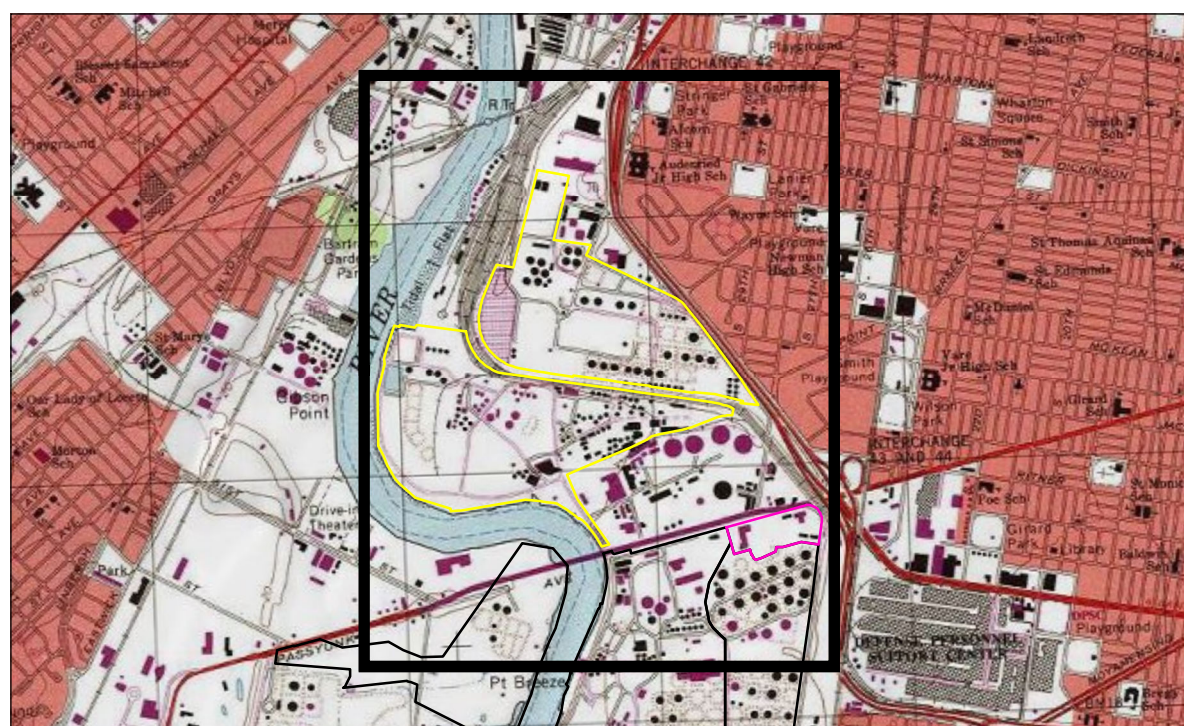
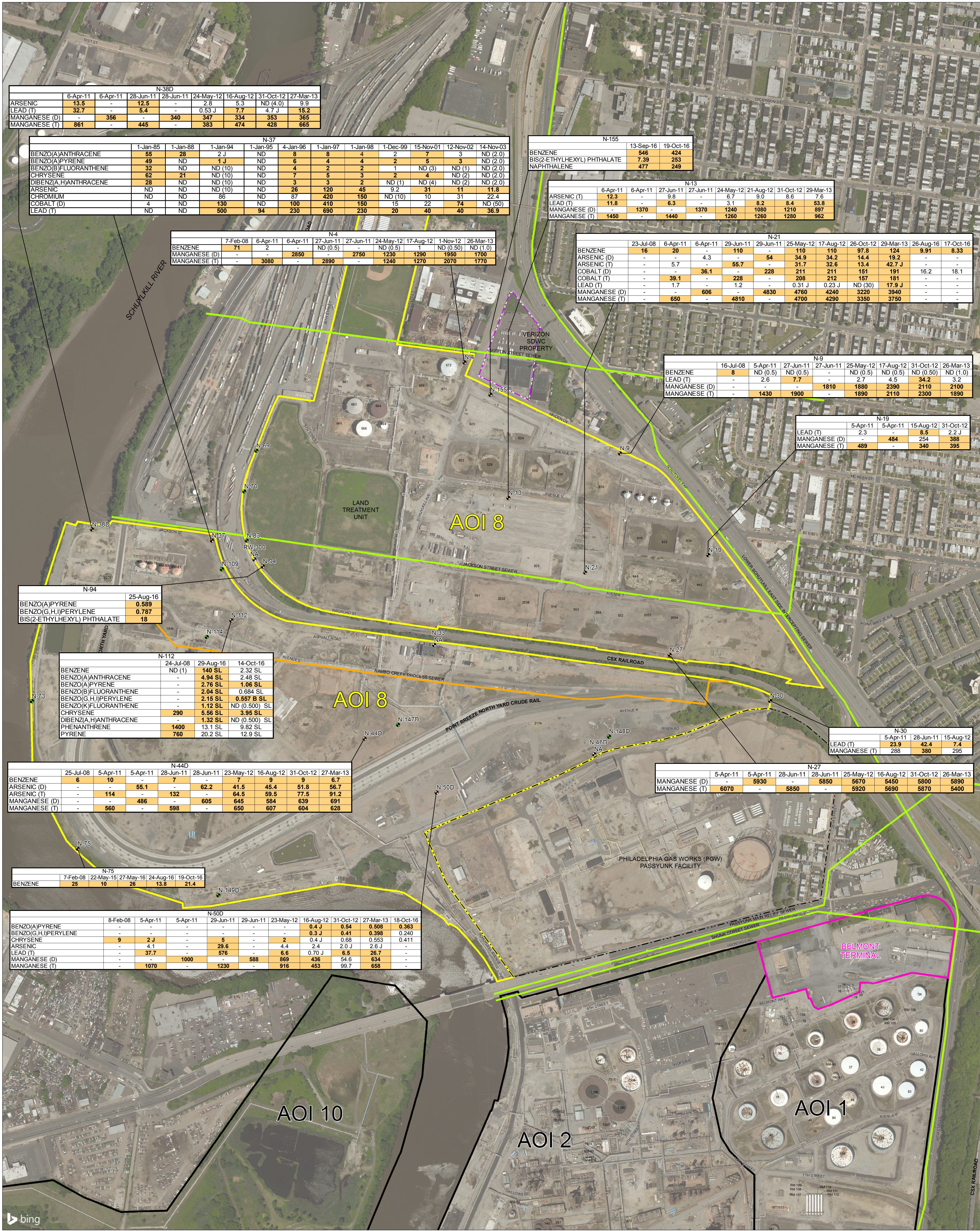
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Prepared by GWC on 11/20/2017
Technical Review by ADK on 11/20/2017
Independent Review by JLM on 11/27/2017

213402435





Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
North American Vertical Datum of 1988 (NAVD 88)
2. Sources: Stantec
3. Well callout boxes denote exceedances of the SHS where bold font and orange shading are used.
4. For this figure, the SHS is defined as the PADEP Medium-Specific Concentration (MSC) for non-residential properties overlying used aquifers with total dissolved solids (TDS) less than or equal to 2,500 milligrams per liter.
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- LEGEND**
- NO OBSERVED STATEWIDE HEALTH STANDARD (SHS) EXCEEDANCES
 - OBSERVED SHS EXCEEDANCES
 - GROUNDWATER ANALYTICAL DATA NOT AVAILABLE
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK PROCESS SEWER
 - PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI) BOUNDARY
 - AOI 8 BOUNDARY
 - BELMONT TERMINAL
 - 8-Feb-08 SAMPLE DATE
 - J INDICATES ESTIMATED VALUE
 - SL SAMPLE WAS COLLECTED BELOW LNAPL
 - ND NOT DETECTED
 - NA WELL NOT SAMPLED
 - (D) DISSOLVED
 - (T) TOTAL

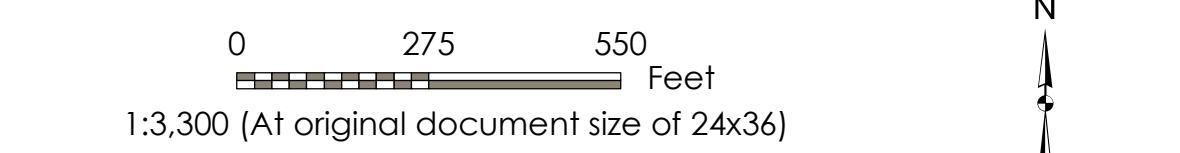


Figure No.
9-4
Title
LOWER AQUIFER GROUNDWATER EXCEEDANCES (PERIOD OF RECORD)

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Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

Prepared by GWC on 11/20/2017
Technical Review by ANP on 11/21/2017
Independent Review by JLM on 11/27/2017



Figure 9-5a. Benzene Concentration Trends: Schuylkill River Bulkhead Area
Philadelphia Refining Complex, AOI 8
Philadelphia, PA

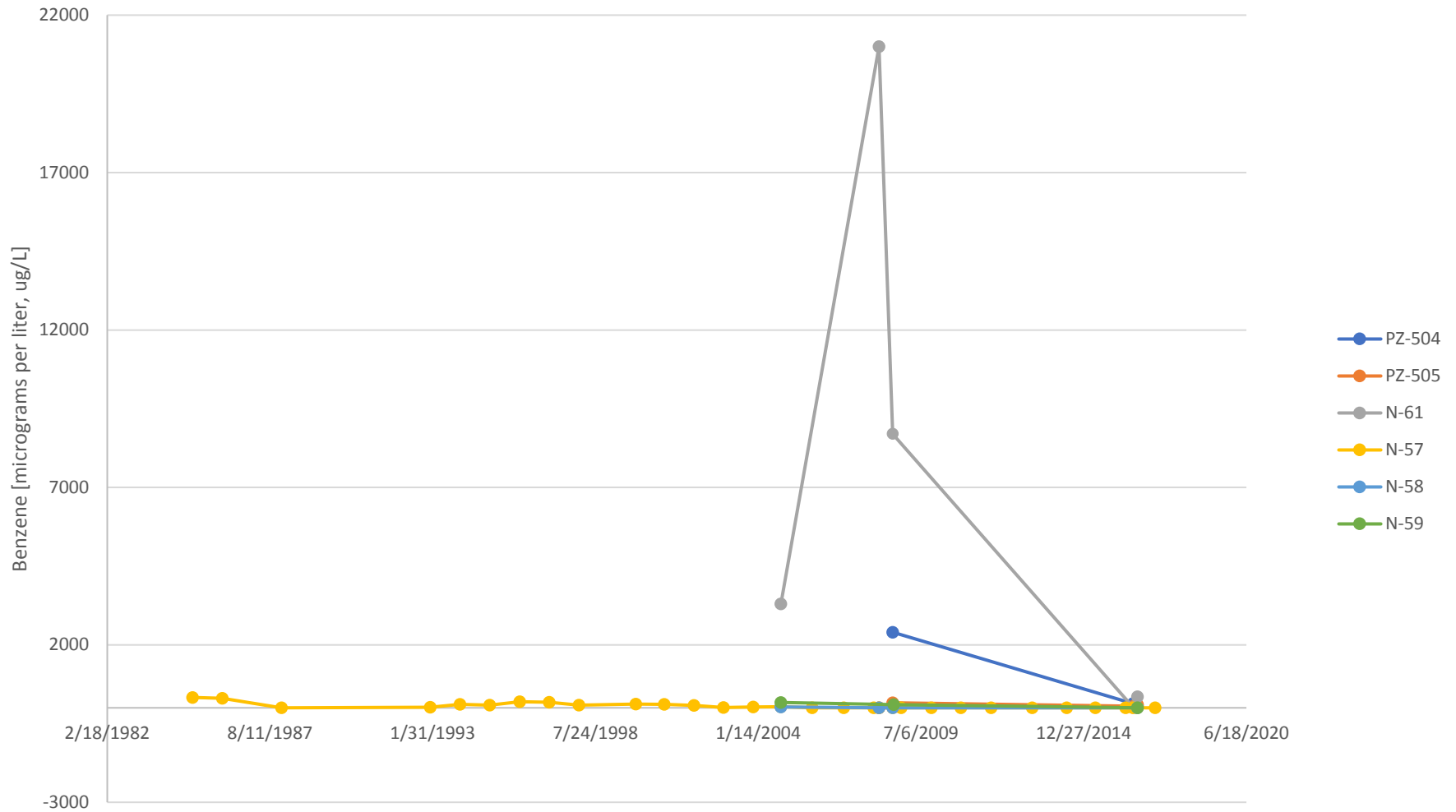


Figure 9-5b. Benzene Concentration Trends: Verizon SDWC Property Area
Philadelphia Refining Complex, AOI 8
Philadelphia, PA

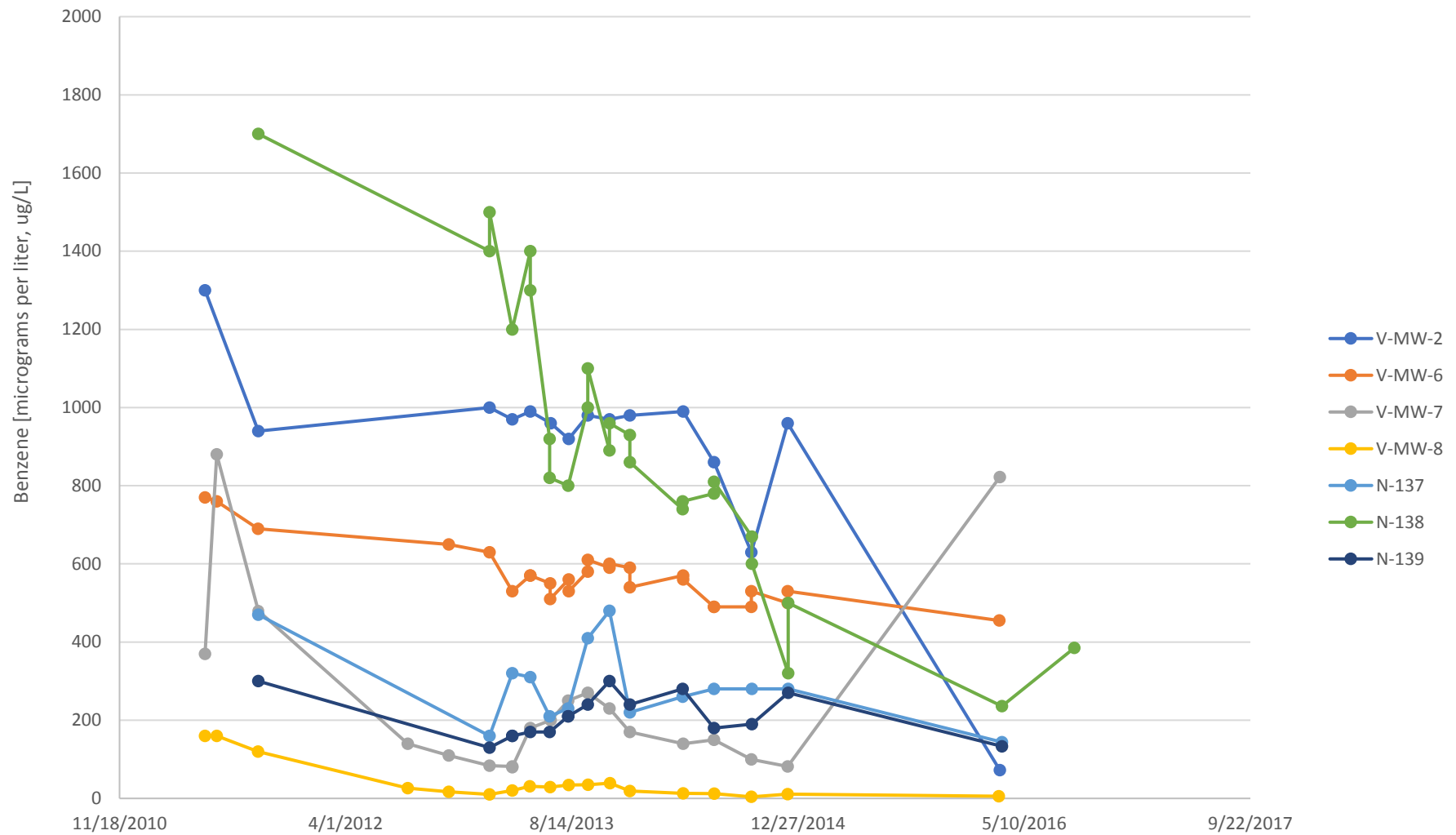


Figure 9-5c. Benzene Concentration Trends: PGW Border Remediation System Area
Philadelphia Refining Complex, AOI 8
Philadelphia, PA

