



PRELIMINARY INVESTIGATION REPORT

for

NOCKAMIXON TCE SITE

**NOCKAMIXON TOWNSHIP
BUCKS COUNTY
PENNSYLVANIA**

PADEP Requisition Number GTAC5-1-222

Benham Project 4501020115

Prepared for:

**Pennsylvania Department of Environmental Protection
Southeast Regional Office
2 East Main Street
Norristown, PA 19401**

July 2010

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1.0 INTRODUCTION AND BACKGROUND

1.1 Project Introduction

Pennsylvania Department of Environmental Protection (DEP) Bureau of Waste Management, Division of Remediation Services requested that Benham, a Science Applications International Corporation (Benham-SAIC) company, assist with a site investigation to determine the origin of chlorinated organic compounds, primarily trichloroethylene (TCE), impacts to groundwater in private potable water wells in Nockamixon Township, Pennsylvania under the General Technical Assistance Contact SAP#4000013588 and requisition number GTAC5-1-222. DEP requested assistance by Benham-SAIC in a letter dated December 10, 2009.

To initiate the scope of work, Benham-SAIC attended a scoping meeting on January 8, 2010 at DEP's offices in Norristown, PA to review available information and determine the project objectives. Scoping meeting attendees included Ragesh Patel (Environmental Group Manager), Megan Harkins (Project Officer), Thomas Sheehan (HSCA Supervisor), and Susan Kennedy (Licensed Professional Geologist) of the DEP Southeast Regional Office Environmental Cleanup Program and Noreen Wagner (Contract Officer) of the DEP Central Office Remediation Contracts Section. Marc Reeves (Program Manager) and Rich Merhar (Project Manager) represented Benham-SAIC. It was determined the initial phase of the project would focus on investigating various properties in the area, performing file reviews on environmental sites in the area, accurately locating and mapping private water supply wells in the area, and assembling historical information and private well water sample data. Benham-SAIC was also to provide bottled water to residents with wells impacted by TCE at levels above the U.S. Environmental Protection Agency National Drinking Water Regulations Maximum Contaminant Level (MCL) of 5 micrograms per liter (ug/l) or parts per billion.

Following the Scoping meeting, Benham-SAIC prepared a workplan and pricing to perform the initial phase of the work. The final workplan was submitted to DEP on March 16, 2010. The work scope tasks included relieving DEP of providing bottled water to six affected residents, obtaining and reviewing historical information for properties in the area, conducting regulatory

file reviews on known environmental sites in the area, completing a well search using the Pennsylvania Department of Conservation and Natural Resources (DCNR) Pennsylvania Groundwater Information System (PaGWIS) in an effort to obtain well construction and geologic/hydrogeologic details, accompanying DEP personnel during the April 2010 private well sampling event to accurately locate the private wells using a sub-meter GPS, assembling private well chemistry results, and preparing a project report documenting all work completed.

1.2 Project Background

Chlorinated organic impacts to groundwater are present at numerous properties along and in close proximity to Easton Road (Route 611) and Durham Road (Route 412) in Nockamixon Township (Site Area). Affected properties consist of businesses and residential properties along Easton and Durham Roads and scattered residential properties along Tower Road, Easton Road and Park Drive (Figure 1). A public water supply system does not exist in the Site Area.

Chlorinated organic impacts, primarily TCE, were initially detected in the late 1980's during routine monitoring of the water supply at Przyuski's Family Restaurant (now Friend's Pizza) on Durham Road by the Bucks County Health Department (BCHD). Subsequent sampling of private wells in the area by BCHD in 2002 identified the presence of TCE in numerous wells at concentrations as high as 27 micrograms per liter (ug/l). DEP resumed the private well sampling in October 2009 and identified TCE at levels as high as 47 ug/l and exceeding the MSC at the following 6 residential properties:

- Stanzione- 133 Tower Road
- Watson- 135 Tower Road
- Grieger- 149 Tower Road
- Loubris- 4051 Durham Road
- Baumhauer- 8329 Easton Road
- Sado- 282 Park Drive

Benham began providing bottled water to the six affected residents identified above on February 17, 2010. Benham contracted with Nature's Source, Inc. of Emmaus, PA to provide and deliver

the water to the residents. Bottled water deliveries to two additional residents, Przyuski of 4028 Durham Road and Gustavson of 8382 Easton Road, began on May 26, 2010 based on elevated detections of TCE in recent samples collected from their wells.

In addition to these six properties, TCE was also identified at a concentration exceeding the MCL in potable well water at St John the Baptist catholic school on Durham Road. An aerial photograph depicting the above property locations, parcel boundaries, and land use within the Site Area and at surrounding lands is provided as Figure 2.

A Baseline Water Quality Monitoring study was conducted in the area by Princeton Hydro, LLC in the fall of 2009 for the Lower Delaware River Wild and Scenic Management Committee in advance of regional Marcellus Shale gas exploration. This study also identified TCE impacts to groundwater in the vicinity of the Site Area.

DEP reported that known environmental sites in the area include the Revere Chemical Superfund Site, the former Bickel Landfill, Cabot Metals, the Fleck site, and the Route 563 drum site. In addition, a gas station previously existed at the intersection of Durham Road and Route 563 along with a recently closed car dealership property present at the intersection of Easton Road and Durham Road (Figure 2).

2.0 SETTING AND LAND USE

2.1 Setting and Land Use

The Site Area is located approximately 13 miles north of Doylestown along the Route 611 and Route 411 corridors in Ottsville, Nockamixon Township, Pennsylvania. Nockamixon State Park is located beyond the Site Area to the west. An aerial photograph depicting the Site Area and surrounding land is provided as Figure 2.

Land use along the Route 611 and Route 411 corridors within the Site Area is used primarily for commercial and community purposes including restaurants, a new shopping center, contractor businesses, a vacant auto dealership and active used car business, medical and veterinary offices, a church and school, a day care, and other commercial properties and offices. Lands within the Site Area farther to the west are used almost exclusively for agricultural purposes with a smaller component of scattered and sporadic residential use properties adjacent to roadways.

The ground surface elevation across the majority of the Site Area is approximately 500 feet above mean sea level (amsl) according to United States Geological Survey 1983 Digital Raster Graphic for the area. Western portions of the Site Area slope to the southwest towards Haycock Creek. The general topography in the region is characterized by lands sloping to the southeast (Figure 1).

The nearest surface water bodies are Haycock Creek located immediately southwest of the Site Area and Rapp Creek and one of its unnamed tributaries located within 1,500 feet to the northeast and east. Both creeks flow to the southeast and eventually drain to the Delaware River. All businesses, farms and residences within the Site Area obtain water from potable and/or irrigation supply wells.

The lands beyond the Site Area are or have been used for various purposes including quarrying, commercial, residential, and agricultural use, or are unused, wooded or vegetated lands.

3.0 LOCAL GEOLOGY AND HYDROGEOLOGY

3.1 Local Geology and Hydrogeology

Soil at the Site Area consists of six or more soil types, the most predominant including the Croton silt loam and Amwell silt loam. Croton silt loam is classified as poorly drained soil originating from sandstone and shale. Amwell silt loam is defined as somewhat poorly drained soil originating from igneous, metamorphic, and sedimentary rock (USDA Web Soil Survey, May 20, 2010).

The bedrock underlying surface soil at the Site Area is mapped as Triassic or Jurassic aged Brunswick Formation consisting of reddish-brown shale, siltstone, and mudstone containing a few green and brown shale interbeds (Geologic Map of Pennsylvania, 1980) (Figure 3). The Brunswick Formation is part of the larger Newark Supergroup present within the Newark and Gettysburg Basins which is composed of several thousand meters of nonmarine (fluvial and lacustrine) sedimentary rocks and intrusive diabase flows (Smoot, 1999). The Brunswick Formation overlies the Lockatong Formation that is present nearby as shallow bedrock to the east and northeast of the Site Area where uplifting has occurred and the Brunswick formation has been eroded away. The Lockatong Formation is characterized by dark gray to black, thick bedded argillite (mudstone, lithified mud) containing a few zones of thin bedded black shale. Depending on location, the Lockatong Formation may have thin layers of limestone and calcareous shale (Geologic Map of Pennsylvania, 1980 and Smoot, 1999). Diabase dikes and flows are prevalent within the Basin and occur relatively nearby to the northeast and west of the Site Area. Regional bedding strike is E-W, while bedding dip is to the north, northwest at low angles.

The local geology is expected to be dominated by the base of the Brunswick Formation characterized by red or dark gray argillite transitioning into the Lockatong Formation, the contact being arbitrarily placed where red mudstones predominate over gray (Smoot, 1999). This is supported by aerial views of the Hanson Quarry on Tower Road that reveal gray to dark gray bedrock from near grade to a depth of what appears to be 100 or more feet below grade.

Information presented in the Remedial Action Completion Report for Donohue's Gulf, formerly located at the intersection of Durham Road (Route 412) and Mountainview Road (Route 563), indicates shallow, weathered bedrock consisting of blue-gray siltstone and limestone to be present below four feet below grade (Section 5.5).

Greenman, in Ground Water Resources of Bucks County, Pennsylvania, reports "the lower beds of the Brunswick occur in sinuous bands which alternate with bands of the Lockatong. The Brunswick Formation is a sequence of monotonously similar, irregularly bedded soft red argillaceous shales locally interbedded with fine-grained red sandstone. The lower beds of the Brunswick in the zones of transition with the Lockatong include a considerable thickness of thick-bedded hard red argillite and occasional beds of tough gray shale. The argillite grades upward into typical soft red shale, and near the top of the formation there are rare recurrences of the more resistant Lockatong-type rocks. In general, the Brunswick conformably overlies the Lockatong, but the lower beds of the Brunswick extensively interfinger with an appreciable thickness of beds of the Lockatong."

The geologic structure of the Brunswick and Lockatong formations in nearby Montgomery and Berks Counties is characterized by beds dipping gently to the north and northwest at an average angle of 20 degrees (Longwell, 1965). Joint systems are reportedly well developed in many beds of the Brunswick formation. Reported joint sets are present striking N 30 E, N 45 W, and N 75 E, independent of the strike and dip of the beds. All joint sets are nearly vertical and the average distance between joints in most sets is 6 inches (Longwell, 1965). The movement of groundwater in fractured bedrock of the Gettysburg-Newark Lowland generally moves through and is stored in networks of narrow secondary openings, such as bedding planes and joints. Ground water flow is reportedly complex, anisotropic, and heterogeneous. Horizontal permeability is much greater than vertical permeability and is greatest parallel to strike and lowest perpendicular to strike of the bedding planes (Low, 2002).

Greenman reports "The Brunswick contains water under both water table and semi-artesian conditions in the weathered zone of the formation, which may extend to a depth of 600 feet or more. A water table aquifer of low permeability, comprising the highly weathered zone of the

formation, occurs to depth of about 250 feet; and one or more rather permeable artesian aquifers, consisting of beds of partly altered rock rarely more than 20 feet thick, occur to depths of about 600 feet. In both types of aquifers the saturated voids are believed to be vertical joint fractures enlarged by solution. The water table aquifer contains many more fractures than the semi-artesian aquifers but the near-surface rocks have been so thoroughly decomposed that many cracks are filled with clay residual from the weathering of shale. Most wells in the Brunswick tap both the water table and artesian aquifers, and their yields are derived in part from both sources.” Additional information provided by Greenman for 52 Brunswick formation wells indicates that yields range between 2 and 260 gallons per minute (gpm), the average being 40 gpm.

Greenman reports that the capacity of the Lockatong formation to transmit water is low, occurring by fracture and solution porosity where it has been faulted and jointed and exposed to the forces of weathering. Additional information provided by Greenman for 43 wells tapping the Lockatong indicates that yields range from 2 to 25 gpm and average 10 gpm.

Median values of hydraulic conductivity and transmissivity for the Brunswick formation from analysis of single-well aquifer tests are 1.3 ft/day and 350 ft²/day, respectively, while median values of hydraulic conductivity and transmissivity for the Lockatong formation from analysis of single well-aquifer tests are 0.78 ft/day and 81 ft²/day, respectively (Low, 2002).

The published geologic and hydrologic information presented above suggests private water wells within and nearby the Site Area are most likely drawing groundwater from multiple aquifers within the Brunswick and Lockatong Formations, under both water table and semi-artesian conditions. Groundwater storage and movement is primarily by secondary openings including bedding planes and joints and tends to be anisotropic and heterogeneous. Horizontal permeability is much greater than vertical permeability and is greatest parallel to strike or in the orientation of most major joint systems (NE-SW).

4.0 GROUNDWATER USE AND CHEMISTRY

The following sections provide available information on potable water wells within the Site Area and surrounding areas including well details obtained from the PaGWIS search and GPS location and well sample data obtained during field activities. The results of the Baseline Water Quality Monitoring study conducted by Princeton Hydro in the fall of 2009 for the Lower Delaware River Wild and Scenic Management Committee are also presented in this Section.

4.1 PaGWIS Water Well Information

A search of the DCNR Pennsylvania Geological Survey PaGWIS was conducted to identify the number and nature of registered water wells within three miles of the center of the Site Area. Well record data in PaGWIS come from various sources (US Geological Survey, PA Dept. of Environmental Protection, Susquehanna River Basin Commission, PA Dept. of Agriculture), but the vast majority is from well records submitted to the Pennsylvania Geological Survey by water well drillers. The results of the search are provided on Figure 4 and in Table 1. A larger scale map that provides more clarity and detail is provided in Appendix A. The large majority of the wells are domestic/agricultural in nature and used for obtaining potable water for consumption and household purposes.

4.2 PADEP Well Sampling Locations

Potable well sample locations were located in the field using a Trimble GPS Pathfinder Pro XRS unit at the time of the April 2010 potable well sampling event conducted by DEP. Benham personnel accompanied the DEP sampling team at the time of the sampling efforts on April 27 and 28, 2010 to collect GPS data at each well location to enable the generation of groundwater chemistry maps of the Site Area. GPS data was collected at 22 locations and is included on Figure 4.

4.3 PADEP Well Sampling Results

Potable well sampling was conducted at multiple residences and businesses at the Site Area by the Bucks County Health Department in 2002 after the discovery of chlorinated organic compounds in the water supply at Przyuski's Family Restaurant (now Friend's Pizza) on Durham Road.

PADEP resumed the sampling in October 2009 and began providing bottled water to residents whose well water contained dissolved TCE above the MCL. PADEP conducted a second round of sampling in April 2010. Sample results for selected chlorinated organic compounds for the three monitoring rounds are provided in Table 2. Well sample analytical data sheets provided by PADEP are included in Appendix B. Groundwater chemistry maps for the October 2009 and April 2010 monitoring rounds are provided as Figures 5 and 6.

The well sampling efforts between 2002 and 2010 have identified the presence of TCE in 21 different private water wells at concentrations as high as 41 ug/l. Other chlorinated organic compounds including tetrachloroethene (PCE), 1,1,1-trichloroethane, (1,1,1-TCA), 1,1,2-trichloroethane (1,1,2-TCA) 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), and 1,2-dichloroethane (1,2-DCA) have also been detected in well water samples, but all at concentrations below the applicable MCLs.

TCE has been detected above the U.S. EPA Drinking Water Maximum Contaminant Level (MCL) of 5 ug/l in the samples collected at ten different residences between 2002 and 2010. During the April 2010 sampling round, TCE was detected above the MCL in the samples collected at seven different residences at concentration ranging between 5.1 and 41.4 ug/l. The highest TCE concentrations occur along a NE-SW trending swath that crosses over Durham Road (Route 412) just north of its intersection with Easton Road (Route 611).

Review of the 2009 and 2010 concentration maps (Figures 5 and 6) and file review information for Donohue Gulf and the Nockamixon Township-Route 563 (Drum) site may indicate two potentially separate chlorinated organic plumes. One plume could potentially be centered around

the Nockamixon Township-Route 563 (Drum) site based on recent detections at 282 Park road and the detection of TCE at concentrations as high as 180 ug/l in 2007 at home wells along Mountainview Drive and Brennan Road (see Section 5.5; Donohue Gulf)

A separate plume farther to the south could be originating from somewhere near the intersection with Route 611 and Route 412 based on detections above 40 ug/l at home wells along Route 412 and to the northwest of Tower Road.

4.4 Princeton Hydro 2009 Baseline Water Quality Monitoring Study

A Baseline Water Quality Monitoring study was conducted in the area by Princeton Hydro, LLC in the fall of 2009 for the Lower Delaware River Wild and Scenic Management Committee in advance of regional Marcellus Shale natural gas exploration. The study encompassed the 300-square mile Lower Delaware River Wild and Scenic designated attributes spanning across Bucks, Lehigh, and Northampton Counties and included the collection of 22 surface water samples from streams and ten groundwater samples from private, potable water wells. The study identified two permitted gas well drilling sites, the Cabot and Fleck sites, both located within the Rapp Creek watershed in Bucks County and in proximity to the Site Area (Figure 2). The Cabot site is the location of the former Cabot Super Metals facility on Beaver Run Road, also previously known as Cabot Performance Materials and Penn Rare Metals that produced columbium base master alloys, cesium, rubidium, germanium, tellurium and niobium compounds. The Fleck site referred to in the Princeton Hydro Study is a gas production well pad site located at 4415 Durham Road on agricultural use property owned by Frank Fleck. The property is located directly adjacent and to the east of Durham Road (Route 412) near the intersection with Church Road.

All ten groundwater samples were collected on August 13, 2009 from potable water wells in the vicinity of the Cabot and Fleck sites. The exact locations of the wells sampled are not available as location data was filtered with approximately 400 feet Latitude and Longitude uncertainty to protect the privacy of the study participants. Well location and chemical data as depicted in the Princeton Hydro report is presented on Figure 5 along with the PADEP 2009 sampling results.

Well samples were analyzed for various wet chemistry parameters, ions, metals, detergents, and volatile organic compounds (by EPA Method 8260). TCE was only detected in two well water samples, GW-10 Park Drive West and GW-2 Beaver Run Road, at concentrations of 7.99 ug/l and 1.54 ug/l, respectively. The well water at Park Drive West also contained cis-1,2-dichloroethene and chloroform at concentrations below 1.0 ug/l. A copy of the Baseline Water Quality Monitoring study is provided in Appendix C.

5.0 HISTORICAL INFORMATION

A land use evaluation consisting of obtaining and reviewing historical aerial photographs, topographic maps, and an environmental database radius report was conducted for the Site Area and surrounding land. The historical materials were obtained from Environmental Data Resources, Inc. (EDR) of Milford, Connecticut. EDR reported that no historical Sanborn fire insurance maps are available for the area. Additional aerial photographs were obtained from the Pennsylvania Geological Survey Penn Pilot Photo Center.

5.1 Historical Aerial Photographs

Historical aerial photographs were obtained for the Site Area and surrounding lands to evaluate historical land use in the area. The aerial photographs were available for years 1938, 1950, 1955, 1964, 1971, 1978, 1981, 1988, 1992, and 2005 at scales ranging between 1 inch equals 500 feet and 1 inch equal 1,000 feet. Additional aerial photographs were obtained for years 1938, 1958, and 1972 at a scale of 1 inch equals 1,000 feet from Penn Pilot Photo Center (source: USDA/Farm Service Industry). Copies of the aerial photographs and topographic maps are provided in Appendix D.

The early EDR aerial photographs (1938, 1950, 1955, and 1964) depict the Site Area primarily as cultivated, agricultural land with farm buildings or unused, wooded land. Some residential properties are also visible along the major roadways. A building similar in size to the one that currently exists at the intersection of Durham Road and Mountainview Road (formerly Donohue Gulf, now Owowcow Creamery) is present on the 1950 photo. What is now St John the Baptist school appears sometime between 1958 and 1964. The car dealership building at the intersection of Easton and Durham Roads is present for the first time on the 1971 photo. Activities at the Revere Chemical Waste Site and the Bickel Landfill are clearly visible on the 1972 photo. The Mountainview Plaza shopping strip mall is visible on Mountainview Road just west of the intersection with Durham Road in 1988. The plaza was destroyed by fire in March, 2008 and remains vacant, except for a small shed used to sell and rent canoes. Other notable changes

visible on the aerial photos include the construction of the St John the Baptist Church next to the school on Durham Road sometime between 1992 and 2005 and the development of the Harrow Station Shopping Center along Easton Road in 2005 (previously cultivated agricultural fields).

The commercial land across Easton Road from the Harrow Station Shopping Center, now occupied by commercial businesses and Harrow Homes, was originally agricultural land occupied by farm type structures and fields. The transformation of these properties to commercial use appears to have occurred in the 1980s.

5.2 Historical Topographic Maps

Topographic maps were obtained for the Riegelsville and Bedminster Quadrangles for all available map years including 1942, 1946, 1956, 1957, 1968, 1973, 1983, 1990, 1992, and 1997.

Historic topographic maps dated 1942 and 1946 for Riegelsville and Bedminster, respectively, indicate the Site Area is primarily used for agricultural and, to a lesser extent residential purposes at all areas within and adjacent to the Site Area. There are no indications of significant commercial or industrial operations in the area. Structures are present at three corners (N, E, S) of the intersection of Easton Road, Tower Road, and Quarry Road. Structures are also present at the intersection of Easton and Durham Roads and Durham Road and Mountainview Road.

The next set of maps (1956/1957) does not illustrate any significant changes other than the addition of numerous small structures assumed to be houses or agricultural related structures along Easton and Durham Roads. Three structures are now present at the east corner of the intersection of Easton and Quarry road, of which one new structure is elongated similar to a barn.

The 1968 maps again only show the addition of small structures assumed to be house and agricultural related structures along the main roads. St John the Baptist school is now present on Durham Road and the Revere Chemical site is present for the first time and consists of a series of round features of various sizes interpreted to be the lagoons (as many as 9) and a building.

The 1973 maps show no significant change from the 1968 maps. A lone 1983 map of the Bedminster quadrangle does not present any noticeable changes.

The 1990/1992 and 1997 sets of maps do not present any new information.

5.3 Environmental Database Report

A radius report of state and federal database sites was obtained for the Site Area and surrounding lands. Over 80 different federal, state, and local databases were searched for sites that could be potential sources of chlorinated organic compounds to the groundwater aquifer in the area. A half mile was added to the database search request resulting in databases being searched for sites a distance of 1.5 miles from the center of the Site Area. The individual databases and associated search distances are listed in the EDR report. Additional physical setting information including topography, shallow soil data, and nearby water and gas wells is also included with the report. A copy of the report is provided in Appendix E.

Twelve different sites (properties) are identified within the specified search distances. Individual sites or database listing at a particular location are identified by number. Multiple sites or database listings at a single location are identified by a letter followed by a number specific to the database listing. Sites identified as “FINDS” (Facility Index System/Facility Registry System) are not included in the discussions. The FINDS database contains multiple EPA databases used for indexing sites.

1 - Nockamixon TWP RTE 563 Site

The Nockamixon Twp Rte 563 Site is identified in the CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System) database located at the center of the Site Area. The report describes the site as a former drum storage area less than one acre in size. The report also indicates two other storage areas were observed near the former storage area and that PA DER conducted drum removal in 1980. PADEP representatives have indicated the drum storage area was present near a garage structure at the property at the northwest corner of Mountainview Road (Route 563) and Durham Road (Route 412).

NPL – Revere Chemical Co.

The Revere Chemical Co. is identified in NPL (National Priority List), CERCLIS, US ENG Controls (Engineering Controls Sites List), US INST Control (Sites with Institutional Controls), CONSENT (Superfund Consent Decrees), and ROD (Records of Decisions) databases. This site is located approximately 0.5 to 1.0 mile to the east of the Site Area. The report indicates this site is currently on the Final NPL and was once operated as a metals reclamation facility where waste streams including chromic acid, copper sulfate, sulfuric acid, and ammonia were stored in numerous unlined earthen lagoons. There were also spray fields used to dispose of liquids generated during the reclamation processes. The facility was forced to close in 1969. Subsequent investigation work identified the presence of metals and chlorinated organic compounds in shallow groundwater. Reportedly, deep groundwater was not impacted by operations at this facility. Additional information regarding the Revere Chemical Waste Site is presented below in Section 5.5.

2 - Owowcow Creamery

This site is identified in the FINDS database and is not further discussed.

A3/A4 – St John the Baptist School

This site is identified in the ICIS (Integrated Compliance Tracking System) database used to track EPA Enforcement and Compliance information. The listing in the ICIS database is related to TSCA asbestos activity.

5 – Country Drive In

This site is only identified in the FINDS database and is not discussed further.

6 – Suburban Ford Inc.

The former Suburban Ford property at the intersection of Easton Road (Route 611) and Durham Road (Route 412) is within the Site Area and is identified in the RCRA-CESQG (Resource Conservation and Recovery Act-Conditionally Exempt Small Quantity Generator), FINDS, and Manifest databases. The site was registered as a CESQG of wastes including D001, D002, and

F002 (includes both PCE and TCE). No violations are reported. The Manifest listing is related to a 1996 manifest associated with waste D039 – PCE.

B7 – Depaul Ford

The former Depaul Ford facility was located at the same property as Suburban Ford and is also identified in the RCRA-NonGen (Resource Conservation and Recovery Act-Non Generators), FINDS, and Manifest databases. The facility was a RCRA Large Quantity Generator from 1988 to 1996 and generated waste streams D001 (ignitable hazardous wastes), F002 (spent halogenated solvents including PCE and TCE), and F003 (spent non-halogenated solvents). No violations are reported. Manifest information provided in the report is associated with disposal of F003 wastes in 1988, 1989, and 1990.

B8 – Donohues Gulf

The former Donohue's Gulf gas station site is located within the Site Area at the intersection of Mountainview Road (Route 563) and Durham Road (Route 412). This site is identified in the LUST (Leaking Underground Storage Tank Site) database. The report indicates a release date of 1997 and current status of "Cleanup Completed." This site is the current location of a single story building occupied by the Owowcow Creamery Ice Cream business and a vacant suite. The LUST case is related to the release of gasoline from the UST system formerly located at the site and removed in 1997. Monitoring and remedial activities were conducted for MTBE from 1998 through 2007. Additional information regarding this site is provided below in Section 5.5.

9 – Harrow Station LLC

This site is only identified in the FINDS database and is not discussed further. This site is the current location of the Harrow Station Shopping Center recently developed in 2005. The site was previously cultivated, agricultural land.

10 – AT&T Harrow

This site is located within the Site Area along Tower Road and is identified in the LUST database. This site is the location of a communications tower and associated equipment building. The report indicates the release of petroleum from a UST in 1989 and a current status of

“Cleanup Completed.” Additional information regarding the release is provided below in Section 5.5.

11 - K&J Autoworks

This site is located near the southeastern boundary of the Site Area and identified in the RCRA-SQG (Resource Conservation and Recovery Act-Small Quantity Generator) and FINDS databases. This site is the current location of Swamp’s Auto Body automotive repair facility. The report indicates the generation and handling of small quantities of waste stream D001 (ignitable hazardous wastes). No violations found.

12 – Better Materials Ottsville Quarry

This site is located near the southeast boundary of the Site Area on Quarry Road and is the location of historical surface mining operations for stone products. The site is identified in the RCRA-CESQG and FINDS databases. The report indicates this facility has been a RCRA-CESQG since 2002. No other information is provided. Additional information obtained during review of PADEP files is provided below in Section 5.5.

5.4 EDR City Directory Abstract Search

An abstract search of the Cole Criss-Cross Directory for available city directory data was conducted for years 1972, 1975, 1980, 1985, 1989, 1994, 2001, and 2007. Benham requested the following addresses be researched:

- 4018 Durham Road – currently Big Backyard preschool and Rakowsky Family Dentistry,
- 4105 Durham Road – currently Owowcreamery Ice Cream facility, formerly Donohue’s Gulf,
- 8214 Easton Road – currently Swamp’s Auto Body, formerly K&J Autoworks,
- 8244 Easton Road – currently Specialty Woods facility,
- 8260 Easton Road – former gas station at Easton and Tower Roads,
- 8305 Easton Road – currently Harrow Professional Center building (spa, realtor, Harrow Homes) and Harrow Homes storage yard,
- 8330 Easton Road – current location of Harrow Station Shopping Center,

- 8340 Easton Road – currently real estate office,
- 8364 Easton Road – currently vacant commercial property, formerly Suburban Ford and Depaul Ford,
- 8410 Easton Road – currently Off The Wall Custom Cycle Harley Davidson parts, former use unknown,
- 2503 Mountainview Road – currently Parkside Orchid Nursery and possibly machine shop,
- 2540 Mountainview Road – currently Nature’s Way Canoe and Kayak, formerly Mountainview Plaza strip mall.

Listing information was not identified in directories for years 1972 through 1989 at any of the requested addresses. Listing information was identified for some locations in 1994 and 2001 and at all locations for 2007. The listing information is provided on pages 4 and 5 of the City Directory Abstract provided in Appendix F.

The only notable finding is that the Specialty Woods facility property located at 8244 Easton Road is identified as the Candlewic Company (candle making equipment and supplies) in 2001.

5.5 Regulatory File Review Information

Regulatory file reviews were conducted on known environmental sites in the area. Benham requested the review of PADEP files for sites including the following:

- Bickel Landfill,
- Fleck Site (Tower Road),
- Nockamixon Township-Route 563 (Drum) Site,
- Suburban Ford/Depaul Ford (8364 Easton Road),
- Donohue Gulf (4105 Durham Road),
- AT&T Harrow (92 Tower Road),
- K&J Autoworks/Swamp’s Auto Body (8214 Easton Road),
- Parkside Orchid Nursery/Machine Shop (2503 Mountainview Road),
- Better Materials Ottsville Quarry/Hanson Quarry (262 Quarry Road), and

The Benham Companies, LLC, an SAIC Company

- Cabot Metals/Cabot Performance Materials (Beaver Run Road).

Review of available files was conducted at PADEP offices in Norristown, Pennsylvania on May 5, 2010 and June 8, 2010. Files for the Revere Chemical Waste Site were available for review online at the U.S. EPA Region 3 website. Copies of selected file information are provided in Appendix G. The May 2006 Revere Chemical Superfund Site Five-Year Review Report is provided in Appendix H.

Bickel Landfill

Limited file information for the former Bickel Landfill site was available for review. File information contained a WRS Infrastructure and Environment, Inc. June 2005 Work Plan to PADEP to complete repair work related to undercutting of landfill materials by a stream. The work plan indicates the landfill was a pre-regulation landfill closed in the mid 1960s. Additional file information included WRS invoices to PADEP dated 2005 through 2007 for work associated with repair of the landfill cap. No information regarding the quantities or types of wastes disposed at this site, or information related to investigation or characterization of the groundwater beneath the site was available in the PADEP files.

Fleck Site

File information for the Fleck site included various 2007 well permit application documents by Arbor Operating LLC (Arbor Resources) to drill a gas production well at property owned by Frank Fleck located at 4415 Durham Road. The property is located directly adjacent and to the east of Durham Road (Route 412) near the intersection with Church Road. The files also contained a June 2007 Comprehensive Wetland Delineation Report prepared by Mellon Biological Services for Arbor Resources.

Nockamixon Township-Route 563 (Drum) Site

File information provided by PADEP for the Nockamixon Township-Route 563 (Drum) Site included 1981 Bucks County Health Department (BCHD) residential potable water well sample information and 1989/1990 site assessment and inspection reports by NUS Corporation Superfund Division (NUS) on behalf of the U.S. Environmental Protection Agency Hazardous

Site Control Division. The NUS reports included a March 1989 Preliminary Assessment of Nockamixon Township-Route 563, a May 1989 Site Visit Summary Report for Nockamixon Township-Route 563, and a March 1990 Site Inspection of Nockamixon Township-Route 563.

The NUS March 1990 Site Inspection Report includes the results of the Site Visit Report, the Preliminary Assessment Report, and the BCHD 1981 residential potable well sample results. A copy of the Preliminary Assessment Report is provided in Appendix G. The report indicates the site existed on approximately 10 acres of a larger 76 acre parcel of land to the north and west of the northwest corner of Brennan Road between Route 563 and Route 412 (see Figure 2). The site was reportedly used for the disposal of septic tank wastes in the 1970s and for the storage of 55-drums at a less than one acre area of land during the 1980s (see land disturbances on 1971 aerial photograph). The report indicates roughly 50 drums of unknown content, stored in two piles, were removed from the site by the owner in 1980. Many drums were reported to have leaked. At the time of the 1990 Site Inspection Report, it was suspected that septic tank waste dumping was still occurring at the site.

BCHD conducted sampling of residential wells in the area surrounding the site in 1981 as a response to a adjacent landowner complaint that high amounts of TCE had been detected in his well. The results of this sampling demonstrated that TCE contamination was detected in 11 home wells, four having TCE concentrations between 110 and 150 ppb. TCE, PCE, and 1,1,1-trichloroethane were detected at concentrations as high as 260 ppb in a soil sample from the former drum storage area. Several remaining drums, some leaking, were reported by BCHD to be present onsite. BCHD also reported paint-like substances and oil stains at the site and noted that the drum storage area (approximately 20 feet in diameter) was devoid of vegetation.

NUS conducted a Site Inspection in April 1989 that included the collection of four shallow soil samples at the site and the sampling of five home water wells. Stained soils and stressed vegetation were also observed at the former drum storage area. Scrap metal and tires were scattered around the site. One or more chlorinated organic compounds were detected in three of the home well samples at concentrations as high as 160 ppb (TCE). Three of the four soil samples contained three chlorinated organic compounds (TCE, PCE, and 1,1,1-trichloroethane)

at levels as high as 44,000 ppb. The same soil samples also contained several semivolatile organic compounds (pyrene and chrysene) and one soil sample contained polychlorinated biphenyls (PCBs) at a concentration of 5,200 ppb. A toxicological evaluation, presented in Section 8.0 of the March 1990 Site Inspection Report, identified possible increased lifetime cancer risks resulting from long-term ingestion of untreated groundwater at two of the nearby residences.

No further or more recent information was available for this site. However, residential well sampling conducted in association with the Donohue Gulf Leaking Underground Storage Tank site (presented below) appears provide additional information related to the extent of chlorinated organic impacts in groundwater beneath additional properties along Mountainview Road and Brennan Road to the south/southeast of the Nockamixon Township-Route 563 (Drum) site.

Suburban Ford/Depaul Ford

No PADEP file information was available for Suburban Ford, Depaul Ford, or 8364 Easton Road.

Donohue Gulf

PADEP files for the Donohue Gulf gas station that previously existed at the intersection of Durham Road (Route 412) and Mountainview Road (Route 563) included various correspondence and documents related to the closure of the UST system at that site and subsequent remedial activities and monitoring. The UST system was closed in August 1997 and included the removal of two 8,000-gallon steel gasoline USTs and associated equipment. Impacted soils were also removed and soil samples indicated adequate soil removal had been completed. A water sample of groundwater infiltrating into the excavation contained benzene and MTBE at levels above the applicable criteria. File information did not indicate whether automotive repair operations were conducted at the property or whether any other USTs had existed at the property (i.e. waste oil UST).

Subsequent investigation and remedial activities ensued and included the installation of monitoring wells and operation of a groundwater remediation system (pump and treat) beginning

in August 1998 to address the impacts of a MTBE plume extending to the southeast and east. Quarterly monitoring was implemented. Nearby potable water wells were also sampled to determine if deeper groundwater was impacted with gasoline related constituents. Supply well treatment systems (carbon units) were installed at six nearby residences to address MTBE impacts. The groundwater remediation system was operated until November 2001. Individual temporary treatment systems were installed at 10 Brennan Road and 2526 Mountainview Road to address persistent MTBE concentrations. The temporary treatment systems consisted of carbon vessels and additional plumbing that allowed continuous pumping of the wells and permitted discharge to the storm sewer. The site received closure and release of liability on September 17, 2007.

Concurrent with the MTBE investigation at offsite potable water wells, the presence of TCE, PCE, 1,1-DCE, 1,1,1-TCA, and cis-1,2-DCE were identified in wells at 2454 Mountainview Road, 2526 Mountainview Road, 2506 Mountainview Road, and 10 Brennan Road at concentrations as high as 168 ug/l. The most recent potable well sample data from 2007 indicated TCE concentrations as high as 180 ug/l.

It should be noted that these compounds were not detected in potable wells further to the east at the Donohue Gulf site and other adjacent properties suggesting a source in close proximity to these residences, possibly the Nockamixon Township-Route 563 (Drum) site located 1,000 feet to the north on Brennan Road. What appeared to be a machine shop of some type was also observed during site reconnaissance activities to be located in close proximity to the affected properties at the location of the Parkside Orchid Nursery at 2503 Mountainview Road.

AT&T Harrow

No PADEP file information was available for the AT&T harrow communications tower property located at 92 Tower Road.

K&J Autoworks/Swamp's Auto Body

No PADEP file information was available for the K&J Autoworks, Swamp's Autobody, or 8214 Easton Road property.

Parkside Orchid Nursery/Machine Shop

No PADEP file information was available for the Parkside Orchid Nursery or 2503 Mountainview Road property.

Better Materials Ottsville Quarry/Hanson Quarry

PADEP file information for Hanson Aggregates, Better Materials Ottsville Quarry, and Bucks County Crushed Stone included residual waste General Permit correspondence and renewal information related to the reuse of hot-mix asphalt plant baghouse fines and scrubber pond precipitates as soil additives or soil conditioners. This facility would be expected to maintain NPDES permits associated with quarry dewatering operations however, no permit information was present in the provided files.

Cabot Metals/Cabot Performance Materials

Information in PADEP files for Cabot Super Metals Corp, Cabot Performance Materials Corp, Cabot Berylco Inc., and Penn Rare Metals Division of Kawecki Berylco Industries Inc. included the following:

- relatively recent documents (2002-2004) related to the characterization of remaining onsite slag materials and PADEP approval to reuse the materials in specific industrial and commercial applications,
- NPDES permit discharge reports and correspondence (1994-2002),
- PADEP inspection reports (1987-2002),
- UST registration information related to a 1,000-gallon anhydrous ammonia UST installed in 1983, a 5,000-gallon sulfuric acid UST installed 1978 and removed 2001, a 10,000-gallon fuel oil UST installed 1980, and a 500-gallon gasoline UST installed in 1968, and
- 1973 NPDES permit application for discharge of treated process waters to Rapp Creek and 1981 NPDES permit transfer application to Cabot Berylco Inc.

The file information indicates the facility manufactured columbium base master alloys by aluminothermic reduction of oxide and manufacture of cesium, rubidium, germanium metals and compounds by chemical leach reaction of ores. The most recent activities conducted at the plant

included metal refining processes for the production of cesium, germanium, rubidium, tellurium, and niobium. The facility was active from 1973 through 2002 when the plant was shut down. The site is currently vacant and most equipment and buildings have been removed. No additional information regarding recent site characterization work was available in the provided files.

Online U.S. EPA Region 3 information for the Cabot Performance Materials site indicates RCRA Corrective Action activities at the facility are being conducted under the direction of EPA Region 3 with assistance from the State. The EPA fact sheet also indicates no institutional controls are needed at this time. Benham contacted Mr. Walter Payne, Project Manager and ECP Licensed Professional Geologist Manager of PADEP, to inquire about the current characterization status at the plant. Mr. Payne was unable to provide definitive information, but did indicate chlorinated organic compounds were not a contaminant of concern at the site.

Revere Chemical Waste Site

The complete Administrative Record for the Revere Chemical Waste Site (Superfund) is available online at the U.S. EPA Region 3 website: (<http://www.epa.gov/reg3hwmd/super/sites/PAD051395499/index.htm>). The Five Year Review Report prepared for the site in May 2006 indicates the site operated as a metals reclamation facility from 1963 to 1969 causing the release of volatile organic compounds (VOCs) to groundwater, the release of metals and organic contamination to soil and the migration of metal contamination to two onsite tributaries to Rapp Creek. The 1993 Record of Decision (ROD) for Operable Unit One (OU1) addressed the remaining contaminated soil, solid wastes and debris onsite and included long-term groundwater monitoring with institutional controls (capping a large portion of the site). The 1996 ROD for Operable Unit Two (OU2) addressed groundwater and the mercury contaminated stream sediments and required no further action for groundwater and stream corridor monitoring. OU1 construction was completed in 1998. Additional information regarding site history, chronology of events, and remedial measures are provided in sections III and IV of the Five Year Review Report in Appendix H.

The report indicates the groundwater monitoring program is designed to determine whether contamination in the shallow aquifer is migrating to the deep aquifer. Deep groundwater samples are analyzed for TCE, 1,2,4-trichlorobenzene, 1,2,3-trichlorobenzene, and bis(2-ethylhexyl)phthalate because they were historically detected in shallow groundwater. Only very low levels of 1,2,3-trichlorobenzene and bis(2-ethylhexyl)phthalate have been detected in several deep well samples since 1998. In 2005, a full scan for VOCS was run on the groundwater samples. The results indicated non-detect for all compounds with the exception of a trace detection for 1,2,3-trichlorobenzene. The report concludes “the data continue to support the conceptual site model that the natural barriers (low permeability geologic formation) and the remedial activities at the site are successfully preventing impact to the deep aquifer.”

5.6 Additional Sites of Interest

Manual reconnaissance activities were conducted following the scoping meeting on January 8, 2010 and April 16, 2010 to investigate historical information findings and identify additional sites of interest.

The Parkside Orchid Nursery and what appeared to be a machine shop located at 2503 Mountainview Road is considered to be an additional site of interest based on the detections of chlorinated organic compounds as recently as 2007 (TCE up to 180 ug/L) in nearby private water wells during the site investigation and remedial work associated with the Donohue’s Gulf gas station property. TCE and chlorinated organic compounds were not detected in private water wells closer to the Donohue’s Gulf property, but were detected in the private water wells farther to the southwest at 2454 Mountainview Road, 2526 Mountainview Road, 2506 Mountainview Road, and 10 Brennan Road. PCE, 1,1-DCE, 1,1,1-TCA, and cis-1,2-DCE were also consistently detected in the private well samples

A large metal frame building located on land to the northwest of the Hanson Quarry appears to be used for large quarry machinery maintenance activities. The exact nature of operations currently and formerly conducted at this property are unknown, but are suspected to involve maintenance and repair work on heavy machinery. Also present at this property are old out-of-

service quarry dump trucks and large ASTs and dispensers for refueling machinery. Historical aerial photos indicate this property has been active since at least 1972 along with quarrying operations.

6.0 SIGNIFICANT FINDINGS

The significant findings associated with the first phase of site investigation work are presented below:

- Based on published geologic and hydrogeologic information for the Site Area presented in Section 3.0, private water wells within and nearby the Site Area are most likely drawing groundwater from multiple aquifers within the Brunswick and Lockatong Formations, under both water table and semi-artesian conditions. Groundwater storage and movement is primarily by secondary openings including bedding planes and joints and tends to be anisotropic and heterogeneous. Horizontal permeability is much greater than vertical permeability and is greatest parallel to strike or in the orientation of most major joint systems (NE-SW).
- TCE has been detected above the U.S. EPA MCL of 5 ug/l in the samples collected at ten different residences within the Site Area between 2002 and 2010. During the April 2010 sampling event, TCE was detected above the MCL in the samples collected at seven different residences at concentration ranging between 5.1 and 41.4 ug/l. The highest TCE concentrations occur along a NE-SW trending swath that crosses over Durham Road (Route 412) just north of its intersection with Easton Road (Route 611). This orientation correlates with the strike of reported joint systems present in the Brunswick Formation discussed in Section 3.0.
- A septic tank waste and drum dump site was present along Brennan Road between Route 563 and Route 412. The site was reportedly used for the disposal of septic tank wastes in the 1970s and for the storage of 55-drum of unknown content at a less than one acre area of land during the 1980s. U.S. EPA performed Preliminary Assessment and Site Inspection activities in 1989 and 1990. One or more chlorinated organic compounds were detected in three home well samples at concentrations as high as 160 ppb (TCE). Three of four soil samples contained three chlorinated organic compounds (TCE, PCE, and 1,1,1-trichloroethane) at levels as high as 44,000 ppb. The same soil samples also

contained several semivolatile organic compounds (pyrene and chrysene) and one soil sample contained polychlorinated biphenyls (PCBs) at a concentration of 5,200 ppb. No further investigative or remedial work appears to have occurred at the site.

- TCE and other chlorinated organic compounds were found at concentrations between 100 and 200 ug/l in private water wells along Mountainview Road (Route 563) to the southwest of the intersection with Durham Road (Route 412) in association with Dohonue's Gulf gas station LUST case investigation and remediation between 1997 and 2007. The chlorinated organic compounds were not attributed to historical operations associated with the gas station and are suspected to be the result of the drum storage/dumping at the nearby Nockamixon Township-Route 563 (Drum) site on Brennan Road. What is suspected to a machine shop is also present in close proximity at the Parkside Orchid Nursery at 2503 Mountainview Road.
- The Revere Chemical Superfund Site, located to the northeast and within 1,500 feet of the Site Area, operated as a metals reclamation facility from 1963 to 1969 causing the release of VOCs (primarily chlorinated organics) to groundwater, the release of metals and organic contamination to soil and the migration of metal contamination to two onsite tributaries to Rapp Creek. Remedial work at the site was completed in 1998, but did not include active groundwater remediation on the basis that natural geologic barriers prevented contamination of the deeper groundwater aquifer. Annual monitoring of deeper aquifer wells at the Revere Chemical site between 1998 and 2005 indicates there is virtually no contamination in the deep aquifer.
- Review of the 2009 and 2010 concentration maps (Figures 5 and 6) and file review information for Donohue Gulf and the Nockamixon Township-Route 563 (Drum) site may indicate two potentially separate chlorinated organic plumes. One plume could be centered around the Nockamixon Township-Route 563 (Drum) site based on detections at 282 Park road and the high concentrations detected in 2007 at home wells along Mountainview Drive and Brennan Road. A separate plume farther to the south could be originating from somewhere near the intersection with Route 611 and Route 412 based

on elevated detections at home wells along Route 412 and to the northwest of Tower Road.

7.0 RECOMMENDATIONS

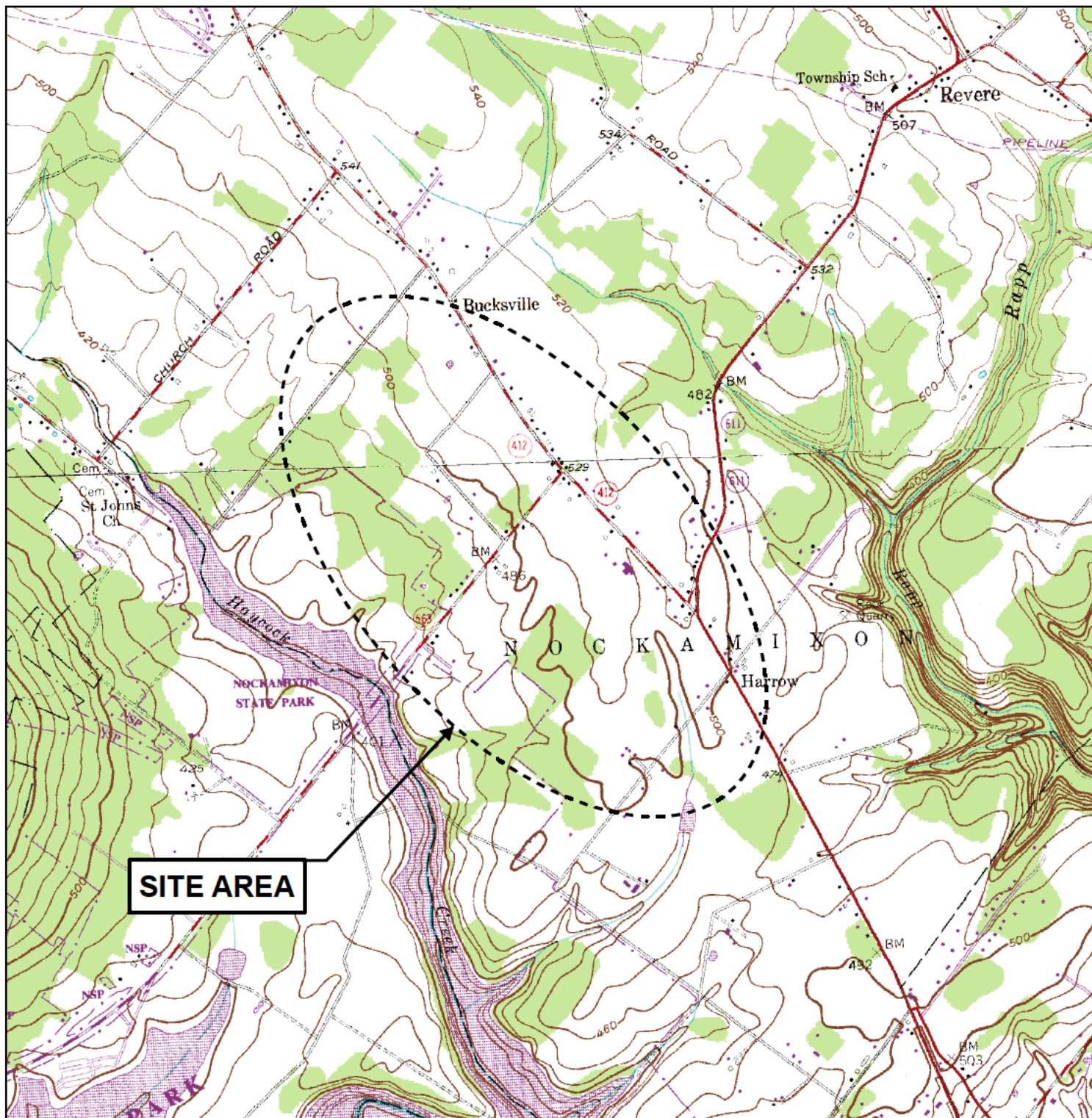
The following recommendations are presented based upon the findings of this first phase of site investigation work:

- Additional investigation of the Nockamixon Township-Route 563 (Drum) site on Brennan Road to determine if historical operations at that site have resulted in the chlorinated organic impacts to properties along Mountainview Road and Park Drive West (install monitor wells at and around the perimeter of this site),
- Additional investigation of the Parkside Orchid Nursery and suspected machine shop at the 2503 Mountainview Road (563) site to determine if this property is a source of TCE and similar chlorinated organic compounds to groundwater in that area (assessment of current/historical operations),
- Inclusion of private water wells at 2454 Mountainview Road, 2526 Mountainview Road, 2506 Mountainview Road, 2503 Mountainview Road, 10 Brennan Road, and possibly other nearby wells in the DEP well sampling program,
- Site visit to the Hanson Quarry to evaluate the actual geology for the Site Area and confirm or dispute the geologic and hydrogeologic data reported for the area,
- Additional investigation of the historical maintenance activities conducted at the quarry's heavy equipment maintenance facility on the north side of Quarry Road (assessment of current/historical operations).

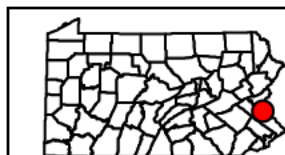
8.0 REFERENCES

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<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

FIGURES



2,000 1,000 0 2,000
 Feet
 1 inch = 2,000 ft



Source Imagery:
 USGS Digital Raster Graphic
 1983 Bedminster PA 24k
 Projection: NAD 1983, UTM Zone 18

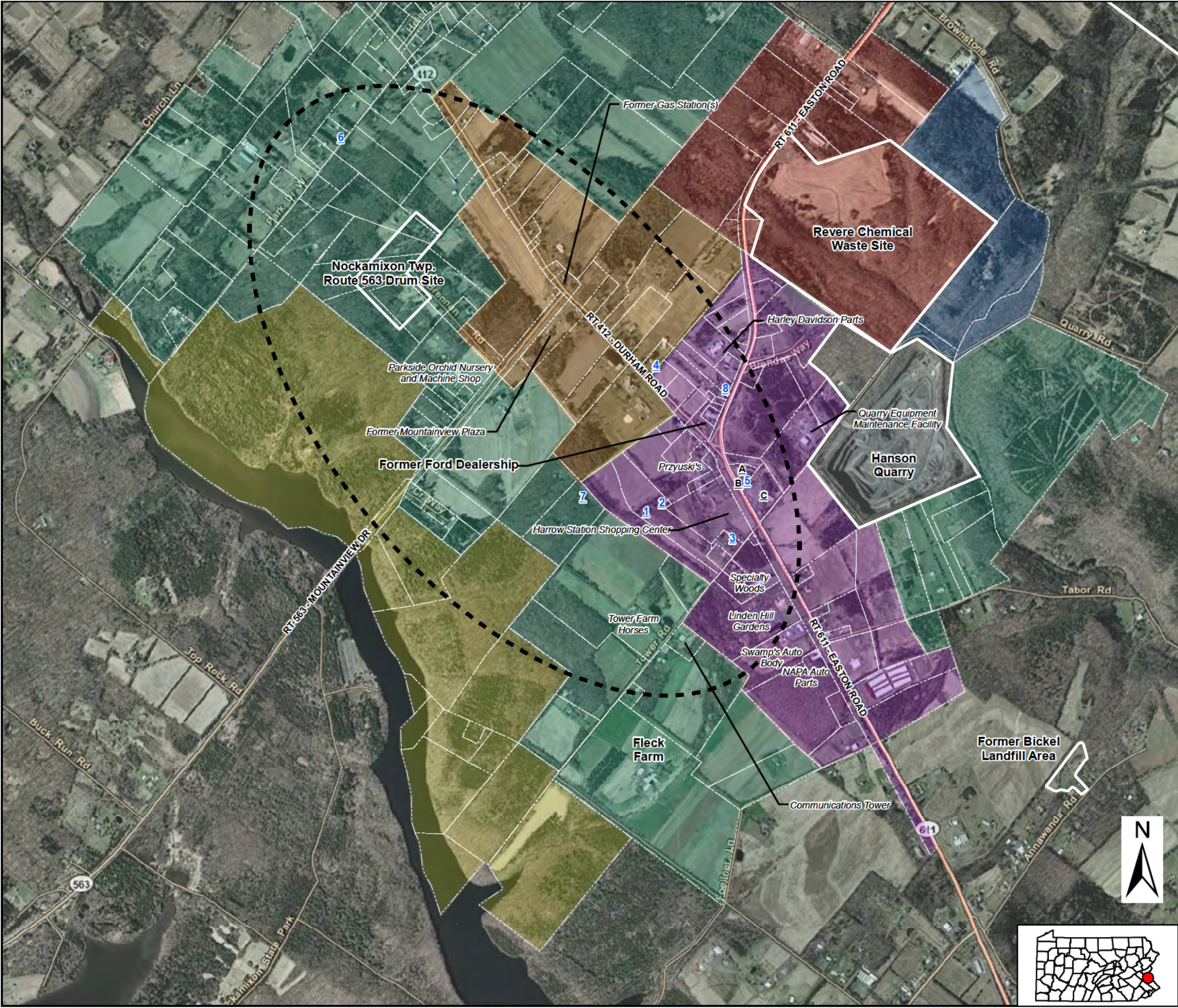
GTAC-5 Nockamixon TCE Site Nockamixon Township, PA

Site Location Map

drawn JWS	checked RLM	approved	figure no. 1
date 1/13/10	date 1/13/10	date	
job no.		file no. Fig 1 - Site Location.mxd	



an SAIC company



Legend:

Zoning Areas

- C - Commercial
- I - Industrial
- LI - Light Industrial
- OSM - Open Space Management
- Q - Quarry
- R - Residential
- VC - Village Center

- Parcel Boundaries
- Site Area

- 1 - Stanzione - 133 Tower Road
- 2 - Watson - 135 Tower Road
- 3 - Grieger - 149 Tower Road
- 4 - Loubris - 4051 Durham Road
- 5 - Baumhauer - 8329 Easton Road
- 6 - Sado - 282 Park Drive
- 7 - Przyuski - 4028 Durham Road
- 8 - Gustavson - 8382 Easton Road
- A - Harrow Center (Chiropractor, HVAC Contractor, Propane Contractor)
- B - Baumhauer's Kitchen and Bath
- C - 611 Auto Sales, Harrow Homes Builder Yard and Storage

1,200 600 0 1,200
Feet
1 inch = 1,200 feet

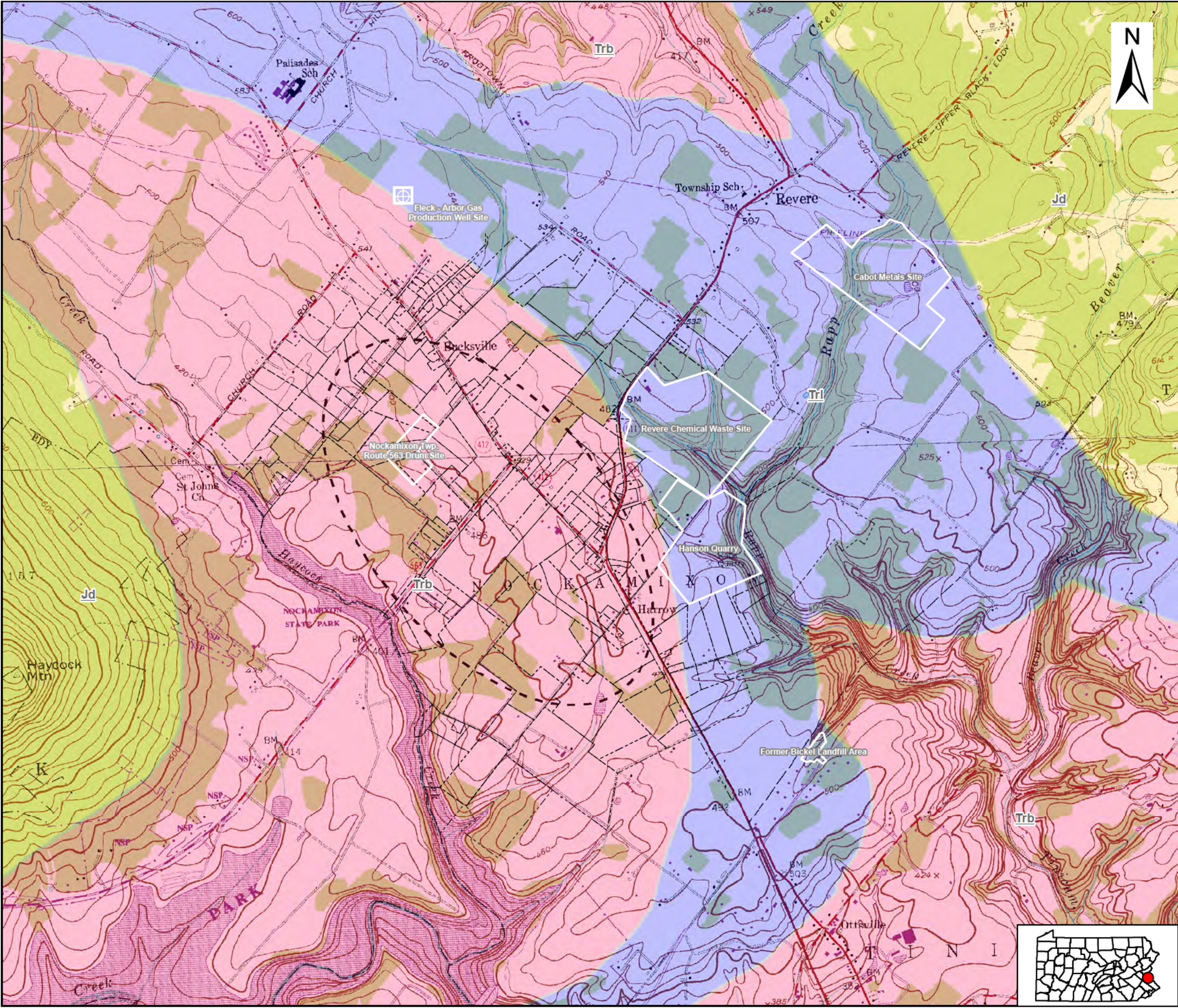
Source Imagery:
USGS Ortho Aerial
c. 2005 Bedminster PA Quadrangle PA
Projection: NAD 1983, UTM Zone 18

GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

Site Area and Features Map

drawn	JWS	checked	RLM	approved	figure no.
date	7/16/10	date	7/16/10	date	2
job no.				file no. Fig 2 - Site Aerial.mxd	





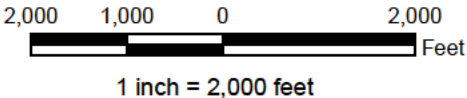
Legend:

Boundaries

- Site Area
- Parcel Boundaries

PA Geology

- Diabase:
Intrusive igneous rock; medium to coarse grained
labradorite and pyroxenes
- Brunswick Formation:
Typically reddish-brown shale, siltstone and mudstone
with occasional green and brown shale interbeds.
Interbedded argillites near base.
- Lockatong Formation:
Dark gray to black, thick bedded argillite with
occasional zones of thin bedded black shale.



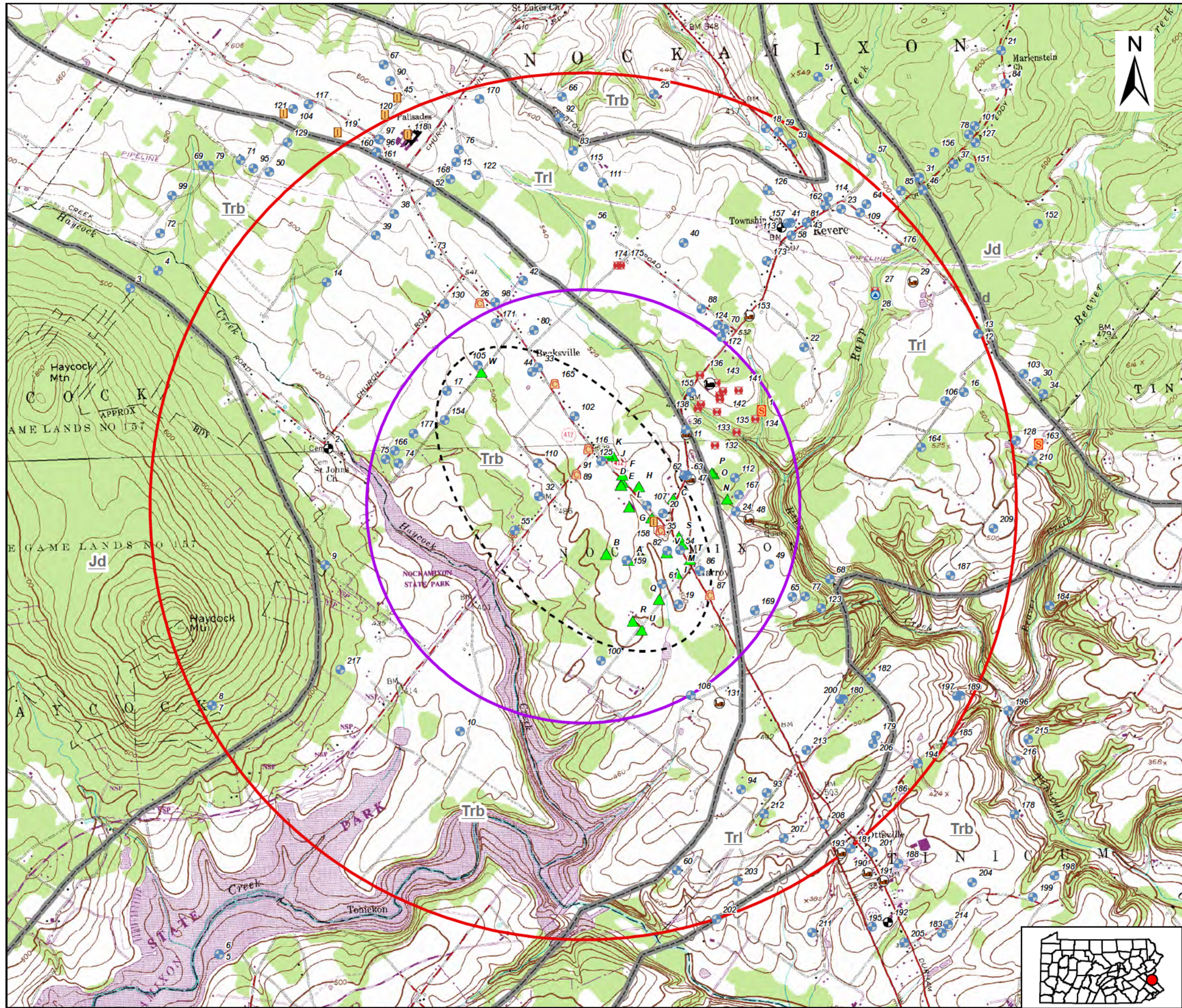
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USGS Digital Raster Graphic
1983 Bedminster PA 24k
Projection: NAD 1983, UTM Zone 18

GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

Local Geology Map

drawn	JWS	checked	RLM	approved	figure no.
date	6/15/10	date	6/15/10	date	3
job no.				file no. Fig 3 - Local Geology.mxd	

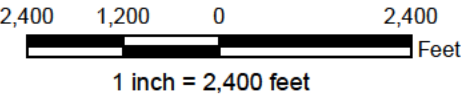




Legend:
Boundaries
1 Mile Radius
2 Mile Radius
Site Area
PA GWIS Data
Commercial
Domestic
Industrial
Institutional
Irrigation
Public Supply
Stock
Unused
PA Geology
Formation Boundary
Jd - Diabase
Trb - Brunswick Formation
Trl - Lockatong Formation
GPS Data (2010)
A Potable Well Location (with Map ID Label from Table)

Map ID	Address
A	135 Tower Rd
B	4028 Durham Rd
C	8382 Easton Rd
D	4064 Durham Rd
E	4066 Durham Rd
F	4071 Durham Rd
G	4018 Durham Rd
H	4051 Durham Rd
I	149 Tower Rd
J	4081 Durham Rd
K	4089 Durham Rd
L	4040 Durham Rd - School
M	8329 Easton Rd
N	265 Quarry Rd
O	15 Brenda Way
P	12 Brenda Way
Q	117 Tower Rd
R	83 Tower Rd
S	8335 Easton Rd
T	8305 Easton Rd
U	64 Tower Rd
V	Shopping Center Well
W	282 Park Drive West

Source Imagery:
Well Info: DCNR PaGWIS Search Conducted 3/31/10
USGS Digital Raster Graphic
1983 Bedminster PA 24k
Projection: NAD 1983, UTM Zone 18

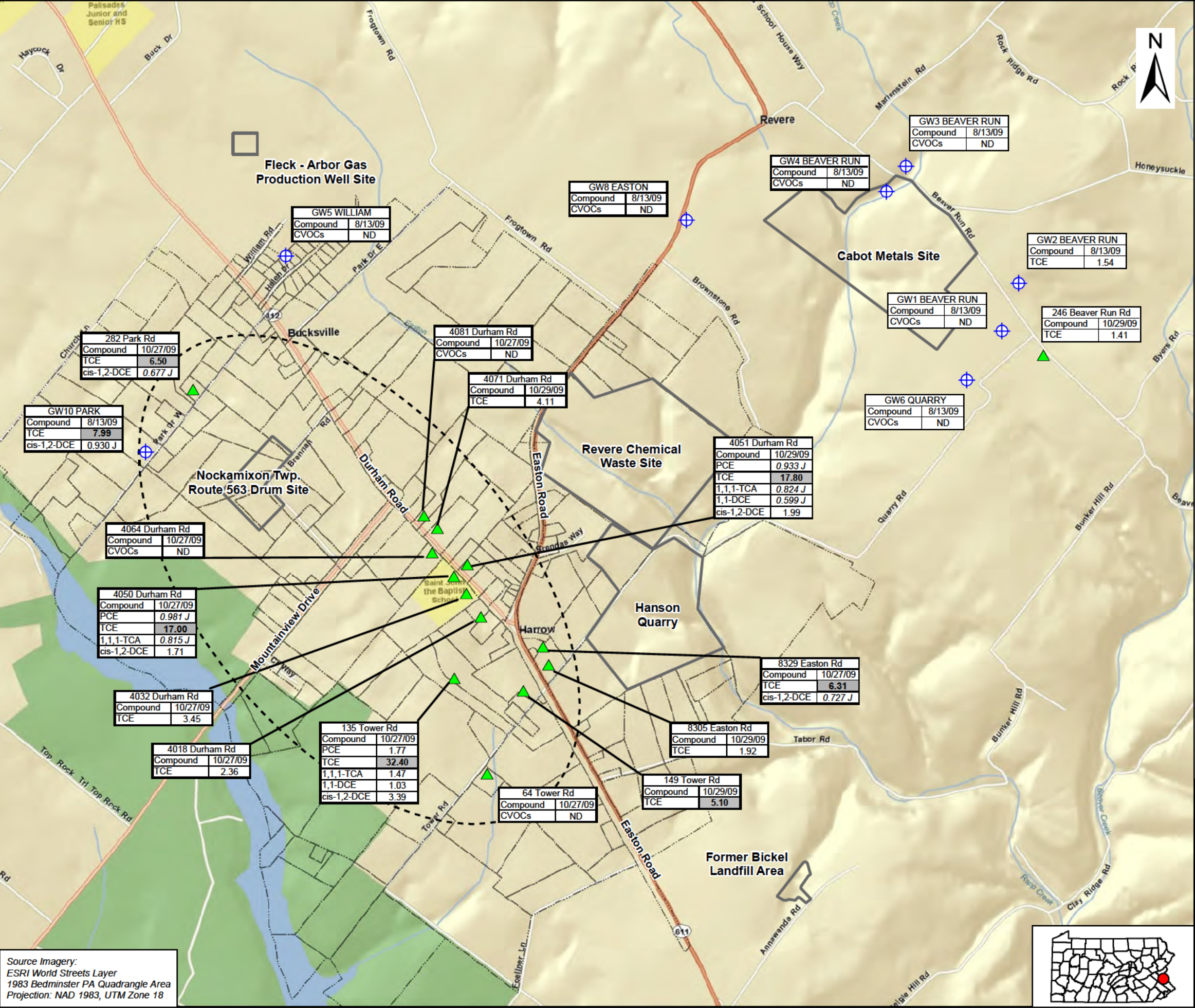


GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

Well Location Map

drawn JWS	checked RLM	approved	figure no. 4
date 5/28/10	date 5/28/10	date	
job no.		file no. Fig 4 - PAGWIS GPS.mxd	





Legend:

- ▲ 2009 PADEP Groundwater Samples
- ⊕ 2009 Princeton Hydro Samples
- ⬡ Site Area
- Parcel Boundaries

Chlorinated VOC Results (Detections Only)

Sample Location	
Compound	MCL
PCE	5
TCE	5
1,1,1-TCA	200
1,1-DCE	7
cis-1,2-DCE	70

Tetrachloroethene

Trichloroethene

1,1,1-Trichloroethane

1,1-Dichloroethene

cis1,2-Dichloroethene

MCL - EPA Drinking Water Contaminants MCLs Standard

500 - Result Exceeds EPA Drinking Water Contaminants MCLs Standard

ug/L - Micrograms per liter (MCL Standards and Results)

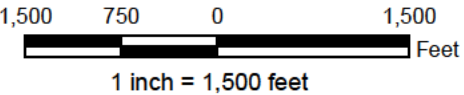
VOCs - Volatile Organic Compounds

CVOCs - Chlorinated Volatile Organic Compounds

ND - Not Detected

J - Result Estimated by Laboratory

Note: Princeton Hydro Sample Locations were intentionally filtered with uncertainty to protect identity and privacy of survey participants.

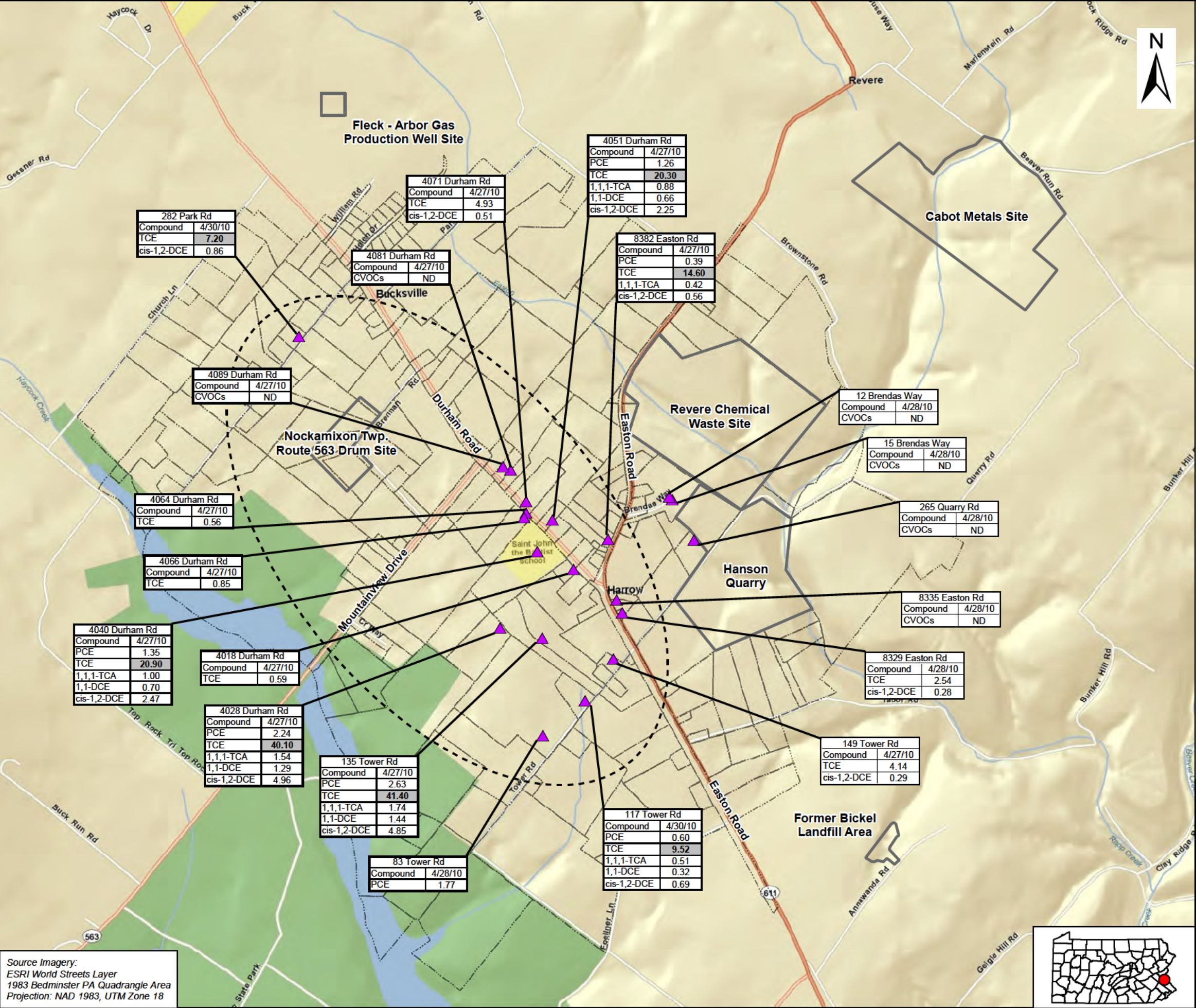


GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

Chlorinated VOC Concentration Map
August and October 2009

drawn JWS	checked RLM	approved	figure no.
date 6/14/10	date 6/14/10	date	5
job no.		file no. Fig 5 - CVOCs 10-09.mxd	

an SAIC company



Legend:

- ▲ 2010 PADEP Groundwater Samples
- Site Area
- Parcel Boundaries

Chlorinated VOC Results (Detections Only)

Sample Location	
Sample Date	
Compound	MCL
PCE	5
TCE	5
1,1,1-TCA	200
1,1-DCE	7
cis-1,2-DCE	70

- Tetrachloroethene
- Trichloroethene
- 1,1,1-Trichloroethane
- 1,1-Dichloroethene
- cis1,2-Dichloroethene

MCL - EPA Drinking Water Contaminants
MCLs Standard

500 - Result Exceeds EPA Drinking Water
Contaminants MCLs Standard

ug/L - Micrograms per liter (MCL Standards
and Results)

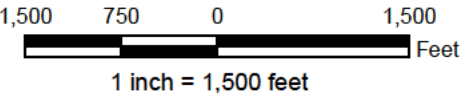
VOCs - Volatile Organic Compounds

CVOCs - Chlorinated Volatile Organic
Compounds

ND - Not Detected

J - Result Estimated by Laboratory

Note: Princeton Hydro Sample Locations were intentionally
filtered with uncertainty to protect identity and privacy
of survey participants.



GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

Chlorinated VOC Concentration Map
April 2010

drawn	JWS	checked	RLM	approved	figure no.
date	6/15/10	date	6/15/10	date	6
job no.				file no. Fig 6 - CVOCs 2010.mxd	

Source Imagery:
ESRI World Streets Layer
1983 Bedminster PA Quadrangle Area
Projection: NAD 1983, UTM Zone 18



TABLES

Table 1
PAGWIS Well Details
GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

FID	PA Well ID	Date Drilled	Owner	Latitude	Longitude	Well Depth	Depth To Bedrock	Well Yield	Static Water Level	Water Use	Borehole Bottom	BoreHole Diameter	Casing Bottom	WBZ Top1	WBZ Top2	WBZ Top3
1	1113	1/1/1948	GRIMES, WILLIAM	40.50194	-75.167778	160				STOCK						
2	5908		CATHOLIC CHURCH	40.50028	-75.205833	70		20		PUBLIC SUPPLY	70	6				
3	70968	3/1/1980	DUNNE P	40.51139	-75.222778	120	60	20		DOMESTIC						
4	6174		GILLESPIE, ROBERT	40.5125	-75.220278				108	DOMESTIC						
5	419941	3/5/2002	GODOWN-CARNEY PARTNERSHIP	40.46667	-75.216667	275	7	15		DOMESTIC						
6	419946	7/19/2002	GODOWN-CARNEY PARTNERSHIP	40.46667	-75.216667	375	5	8		DOMESTIC						
7	419743	1/17/2002	GODOWN-CARNEY PARTNERSHIP	40.48333	-75.216667	350	5	40		DOMESTIC						
8	419745	1/16/2002	GODOWN-CARNEY PARTNERSHIP	40.48333	-75.216667	200	12	8.5		DOMESTIC						
9	71002	10/1/1985	HARRIES W	40.4925	-75.206389	250	70	20	12	DOMESTIC						
10	71000	10/1/1985	WARDLE T	40.48111	-75.195	125	23	40		DOMESTIC						
11	72076	1/1/1969		40.50056	-75.174444	238	6	5	150	INDUSTRIAL						
12	5924	1/1/1980	ARNOLD, CECILE	40.50667	-75.148611	200			19.3	DOMESTIC						
13	5924	1/1/1980	ARNOLD, CECILE	40.50667	-75.148611	200			19.3	DOMESTIC						
14	6375		ASPLUNDH, CHRIS	40.51139	-75.205556				34.8	DOMESTIC						
15	72014	6/29/1978	B & J CONTRACTORS	40.51917	-75.193889	200	10	5		DOMESTIC						
16	6294	12/22/1989	BANAS, GARRY	40.50278	-75.15	420			269	DOMESTIC	420	6	45			
17	6368	5/1/1978	BARBER	40.50389	-75.195278	230			42.7	DOMESTIC	230	6	31	60	105	145
18	5970		BARBER, ANNE	40.52083	-75.166667				81.3	DOMESTIC						
19	72021	9/1/1984	BARTISH J	40.48917	-75.175556	175	3	30		DOMESTIC						
20	5891	1/1/1951	BEHM, GEORGE	40.49528	-75.176667	309			141	DOMESTIC	309	6				
21	72035	11/1/1985	BLACKWELL E	40.52556	-75.145833	510	4	2	8	DOMESTIC						
22	6769	1/1/1974	BRADLEY, ELSIE	40.50611	-75.163889	300			165	DOMESTIC	300	6				
23	72040	1/1/1985	BRYAN E	40.51528	-75.160278	200	8	24		DOMESTIC						
24	5890		BUCKS CO CRUSHED STONE INC	40.49528	-75.170278				94.8	DOMESTIC	250	6	18			
25	5977		BUCKS COUNTY WATER AUTHORITY	40.52333	-75.176389				102	DOMESTIC						
26	247741		BUCKSVILLE SHOP.CTR%J.W. HYRSL	40.50972	-75.19222					COMMERCIAL						
27	5932	1/1/1891	CABOT CORP	40.50972	-75.1575	2080				UNUSED	5	20	1780			
28	6887	1/1/1960	CABOT CORP	40.50944	-75.1575	265			100	IRRIGATION	265	8	40			
29	6740	8/23/1965	CABOT CORPORATION	40.51028	-75.154167	627		25		INDUSTRIAL	255	8	34			
30	72005	1/1/1980	CHADWICK H	40.50333	-75.143611	200	12	15		DOMESTIC						
31	6747	2/1/1988	CHARLES, MEL	40.51722	-75.153333	150			19.3	DOMESTIC	150	6	40	121		
32	71980	7/1/1979	COMLEY L	40.49667	-75.1875	450	6	6	85	DOMESTIC						
33	5920		COMLY, MARYANNE	40.50528	-75.187222	350			111	DOMESTIC						
34	6743		COOPER, MIKE	40.5025	-75.143056	240			45.2	DOMESTIC	240	6	42			
35	255539		COUNTRY DRIVE IN	40.49417	-75.17694					COMMERCIAL						
36	72082	1/1/1969	CUBERO CARLOS	40.50083	-75.174444	443	7		200	DOMESTIC						
37	71995	1/7/1977	D'ANGELO E	40.51806	-75.150278	510	7	2.5		DOMESTIC						
38	72049	10/1/1984	DAILY J	40.51583	-75.199444	150	4	10		DOMESTIC						
39	6255	10/1/1984	DAILY, J	40.51444	-75.201111	150			60.9	DOMESTIC	150	6	20			
40	6770	1/1/1983	DARMANIN, BARBARA	40.51333	-75.174167				144	DOMESTIC						
41	72077	1/1/1968	DEGEN ARTHUR	40.51444	-75.164722	185	17	5	10	DOMESTIC						
42	6712	1/1/1952	DERILLO, ANNA	40.51111	-75.188333	180			54.5	DOMESTIC	180	6				
43	72000	2/1/1981	DOLINSKI J	40.51444	-75.163333	600	20	1		DOMESTIC						
44	72036	3/1/1986	DREAM HOMES	40.505	-75.187778	220	10	10	55	DOMESTIC						
45	247764		DURHAM/NOCK. ELEM SCHOOL	40.52361	-75.19889					INSTITUTIONAL						

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46	72026	6/1/1984	EATON C	40.51639	-75.153056	410		2	6	6 DOMESTIC						
47	72079	1/1/1968	ECHO INC	40.4975	-75.174167	440		5	350	85 INDUSTRIAL						
48	72075	1/1/1968	ECHO INC	40.49472	-75.169167	440		5	350	85 INDUSTRIAL						
49	5877	2/11/1982	EDGERTON	40.49167	-75.1675	380				185 DOMESTIC	380	6	32	350		
50	6457	1/1/1980	FACHET, JOHN	40.51889	-75.210278	460				84.7 DOMESTIC	460	6				
51	5986	1/1/1986	FARBOTNIK, STEVE	40.52417	-75.161944	260				129 DOMESTIC	260	6		240		
52	6517	1/1/1979	FOREST BUILDERS	40.51722	-75.196111	205				64.8 DOMESTIC	205	6	30	135	200	
53	6541	1/1/1958	FOX, C	40.51972	-75.164444	169				116 DOMESTIC						
54	72010	8/1/1979	FRANK P	40.49278	-75.175278	285		5	18	150 DOMESTIC						
55	6451		FURLONG, THOMAS	40.49444	-75.189722	237				67.8 DOMESTIC						
56	6418	1/1/1974	GAIBLER, JOE	40.51472	-75.182222	230				77.8 DOMESTIC	230	6				
57	5957	2/1/1987	GILLIGAN, E	40.51861	-75.1575	340				96.2 DOMESTIC	340	6	20			
58	71990	9/1/1983	GODOWN A	40.51361	-75.164722	282		14	40	DOMESTIC						
59	72025	6/1/1984	GRAVES B	40.52056	-75.165556	260		6	14	165 DOMESTIC						
60	6314		GUTHRIE, DENNIS	40.47139	-75.176389					5.76 DOMESTIC	0	60				
61	71994	10/1/1983	HAFFNER K	40.49056	-75.176944	340		8	3	DOMESTIC						
62	72009	5/1/1979	HALL J	40.49778	-75.174722	270		8	25	DOMESTIC						
63	6792	5/1/1979	HALL, J	40.49778	-75.174444	270				114 DOMESTIC	270	6	30	230	260	
64	6746	5/1/1985	HANKINSON, ROBERT	40.51556	-75.158056	220				21.6 DOMESTIC	220	0				
65	5870	1/1/1984	HEATH, LLOYD	40.48944	-75.165556					172 DOMESTIC						
66	5978	8/1/1988	HENDRICKS, DOROTHY	40.52333	-75.184444	300				62.2 DOMESTIC	300	6	40	87	155	273
67	6476	1/1/1981	HEOVERSON	40.52583	-75.2	430				128 DOMESTIC	430	6				
68	5873	8/1/1987	HILLS, ROBERT	40.49056	-75.162222	220				69.6 DOMESTIC	220	6	30			
69	6379	9/1/1988	HOILER, ANDREA	40.51944	-75.216111	250				37.4 DOMESTIC	250	6	40	162	238	
70	72011	9/1/1979	J. BARSUM CO.	40.5075	-75.170833	380		8	24	DOMESTIC						
71	72047	6/1/1986	JANKOWITSCH J	40.51972	-75.212778	200		6	5	DOMESTIC						
72	5951	1/1/1985	KAUFFMAN, JUDITH	40.515	-75.22	300				13.9 DOMESTIC	300	6	50			
73	6374	1/1/1989	KEEBLE, BYRON	40.51306	-75.196389					54.8 DOMESTIC						
74	6370		KEEBLE, BYRON	40.49917	-75.199722					15.8 DOMESTIC						
75	6371		KEEBLE, BYRON	40.49944	-75.200833					2.66 DOMESTIC						
76	72015	2/14/1980	KEENAN CONST.	40.52	-75.193611	175		8	20	50 DOMESTIC						
77	5869	1/1/1975	KELCHNER, DAVID	40.48944	-75.164444	330				149 DOMESTIC	330	6		290	320	330
78	72028	6/1/1985	KERSTNER K	40.52	-75.148889	475		7	10	DOMESTIC						
79	72031	10/1/1985	KERSTNER K	40.51944	-75.215556	200		5	6	DOMESTIC						
80	72037	6/4/1986	KERSTNER K	40.50778	-75.1875	400		10	10	DOMESTIC						
81	6417		KEYSER, BRUCE	40.51444	-75.163333					132 DOMESTIC						
82	72073	1/1/1968	KIMENHOUR M	40.49278	-75.176389	215		4	2	50 DOMESTIC						
83	5967	6/8/1991	KLUSKIEWICZ, GAIL	40.51972	-75.183611	300			20	DOMESTIC	300	6	40			
84	72002	12/1/1980	LAPSLEY J	40.52333	-75.145556	320		12	1	DOMESTIC						
85	71993	12/1/1983	LAPSLEY J	40.51639	-75.155	520		5	12	DOMESTIC						
86	72050	8/1/1984	LEON S	40.49139	-75.173611	360		8	15	40 DOMESTIC						
87	6789	8/1/1984	LEON, CHARLES	40.48972	-75.172778	360				145 COMMERCIAL	360	6	30	110	240	350
88	5931	1/1/1961	LIPENCOTT, RICHARD	40.50889	-75.172778	110				24.4 DOMESTIC	110	6				
89	72080	1/1/1970	LITZENBERGER	40.49806	-75.184167	200		6	20	20 DOMESTIC						
90	6719	4/1/1985	LITZENBERGER, D	40.52472	-75.199444	300				142 DOMESTIC	300	6	40			

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91	6381		LOCASS PLAZA, THE SHED PEOPLE	40.49806	-75.184167					130 COMMERCIAL						
92	6744	4/1/1971	LOCKE, JOHN	40.52194	-75.184722	293				81.2 DOMESTIC	293	6				
93	72051	11/1/1984	LONG LANE ACRES	40.47639	-75.168333	340	6	40		DOMESTIC						
94	6450	12/1/1984	LONG LANE ACRES	40.47667	-75.170556	340				185 DOMESTIC	340	6	20			
95	72046	4/1/1986	LOVELESS R	40.51917	-75.211667	125	6	30		DOMESTIC						
96	6420		MANDIC, NICHOLAS	40.52083	-75.200556	270				109 DOMESTIC	270	6	30			
97	6420		MANDIC, NICHOLAS	40.52083	-75.200556	270				109 DOMESTIC						
98	72081	1/1/1970	MARTIN LARRY	40.50972	-75.190833	155	4	15		50 DOMESTIC						
99	6378	1/1/1987	MARTINDALE, JAMES	40.5175	-75.218889	200				22.9 DOMESTIC	200	6				
100	6367	1/1/1981	MAYNARD, SCOTT	40.48556	-75.1825					91.5 DOMESTIC						
101	5969	6/1/1985	MCGLINCHAY, JOHN	40.52056	-75.148333	475				191 DOMESTIC	475	6	30	445	465	
102	6771	6/1/1988	MCKENNEY, JONATHAN	40.50194	-75.184167	525				132 DOMESTIC	525	6	40	200	350	
103	72012	5/25/1977	MCNICHOL C	40.50389	-75.144722	460	8	5		DOMESTIC						
104	72004	1/1/1980	MCNICHOL C	40.52306	-75.208056	200	4	5		DOMESTIC						
105	72029	7/1/1984	MEADOWS D	40.50556	-75.1925	210	3	20		60 DOMESTIC						
106	6456	1/1/1979	MEISSNER, ERIC	40.50222	-75.151667	440				250 DOMESTIC	440	6				
107	72024	9/1/1984	MEITHE M	40.49583	-75.178056	354	12	28		DOMESTIC						
108	72033	8/16/1985	MIETHE MAX K	40.48306	-75.174722	320	5	3		DOMESTIC						
109	72043	9/1/1985	MILLER W	40.515	-75.158611	420	4	10		DOMESTIC						
110	5900		MILLER, RAYMOND	40.49889	-75.1875	250				63.9 DOMESTIC						
111	6745	1/1/1976	NEEBE, GLEN	40.5175	-75.181111	240				147 DOMESTIC	240	6	40			
112	72074	1/1/1968	NEKURANIK F	40.4975	-75.170278	155	4	10		45 DOMESTIC						
113	6913	1/1/1934	NOCKAMIXON HIGH SCHOOL	40.51417	-75.165556	210		20		PUBLIC SUPPLY	300	6				
114	6432	12/1/1990	NOCKAMIXON PARK	40.51611	-75.161389	200				141 DOMESTIC	200	6	40			
115	5958	1/1/1991	OMNI BUILDERS	40.51861	-75.182778					139 DOMESTIC						
116	5906	1/1/1947	OTT'S GARAGE	40.49972	-75.183056	326				COMMERCIAL	326	6	35			
117	6376	1/9/1984	PADLASZEK, JOE	40.52333	-75.206667	275				49.3 DOMESTIC	275	6	40	250		
118	6910	9/1/1950	PALISADES JOINT HIGH SCHOOL	40.52111	-75.198056	550		121		50 INSTITUTIONAL	550	8	25			
119	247066		PALISADES MIDDLE SCHOOL	40.5214	-75.2042	400		60		113 INSTITUTIONAL						
120	72006	11/1/1979	PALISADES SCHOOL	40.5225	-75.2	500	15	100		119 INSTITUTIONAL						
121	6703		PALLISADES MIDDLE SCHOOL	40.52278	-75.208889	350				113 INSTITUTIONAL	350	6				
122	422985	3/12/2008	DONNAPARCIAK	40.51827	-75.192167	457		120		148 DOMESTIC						
123	5868	1/1/1986	PAUPST, WALTER	40.48861	-75.163056					126 DOMESTIC						
124	5929		PFK MARK III CONSTRUCTION CO	40.50778	-75.171389	300				179 DOMESTIC	300	6				
125	72008	5/1/1979	PHILLIPS H	40.49889	-75.181944	490	6	30		130 DOMESTIC						
126	420000	3/12/2002	BOBPICININI	40.51667	-75.166667	700	6	17		DOMESTIC						
127	5964	3/1/1978	POBST, JOHN	40.51944	-75.148333	490				180 DOMESTIC	490	6.25		469	480	
128	72027	7/1/1984	POTTER D	40.49944	-75.145556	230	6	30		50 DOMESTIC						
129	6377	7/1/1984	PRYSKI, S	40.52083	-75.208611	175				19.8 DOMESTIC	175	6	30.5	155	170	
130	71981	11/25/1978	REED A	40.50972	-75.195278	250	20	20		DOMESTIC						
131	5859	7/1/1989	REINBOLD	40.4825	-75.172222	375				184 INDUSTRIAL	375	6	40	328		
132	6392	10/20/1989	REVERE CHEMICAL CO	40.49972	-75.171944	102				62.6 UNUSED	102	6	14			
133	6395	1/1/1991	REVERE CHEMICAL CO	40.50194	-75.171667	225				130 UNUSED	225	8	14			
134	6390	10/13/1989	REVERE CHEMICAL CO	40.50139	-75.168333	72				45.2 UNUSED	72	6	14			
135	6335	10/26/1989	REVERE CHEMICAL CO	40.50056	-75.17	148				101 UNUSED	148	6	30			

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136	6334	1/1/1991	REVERE CHEMICAL CO	40.50444	-75.173056	149			75.2	UNUSED	149	8		13		
137	6391	10/31/1989	REVERE CHEMICAL CO	40.5025	-75.173056	150			9.89	UNUSED	150	6		15		
138	6396	1/1/1991	REVERE CHEMICAL CO	40.50222	-75.173333	123			104	UNUSED	125	0		11		
139	6393	1/1/1991	REVERE CHEMICAL CO	40.50278	-75.171389	105			20.2	UNUSED	105	8		13		
140	6402		REVERE CHEMICAL CO	40.50306	-75.171389	391			101	UNUSED	391	6		27		
141	6394	1/1/1991	REVERE CHEMICAL CO	40.50333	-75.169722	221			134	UNUSED	221	8		14		
142	6397	1/1/1991	REVERE CHEMICAL CO	40.50333	-75.171111	99			30.5	UNUSED	102	8		10		
143	6389	10/12/1989	REVERE CHEMICAL CO	40.50389	-75.171667	102			27.5	UNUSED	102	6		9		
144	261071	3/1/1991	Revere Chemical Site	40.50389	-75.172222	224	6	0.25		INDUSTRIAL						
145	261318	3/1/1991	Revere Chemical Site	40.50389	-75.172222	124	3	0.25		INDUSTRIAL						
146	261319	4/1/1991	Revere Chemical Site	40.50389	-75.172222	149	10	0.25		INDUSTRIAL						
147	261320	3/1/1991	Revere Chemical Site	40.50389	-75.172222	100	5	3		INDUSTRIAL						
148	261069	3/1/1991	Revere Chemical Site	40.50389	-75.172222	100	3	0.4		INDUSTRIAL						
149	261070	4/1/1991	Revere Chemical Site	40.50389	-75.172222	221	5	1		INDUSTRIAL						
150	255506		REVERE GENERAL STORE	40.49417	-75.17694					COMMERCIAL						
151	72084		ROUSE CHRISTOPH	40.51778	-75.148889	547	18	1	168	DOMESTIC						
152	6530	8/4/1976	ROUSE, CHRISTOPHER	40.51389	-75.143056	547			187	DOMESTIC	547	6.25		21.5		
153	71992	1/1/1984	RUFÉ D	40.50833	-75.168611	400	10	5.5		INDUSTRIAL						
154	72048	9/1/1985	SADOW W	40.50194	-75.195556	245	6	6	35	DOMESTIC						
155	72022	1/3/1984	SCHUSTER B	40.50333	-75.173889	100	8	35	20	DOMESTIC						
156	5960	1/1/1987	SMITH, CAROL	40.51889	-75.151944	600			143	DOMESTIC	600	6				
157	6768	1/1/1983	SOBEL, CATHY	40.51444	-75.165	300			145	DOMESTIC	300	6				
158	5889	1/1/1959	ST JOHN THE BAPTIST SCHOOL	40.49472	-75.1775	230		30		INSTITUTIONAL	230	6				
159	5879	1/1/1978	STANZIONE, BOB	40.49222	-75.18	285			143	DOMESTIC	285	6				
160	6419	1/1/1988	STAUFFER, RONALD	40.52	-75.200833	210			101	DOMESTIC	210	6		40		
161	6419	1/1/1988	STAUFFER, RONALD	40.52	-75.200833	210			101	DOMESTIC						
162	6540	7/30/1977	STOY, RONALD	40.51556	-75.161667	230			125	DOMESTIC	230	6		30	180	230
163	5901	1/1/1958	TABER, GEORGE	40.49917	-75.143611	108			41.5	STOCK	108	6				
164	5902		TENNY, FRANCIS	40.49917	-75.153889				237	DOMESTIC						
165	247742		THE FRIENDLY GARDEN RESTAURANT	40.50417	-75.18583					COMMERCIAL						
166	419860	12/15/2004	TINICUM CONTRACTORS INC.	40.5	-75.2	425	7	20	20	DOMESTIC						
167	5896		TROUTS, ROBERT	40.49639	-75.17	500			107	DOMESTIC						
168	72044	10/1/1985	TUMOLA CORPORATION	40.51806	-75.194444	275	3	20		DOMESTIC						
169	72041	4/1/1985	TWIN HOLLY SALES	40.48861	-75.168889	320	10	3		DOMESTIC						
170	5979	1/1/1986	UTZ, EUGENE	40.52333	-75.191667	400			175	DOMESTIC						
171	71989	12/1/1983	VANHALST P	40.50833	-75.190833	450	7	1.5	132	DOMESTIC						
172	72007	10/1/1979	WEISBACH O	40.50694	-75.171111	300	7	30		DOMESTIC						
173	5938	1/1/1960	WHITE, JOSEPHINE	40.51194	-75.166944	300			175	DOMESTIC	300	6				
174	6895		WOLFINGER, DAVID	40.51194	-75.18				2.19	UNUSED						
175	6896		WOLFINGER, DAVID	40.51194	-75.179722				1.13	UNUSED						
176	6914	1/1/1943	WRIGHT, HARMON	40.5125	-75.155556	125				DOMESTIC	125	6				
177	6369	2/1/1988	YATES, DEBBIE	40.50111	-75.198333				24	DOMESTIC						
178	6400		BERNSTIN, BEN	40.47444	-75.146667				69.5	DOMESTIC						
179	73621	7/1/1982	BICKEL W	40.48	-75.158611	320	8	20		DOMESTIC						
180	6171		DARLING, JUNE	40.4825	-75.161389				180	DOMESTIC						

Table 1
PAGWIS Well Details
GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

FID	PA Well ID	Date Drilled	Owner	Latitude	Longitude	Well Depth	Depth To Bedrock	Well Yield	Static Water Level	Water Use	Borehole Bottom	BoreHole Diameter	Casing Bottom	WBZ Top1	WBZ Top2	WBZ Top3
181	5841		DAVIS, BOB	40.4725	-75.161111					174 DOMESTIC						
182	5863	1/1/1973	DEGAN, JIM	40.48389	-75.158889	300				213 DOMESTIC	300	6				
183	73746	1/1/1969	DOUGHERTY EDW	40.46667	-75.153333	210	18	20		80 DOMESTIC						
184	6399	1/1/1981	GERSENSON, HERB	40.48833	-75.143056	220				156 DOMESTIC	220	6		180		
185	6595	1/1/1976	HENNESSEY, BILL	40.47944	-75.151944					166 DOMESTIC						
186	5848	1/1/1970	JENSEN, JAY	40.47583	-75.157778	185				178 DOMESTIC						
187	73620	1/1/1983	JONES C	40.49056	-75.151667	400	5	12		DOMESTIC						
188	73724	1/1/1967	KAUFFUNGER H	40.47139	-75.156944	275	6	25		210 DOMESTIC						
189	73622	7/1/1982	LITSCHAUER G	40.4825	-75.151111	300	8	8		DOMESTIC						
190	73660	4/1/1986	MODERN CONCRETE	40.47083	-75.159722	290	4	25		45 INDUSTRIAL						
191	5834	1/1/1948	MODERN CONCRETE CO	40.47028	-75.158333	203		11		INDUSTRIAL	203	6				
192	6278		OTTS HILL APTS	40.4675	-75.158056					PUBLIC SUPPLY						
193	5840		OTTSVILLE DAIRYMENS ASSOC	40.47222	-75.161944	220		15		INDUSTRIAL	220	6				
194	73737	1/1/1967	PHILLIPS HAROLD	40.47806	-75.155	295	4	6		200 DOMESTIC						
195	73762		PHILLIPS HAROLD	40.46722	-75.159444	200	2	5		100 DOMESTIC						
196	73632	12/1/1983	RAPP HOLLOW FARM	40.48139	-75.146944	180	10	15		40 DOMESTIC						
197	5858	1/1/1969	ROTH, RON	40.4825	-75.151389	220				142 DOMESTIC						
198	6387	1/1/1985	SCHAEFER, DIANE	40.47028	-75.143333	250				146 DOMESTIC	250	6				
199	73654	6/18/1986	SCHAEFFER NORMAN	40.46889	-75.145278	240	7	28		DOMESTIC						
200	73741	1/1/1968	SCHMOOCK DORSEY	40.4825	-75.161667	279	6	6		125 DOMESTIC						
201	73636	5/21/1984	SCULLY D	40.47222	-75.159167	235	12	15		40 DOMESTIC						
202	5830	5/1/1986	SHICK, DIANE	40.46806	-75.173056	250				127 DOMESTIC	250	6	30			
203	5835	1/1/1955	SHIVO, JOHN	40.47056	-75.171111	240				138 DOMESTIC	240	6				
204	6315	5/1/1987	SLABICKI, GERALD	40.47	-75.150556	325				156 DOMESTIC	325	6	40			
205	73752		SMECKER RAYMOND	40.46611	-75.156667	210		100		65 DOMESTIC						
206	6356	1/1/1962	SNYDER, GEORGE	40.47944	-75.158889	400				258 DOMESTIC	400	6				
207	6461	1/1/1969	SOUZA, TONY	40.47333	-75.166944	280				204 DOMESTIC	280	6				
208	6357	3/1/1992	STONE, CHARLEY	40.47417	-75.163333	410				231 DOMESTIC	410	6	60	200	380	
209	5884	10/6/1986	TABER, DANIEL	40.49361	-75.147778	275				236 DOMESTIC	275	6	20			
210	5898	1/1/1971	TABER, GEORGE	40.49806	-75.144167	260				182 DOMESTIC	260	6				
211	73655	9/25/1985	TAYLOR GEORGE	40.46694	-75.164722	220	12	17		DOMESTIC						
212	73668	12/1/1985	TWIN HOLLY	40.475	-75.168611	225	4	15		DOMESTIC						
213	73634	4/7/1983	VANDINE O	40.47917	-75.164722	420	5	4		DOMESTIC						
214	73742	1/1/1967	VICZOREK DAVID	40.46722	-75.152778	235	4	15		200 DOMESTIC						
215	6344		WALLACE, BRUCE	40.47944	-75.145278					93.8 DOMESTIC						
216	6338		WALLACE, BRUCE	40.47806	-75.146389					12 DOMESTIC						
217	419309	9/22/2006	TITAN HOMES	40.48547	-75.20534	200	70	50		0 DOMESTIC						

Table 2
Historic and Current Potable Well Sample Results
GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

Sample Location	Date		PCE	1,1,1,2-PCA	1,1,2,2-PCA	TCE	1,1,1-TCA	1,1,2-TCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCA	1,2-DCA	VC
			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
EPA Drinking Water Contaminants MCLs			5	--	--	5	200	5	7	70	100	--	5	2
PADEP Act 2 MCLs - GW in Residential, Used Aquifer			5	70	0.3	5	200	5	7	70	100	27	5	2
64 Tower Rd	6/26/02		ND	ND	ND	0.17	ND	ND	ND	ND	ND	ND	ND	ND
64 Tower Rd	10/27/09		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
83 Tower Rd	4/28/10		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
117 Tower Rd	6/26/02		0.46	ND	ND	7.67	0.54	ND	0.18	0.27	ND	ND	0.0731 J	ND
117 Tower Rd	4/30/10		0.60	ND	ND	9.52	0.51	ND	0.32	0.69	ND	ND	ND	ND
135 Tower Rd	5/29/02		1.58	ND	ND	26.80	1.70	ND	0.81	1.41	ND	ND	0.12	ND
135 Tower Rd	10/27/09		1.77	ND	ND	32.40	1.47	ND	1.03	3.39	ND	ND	ND	ND
135 Tower Rd	4/27/10		2.63	ND	ND	41.40	1.74	ND	1.44	4.85	ND	ND	ND	ND
140 Tower Rd	6/26/02		0.19	ND	ND	3.21	0.25	ND	ND	0.12	ND	ND	0.05	ND
141 Tower Rd	6/26/02		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
149 Tower Rd	6/26/02		ND	ND	ND	0.12	ND	ND	ND	ND	ND	ND	ND	ND
149 Tower Rd	10/29/09		ND	ND	ND	5.10	ND	ND	ND	ND	ND	ND	ND	ND
149 Tower Rd	4/27/10		ND	ND	ND	4.14	ND	ND	ND	0.29	ND	ND	ND	ND
8305 Easton Rd	6/26/02		0.06	ND	ND	1.05	0.12	ND	ND	ND	ND	ND	ND	ND
8305 Easton Rd	10/29/09		ND	ND	ND	1.92	ND	ND	ND	ND	ND	ND	ND	ND
8329 Easton Rd	10/27/09		ND	ND	ND	6.31	ND	ND	ND	0.727 J	ND	ND	ND	ND
8329 Easton Rd	4/28/10		ND	ND	ND	2.54	ND	ND	ND	0.28	ND	ND	ND	ND
8335 Easton Rd	4/28/10		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8364 Easton Rd	5/29/02		0.06	ND	ND	3.51	0.06	ND	0.09	0.17	ND	ND	ND	ND
8382 Easton Rd	4/27/10		0.39	ND	ND	14.60	0.42	ND	ND	0.56	ND	ND	ND	ND
8386 Easton Rd	6/26/02		0.10	ND	ND	2.39	0.25	ND	0.08	0.10	ND	ND	ND	ND
4018 Durham Rd	10/27/09		ND	ND	ND	2.36	ND	ND	ND	ND	ND	ND	ND	ND
4018 Durham Rd	4/27/10		ND	ND	ND	0.59	ND	ND	ND	ND	ND	ND	ND	ND
4028 Durham Rd	4/27/10		2.24	ND	ND	40.10	1.54	ND	1.29	4.96	ND	ND	ND	ND
4032 Durham Rd	5/29/02		0.10	ND	ND	1.80	0.13	ND	ND	0.09	ND	ND	ND	ND
4032 Durham Rd	10/27/09		ND	ND	ND	3.45	ND	ND	ND	ND	ND	ND	ND	ND
4040 Durham Rd	4/27/10		1.35	ND	ND	20.90	1.00	ND	0.70	2.47	ND	ND	ND	ND
4050 Durham Rd	10/27/09		0.981 J	ND	ND	17.00	0.815 J	ND	ND	1.71	ND	ND	ND	ND
4051 Durham Rd	5/29/02		0.38	ND	ND	5.08	0.38	ND	0.25	0.44	ND	ND	ND	ND
4051 Durham Rd	10/29/09		0.933 J	ND	ND	17.80	0.824 J	ND	0.599 J	1.99	ND	ND	ND	ND
4051 Durham Rd	4/27/10		1.26	ND	ND	20.30	0.88	ND	0.66	2.25	ND	ND	ND	ND
4064 Durham Rd	5/29/02		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4064 Durham Rd	10/27/09		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4064 Durham Rd	4/27/10		ND	ND	ND	0.56	ND	ND	ND	ND	ND	ND	ND	ND
4066 Durham Rd	4/27/10		ND	ND	ND	0.85	ND	ND	ND	ND	ND	ND	ND	ND

Table 2
Historic and Current Potable Well Sample Results
GTAC 5-1-222
Nockamixon TCE Site
Nockamixon Township, PA

Sample Location	Date		PCE	1,1,1,2-PCA	1,1,2,2-PCA	TCE	1,1,1-TCA	1,1,2-TCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCA	1,2-DCA	VC
			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
EPA Drinking Water Contaminants MCLs			5	--	--	5	200	5	7	70	100	--	5	2
PADEP Act 2 MCLs - GW in Residential, Used Aquifer			5	70	0.3	5	200	5	7	70	100	27	5	2
4071 Durham Rd	6/26/02		0.09	ND	ND	1.68	0.12	ND	ND	0.12	ND	ND	ND	ND
4071 Durham Rd	10/29/09		ND	ND	ND	4.11	ND	ND	ND	ND	ND	ND	ND	ND
4071 Durham Rd	4/27/10		ND	ND	ND	4.93	ND	ND	ND	0.51	ND	ND	ND	ND
4081 Durham Rd	6/26/02		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4081 Durham Rd	10/27/09		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4081 Durham Rd	4/27/10		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4089 Durham Rd	4/27/10		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
282 Park Rd	10/27/09		ND	ND	ND	6.50	ND	ND	ND	0.677 J	ND	ND	ND	ND
282 Park Rd	4/30/10		ND	ND	ND	7.20	ND	ND	ND	0.86	ND	ND	ND	ND
246 Beaver Run Rd	10/29/09		ND	ND	ND	1.41	ND	ND	ND	ND	ND	ND	ND	ND
12 Brendas Way	4/28/10		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15 Brendas Way	4/28/10		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
265 Quarry Rd	4/28/10		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

BOLD WITH SHADING = Result Above the EPA Drinking Water Contaminants MCLs Standard

Italic J = Result is lab-estimated value due to low detection level

ND = Compound Not Detected

CVOCs = Chlorinated Volatile Organic Compounds

µg/L = micrograms per liter

PCE = Tetrachloroethene

PCA = Tetrachloroethane

TCE = Trichloroethene

TCA = Trichloroethane

DCE = Dichloroethene

DCA = Dichloroethane

VC = Vinyl Chloride