



**Phase I/II Environmental Site Assessment Report
Francis J. Varieur Elementary School
486 Pleasant Street
Pawtucket, Rhode Island**

Prepared for

Mr. Joseph Martella
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, RI 02908

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
2374 Post Road, Suite 102
Warwick, Rhode Island 02886

April 2015
EA Project No. 14993.04 and 14993.06

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Project Manager/Environmental Professional

17 April 2015

Date

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LIST OF ACRONYMS AND ABBREVIATIONS

AES	Atlantic Environmental Services, Inc.
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and xylenes
BVE	Blackstone Valley Electric
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	CERCLA Information System
CESQG	Conditionally Exempt Small Quantity Generator
COC	Contaminant of concern
CREC	Controlled Recognized Environmental Condition
DNAPL	Dense non-aqueous phase liquid
EA	EA Engineering, Science, and Technology, Inc., PBC
EDR	Environmental Data Resources, Inc.
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment

FEMA	Federal Emergency Management Agency
GPS	Global positioning system
GZA	GZA GeoEnvironmental, Inc.
LGQ	Large Quantity Generator
LNAPL	Light non-aqueous phase liquid
LUCIS	Land Use Control Information System
LUST	Leaking Underground Storage Tank
MassDEP	Massachusetts Department of Environmental Protection
MGP	Manufactured Gas Plant
MRL	Method reporting limit
NBC	Narragansett Bay Commission
OWM	Office of Waste Management
PAH	Polyaromatic hydrocarbons
PCB	Polychlorinated biphenyls
PCE	Tetrachloroethylene
PID	Photoionization detector
ppbv	Parts per billion by volume
PVC	Polyvinyl chloride
RCRA	Resource Conservation and Recovery Act of 1976
RDEC	Residential Direct Exposure Criteria
REC	Recognized Environmental Condition
RIDEM	Rhode Island Department of Environmental Management
SIM	Selective ion monitoring
SHWS	State Hazardous Waste Site
SIR	Site Investigation Report
SOP	Standard operating procedure
SQG	Small Quantity Generator
SVOC	Semi-volatile organic compounds
TCE	Trichloroethylene
USGS	U.S. Geologic Survey
UST	Underground storage tank
VOC	Volatile organic compounds

EXECUTIVE SUMMARY

EA Engineering, Science, and Technology, Inc., PBC (EA) completed a Phase I/II Environmental Site Assessment (ESA) for 468 Pleasant Street located in the City of Pawtucket, Rhode Island (the "Site"). The Site consists of the buildings and appurtenances of the Francis J. Varieur Elementary School, which is operated by the City of Pawtucket School Department. The property is defined as Pawtucket Tax Parcel ID Numbers: Plat 65B, Lots 644, 646, and 650. The sum of the three parcels is approximately 5.22 acres. This Phase I/II ESA was conducted at the request of Mr. Joseph Martella of the Rhode Island Department of Environmental Management (RIDEM) in accordance with EA Proposal No 07307.80 dated 30 May 2014 (Phase I) and 07037.80A dated 6 June 2014 (Phase II), and modified on 12 August 2014.

The Phase I/II ESA was performed in accordance with the scope of work developed by EA pursuant to the American Society for Testing and Materials (ASTM) E1527-13 and E1903-11.

EA personnel conducted site reconnaissance and investigation activities from 16 – 20 June 2014 for the Phase I and 23 July – 25 August 2014 for the Phase II. EA was accompanied for the Phase I site visit by Mr. Dennis J. Rebello, Facilities Director for the Pawtucket School Department. Mr. Joseph Martella of RIDEM provided regulatory oversight for the majority of the Phase II investigation activities.

A recognized environmental condition (REC) is defined as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property due to any release to the environment, under conditions indicative of a release to the environment, or under conditions that pose a material threat of a future release to the environment.

EA reviewed a search of federal and state environmental databases conducted by Environmental Data Resources, Inc. (EDR). This information is summarized in Section 4.1 of this report. Based on the information reviewed, three RECs were identified.

- Historical use of the adjacent property as a MGP and power plant resulted in many types of oil and hazardous materials storage on the adjacent property. A number of releases were reported prior to 1980 until 2011.
- Soil records, topographic maps, and observations of the surrounding areas indicate that the subject site was filled and/or graded in order to achieve a flat surface on which to build. The source of fill material is unknown and environmental testing of fill may not have been performed based on the construction date of the school.
- Soil gas sampling and analysis conducted by others in 2013 along the Narragansett Bay Commission (NBC) combined sewer overflow pipeline detected chlorinated volatile organic compounds (VOCs) at concentrations exceeding the current Massachusetts Sub-Slab Screening Values presented in the 2011 "Interim Final Vapor Intrusion Guidance." The Massachusetts Sub-Slab Screening Values were used because RIDEM does not currently have screening values or standards for evaluating soil gas. The potential exists

for the backfill used during installation of the pipeline or the water flowing through the pipeline to adversely impact soil vapor at the site. Additionally the (presumed) increased porosity of the backfill and/or bedding of the pipeline could create a preferential migratory pathway for soil vapors to enter the site.

A limited field investigation was conducted in accordance with ASTM Phase II ESA E1903-11 to investigate the identified RECs. The investigation consisted of a property utility survey and a subsurface investigation, including the collection of soil vapor, soil, and groundwater samples, and laboratory analysis of samples for each of these matrices.

- 17 shallow (less than five feet deep) and 3 deep (between 12 and 25 feet deep) soil vapor monitoring points were installed on the site. Following installation and integrity testing of the points, samples were collected from each point for analysis of TO-15 Selective Ion Monitoring (SIM), which analyzes for a wide range of VOCs. Of the 20 soil vapor samples collected, three samples (SVP-5S, SVP-5D, and SVP-12S) exhibited concentrations greater than the Massachusetts Residential Sub-Slab Screening Values for tetrachloroethylene (PCE) and/or trichloroethylene (TCE). The Massachusetts Sub-Slab Screening Values were used because RIDEM does not currently have screening values or standards for evaluating soil gas. The source of soil vapor impacts is unknown and the extent of impacts has not been fully defined. Potential sources or preferential pathways include the Narragansett Bay Commission combined sewer overflow pipeline and urban fill material.
- Four soil borings were advanced at on-site locations chosen to characterize soil in key areas. Two soil samples were collected at each boring location; one from surficial soil and one from directly above the water table. None of the eight soil samples collected had concentrations of VOCs that exceeded applicable RIDEM standards.
- Each of the four borings was completed with a monitoring well. One of the three wells did not contain any water, possibly due to a perched water table. Groundwater samples were collected from the three wells that contained groundwater after well development and purging. None of the three groundwater samples collected had concentrations of VOCs that exceeded applicable RIDEM standards.

In addition to the above listed field activities conducted by EA during this investigation, indoor and outdoor air sampling was performed by others under direction of RIDEM and the Pawtucket School Department, in and around the Varieur School building. The indoor air investigation identified PCE in indoor air ubiquitously throughout the school, with the highest concentrations observed on the western side of the school. The investigation, including comparison to screening values, is further detailed in a technical memorandum authored by RIDEM in Appendix K. TCE was detected in soil gas, not PCE; therefore soil vapor intrusion does not appear to be occurring per the data collected to date.

1. INTRODUCTION

1.1 PURPOSE

The purpose of the Phase I/II Environmental Site Assessment (ESA) is to identify and quantify, to the extent feasible pursuant to the process prescribed in American Society for Testing and Materials (ASTM) Standards E1527-13 and E1903-11, recognized environmental conditions (RECs) in connection with the property. A REC is defined as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property due to any release to the environment, under conditions indicative of a release to the environment, or under conditions that pose a material threat of a future release to the environment. The ASTM E1527-13 practice constitutes all appropriate inquiries for the purpose of Landowner Liability Protections, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This report reflects the observations, information, and data collected by EA Engineering, Science, and Technology, Inc., PBC (EA) from 16 – 20 June 2014 and 23 July – 25 August 2014. Supporting documentation is provided in the appendixes as follows:

- *Appendix A*— Photograph Log
- *Appendix B*— Historical Research Documentation (including aerial photographs and historical maps).
- *Appendix C*— Regulatory Records Documentation
- *Appendix D*— Supporting Interview Documentation
- *Appendix E*— Environmental Data Resources, Inc. Database Report.
- *Appendix F*— Utility Location Report
- *Appendix G*— Laboratory Analytical Reports
- *Appendix H*— Boring Logs
- *Appendix I*—EA Standard Operating Procedures
- *Appendix J*— Qualifications of the Environmental Professionals (including resumes of report preparers).
- *Appendix K*—Indoor and Outdoor Air Sampling at the Francis J. Varieur Elementary School

1.2 DETAILED SCOPE OF SERVICES

This Phase I ESA was performed in accordance with ASTM E1527-13 (Standard Practice for ESAs: Phase I ESA Process), and consisted of a review of current and historic activities and

conditions at the property and surrounding properties, including a non-intrusive visual inspection of the property; review of local, state, and federal regulatory database records; review of available historic records; and a survey of adjacent land uses. The Site reconnaissance did not address non-ASTM considerations such as asbestos, lead-based paint, drinking water quality, or radon; or an intensive examination of facility hazards (compliance audit).

The Phase II ESA was performed in accordance with ASTM E1903-11 (Standard Practice for ESAs: Phase II ESA Process). The investigation consisted of a property utility survey and a subsurface investigation, including the collection of soil vapor, soil, and groundwater samples, and laboratory analysis of samples for each of these matrices.

In addition to the above listed field activities conducted by EA during this investigation, RIDEM and the Pawtucket School contracted separately with other entities to perform indoor and outdoor ambient air sampling in and around the Varieur School building. The findings of the investigations conducted by RIDEM and the City are further detailed in Appendix K.

1.3 SIGNIFICANT ASSUMPTIONS

In expressing the opinions stated in this report, EA exercised the degree of skill and care ordinarily exercised by a reasonable prudent Environmental Professional in the same community and in the same time frame given the same or similar facts and circumstances. EA assumes that the client, as set forth in the contractual agreement, is also the user as defined by ASTM E1527-13 and E1903-11. Documentation and data provided by the user, designated representatives thereof, or other interested third parties, or from the public domain, and referred to in the preparation of this assessment, were used and referenced. Consequently, EA assumes no responsibility or liability for the accuracy of such documentation or data.

The independent conclusions in this report represent EA's professional judgment based on information and data available to EA during the course of this assignment. Factual information regarding operations, conditions, and test data provided by the user or their representative are assumed to be correct and complete. The conclusions presented are based on the data provided, observations, and conditions that existed on the date of the site visit.

1.4 LIMITATIONS AND EXCEPTIONS

EA does not warrant that there are no toxic or hazardous materials, or contamination or indoor air impact; nor does EA accept any liability if such are found at some future time, or could have been found if sampling or additional studies were conducted. EA does not assume responsibility for other environmental issues that may be associated with this subject property.

In view of the rapidly changing status of environmental laws, regulations, and guidelines, EA cannot be responsible for changes in laws, regulations, or guidelines that occur after the study has been completed and that may affect the subject property.

This report was prepared for the Rhode Island Department of Environmental Management (RIDEM) Office of Waste Management (OWM) by EA and is based, in part, on third-party

information not within the control of RIDEM or EA. While it is believed that the third-party information contained herein will be reliable under the conditions and subject to the limitations set forth herein, neither RIDEM nor EA guarantee the accuracy thereof.

1.5 SPECIAL TERMS AND CONDITIONS

There are no special terms or conditions.

1.6 USER RELIANCE

This report is exclusively for the use and benefit of RIDEM as shown on the cover page of this report. This report is not for the use or benefit of, nor may it be relied upon by, any other person or entity without the advance written consent of EA.

2. SITE DESCRIPTION

2.1 LOCATION AND LEGAL DESCRIPTION

The property is hereby defined as 486 Pleasant Street in the City of Pawtucket, Providence County, Rhode Island (here, the “Site”) as shown on Figure 1. The property is comprised of three parcels which totals 5.22 acres. The boundaries of the property, as depicted on the current tax map, are shown on Figure 2. The legal description of the property, as presented in the current deed (indenture), was received from the City of Pawtucket City Clerk as part of this investigation and is included in Appendix C.

The property consists of three parcels located at the intersection of Bowles Court and Pleasant Street. The Site is located in a developed residential/commercial area of the City of Pawtucket bound by the Seekonk River to the east. The Max Read Memorial Field adjoins the Site to the south.

2.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The property is located in a residential/commercial area of the City of Pawtucket, Rhode Island.

2.2.1 Topography

The Site is located on the U.S. Geological Survey (USGS) Providence topographic quadrangle map and is approximately 50 feet above mean sea level as shown on Figure 1 (USGS 2012). The topography of the Site is primarily flat with gentle sloping to the east. Regional topography slopes east toward the Seekonk River, which flows south to Narragansett Bay and empties into the Atlantic Ocean on the southern border of Rhode Island.

2.2.2 Geology

The property is underlain by the Narragansett Bay Group of the Rhode Island Formation. The Narragansett Bay Group was formed during the Pennsylvanian Period (approximately 290 to 330 million years ago) and is characterized as primarily arenite. Arenite is a well-sorted sandstone containing little or no matrix material and a relatively simple mineralogic composition. A secondary rock type for the Narragansett Bay Group is shale which is primarily laminated, indurated clay sized minerals (USGS 2013).

The property is located in a GB groundwater area, as classified by RIDEM, which indicates an underlying aquifer that is not suitable for drinking water purposes. An Environmental Resource Map is provided as Figure 3.

2.2.3 Soils

Review of the Web Soil Survey (Natural Resources Conservation Service) indicated that the majority of the subject site is classified as Merrimac-Urban Land Complex, with the remainder

comprised of Udorthents-Urban Land Complex. Merrimac-Urban Land Complex is characterized by urban areas and a mixture of dark brown sandy loam and yellowish brown sandy loam on terraces and outwash plains in the Providence and Warwick, RI areas (Natural Resources Conservation Service). The Udorthents-Urban Land Complex consist of well drained soils that have been disturbed by fill or cuts to level the surface for development. Material properties are variable because fill material is commonly inconsistent.

2.3 CURRENT USE OF THE PROPERTY

The property is owned by the City of Pawtucket and occupied by Francis J. Varieur Elementary School, which is operated by the Pawtucket School Department. The school operates year round with minimal utilization in the summer months.

2.4 DESCRIPTION OF ONSITE STRUCTURES, ROADS, AND IMPROVEMENTS

The property contained the following structures as depicted on Figure 2:

- Francis J. Varieur Elementary School
- Parking area
- Playground

The property is located on the corner of Pleasant Street and Bowles Court. No aboveground storage tanks (ASTs) or underground storage tanks (USTs) were observed at the site. A photograph log is presented in Appendix A.

2.5 CURRENT USE OF ADJOINING PROPERTIES

Properties adjoining the property include a mix of residential and commercial properties to the north, west, and south. Directly to the south of the subject site is the Max Read Memorial Field, which consists of a parking area and sports fields. The Seekonk River is located to the east of the Site. A former manufactured gas plant (MGP) site, currently an active natural gas regulator station and an electrical substation, both operated by National Grid, exists to the east and northeast of the Site.

3. USER PROVIDED INFORMATION

A copy of the ASTM E-1527-13 User Questionnaire submitted to the Pawtucket School Department for the purpose of requesting the following information is presented in Appendix D. The Pawtucket School Department was the operation and maintenance provider of the Francis J. Varieur Elementary School. The school was constructed by the Pawtucket School Department in 1971-1972. Mr. Dennis J. Rebello, Facilities Director for the Pawtucket School Department, completed the User Questionnaire.

3.1 TITLE RECORDS

A copy of the current deed and legal description of the property are provided for review as part of this investigation and are included in Appendix C.

3.2 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

Mr. Rebello indicated that, to the best of his knowledge, he is not aware of any environmental cleanup liens against the property that have been filed or recorded under federal, tribal, state, or local law.

Mr. Rebello indicated that, to the best of his knowledge, he is not aware of any activity and use limitations, such as engineering controls, land use restrictions, or institutional controls that are in place at the Site and/or had been filed or recorded in a registry under federal, tribal, state, or local law.

3.3 SPECIALIZED KNOWLEDGE

Mr. Rebello indicated that he does have specialized knowledge of the operations conducted on the subject property because he is the Facilities Director. He is aware of the former MGP located on the east and northeast border of the property which has been undergoing investigation for environmental purposes.

3.4 COMMONLY KNOWN OR REASONABLY ASCERTAINABLE INFORMATION

Mr. Rebello was questioned regarding commonly known or reasonably ascertainable information about the property that would help the Environmental Professional to identify conditions indicative of releases or threatened releases such as past uses of the property, specific chemicals that are present or once were present at the property, spills or other chemical releases that had taken place on the property, or any environmental cleanups that had taken place at the property. Mr. Rebello indicated he is not aware of any spills or environmental cleanups on the subject property.

3.5 VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES

Mr. Rebello indicated that he is unsure whether the purchase price paid for this property reasonably reflected fair market value of the property.

3.6 OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION

The City of Pawtucket is considered the owner of the property.

3.7 REASON FOR PERFORMING THE PHASE I ENVIRONMENTAL SITE ASSESSMENT

RIDEM informed EA that this report had been contracted to support an environmental investigation. The investigation was in response to public concerns raised about the possibility that chlorinated volatile organic compound (CVOC) vapors that were detected in soil gas at the site property boundary shared with the Tidewater former manufactured gas plant and the NBC sewer easement (which abuts the eastern boundary of the school property).could pose a risk of vapor intrusion to students, teachers and workers in the nearby school.

3.8 OTHER

No other information was provided by the user in association with this Phase I ESA.

4. RECORDS REVIEW

A radius map report was obtained from the Environmental Data Report (EDR) for use in preparation of this report. The EDR report was obtained to fulfill the requirements pertaining to standard environmental record sources, as well as supplementary information considered additional environmental records. A copy of the EDR database report in its entirety is presented in Appendix E. Acronyms and abbreviations utilized in this Phase I ESA Report are provided on the List of Acronyms and Abbreviations and/or directly within the EDR report.

4.1 STANDARD ENVIRONMENTAL RECORD SOURCES AND ADDITIONAL DATABASES

4.1.1 Federal Records and Databases

The following required federal environmental databases were reviewed as part of this investigation:

- National Priorities List
- Proposed National Priorities List
- Delisted National Priorities List
- National Priorities List Recovery – Federal Superfund Liens
- CERCLA Information System (CERCLIS)
- CERCLIS No Further Action Planned
- Corrective Action Report
- Resource Conservation and Recovery Act (RCRA) Treatment/Storage/Disposal
- RCRA Large Quantity Generator (LQG) List
- RCRA Small Quantity Generator (SQG) List
- RCRA Conditionally Exempt Small Quantity Generator (CESQG) List
- RCRA Non-generators (Non-Gen)
- Emergency Response Notification System
- U.S. Engineering Controls – Engineering Controls Site List
- U.S. Institutional Control – Site with Institutional Controls
- Land Use Control Information System (LUCIS).

The following additional federal environmental databases were obtained from EDR and reviewed as part of this investigation:

- Department of Defense
- Formerly Used Defense Sites
- US BROWNFIELDS
- Superfund (CERCLA) Consent Decrees
- Record of Decision
- Uranium Mill Tailings Sites
- Open Dump Inventory

- Toxic Release Inventory Database
- Toxic Substances Control Act
- Federal Insecticide, Fungicide, and Rodenticide Act/Toxic Substances Control Act
- Tracking System
- Section Seven Tracking System
- Polychlorinated Biphenyl Activity Database
- Enforcement Actions Data
- Material Licensing Tracking System
- Mines Master Index File
- EDR MGP
- Facility Index System
- Mercury Database
- National Pollutant Discharge Elimination System
- RCRA Administrative Action Tracking System
- Integrated Compliance Information System
- Radiation Information Database
- Risk Management Plans
- Underground Injection Control Wells
- Voluntary Remediation Program
- Federal Emergency Management Agency (FEMA) Underground Storage Tank Listing
- Engineering Controls Site Listing
- Voluntary Remediation Program Database
- Tier 2 Information Listing
- Corrective Action Program List
- Potential Responsible Parties
- Transformer Registration Database
- Coal Combustion Surface Impoundments
- Steam-Electric Plant Operation Database
- Financial Assurance Information
- EPA Watchlist.

Database findings indicate that there are six facilities located within the ASTM-recommended search distances of the subject Site. The six facilities include 3 RCRA Non-Gen sites, 1 RCRA SQG, 1 CERCLIS site, and 1 US Mines site located within 1.0 mile of the Site. Of these facilities 1 RCRA Non-GEN, 1 RCRA CESQG, 1 CERCLIS, and 1 US Mines site are upgradient and within 0.50 miles of the Site. Upgradient facilities within 0.5 miles have the potential to have an adverse environmental impact on the groundwater, soil vapor, and/or soil beneath the Site. A summary of each of the facilities that have the potential to impact the site follows:

- *CVS #2234, 425 East Avenue*, was identified in the Federal RCRA SQG database. This property is located approximately 0.180 miles west-northwest of the Site and is at a higher elevation. A small quantity generator is defined as a facility that produces 100 kilograms (kg) or less per month of hazardous waste. Wastes generated by this facility are reported as ignitable wastes (D001), corrosive wastes (D002), silver, P001, P042,

P075, and P081. These products are likely associated with pharmacy applications and photo processing. No violations were reported for this facility; therefore, it is not considered a REC for the Site.

- *Fortuna Robert J MD/Orthopedics of New England, 407 East Avenue*, was identified in the RCRA Non-Gen database. This facility is located approximately 0.211 miles west-northwest of the Site and is at a higher elevation. As the facility is listed in the RCRA Non-Generator database, it is inferred that no waste is being generated at this time. Since this facility no longer generates waste and no violations were reported, it is not considered a REC for the Site.
- *River Sand + Gravel, Inc.*, was identified in the US Mines database. This facility is located approximately 0.170 miles east of the Site. There were no violations listed in reference to this facility. As there are no violations reported, this quarry is not considered a REC for the Site.
- *Tidewater Coal Gassification, 91 Tidewater Street*, was identified in the CERCLIS database. This facility abuts the Varieur School property to the north-northwest of the Site and is situated at a lower elevation. This facility is a former MGP and is currently listed in the RI State Hazardous Waste Site (SHWS) and RI Brownfields databases. The MGP operated from the 1880's to 1968. On-site contaminants of concern have been identified as dense non-aqueous phase liquid (DNAPL) such as coal tar; light non-aqueous phase liquid (LNAPL) such as oils; volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); and polyaromatic hydrocarbons (PAHs). As this former MGP is an active brownfields site in the state of RI it is considered a REC for the Site. Further discussion of this property is included in the State Regulatory Environmental Records section (section 4.2.1).

The records review identified the former Tidewater MGP as a potential source of contamination from surrounding properties to the subject Site due to proximity to the Site and documented impacts. Additional records for the former Tidewater MGP are discussed in Section 4.2.1.2. A Phase II ESA (Section 8) was conducted to determine if Tidewater, the NBC sewer pipeline easement, impacts to groundwater, or other potential sources have impacted the subject site.

4.1.2 State/Tribal Records and Databases

The following required state/tribal databases were reviewed as part of this investigation:

- SHWS – Remediation Sites Lists
- Solid Waste Facilities/Landfills Database/Transfer Station List
- Leaking Underground Storage Tank (LUST) List
- Leaking AST List
- Leaking Storage Tank List
- UST – Registered UST Facility List
- AST – Registered AST Facility List

- Oil and Hazardous Material Response Log/Spill Report
- Inst Control – Remediation Sites List
- Drycleaners – Drycleaner Facilities
- Aerometric Information Retrieval System – Emissions Inventory Data
- Lead Inspection Database.

The following additional state/tribal environmental databases were reviewed as part of this investigation:

- State Recycling Directory – SWRCY
- Historical Spills
- Massachusetts Hazardous Waste Generation (HW GEN)
- AST
- DRYCLEANERS
- Permitted Air Facility Listing
- Brownfields Site Specific Assessments
- Torres Martinez Reservation I
- Illegal Dumping Site Locations
- Clandestine Drug Labs
- Open Dumps on Indian Lands
- Indian Reservations
- Indian Leaking UST
- Indian UST.
- Indian Voluntary Cleanup Priority Listing

Database findings indicate that there are seventy-two state facilities located within the ASTM-recommended search distance of the subject site. These facilities include 40 RI SHWS sites, 7 RI LUST sites, 13 RI UST sites, and 12 RI Brownfields located within 1.0 mile of the Site. Of these facilities 2 RI SHWS sites, and 1 RI Brownfield site are located upgradient and within 0.50 miles of the Site. Upgradient facilities within 0.50 miles have the potential to have adversely impact the groundwater, soil vapor, and/or soil beneath the Site. Tidewater MGP (91 Tidewater Street) was listed as a RI SHWS and is summarized in Section 4.1.1 and Section 4.2.1. A summary of each of the remaining upgradient sites is included below:

- *Vaz Property-Heating Oil SPI, 178 Mulberry Street*, was identified in the RI SHWS database. This facility is located approximately 0.496 miles west-northwest of the Site. The LUST at this property is considered active however due to the distance from the Site it is EA's opinion that this property is not a REC for the Site.
- *76 Jefferson Street*, was identified in the RI Brownfields database. This facility is located approximately 0.470 miles west-northwest of the Site. This property was developed into a community garden in 2009 by the Pawtucket Redevelopment Agency. Due to the distance of the property from the Site and redevelopment of the property, it is EA's opinion that this property is not a REC for the Site.

Based on the state and tribal records information reviewed, there are no additional potential sources of contamination from surrounding properties to Site soil, groundwater, and/or soil vapor.

4.2 ADDITIONAL ENVIRONMENTAL RECORDS SOURCES

4.2.1 State Regulatory Environmental Records

4.2.1.1 Varieur Elementary School Records

EA reviewed state regulatory environmental records of the Francis J. Varieur Elementary School for this Phase I ESA. Previous environmental investigations at the subject site were conducted in conjunction with investigations of the Tidewater MGP property:

- From 1986 through 1989, RIDEM conducted air sampling at five locations in the Francis J. Varieur School for analysis of acetylnaphthalene, naphthalene, and hydrogen cyanide. No concentrations were detected. RIDEM also conducted limited soil sampling for polyaromatic hydrocarbons (PAH), cyanide, barium and pH; no exceedances of the RIDEM criteria were noted (GZA Geoenvironmental, Inc. [GZA] 2011).
- In 1996, Atlantic Environmental Services (AES) conducted an investigation on behalf of Tidewater at the Varieur School that included indoor air sampling, soil gas sampling, and soil sampling at Varieur. Indoor air was sampled in five locations for trichloroethylene (TCE). All five samples were non-detect, with a detection limit of 0.8 mg/m³. However, this detection limit is substantially higher than levels that would now be considered acceptable in indoor air. Therefore, the 1996 non-detect findings are not conclusive to determine whether significant levels of contaminants of concern were present in the school at that time.

Temporary soil gas points were installed at a depth of 4 feet and field screened for BTEX and chlorinated solvents. No BTEX compounds were detected, although two samples contained TCE at what was characterized at the time as a low level (not quantified by screening methods). Subsequent sampling re-confirmed these reportedly low level non-quantified detections. The report attributed TCE impacts to possible use of maintenance products at the school. The two TCE impacted locations were on the southeastern and south sides of the school. The detections were not further investigated as TCE was not a target analyte for the Tidewater investigations.

Surficial soil sampling was also conducted on the school property and adjacent City owned Max Reed field property for PAHs and 13 priority pollutant metals. The majority of the 22 soil samples exceeded the Method 1 Residential Direct Exposure Criteria (RDEC) for arsenic, beryllium and several individual PAHs, as listed in the 1996 RIDEM Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Remediation Regulations), which were the applicable criteria at the time of the

investigation (AES 1996). Arsenic and beryllium are naturally occurring elements in soil. Using the current Remediation Regulation criteria, which was revised in November, 2011, all 22 samples would be compliant for the revised beryllium RDEC, which is based upon state beryllium background levels. While two of the of the 22 arsenic samples matched or slightly exceeded the revised arsenic RDEC of 7 mg/kg (7.0 and 7.4 mg/kg), the arsenic conditions meet all of the requirements of Section 12 (Special Requirements for Managing Arsenic in Soil) and would therefore be deemed consistent with state background levels, and hence be non-jurisdictional for arsenic under current regulations.

The AES investigation concluded that concentrations of metals and PAHs detected in soil on the school and city properties were not significantly different than the levels detected in the background soils of similar land use areas within the city of Pawtucket (AES 1996). No further investigation of metals or PAHs was conducted on the school or city properties for the 2014 investigation conducted by EA as the goal of the study was to investigate the possibility of volatilization of VOCs into indoor air of the school from the subsurface.

4.2.1.2 Tidewater MGP Records

EA reviewed state regulatory environmental records of the Former Tidewater MGP located to the east and northeast borders of the Site. No other state regulatory environmental records were reviewed for this Phase I ESA. The summaries of records reviewed for the former MGP Tidewater site are below:

MGP operations were conducted at the Tidewater property from approximately 1880 to 1954 and power plant operations were conducted from approximately 1890 to 1975 (GZA 2011). Following the cessation of MGP operations at the site, National Grid utilized the property as a natural gas and electrical substation. Coal tar, coal, coke, gasoline, oils, and other petroleum products were used and/or generated and stored on-site for nearly 100 years. Numerous oil storage containers were located on the facility over the years and a list of those tanks is recorded in the Site Investigation Data Report written by GZA (2011).

Greater than 50 release conditions (oils spills from floods, explosions, tank leaks, fuel line leaks, etc.) were noted by GZA for the Tidewater site that pre-date formal RIDEM spill reporting. A Letter of Responsibility was issued to Blackstone Valley Electric Company by RIDEM for the MGP site on September 12, 1995 opening State Site No. 95-022. Since RIDEM reporting was initiated, four releases have been reported:

- In 2004, there was a release of mercury reported within the facility machine shop. Emergency response measures were conducted inside of the building and on adjacent soils. In 2005, excavation was conducted for further removal of metallic mercury which had been released to the former machine shop interior and exterior. Following excavation activities mercury concentrations in the soil were below applicable regulatory values (VPB 2005).

- In 2007, during an investigation of non-polychlorinated biphenyl (PCB) mineral oil release, a historical release of PCBs was discovered. The US Environmental Protection Agency (EPA) issued approval for clean-up of the PCBs which was scheduled to take place in 2011 (GZA 2011).
- In June 2009, a release of accumulated stormwater was reported and corrections were made to prevent another release from occurring.
- In October 2009, a sheen was reported on the Seekonk River adjacent to the MGP site and a temporary containment cap was installed. The cap has since been effective in preventing any further sheen formation.
- A soil gas investigation was conducted at the Tidewater property in 2013. The investigation consisted of the installation of 34 soil gas probes and the collection of 33 soil gas samples. Ten ambient air samples were also collected. The results of the investigation indicated the presence of chlorinated solvents in soil gas in eight samples, all of which were collected along the western tidewater property boundary and also coincide with the location of the NBC combined sewer overflow pipeline. Four of the eight samples with chlorinated solvent detections were collected along the property boundary with the Varieur School.

Through various subsurface investigations from 1986 until present, the contaminants of concern (COCs) at the Tidewater property were determined to be PAHs, naphthalene, pyrene, PCBs, metals, pure phase oils and tars. A final remedy for the Tidewater site has not been determined and the regulatory process is ongoing. The soil gas investigation conducted in 2013 appears to demonstrate that soil gas impacts along the Varieur School property are likely not attributable to contamination present on the Tidewater property.

4.2.2 City of Pawtucket Fire Department Records

EA visited the City of Pawtucket Fire Department for information regarding environmental issues or emergency response at the subject property. There were no records of any aboveground or underground storage tanks associated with the Site.

4.2.3 City of Pawtucket Tax Assessor Files

The City of Pawtucket tax map is available online at <http://www.pawtucketri.com/departments/tax/platmap.php>. The Varieur property is listed as Plat 65B, Lots 644, 646, and 650, all of which are owned by the City of Pawtucket. Property boundaries as depicted on the tax map are shown on Figure 2. Previous owners include the Blackstone Valley Electric Company (BVE).

4.2.4 City of Pawtucket City Clerk Records

The City of Pawtucket City Clerk did not have a deed on file. An indenture between BVE and the City of Pawtucket was provided for the Site and is included in Appendix C. The property was obtained by the City of Pawtucket from the BVE in July 1968.

4.2.5 Other Records

No other records were reviewed in association with this Phase I/II ESA.

4.3 PHYSICAL SETTING SOURCES

Information on physical setting sources, including topographic maps, was reviewed as part of this investigation. This information is included in Section 4.4.

4.4 HISTORICAL USE INFORMATION ON THE PROPERTY AND ADJOINING PROPERTIES

4.4.1 Historical Topographic Maps

Topographic maps from 1894, 1915, 1935, 1939, 1947, 1957, 1970, 1975, 1979, 1987, and 1996 of the areas surrounding the subject site were reviewed as part of this investigation. The following table summarizes the information from these maps. Historical topographic maps review indicates that the Varieur School was constructed between 1970 and 1975. Copies of the reviewed topographic maps are presented in Appendix B.

HISTORIC TOPOGRAPHIC MAP REVIEW SUMMARY

Date	Quadrangle	Subject Property	Adjacent Properties
1894	Providence 15-minute	The subject property appeared undeveloped or on the edge of residential-type roads. The area between the residential roads and the Seekonk River is undeveloped and the coastline is irregular in shape.	Due to the scale of the map, particular properties are difficult to identify. The city of Pawtucket is visibly separated from Providence and connected by two main roads and a rail line but little residential development. The subject site is on the southern side of the developed city of Pawtucket. The edge of the Seekonk River adjacent to the site appeared undeveloped from the subject site and to the south, until it nears Providence Harbor.
1915	Providence 15-minute	The subject property appears undeveloped or on the edge of residential-type roads. The area between the residential roads and the Seekonk River is undeveloped and the coastline is irregular in shape.	The map appeared similar to the 1894 topographic map. Providence is more developed; however, Pawtucket has approximately the same footprint. Route 1 runs through the center of city and crosses the Seekonk River slightly north of the subject site.
1935	Providence 7.5-minute	The subject site appeared undeveloped and is on the edge of a residential area. The land is steeply graded to the east and west	To the east and northeast of the subject site and down a steep slope, the coast of the Seekonk River appeared developed with seven tanks. Other structures are not

Date	Quadrangle	Subject Property	Adjacent Properties
		of the subject site, but the subject site appears relatively flat.	depicted. The property to the south of the subject site is also undeveloped. Pawtucket is very developed and the development extends and connects with that of Providence.
1939	Providence 7.5-minute	The subject site appears identical to the previous map.	The map appears similar to the 1935 topographic map.
1947	Providence 7.5-minute	The subject site appears identical to the previous map.	The map appears similar to the 1939 topographic map.
1957	Providence 7.5-minute	The subject site appeared largely undeveloped. Two small buildings are depicted, however they may be on the property to the south of the subject site.	The MGP to the north and east of the subject site appear larger. It extended north to the Route 1 bridge and south to approximately in line with the subject site. Five of the seven tanks previously identified are depicted, along with approximately 15 buildings and a tower. The tank areas are labeled as "Gas" and "Oil." A substation is located to the north of the subject site (west of the MGP). Pawtucket appears more developed. Two schools (St. Anns and West High) are located within four blocks of the subject site to the west and northwest.
1970	Providence 7.5-minute	The subject site appears undeveloped. The two small buildings identified in the previous photograph are not depicted.	The adjacent areas appeared similar to the 1957 topographic map. Route 1 expanded and appeared as a divided highway with on and off ramps before the bridge over the Seekonk River.
1975	Providence 7.5-minute	The subject site is developed with a building that appears to be the Varieur School.	The MGP appeared similar to the previous maps. The Max Read Memorial Field is developed with a round track complex and a small building on the south edge of the property. Pawtucket appeared generally the same as the previous map.
1979	Providence 15-minute	The subject site building is depicted as two adjacent buildings instead of one large building.	The surrounding areas appeared similar and the detail level does not show small changes.
1987	Providence 7.5-minute	The subject site is developed with a building that appears to be the Varieur School.	The MGP property appeared with only two tanks, one large building, and three small buildings. The property is labeled as "Substa." and power lines are shown crossing the Seekonk River adjacent to the MGP. The Max Read Memorial Field appeared identical to the previous maps. Shea High School is located at the former West High School.
1996	Providence 7.5-minute	The subject site is developed with a building that appears to be the Varieur School.	Adjacent properties and roads appeared similar to the 1987 map.

4.4.2 Aerial Photographs

Aerial photographs from 1939, 1951, 1955, 1962, 1969, 1970, 1977, 1981, 1985, 1992, 1995, and 2012 were reviewed as part of this investigation. Aerial photograph review indicated the Site was developed between 1970 and 1977. Observations made from the reviewed aerial photographs are presented in the following table. Copies of the aerial photographs are presented in Appendix B.

AERIAL PHOTOGRAPH REVIEW SUMMARY

Year	Source	Observations
1939	EDR	The subject site is mostly undeveloped and the groundcover consists of a mix of dirt and grass with no trees. The ground at the subject site appears flat (graded). Two small buildings are visible on the western side of the subject site that may be residences. The MGP is located to the north and east of the subject site. Eight large white storage tanks are visible. Piles of dark material, possibly coal, are located along the Seekonk River to the north of the subject site. Multiple large and small buildings are located on the property. The property to the south of the subject site (currently Max Read Memorial Field) is undeveloped except for the northeastern corner, which is part of the MGP. The Route 1 bridge, located to the north of the subject site, accommodates approximately 2 lanes of traffic. The surrounding areas are largely residential, with some industrial development on the eastern bank of the river.
1951	EDR	The subject property appears undeveloped. An access road to the river and/or southern edge of the MGP is located along the southern property line. Three large white tanks and three darker colored tanks are visible on the MGP property. The shadow of a large stack or tower is visible on the MGP property. The general surrounding area appears unchanged from the previous photograph.
1955	EDR	The subject property appears similar to the previous photograph except that it appears cars are parked along the southeastern corner of the property, near the access road. The MGP and surrounding areas appear unchanged.
1965	EDR	The subject property appears similar to the previous photograph except cars are absent. The MGP has installed a large black covering adjacent to the two largest white storage tanks. All buildings appear unchanged since the previous photograph.
1969	EDR	The subject property is not visible due to the scale of the aerial. Pawtucket appears densely developed with the main downtown to the north of the Route 1 Bridge. Residential areas surround the subject site. Parks and green space are located to the south of the subject site, along the Seekonk River.
1970	EDR	The subject site is undeveloped. Five tanks are visible at the MGP and there is not a covering on the ground adjacent to the largest tanks. Three large buildings have been demolished and only the building with the stacks remains, as well as multiple smaller site buildings. There is a building located on Pleasant Street immediately to the south of the Max Read Memorial Field property, which is also undeveloped.
1977	EDR	The photograph quality is poor, but the building is visible on the subject site, as well as the track on the Max Read Memorial Field property. Features are indistinguishable on the MGP property.
1981	EDR	The building is located on the subject site. The northern portion of the building has a light colored roof, but the southwestern portion has a darker and possibly raised roof. A parking area is located to the north of the building. A fenced play field is located on the eastern side of the building. A vacant lot divides Varieur from the Max Read Memorial Field. The Field property has a parking area on the west side, a large oval track, and baseball fields to the south. The MGP property is mostly

Year	Source	Observations
		vacant. The only remaining structures are the two largest white storage tanks, approximately 6 small site buildings (the large building with the stacks has been demolished), and access roads. The surrounding areas appear identical to previous maps.
1985	EDR	Subject property and adjacent properties appeared similar to the 1981 aerial; poor image quality make detail impossible to distinguish.
1992	EDR	Subject property and adjacent properties appeared similar to the 1985 aerial; poor image quality make detail impossible to distinguish
1995	EDR	The Varieur School building appears in its current configuration. A playground and a field separate Varieur from the Max Read Memorial Field property. The MGP appears similar to the 1981 photograph, except tank dismantling is in progress on the two large white tanks.
2002	EDR	The subject property appears in its current configuration. The MGP property has more vegetation on unused areas. The two large tanks have the same footprint as they did previously, but are now low to the ground with possibly just the foundations remaining. The surrounding areas appear identical to previous maps.

4.4.3 Fire Insurance Maps

Fire insurance maps from 1902, 1923, 1949, and 1984 were reviewed as part of this investigation. Fire insurance map review indicated the Site was developed between 1948 and 1984. The review did not identify any historic tanks or other sources of possible environmental impacts. Observations made from the Sanborn fire insurance maps are presented in the following table. Copies of the maps are presented in Appendix B.

FIRE INSURANCE MAP REVIEW SUMMARY

Year	Source	Observations
1902	EDR / The Sanborn Library LLC	The subject site is not shown on the Sanborn map. Small residential lots and houses immediately to the north of the subject site are shown. The MGP is not visible. Pleasant Street and Bensley Street are the streets closest to the subject site.
1923	EDR / The Sanborn Library LLC	The subject site is shown as subdivided into at least 25 smaller properties. Only one of the subject site properties along Pleasant Street is developed. The developed property has two small buildings that appear residential. A street called Bowles runs through the subject site, a street called Thornton runs along the northern edge of the site, and a street called Lyman runs along the southern edge of the site. Stiness Street runs between the western MGP property line and the subject site. Western portions of the MGP are visible, including a label on one large building notating the property as "Blackstone Valley Gas." A machine shop, four unlabeled buildings, one building partially labeled as "Engine" and one large round storage tank are visible. Surrounding areas are residential.
1949	EDR / The Sanborn Library LLC	The subject site is again depicted as a group of smaller properties. The residence along Pleasant Street is no longer present. Streets are identical to the previous map. Stiness Street is no longer present, and the MGP has expanded slightly westward. MGP features on the western portions of the site are shown including a 28,500 barrel fuel oil tank, another large tank with labels not visible, a small building called "Formite Generating Building," a transformer yard, a fireproof control building for the transformer fog spray protection, two areas labeled "Stge," a small building with an illegible label, and a portion of a

Year	Source	Observations
		building called "Engine Bldg." Surrounding areas are residential
1984	EDR / The Sanborn Library LLC	The subject site is shown with a large building labeled as "Pleasant St School." The southwestern corner of the building is indicated as 22 feet high and the remainder of the building is 14 feet high. The street along the northern edge of the site is now called Bowles. Surrounding areas are residential. The Max Read Memorial Field is labeled as "Athletic" and "Parking," but structures are not shown. No tanks are visible on the MGP property. The transformer yard is expanded. The "Engine Bldg" is still visible, but the machine shop adjacent to it is gone. Surrounding areas are residential.

4.4.4 Local Street Directories

City Directories for Pleasant Street from 1938, 1943, 1948, 1953, 1959, 1964, 1969, 1974, 1979, 1984, 1989, 1996, 1999, 2003, 2008, and 2013 were searched by EDR as part of this investigation. The City Directory review has been summarized in the City Directory table presented below. The subject property was not identified under any name before being identified as Francis J. Varieur Elementary School. The subject property was first identified as Francis J. Varieur Elementary School in 1974. Varieur was identified in 1974-2008 and was not identified in the 2013 listings. A copy of the City Directory Report provided by EDR is included in Appendix B.

CITY DIRECTORY REVIEW SUMMARY

Year	Source	Address	Occupant
1938	Polk's City Directory	Pleasant Street 360 Pleasant Street	Residential Properties Vacant Properties Gionfriddo Gaetano bldg
1943	Polk's City Directory	Pleasant Street 544 Pleasant Street	Residential Properties Vacant Property Barber Jos S Veterinarian
1948	Polk's City Directory	Pleasant Street 391 Pleasant Street 544 Pleasant Street	Residential Properties Vacant Property A&H Plumbing & Heating Co Barber Jos S Veterinarian
1953	Polk's City Directory	Pleasant Street 000 Pleasant Street 315 Pleasant Street 360 Pleasant Street 765 Pleasant Street	Residential Properties Vacant properties Riverside Cemetery Nunez Manuel A Liquors Gionfriddo Gaetano bldg Percy Jos Monument Work
1959	Polk's City Directory	Pleasant Street 395 Pleasant Street 560 Pleasant Street	Residential Properties Vacant Properties Alix John F Auto Repr and welding Barber Jos S Veterinarian
1964	Polk's City Directory	Pleasant Street 395 Pleasant Street	Residential Properties Vacant Property Alix Welding Co Inc Welding Auto Repairs
1969	Polk's City Directory	Pleasant Street	Residential Properties
1974	Polk's City Directory	Pleasant Street	Residential Properties

Year	Source	Address	Occupant
		486 Pleasant Street	Vacant Property Varieur Francis Elementary Sch
1979	Polk's City Directory	Pleasant Street 395 Pleasant Street 486 Pleasant Street	Residential Properties Vacant Property Alix Welding Co Inc Varieur Francis J Elementary Sch
1984	Polk's City Directory	Pleasant Street 334 Pleasant Street 394 Pleasant Street 395 Pleasant Street 486 Pleasant Street	Residential Properties Red Farm Studio greeting cards/SHS Competition Shooting Supplies Inc Judy's Beauty Salon Alix Welding Co Inc/Alix Welding Radiator Division Inc Varieur Francis J Elementary Sch
1989	Polk's City Directory	Pleasant Street 394 Pleasant Street 395 Pleasant Street 486 Pleasant Street 537 Pleasant Street 544 Pleasant Street	Residential Properties Judy's Beauty Salon Alix Welding Co Inc Varieur Francis J Elementary Sch Read Max W Memorial Field Oak Hill Nursing Center Inc
1996	Polk's City Directory	Pleasant Street 394 Pleasant Street 395 Pleasant Street 486 Pleasant Street 544 Pleasant Street 752 Pleasant Street	Residential Properties Judy's Beauty Salon Cuddy Spray Fireproofing Varieur Francis J Elementary Sch Oak Hill Nursing Ctr Personacare Theratex Riverside Cemetery
1999	Cole Information Services	Pleasant Street 394 Pleasant Street 486 Pleasant Street 544 Pleasant Street 555 Pleasant Street	Residential Properties Judy's Beauty Salon Varieur Francis J Elementary Sch Oak Hill Nursing & Rehabilitation Services Theratex J & S Construction
2003	Cole Information Services	Pleasant Street 394 Pleasant Street 455 Pleasant Street 486 Pleasant Street 544 Pleasant Street 555 Pleasant Street 565 Pleasant Street	Residential Properties Judy's Beauty Salon Real Estate Mrktng & Mrtg Fing Pawtucket City Schol Dstrct Theratex Healing Space of New England Inc Optimal Business Prcs LLC
2008	Cole Information Services	Pleasant Street 455 Pleasant Street 486 Pleasant Street 505 Pleasant Street 544 Pleasant Street	Residential Properties Real Estate Marketing & Mortgage Francis J Varieur School/Pawtucket City School District Fred's Place Inc Kindred Healthcare Inc/Oak Hill Nursing & Rehab Center
2013	Cole Information Services	Pleasant Street 544 Pleasant Street	Residential Properties Oak Hill Nursing & Rehabilitation

4.4.5 Prior Environmental Reports

There are no prior environmental reports for the Site except for the historical environmental reports which were discussed in Section 4.2.1.1.

4.4.6 Other Historical Sources

No other historical sources were reviewed in association with this Phase I/II ESA.

5. SITE RECONNAISSANCE

5.1 METHODOLOGY AND LIMITING CONDITIONS

The Site reconnaissance was conducted on 17 June 2014 by EA personnel. EA personnel were provided access to all areas of the Site by Mr. Dennis Rebello of the Pawtucket School Department. The school was not occupied at the time of the Site reconnaissance.

5.2 GENERAL SITE SETTING

The subject property is located in a commercial/residential area in Pawtucket. The subject property abuts the Tidewater former MGP site to the north and east. The Seekonk River is located approximately 800 ft east of the Site. Regional topography is sloped east toward the Seekonk River.

5.3 INTERIOR OBSERVATIONS

The following information documents the interior observations of the property's structure(s) conducted on 16 June 2014:

- Varieur is a one story building with classrooms, assembly areas, offices, a kitchen, a maintenance area, and restrooms. The restrooms contain open floor drains which are reportedly connected to the municipal sewer line.
- The library is centrally located within the building and the classrooms are at the outer edges of the building with only a few located at the interior of the building.
- The walls appear to be of concrete cinder block construction and are painted.
- The floors in the hallways, cafeteria/gymnasium, and kitchens are linoleum. Classrooms have carpeted floors.
- There are sinks located in most hallways. No staining or leaking was present on the floors.
- The boiler room is located at the south side of the building off from the custodial room. The heat for the building is natural-gas-fired forced hot water and the air conditioning is fueled by natural gas. No staining or floor cracks were observed in the room.
- There are inactive transformers located in a supply room next to the custodial room. Two active transformers are located within the custodial room.
- There are security and fire alarm systems located at the northwest entrance of the building next to the front office.

5.4 EXTERIOR OBSERVATIONS

The exterior of the Site was observed on 16 June 2014 at approximately 0800 hours. At the time of the Site visit, the temperature was in the 70s (degrees Fahrenheit) with clear skies. The developed portions of the subject property were the focus of the exterior reconnaissance.

EA noted several general observations of the Site. The Varieur building has a brick exterior with the main entrance at the northwest corner. The main service entrance is on the south side of the building. There are doors on most exterior walls that remain locked for most of the school day. Active areas of the Site are primarily covered with asphalt. The parking area is located on the north side of the school. The playground is located on the south side of the building and has wood chip landscaping. South of the playground on the adjoining property is the Max Read Memorial Field and two baseball fields used primarily for high school sports activities. The following information documents the exterior observations:

- There is one transformer located on the west (Pleasant St.) side of the building on a concrete pad in grassy area.
- A shed and garbage disposal bin are located on the south side of the building off of the paved area surrounding the building.
- On the east, south, and west ends of the building are fenced asphalt recreation areas.
- The exterior of the building was observed to be in good condition with no stained pavement or soils. No stressed vegetation was observed onsite. No evidence of impacts to soil, groundwater, or sources that may cause soil vapor intrusion was observed during the Site reconnaissance.
- An easement exists along the southern and eastern sides of the site where a Narragansett Bay Commission (NBC) combined sewer overflow pipeline runs toward the Seekonk River. Multiple manholes are located at grade to provide access to the line.
- Five partially destroyed soil gas monitoring points are located along the eastern property line of the subject site in the grass. The construction and date of installation of the points is unknown.

6. INTERVIEWS

The following summary of Site history is based on a compilation of information collected from interviews. The subject property is occupied by the Francis J. Variieur Elementary School which is operated by the Pawtucket School Department at the time of the investigation. The facility began operation in 1972. The land is owned by the City of Pawtucket.

6.1 PRESENT AND PAST OWNER INTERVIEWS

EA was able to interview Mr. Dennis Rebello, Pawtucket School Department Facilities Operator, at the time of the Site reconnaissance activities. Mr. Rebello had been employed with the Pawtucket School Department for 11 years.

Information obtained by the interview with Mr. Rebello has been incorporated and referenced throughout this report.

6.2 PRESENT AND PAST SITE MANAGER INTERVIEW(S)

The Pawtucket School Department would be considered the present Site manager of the subject property. Mr. Rebello was interviewed as a representative of the Pawtucket School Department. Mr. Rebello is not aware of any past owners of the subject property.

6.3 PRESENT AND PAST OCCUPANT INTERVIEW(S)

The Pawtucket School Department would be considered the present Site occupant of the subject property. Mr. Rebello was interviewed as a representative of the Pawtucket School Department. Mr. Rebello is not aware of any past owners of the subject property.

6.4 LOCAL GOVERNMENT OFFICIAL INTERVIEW(S)

Information obtained from interviews with local government officials is presented in Section 4.2.

6.5 INTERVIEWS WITH OTHERS

No additional interviews were conducted.

7. FINDINGS OF PHASE I INVESTIGATION

7.1 *DE MINIMIS* FINDINGS

A *de minimis* finding is not considered a REC, but would rather be considered a condition where no additional investigation or action was currently warranted; however, preventive measures may be prudent and are provided only for the purpose of awareness. No *de minimis* conditions were identified during this Phase I ESA.

7.2 HISTORICAL RECOGNIZED ENVIRONMENTAL CONDITIONS

No historical RECs were identified during this Phase I ESA.

7.3 RECOGNIZED ENVIRONMENTAL CONDITIONS

The following RECs were identified during the Phase I ESA:

Historical use of the adjacent property as a MGP and power plant resulted in the storage of many types of oil and hazardous materials. A number of releases were reported up to 2011. The former MGP is located on the western bank of the Seekonk River and down a steep slope from the Site, therefore groundwater flow is not likely to facilitate migration of contaminants toward the subject site. Migration of contaminants in soil is not considered a risk unless soil was physically moved to the subject site from the former MGP, such as during fill/grading activities. Potential soil vapor migration from the former MGP property to the subject site was evaluated as part of this Phase II portion of this ESA.

- Soil records, topographic maps, and observations of the surrounding areas indicate that the subject site was filled and/or graded in order to achieve a flat surface on which to construct the Varieur School. In the 1935 topographic map, the site appeared flat while all surrounding areas were steeply sloped down to the Seekonk River. The source of fill material is unknown and environmental testing of fill would not have been performed during this period. Common constituents that are the result of urban fill include PAH and metals (Massachusetts Department of Environmental Protection, 2002).
- Historic soil gas sampling and analysis conducted along the NBC combined sewer overflow pipeline detected chlorinated VOCs at concentrations exceeding the current Massachusetts Sub-Slab Screening Values presented in the 2011 “Interim Final Vapor Intrusion Guidance.” The Massachusetts Sub-Slab Screening Values were used because RIDEM does not currently have screening values or standards for evaluating soil gas. The Massachusetts Sub-Slab Screening Values are intended to be compared to sub-slab soil gas samples collected from the airspace immediately below a building’s basement or slab, which is most likely to be representative of what may be entering a building. The potential exists for the backfill used during installation of the pipeline or the water flowing through the pipeline to adversely impact soil vapor at the site. Additionally the

(presumed) increased porosity of the backfill and/or bedding of the pipeline could create a preferential migratory pathway for soil vapors to enter the site.

7.4 CONTROLLED RECOGNIZED ENVIRONMENTAL CONDITIONS

No controlled RECs (CRECs) were identified during this Phase I/II ESA.

7.5 DATA GAPS

A data gap was defined by ASTM E-1527-13 as a lack of or inability to obtain information required by this practice despite good faith efforts by the Environmental Professional to gather such information. Data gaps may result from the incompleteness in any of the activities required by this practice including, but not limited to, the site reconnaissance, interviews, and historical research. Failure to achieve the historical research objectives identified in the standard was termed a *data failure* and was a type of *data gap*.

One data gap was identified: the lack of information regarding the NBC pipeline that runs adjacent to the subject site. EA recommends further research on the pipeline to determine the age of the line, construction details, inquiring whether NBC has ever conducted sampling of the contents of the line or the easement in the vicinity or upgradient of the site, and details of the sources of water flowing through the pipeline to evaluate if the line or the easement are possible sources of soil vapor impacts.

8. SUMMARY OF PHASE II FIELD INVESTIGATION

A Phase II ESA was conducted to investigate RECs identified in the Phase I ESA and the detections of chlorinated solvents in soil gas along the property boundary. The focus of the investigation was to determine if impacts had migrated from the property boundary towards the school itself and to identify the source of the impacts. The investigation consisted of a site utility survey, soil vapor point installation and sampling, soil boring advancement and soil sampling, and monitoring well installation and groundwater sampling.

8.1 SITE UTILITY SURVEY

On 25 June 2014 a subsurface utility survey was completed by EA and a subcontractor, TPI Environmental, Inc. A communications line, water line, gas line, a sanitary sewer line, and an unknown subsurface utility line (assumed to be separate communications for the school fire alarm) were identified, as well as multiple electric lines, storm sewer lines, and the NBC pipelines. The utility locations were marked with spray paint on the ground surface and documented in a utility plan drawn by an EA drafter. The utility layout is displayed on Figure 2. Utility locations were verified with completion of a Digsafe utility markout prior to ground disturbance. As built utility plans for the sub-slab utilities in the Varieur building were not available at the time of the investigation. Due to safety concerns about drilling through the slab without accurate knowledge of the exact utility locations, no sub-slab soil gas samples were collected from the airspace immediately below the building's slab. All soil gas samples were collected from exterior locations around the school property.

A copy of the Utility Location Report is included as Attachment H.

8.2 SOIL VAPOR INVESTIGATION

EA contracted and oversaw the installation of 17 shallow and 3 deep temporary soil gas monitoring points at locations around the property on 23 and 24 July 2014. Due to subsurface conditions, the contract numbers of soil gas probes (16 shallow and 4 deep) were not attainable. One deep point was converted to a shallow point. Shallow point target depth was 5 feet and deep point target depth was approximately 20 feet. The table below summarizes the depths and construction of soil gas points. GeoLogic Earth Exploration, Inc of Norfolk, MA (Geologic), a RI Certified Woman Owned Business, performed the drilling with a direct push drill rig. No soil samples or rinsate blank samples were collected. All soil gas probes were constructed of one-inch polyvinyl chloride (PVC), a slip cap with barbed metal sampling nozzle, and completed with a four-inch, flush-mount protective roadbox.

Soil Gas Probe ID	Total Depth (ft)	Length of Screen (ft)
SVP-1S	4.5	2
SVP-2S	5	2
SVP-3S	5	2
SVP-4S	5	2
SVP-5S	5	2
SVP-5D	12	2
SVP-6S	4.5	1.8

Soil Gas Probe ID	Total Depth (ft)	Length of Screen (ft)
SVP-7S	4	1.5
SVP-8S	5	2
SVP-9S	5	2
SVP-9D	23.5	2
SVP-10S	5	2
SVP-11S	5	2
SVP-12S	5	2
SVP-13S	4	1.5
SVP-14S	5	2
SVP-15D	20	2
SVP-16S	5	2
SVP-17S	3.5	1
SVP-18S	3.5	1

Following installation and at least 24-hours of equilibration, the integrity of each soil gas probe and sample connections was tested using helium as a tracer gas in accordance with EA standard operating procedure (SOP). A copy of the SOP is included in Appendix I. The testing indicated that two soil vapor probes had non-competent seals; both probes were repaired in the field, one by removing and replacing the slip cap and the other by adding an additional bentonite seal inside of the roadbox. Subsequently, three well volumes of soil gas was purged from each shallow and deep location soil gas probe. A screening sample was collected from each probe using an air sampling pump into a tedlar bag. The air sample was screened for total VOCs using a photoionization detector (PID) equipped with a 10.6 eV lamp and calibrated to an isobutylene response. PID readings are displayed on Table 1.

On 25 and 29 July 2014, EA collected 20 soil gas samples and one field duplicate sample from the installed soil gas points. Soil gas samples were collected from each probe using 2.7 L Summa canisters with flow controllers set to collect a grab sample over 30 minutes. The canister was connected to the soil gas probe using dedicated silicone and polyurethane tubing. Each sample was submitted to Alpha Analytical Laboratory, Inc. (Alpha) for analysis via EPA Method TO-15 Selective Ion Monitoring (SIM). The soil vapor sample collected from SVP-8S was observed by the laboratory as having ambient air infiltration (pressure upon reaching lab was neutral, while a negative pressure was observed in the field). The sample collected on 25 July 2014 was not analyzed; a replacement sample was collected on 25 August 2014. Results are displayed in Table 1 and discussed in Section 9.1.

8.3 SOIL INVESTIGATION

EA contracted and conducted oversight of GeoLogic during advancement of four soil borings (SB-1 through SB-4) from 20 August to 22 August 2014. The locations of soil borings were decided based on observations of soil vapor sampling results and located across the site to obtain sufficient data to ascertain a groundwater flow direction. See Figure 2 for boring locations. The borings were advanced using a hollow stem auger rig with air hammer or roller bit capabilities and an air compressor to advance through rock or bedrock. The drill method was selected based on subsurface conditions observed during soil vapor probe installation. Target depth of soil investigation was five feet below the water table in order to obtain a soil sample from the top of

the water table and facilitate monitoring well installation. During the investigation, the water table elevation was observed to be highly variable across the site and ranged from 16 feet bgs to over 35 feet bgs. Bedrock was encountered at three boring locations: SB-1 at approximately 32 feet, SB-3 at approximately 24 feet, and SB-4 at approximately 22 feet.

During the advancement of SB-3 (the first soil boring advanced), soil was screened with a PID and logged at five-foot intervals for the entire depth of the boring. Soil screening frequency at subsequent borings was decreased, with RIDEM approval, due to schedule and scope of the investigation. The soil sampling goals remained unchanged.

Soil samples were collected at target depths using a properly decontaminated split spoon. Soil samples were logged and headspace screened for total VOCs using a PID. Two soil samples were preserved for laboratory analysis at each soil boring location: 0-2 foot interval (1-3 foot interval at one boring based on driller error) and at or slightly above the groundwater table. One blind duplicate sample was collected for quality assurance. The soil samples were logged on a chain of custody, cooled to 4⁰C and transported to Premier Laboratory of Dayville, CT. Samples were analyzed for VOC via EPA Method 8260C. A rinsate blank sample was also collected each day that soil sampling occurred; distilled water was poured over a decontaminated split spoon tip into a preserved bottle for laboratory analysis of VOCs. Soil boring logs are included as Appendix H. Analytical results are discussed in Section 9.2 and laboratory reports are included in Appendix G.

Soil cuttings were collected in 55-gallon drums and labeled as non-hazardous waste. Drums were staged near the dumpster at the site and waste transportation and disposal to an appropriately licensed disposal facility was conducted on October 10, 2014. A total of three drums of drill cuttings were generated.

8.4 GROUNDWATER INVESTIGATION

Each of the four soil borings was completed as a flush mounted groundwater monitoring well, identified as MW-1 through MW-4. The monitoring wells were constructed of clean, schedule 40 PVC with a well screen of 0.010 inch slotted schedule 40 PVC connected to the well casing with flush threads. A filter pack consisting of clean silica sand was installed in the soil boring annulus surrounding the PVC. The filter pack extended two feet above the screened interval of the monitoring well and was capped with two feet of bentonite chips. The remaining annular space was filled with native material. The PVC was topped with a rubber gripper cap and the surface of the monitoring wells was completed with a flush mount road box with a concrete pad. Details of the well construction are noted in the borings logs, included as Appendix H and a summary of monitoring well depths is tabulated below.

Monitoring Well ID	Well Depth (ft bgs)	Screen Length (ft)
MW-1	35	10
MW-2	35	10
MW-3	34	12
MW-4	25	10

An engineering elevation survey of the monitoring wells was conducted to facilitate determination of the flow direction of the shallow groundwater aquifer. A set datum on each monitoring well was established upon installation for groundwater measurements. All wells, soil vapor points, and select site features were located with a global positioning system (GPS) unit with sub-meter accuracy for placement on the site plan.

After installation of MW-1, EA attempted to gauge the monitoring well for depth to water. The well was discovered to be dry. The presence of saturated soils during soil sampling and subsurface material encountered at that location indicates a perched water table over a silt aquiclude may be the cause of the dry well. Seasonal water table variation may result in groundwater infiltration into MW-1 at another time, therefore the well was not abandoned and was surveyed into the site datum.

Prior to groundwater sampling, the three monitoring wells were developed by over pumping to remove fine-grained soils from the vicinity of the well screen. Wells were developed by pumping with a submersible pump and/or a dedicated bailer with check valve. Wells were purged until at least three well volumes of water was removed or until the well ran dry. Development water was placed in a 55-gallon drum labeled as non-hazardous purge water and staged near the soil cutting drums.

On 25 August 2014, the monitoring wells were gauged to determine depth to groundwater prior to sampling to the nearest hundredth of a foot. The monitoring wells were purged via EPA low flow sampling protocols whereby the sampling pump intake was installed within the screened interval of the monitoring well and groundwater was withdrawn at a limited rate until physical parameters (i.e., temperature, specific conductance, pH, and dissolved oxygen) had stabilized. The groundwater parameters were monitored and recorded. At MW-2, an approximately two-foot water column limited the volume of purging as the well had very limited recharge. The well was purged until dry and allowed to recharge, at which point samples were collected. A total of three samples and one blind duplicate sample (from MW-3) were collected into pre-labeled laboratory cleaned and preserved vials. The groundwater samples were logged on a chain of custody, cooled to 4⁰C and transported to Premier Laboratory. The groundwater samples were analyzed for VOC via EPA Method 8260C. Results are discussed in Section 9.3 and laboratory reports are included in Appendix G.

Purge water was added to the drum of well development purge water. Approximately 30 gallons of purge water was generated from well development and sampling. The drum was staged near the dumpster at the site and waste transportation and disposal to an appropriately licensed disposal facility was conducted on October 10, 2014.

8.5 HEALTH AND SAFETY MONITORING

The disturbance of soil has the potential to allow site contaminants to volatilize and entrain dust into the ambient air. EA provided real-time air quality monitoring during field activities involving soil disturbance. The real-time air quality monitoring was performed for total VOCs and particulate dust in the work zone perimeter. A PID and a dust monitor were located downwind of the work area each day soil disturbance was performed. Additionally, one daily

ambient air sample was collected via summa air canister with 8-hour flow controllers each day soil was disturbed and submitted to Alpha for analysis of VOC via EPA Method TO-15 SIM. A total of five daily composite samples were collected (two for soil vapor point drilling and three for soil boring). Results are discussed in Section 9.4 and laboratory reports are included in Appendix G.

9. RESULTS OF PHASE II FIELD INVESTIGATION

9.1 SOIL VAPOR AND AMBIENT AIR SAMPLING

On 25 and 29 July 2014, EA collected 20 soil gas and one field duplicate from the installed soil gas points using 2.7 L Summa canisters with flow controllers set to collect a composite sample over 30 minutes. Each sample was submitted to Alpha for analysis via EPA Method TO-15 SIM. One sample was compromised (SVP-8S), therefore a replacement sample was collected on 25 August 2014.

Sample results were compared to the Massachusetts Residential Sub-Slab Soil Gas Screening Values presented by MassDEP in the “Interim Final Vapor Intrusion Guidance” published December 2011 and the Connecticut Residential Volatilization Criteria for Soil Vapor in the CT Remediation Standard published June 2013. Both criteria provide screening values for soil vapors below a building. RIDEM does not currently have screening values or standards for evaluating soil gas below a building. None of the samples collected were from directly below the building; however, 10 of the 20 soil gas monitoring points are located within 10 feet of the building. These criteria, while they do not directly regulate or apply to the collected data, are useful for evaluating potential “hot spots” where additional information or samples may be needed.

No sample concentrations exceeded the CT Volatilization Criteria. Massachusetts Screening Values were exceeded for two analytes: TCE and PCE. Samples collected from SVP-5S, SVP-5D, and SVP-12S had concentrations of TCE of 25.6, 23.5, and 10.4 parts per billion by volume (ppbv), respectively, which exceed the Screening Value of 5.2 ppbv. Samples collected from SVP-5S and SVP-5D had concentrations of PCE of 136 and 97.9 ppbv, respectively, which exceed the Screening Value of 14 parts per billion by volume (ppbv). SVP-5S and SVP-5D are located in the southeastern corner of the Site property and SVP-12S is located on the south side of the Varieur building. Several other samples had detections of TCE, PCE, and other chlorinated analytes at concentrations below the Screening Values or the analyte had no standard established. TCE and PCE isocontour maps were developed to show the results spatially and are included as Figures 4 and 5.

Benzene, toluene, ethylbenzene, and xylene (a.k.a. BTEX) were also detected in every soil vapor sample at concentrations below the MA and CT Screening Values.

A table of complete soil vapor monitoring results is included as Table 1 and the laboratory report is included in Appendix G.

9.2 SOIL SAMPLING

During the subsurface exploration on 20 through 22 August 2014, two soil samples were screened with a PID and preserved for laboratory analysis at each of the four soil boring locations. One blind duplicate sample was collected for quality assurance. The soil samples were logged on a chain of custody, cooled to 4⁰C and transported to Premier Laboratory. Samples were analyzed for VOC via EPA Method 8260C. A rinsate blank sample was also collected each

day that soil sampling occurred; distilled water was poured over a decontaminated split spoon tip into a preserved bottle for laboratory analysis of VOCs. The following samples were collected:

Sample Location	Sample Depth	Media	Date Collected	PID (ppbv)
SB-1	1-3 feet	Soil	8/21/14	870
SB-1	30-32 feet	Soil	8/21/14	31
SB-2	0-2 feet	Soil	8/21/14	22
SB-2	25-27 feet	Soil	8/21/14	62
Rinsate Blank 2	N/A	Aqueous	8/21/14	N/A
SB-3	0-2 feet	Soil	8/20/14	147
SB-3	20-22 feet	Soil	8/20/14	97
Rinsate Blank 1	N/A	Aqueous	8/20/14	N/A
SB-4	0-2 feet	Soil	8/22/14	38
SB-4	20-22 feet	Soil	8/22/14	55
Rinsate Blank 3	N/A	Aqueous	8/22/14	N/A

Soil sample results for the shallow sample collected at each soil boring were compared to the Rhode Island Method 1 Residential Direct Exposure Criteria (RDEC) presented in the Remediation Regulations amended in November 2011. The deep soil sample collected at each soil boring was compared to the Rhode Island Method 1 Leachability Criteria for GB groundwater presented in the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (*Remediation Regulations*) amended in November 2011. The DEC are protective of direct human contact with soils and the Leachability Criteria are protective of GB groundwater underlying the soils.

The sole detection of an analyte over laboratory detection limits was in SB-3 (0-2') for naphthalene. The concentration detected was 1.9 mg/kg, which does not exceed the Residential DEC of 54 mg/kg. No other analytes were detected at SB-3 (0-2'); however, the laboratory detection limits were greater than the DEC for two compounds: ethylene dibromide and vinyl chloride. The soil sample collected from SB-1 (1-3') appeared stained but laboratory analytical results do not indicate any impacts. All other compounds were below laboratory method reporting limits (MRL) for the remaining soil borings and the laboratory MRLs were below the RDEC and Leachability Criteria.

No detections of VOCs were noted for any of the daily rinsate blank samples, indicating proper field decontamination of down-hole and sampling equipment. The laboratory reports are included in Appendix G.

9.3 GROUNDWATER SAMPLING

On 25 August 2014, a total of three groundwater samples and one blind duplicate sample (from MW-3) were collected into pre-labeled laboratory cleaned and preserved vials. The groundwater samples were logged on a chain of custody, cooled to 4⁰C and transported to Premier Laboratory. The groundwater samples were analyzed for VOC via EPA Method 8260C.

Groundwater results were compared to the Rhode Island Method 1 Groundwater Objectives for GB groundwater presented in the *Remediation Regulations* amended in November 2011, based

on the site location within an urban area classified as GB groundwater, as depicted on Figure 3, Environmental Resource Map.

The sole detection of an analyte over laboratory detection limits was in MW-2 for acetone. The concentration detected was 47 µg/L; there is no GB Groundwater Objective for acetone. Vinyl chloride was not detected in groundwater samples; however, the laboratory detection limit of 5 µg/L exceeds the GB Groundwater Objective of 2 µg/L. All other compounds were below laboratory MRLs for the remaining soil borings and the laboratory MRLs were below the GB Groundwater Objectives and the GB Groundwater Upper Concentration Limits. The laboratory report is included in Appendix G.

A groundwater contour map was created using the data collected from the engineering elevation survey and the depth to water measurements collected on 25 August 2014. The map indicates a significant groundwater elevation difference (approximately 20 feet over the length of the property) and flow direction to the east (toward the Seekonk River).

9.4 HEALTH AND SAFETY MONITORING

Work zone and perimeter air quality was measured with a PID and a dust monitor each day soil was disturbed. Additionally, one daily ambient air sample was collected via summa air canister with 8-hour flow controllers each day soil was disturbed and submitted to Alpha for analysis of VOC via EPA Method TO-15 SIM. A total of five daily composite samples were collected (two for soil vapor point drilling and three for soil boring).

No measureable levels of VOCs were detected by the PID during the drilling processes, except those from the generator and diesel-powered equipment used by the contractor. Dust was produced from use of a concrete saw for installation of concrete pads in the asphalt around roadboxes and during use of the air hammer and roller bit drilling methods. Dust was dampened when possible by spraying water onto the area; however, significant levels of dust was generated for short periods of time. Workers in the close vicinity of the dust wore protective equipment (particulate respirators) and the area was continuously monitored. Pedestrians in the area were warned prior to dust-generating activities and left the area voluntarily. No complaints were received.

Results from the daily composite samples show low-level detections of compounds likely related to combustion engine exhaust. The laboratory reports are included in Appendix G.

10. OPINIONS AND CONCLUSIONS

EA performed a Phase I ESA in conformance with the scope and limitations of ASTM E1527-13 of the Francis J. Varieur School in the City of Pawtucket, Rhode Island. Any exceptions to, or deletions from, this practice are described in Section 11. The Phase I ESA revealed evidence of three RECs in connection with the property:

- Historical use of the adjacent property as a MGP and power plant resulted in many types of oil and hazardous materials storage on the adjacent property. A number of releases were reported prior to 1980 until 2011. Based upon the information and environmental data collected and reviewed to date, there is no evidence of impacts on the Varieur property from releases on the former Tidewater MGP property.
- Soil records, topographic maps, and observations of the surrounding areas indicate that the subject site was filled and/or graded in order to achieve a flat surface on which to build. The source of fill material is unknown and environmental testing of fill may not have been performed based on the construction date of the school.
- Soil gas sampling and analysis conducted by others in 2013 along the NBC combined sewer overflow pipeline has detected VOCs at concentrations exceeding the current Massachusetts Sub-Slab Screening Values presented in the 2011 “Interim Final Vapor Intrusion Guidance.” RIDEM does not currently have screening values or standards for evaluating soil gas. The potential existed for the backfill used during installation of the pipeline or the water flowing through the pipeline to adversely impact soil vapor at the site. Additionally the (presumed) increased porosity of the backfill and/or bedding of the pipeline could create a preferential migratory pathway for soil vapors to enter the site.

In response to the RECs identified above, a limited Phase II field investigation was conducted in conformance with ASTM E1903-11, and consisted of a property utility survey, subsurface investigation, collection of soil vapor, soil, and groundwater samples, and analysis of samples. These investigations were conducted in response to public concerns raised about the possibility that chlorinated volatile organic compound vapors that were detected in soil gas at the Tidewater former manufactured gas plant site property line along the NBC easement (both of which abut the eastern boundary of the school property) could pose a risk of vapor intrusion to students, teachers and workers in the nearby Varieur school. The focus of the investigations was to determine if impacts had migrated onto the school property. The investigation results are summarized and discussed below:

- 17 shallow (less than five feet deep) and 3 deep (between 12 and 25 feet deep) soil vapor monitoring points were installed on the site. Following installation and integrity testing of the points, samples were collected from each point for analysis of TO-15 Selective Ion Monitoring (SIM), which analyzes for a wide range of VOCs. Of the 20 soil vapor samples collected, three samples (SVP-5S, SVP-5D, and SVP-12S) exhibited concentrations greater than the Massachusetts Residential Sub-Slab Screening Values for PCE and/or TCE. RIDEM does not currently have screening values or standards for

evaluating soil gas. The source of soil vapor impacts is unknown. Potential sources or preferential pathways include the Narragansett Bay Commission combined sewer overflow pipeline and urban fill material.

- Four soil borings were advanced at on-site locations chosen to characterize soil in key areas. Two soil samples were collected at each boring location; one from surficial soil and one from directly above the water table. None of the eight soil samples collected had concentrations of VOCs that exceeded applicable RIDEM standards.
- Each of the four borings was completed as a monitoring well. One of the three wells did not contain any water, possibly due to a perched water table. Groundwater samples were collected from the three wells that contained groundwater after well development and purging. None of the three groundwater samples collected had concentrations of VOCs that exceeded applicable RIDEM standards.

In addition to the above listed field activities conducted by EA during this investigation, indoor and ambient outdoor air sampling in the Varieur School building was performed by others under direction of RIDEM and the Pawtucket School Department. The indoor air investigation identified PCE in indoor air ubiquitously throughout the school, but at levels below EPA's health-based indoor air screening levels, with the highest concentrations observed on the western side of the school. The concentrations of PCE detected in the school were typical of those commonly detected in indoor samples due to the presence of PCE in consumer cleaning products, and did not appear to be related to vapor intrusion. In order to address potential alternative sources of the PCE, it is RIDEM's understanding that the Pawtucket School Department is planning to perform a complete survey and inventory of all products used by maintenance staff and teachers in the school, including products that were not issued by the School Department which may have been brought in from an employee's home, to evaluate the inventory for potential contaminants of concern, in order to eliminate potential contributing sources of indoor air pollutants. The investigation, including comparison of results to screening values, is further detailed in a memorandum authored by RIDEM in Appendix K of this report. TCE was detected in soil gas, not PCE; therefore soil vapor intrusion does not appear to be occurring per the data collected to date.

11. DEVIATIONS

No deviations from the standard ASTM practice were completed as part of these Phase I/II ESAs.

12. ADDITIONAL SERVICES

No additional services other than those standard to ASTM practice were provided as part of these Phase I/II ESAs.

13. REFERENCES

The following sources of information were consulted as a part of this ESA. Documentation supporting these sources and additional site research was contained in Appendix C.

Atlantic Environmental Services. December 1996. *Remedial Investigation at the Tidewater Site, Pawtucket, Rhode Island*.

EA Engineering, Science, and Technology, Inc. (EA). 2014. Site reconnaissance by Mary Russo of EA. 16 June.

Environmental Data Resources, Inc. (EDR). 2014. Radius Map, Sanborn Fire Insurance Map Search, Historic Topographic Maps, Aerial Photo Decade Package. 6 June.

Massachusetts Department of Environmental Protection. 2002. Technical Update on Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil. <http://www.mass.gov/eea/docs/dep/cleanup/laws/backtu.pdf>.

Massachusetts Department of Environmental Protection. 2011. Interim Final Vapor Intrusion Guidance. WSC#-11-435.

Esri. 2012. USA Topo Maps. <http://www.arcgis.com/home/item.html?id=99cd5fbd98934028802b4f797c4b1732>. 30 September 2013.

GZA GeoEnvironmental. January 2011. *Site Investigation Data Report, Former Tidewater MGP and Power Plant Site, Pawtucket, RI*.

GZA GeoEnvironmental. October 2013. *Site Investigation Data Report Addendum, Former Tidewater MGP and Power Plant Site, Pawtucket, RI*.

Rebello, D. 2014. Property Owner/User Pre-Survey Questionnaire: Phase I Environmental Site Assessment. 16 June.

State of Connecticut. Regulation of Department of Energy and Environmental Protection Section 22a-133k-1. *Remediation Standard*. 2013.

State of Rhode Island. Department of Environmental Management. 2013. Environmental Resource Map. <http://www.arcgis.com/home/webmap/viewer.html?webmap=b24d6c60ff3a4947a14fbd15a66390c6&extent=-72.3519,41.0712,-70.6655,42.0922>

State of Rhode Island. Department of Environmental Management Regulations DEM-DSR-01-93. *Rules and Regulations for the Investigation and Remediation of Hazardous Materials Releases*. Amended 2011.

U.S. Department of Agriculture, Natural Resource Conservation Service. 2014. Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/app/>. Accessed on 19 June.

U.S. Geological Survey. 2013. Mineral Resources On-Line Spatial Data.
<http://mrdata.usgs.gov/geology/state/state.php?state=RI>. Accessed on 19 June.

U.S. Geological Survey. 2012. Providence, Rhode Island. 7.5-minute Quadrangle Topographic Map.

14. SIGNATURES OF THE ENVIRONMENTAL PROFESSIONALS

“I declare that, to the best of my professional knowledge and belief, I meet the definition of an Environmental Professional as defined in Section 312.10 of 40 Code of Federal Regulation 312.”

“I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the All Appropriate Inquiries in conformance with the standards and practices set forth in 40 Code of Federal Regulation Part 312.”



17 April 2015

Ronald Mack, P.E.
Project Manager

Date



17 April 2015

Frank B. Postma, LSP, LEP, PG
Senior Technical Reviewer

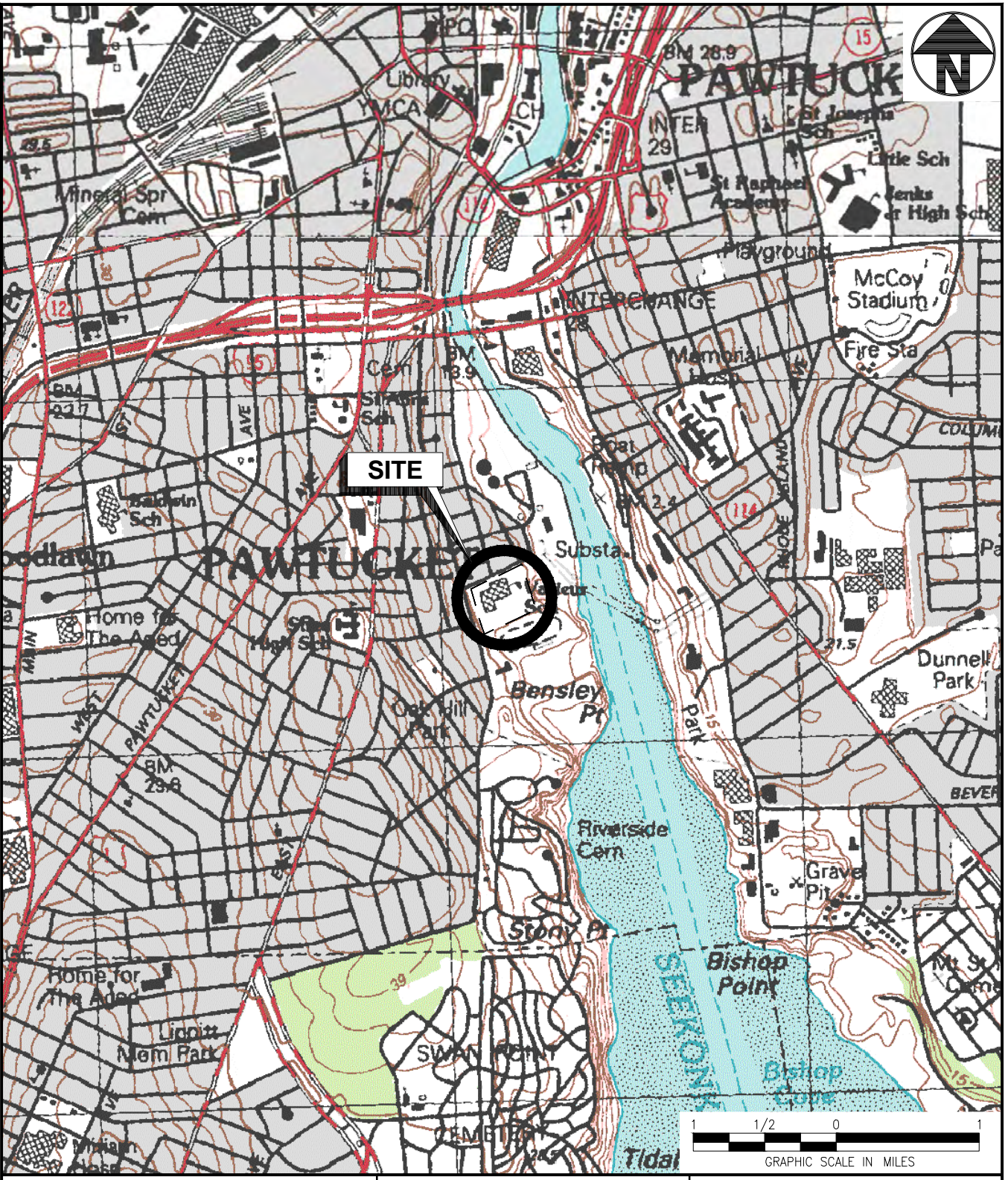
Date

15. QUALIFICATIONS OF THE ENVIRONMENTAL PROFESSIONAL(S)


Resumes for the following personnel assigned to this project are provided in Appendix J:

- Ronald Mack, Project Manager
- Frank Postma, Senior Technical Reviewer
- Mary Russo, Geologist
- Catherine Swanson, Engineer.

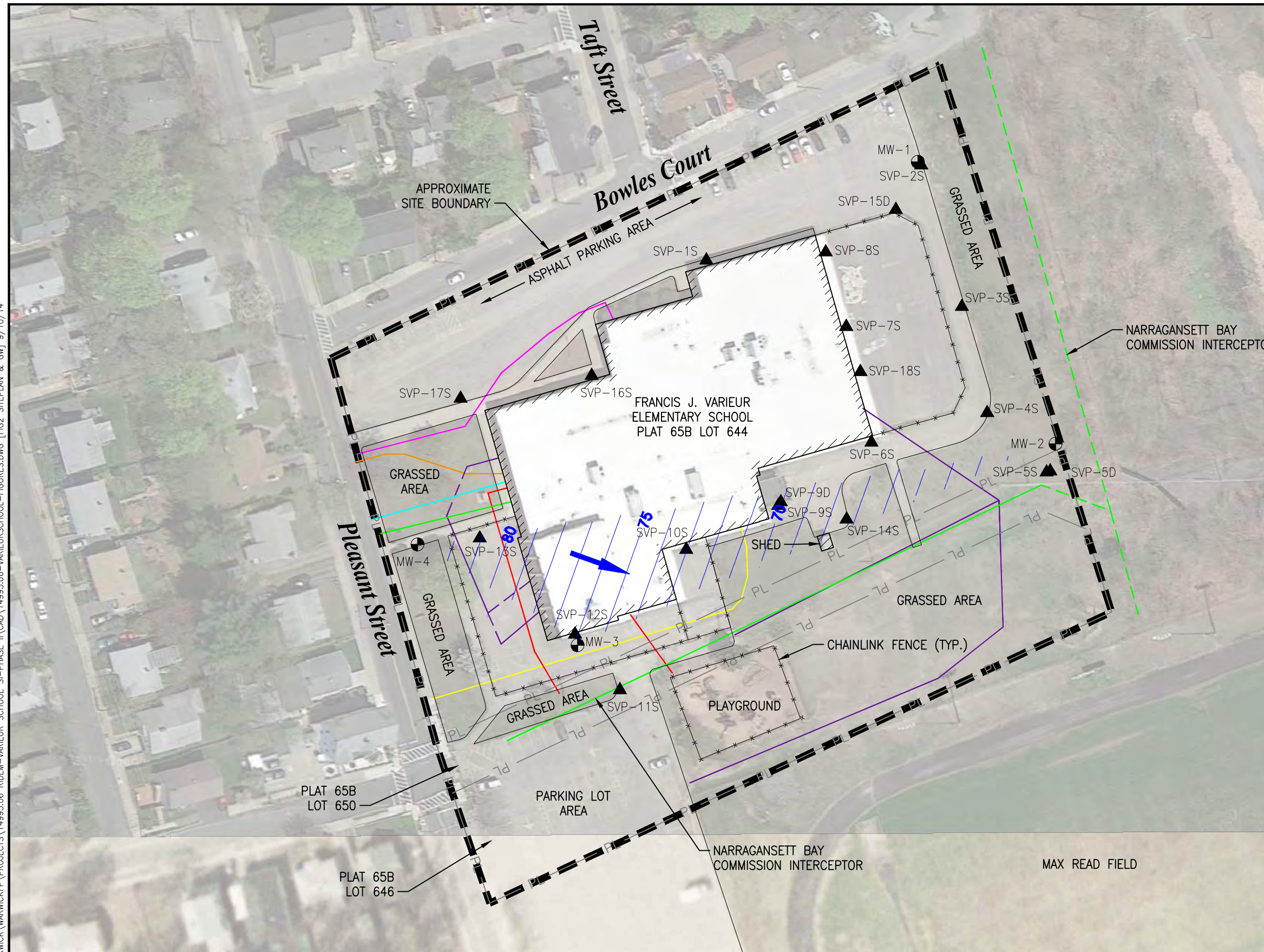
Figures



FILE PATH: \\WARRICK\WARRICK\PROJECTS\14993.06 RIDEN-VARIEUR SCHOOL SITE PHASE II\CAD\14993.06-VARIEUR SCHOOL-FIGURES.DWG [FIG1] 8/19/14

 EA ENGINEERING, SCIENCE, AND TECHNOLOGY			FRANCIS J. VARIEUR ELEMENTARY SCHOOL SITE INVESTIGATION 486 PLEASANT STREET PAWTUCKET, RHODE ISLAND			SITE LOCATION MAP		
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE	
RGM	CAS	DPA	FBP	1"=1/4 MILE	AUGUST 2014	14993.06	1	

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SITE LEGEND:

- PL — APPROXIMATE PROPERTY LINES
- — — APPROXIMATE SITE BOUNDARY
- 75 — GROUNDWATER CONTOUR (FT)
- ⊙ MONITORING WELL
- ▲ SOIL VAPOR POINT
- ➔ APPROXIMATE GROUNDWATER FLOW DIRECTION

UTILITY LEGEND:

- LINEAR ANOMOLY (LIKELY UTILITY)
- COMMUNICATION LINE
- STORM SEWER LINE
- SANITARY SEWER LINE
- ELECTRIC LINE
- GAS LINE
- WATER LINE

*DASHES INDICATE INFERRED LOCATION

80 40 0 80
GRAPHIC SCALE IN FEET



FRANCIS J. VARIEUR ELEMENTARY SCHOOL
SITE INVESTIGATION
PAWTUCKET, RHODE ISLAND

SITE PLAN WITH GROUNDWATER CONTOURS

DESIGNED BY CAS	DRAWN BY DPA	DATE SEP 2014	PROJECT NO. 14993.06
CHECKED BY FBP	PROJECT MGR. RGM	SCALE 1" = 80'	FIGURE 2

FILE PATH: \\WARWICK\WARWICK\FP\PROJECTS\14993.06 RIDEM-VARIEUR SCHOOL SI-PHASE II\CAD\14993.06-VARIEUR SCHOOL-FIGURES.DWG [FIG3 RESOURCE MAP] 9/10/14



Legend

Flood_Hazard_Areas

Flood Hazard Areas

-  0.2% Annual Chance Flood Hazard
-  A, AE, AH, AO, V, VE

Ground Water Resources

CWHPA 

NCWHPA 

Groundwater Classification

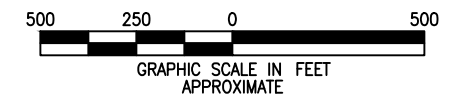
-  GA
-  GAA
-  GB
-  GC

Surface Water Protection Areas

Drinking Water Supply Watersheds 

Wetland Generalized

Wetlands 



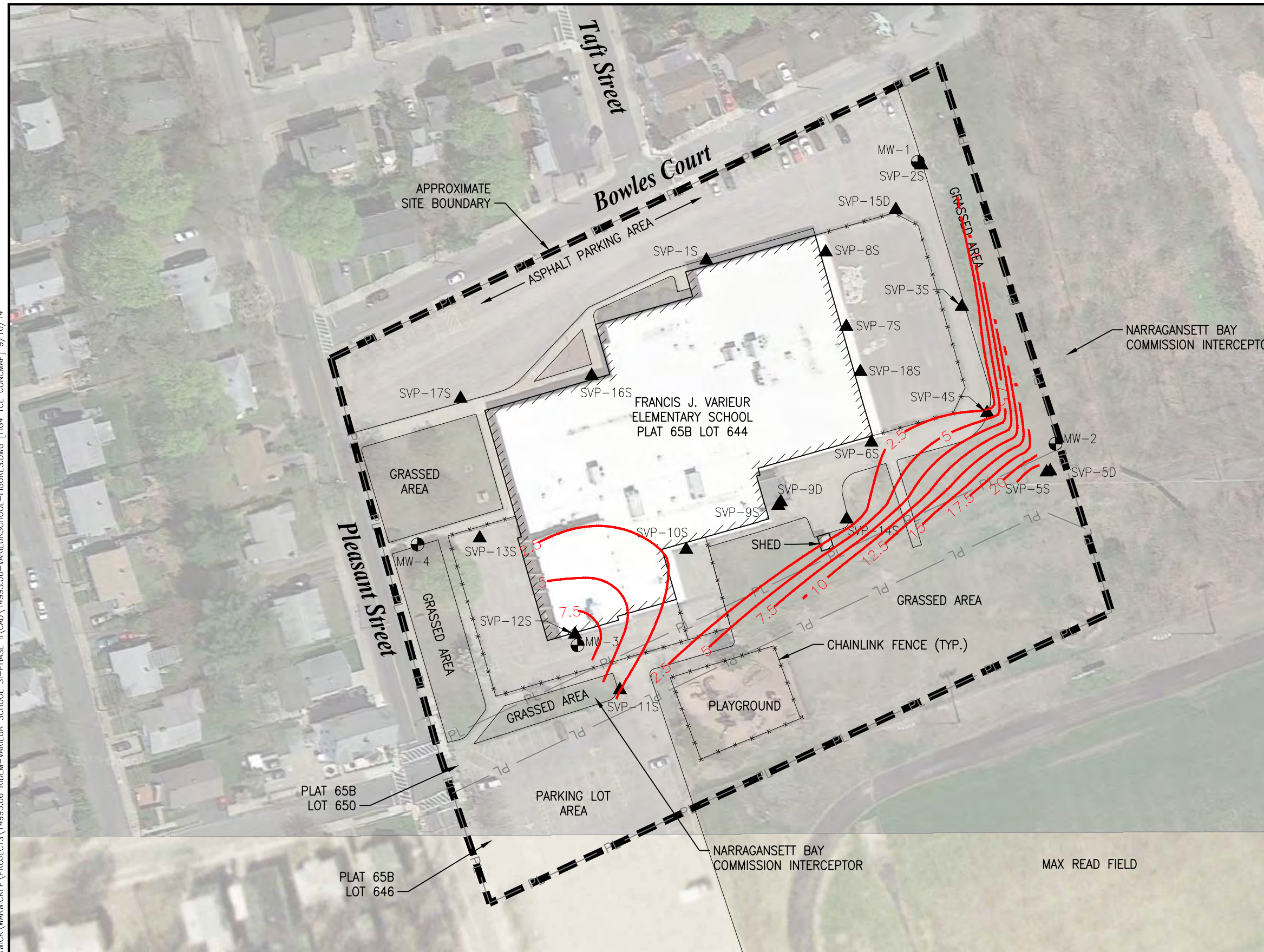
FRANCIS J. VARIEUR ELEMENTARY SCHOOL
SITE INVESTIGATION
PAWTUCKET, RHODE ISLAND

ENVIRONMENTAL RESOURCE MAP

DESIGNED BY CAS	DRAWN BY DPA	DATE SEP 2014	PROJECT NO. 14993.06
CHECKED BY FBP	PROJECT MGR. RGM	SCALE 1" = 80'	FIGURE 3



FILE PATH: \\WARWICK\WARWICK\FP\PROJECTS\14993.06 RIDEM-VARIEUR SCHOOL SI-PHASE II\CAD\14993.06-VARIEUR-SCHOOL-FIGURES.DWG [FIG 4 TCE CONCMAP] 9/10/14



SITE LEGEND:

- PL — APPROXIMATE PROPERTY LINES
- — — APPROXIMATE SITE BOUNDARY
- — — TCE CONCENTRATION CONTOUR
- # APPROXIMATE TCE CONCENTRATION (PPBV)
- ⊙ MONITORING WELL
- ▲ SOIL VAPOR POINT

GRAPHIC SCALE IN FEET

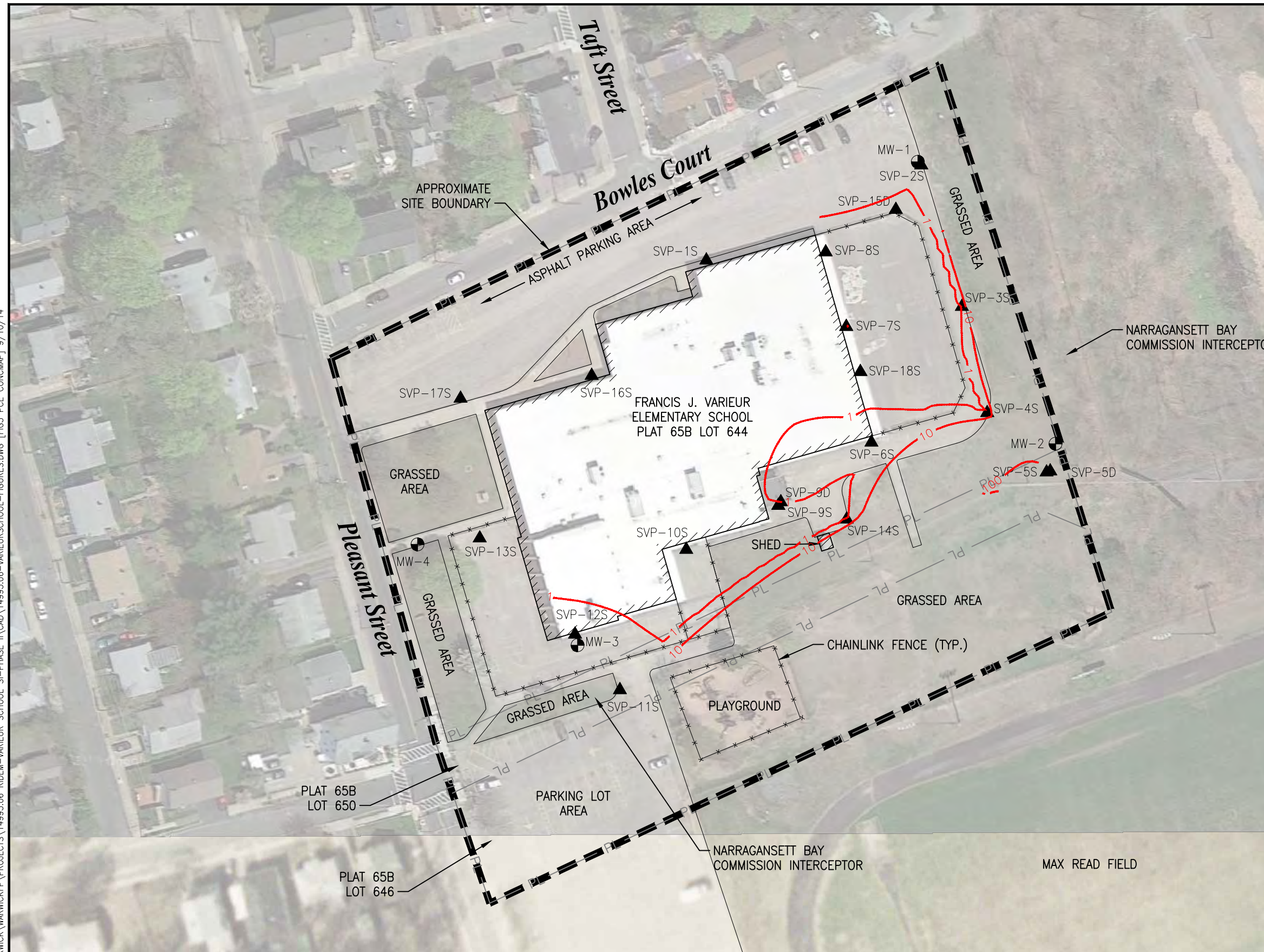


FRANCIS J. VARIEUR ELEMENTARY SCHOOL
SITE INVESTIGATION
PAWTUCKET, RHODE ISLAND

TCE CONCENTRATION MAP

DESIGNED BY CAS	DRAWN BY DPA	DATE SEP 2014	PROJECT NO. 14993.06
CHECKED BY FBP	PROJECT MGR. RGM	SCALE 1" = 80'	FIGURE 4

FILE PATH: \\WARWICK\WARWICK\FP\PROJECTS\14993.06 RIDEM-VARIEUR SCHOOL SI-PHASE II\CAD\14993.06-VARIEUR-SCHOOL-FIGURES.DWG [FIG5 PCE CONCMAP] 9/10/14



SITE LEGEND:

- PL — APPROXIMATE PROPERTY LINES
- — — — — APPROXIMATE SITE BOUNDARY
- — — — — PCE CONCENTRATION CONTOUR
- # APPROXIMATE PCE CONCENTRATION (PPBV)
- ⊙ MONITORING WELL
- ▲ SOIL VAPOR POINT

80 40 0 80
GRAPHIC SCALE IN FEET



FRANCIS J. VARIEUR ELEMENTARY SCHOOL
SITE INVESTIGATION
PAWTUCKET, RHODE ISLAND

PCE CONCENTRATION MAP

DESIGNED BY CAS	DRAWN BY DPA	DATE SEP 2014	PROJECT NO. 14993.06
CHECKED BY FBP	PROJECT MGR. RGM	SCALE 1" = 80'	FIGURE 5

Table

Table 1
Soil Vapor Point Analytical Summary
Varietur Elementry
Pawtucket, RI

Monitoring/ Sampling Location	Date	PID Screening Results	Analyte	Dichlorodifluoromethane	Chloromethane	Vinyl Chloride	1,3-Butadiene	Chloroethane	Trichlorofluoromethane	Methylene chloride	1,1,2-Trichloro-1,2,2-Trifluoroethane	Methyl tert butyl ether	6s-1,2-Dichloroethene	Chloroform	1,2-Dichloroethane	1,1,1-Trichloroethane	Benzene	Carbon tetrachloride	Bromodichloromethane	Trichloroethene	Toluene	Tetrachloroethene	Chlorobenzene	Ethylbenzene	Total Xylene	Styrene	1,1,2,2-Tetrachloroethane	4-Ethyltoluene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2-Dichlorobenzene	Notes			
				ppmv	units	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv		ppbv	ppbv	ppbv
				MA Residential Sub-Slab Soil Gas Screening Values			NS	NS	7.4	NS	NS	NS	NS	NS	750	14	27	1.6	39	50	6.0	1.4	5.2	1000	14	35	120	320	23	0.41	NS	NS	NS		7.0	5.8	8.3
CT Residential Soil Vapor Volatilization Criteria			NS	NS	1000	NS	NS	NS	1200000	NS	1000000	NS	4500	77	1310000	1000	1000	NS	7000	760000	11000	31000	1650000	500000	8000	1000	NS	NS	NS	240000	950000	240000					
SVP-1S	7/25/2014	1.9		0.585	<2.5	<0.100	0.185	<0.100	398	<5.00	<0.250	<0.100	<0.100	0.255	<0.100	<0.100	<0.500	<0.100	<0.100	<0.100	2.34	0.405	<0.100	0.650	3.015	0.175	<0.100	0.19	0.185	0.745	1.20	<0.100	<0.100				
SVP-2S	7/25/2014	13.2		0.131	<0.500	0.064	0.670	0.052	26.3	<1.00	0.085	<0.020	<0.020	0.098	<0.020	<0.020	3.32	0.049	<0.020	0.032	43.9	1.81	<0.020	4.06	19.36	0.243	<0.020	0.185	0.160	0.472	0.228	0.023	<0.020				
SVP-3S	7/25/2014	1.9		0.102	<0.500	0.032	0.167	0.083	13.4	<1.00	0.086	0.202	<0.020	0.351	<0.020	<0.020	1.59	0.043	<0.020	<0.020	8.57	0.596	<0.020	4.03	19.31	0.179	<0.020	0.169	0.167	0.505	0.981	0.021	<0.020				
SVP-4S	7/25/2014	1.2		0.155	0.753	0.032	1.15	0.051	7.49	<1.00	0.106	<0.020	<0.020	0.176	<0.020	<0.020	4.07	0.065	<0.020	<0.020	12.0	0.889	<0.020	45.8	23.41	0.382	0.080	0.759	0.209	0.630	2.45	0.03	<0.020				
SVP-5S	7/25/2014	1.6		0.232	<1.00	<0.040	<0.040	0.054	0.054	<2.00	0.144	<0.040	<0.040	0.366	<0.040	<0.040	0.562	0.106	<0.040	25.6	3.58	136	<0.040	2.60	10.48	0.260	<0.040	0.794	0.658	2.27	3.77	0.048	<0.040				
SVP-5D	7/25/2014	1.1		0.447	<1.67	<0.067	<0.067	<0.067	0.860	<3.33	<0.167	<0.067	<0.067	1.36	<0.067	0.770	0.357	0.100	<0.067	23.5	1.30	97.9	<0.067	0.42	2.273	0.170	<0.067	0.733	0.237	0.970	2.08	<0.067	<0.067				
SVP-6S	7/25/2014	1.5		0.640	<5.00	<0.200	<0.200	<0.200	949	<10.0	<0.500	<0.200	<0.200	<0.200	<0.200	<0.200	<1.00	<0.200	<0.200	2.48	8.23	1.41	<0.200	2.59	12.60	0.290	<0.200	0.720	0.650	2.63	3.42	<0.200	<0.200				
SVP-7S	7/25/2014	1.0		0.830	<5.00	<0.200	<0.200	<0.200	900	<10.0	<0.500	<0.200	<0.200	0.220	<0.200	<0.200	<1.00	<0.200	<0.200	<0.200	2.89	1.02	<0.200	1.13	9.16	0.200	<0.200	0.310	0.300	1.29	2.75	<0.200	<0.200				
SVP-8S	7/25/2014	1.5		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Sample was not analyzed due to loss of vacuum.		
SVP-8S	8/25/2014	--		0.910	<2.50	<0.100	<0.100	<0.100	313 ^E	<5.0	<0.250	<0.100	<0.100	<0.100	<0.100	<0.100	<0.500	<0.100	<0.100	<0.100	0.405	0.415	0.110	0.215	1.045	0.470	<0.100	<0.100	<0.100	0.215	0.215	0.160	1.55				
SVP-9S	7/25/2014	2.8		<0.500	<5.00	<0.200	<0.200	<0.200	204	<10.0	<0.500	<0.200	<0.200	3.96	<0.200	<0.200	<1.00	<0.200	<0.200	<0.200	4.56	0.53	<0.200	2.27	12.82	0.230	<0.200	0.810	0.750	3.10	5.19	<0.200	<0.200				
SVP-9D	7/29/2014	0.9		0.507	1.06	0.045	0.021	0.048	1.53	<1.00	0.095	<0.020	<0.020	0.128	0.021	<0.020	0.305	0.102	<0.020	0.113	1.85	1.29	0.032	0.307	1.643	0.124	<0.020	0.208	0.247	0.943	1.72	0.024	<0.200				
SVP-10S	7/25/2014	1.7		0.710	<5.00	<0.200	<0.200	<0.200	471	<10.0	<0.500	<0.200	<0.200	<0.200	<0.200	0.370	<1.00	<0.200	<0.200	1.61	5.75	0.590	<0.200	1.95	10.57	0.210	<0.200	0.810	0.770	3.20	4.68	<0.200	<0.200				
SVP-11S	7/29/2014	1.4		0.105	<0.500	0.026	0.091	0.047	32.8	<1.0	0.300	<0.020	<0.020	0.398	<0.020	5.30	0.154	0.071	0.038	1.82	1.91	1.29	<0.020	0.611	3.107	0.352	<0.020	0.225	0.215	0.722	0.983	0.033	0.039				
SVP-12S	7/25/2014	1.2		<3.02	<30.2	<1.21	<1.21	<1.21	1900	<60.5	<3.02	<1.21	<1.21	<1.21	<1.21	3.26	<6.05	<1.21	<1.21	10.4	12.2	1.21	<1.21	1.87	8.04	<1.21	<1.21	<1.21	<1.21	2.48	3.87	<1.21	<1.21				
SVP-13S	7/29/2014	1.2		0.167	<0.500	<0.020	0.048	0.025	13.5	<1.00	0.086	<0.020	<0.020	0.485	<0.020	<0.020	0.826	0.047	0.053	<0.020	4.41	0.688	<0.020	1.09	5.16	0.429	<0.020	0.305	0.299	0.954	1.10	0.028	<0.020				
SVP-14S	7/29/2014	3.3		0.134	0.628	0.030	<0.020	0.069	10.4	<1.00	0.086	<0.020	<0.020	0.128	0.035	<0.020	0.233	0.058	<0.020	<0.020	3.45	0.079	<0.020	0.873	4.49	0.593	<0.020	0.321	0.327	1.13	1.74	0.028	<0.020				
Field Duplicate (SVP-14S)	7/29/2014	--		0.468	0.843	<0.020	<0.020	0.041	1.25	<1.00	0.095	<0.020	<0.020	0.067	0.032	<0.020	0.505	0.071	<0.020	<0.020	1.64	0.106	0.047	0.721	3.698	0.369	<0.020	0.186	0.188	0.795	1.14	0.026	<0.020				
SVP-15D	7/29/2014	1.1		0.289	<0.500	0.037	0.033	0.032	13.2	1.08	<0.080	<0.020	<0.020	0.052	<0.020	<0.020	0.168	0.065	<0.020	<0.020	1.60	0.188	0.027	0.479	2.764	0.220	<0.020	0.379	0.402	1.45	1.40	0.025	<0.020				
SVP-16S	7/29/2014	0.5		1.05	<5.92	<0.237	<0.237	<0.237	685	<11.8	<0.592	<0.237	0.249	<0.237	<0.237	<0.237	<1.18	<0.237	<0.237	<0.237	1.43	0.450	<0.237	0.485	2.416	0.272	<0.237	<0.237	<0.237	0.687	0.687	<0.237	<0.237				
SVP-17S	7/29/2014	1.2		0.248	<1.00	0.056	0.178	0.078	183	<2.00	0.152	<0.040	<0.040	2.50	<0.040	<0.040	2.40	<0.040	<0.040	0.296	28.8	0.878	<0.040	2.64	8.92	0.388	<0.040	0.202	0.208	0.828	1.33	<0.040	<0.040				
SVP-18S	7/29/2014	0.8		0.920	<5.00	<0.200	<0.200	<0.200	596	<10.0	<0.500	<0.200	<0.200	0.240	<0.200	<0.200	<1.00	<0.200	<0.200	<0.200	1.92	0.580	<0.200	0.640	3.04	0.300	<0.200	0.230	0.260	1.03	1.72	<0.200	<0.200				

Notes:
 NA: not applicable.
 NS : No Standard or Screening Value Defined
Bold values indicate a sample result greater than the MA Residential Sub-Slab Soil Gas Screening Values
 E: Result is estimated by laboratory
 Massachusetts Residential Sub-Slab Soil Gas Screening Values obtained from the Massachusetts Department of Environmental Protection "Interim Final Vapor Intrusion Guidance", WSC-11-435, December 2011
 Connecticut Residential Volatilization Criterion for Soil Vapor obtained from the State of Connecticut Department of Energy and Environmental Protection, Remediation Standard, June 2013

Appendix A

Photograph Log



Photograph No. 1

Aerial view of Francis J. Varieur Elementary School (Varieur) with the Max Read Memorial Field and baseball fields to the South, and Seekonk River to the east.



Photograph No. 2

View of Varieur from the northeast corner of the property.



Photograph No. 3
Transformer on the west side of Varieur.



Photograph No. 4
Southern view of the playground on the south side of Varieur.



Photograph No. 5
Eastern view of the parking lot south of Varieur.



Photograph No. 6
Northern view of the neighboring MGP site from eastern river bank.



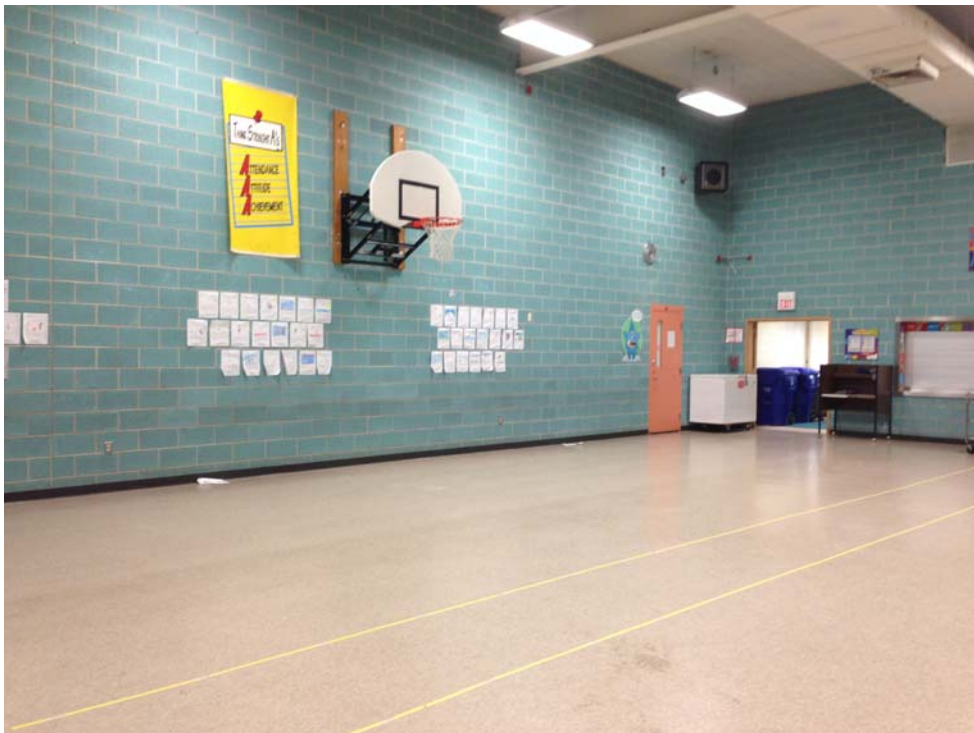
Photograph No. 7
School library located in the center of the building.



Photograph No. 8
A main hallway at the west side of Varieur.



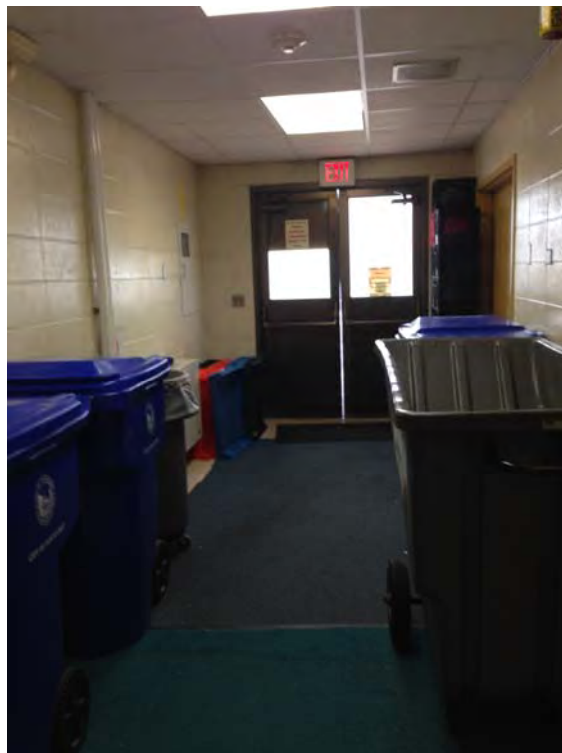
Photograph No. 9
Sink outside of the gymnasium/cafeteria.



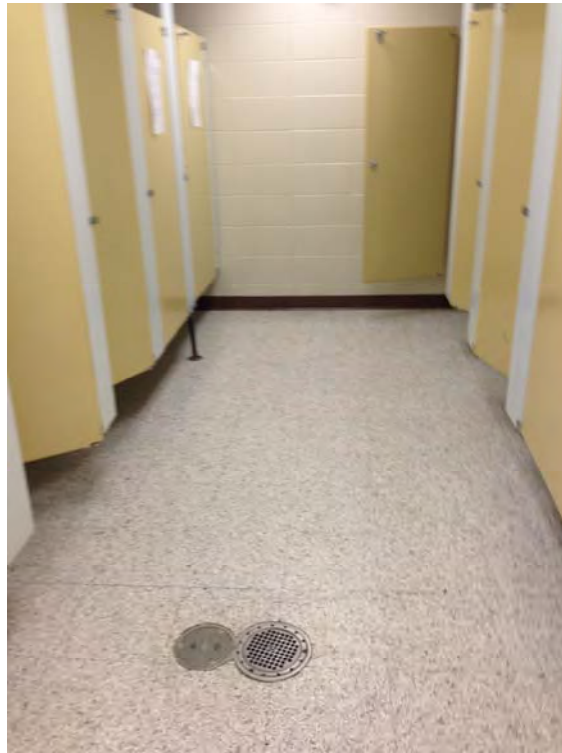
Photograph No. 10
Gymnasium and cafeteria of Varieur (southwest corner of building).



Photograph No. 11
Kitchen and gymnasium storage for Varieur.



Photograph No. 12
Exit hallway off kitchen to south side of Varieur.



Photograph No. 13

Bathroom with floor drain which is connected to the City of Pawtucket sewer.



Photograph No. 14

Varieur music classroom.



Photograph No. 15
Room for school supply storage at Varieur.



Photograph No. 16
Heat provided by natural gas fired forced hot water.



Photograph No. 17
A sink located within a classroom.



Photograph No. 18
Inactive circuit breakers from heating system before forced hot water heating system was installed.



Photograph No. 19
Custodial storage space for cleaning supplies.



Photograph No. 20
Active circuit breakers in custodial storage area.



Photograph No. 21
Boiler #1 of two in the boiler room.



Photograph No. 21
Hot water heater in the boiler room.



Photograph No. 22
Hot water and natural gas piping within the boiler room.



Photograph No. 23
A sink located in the hallway of Varier.



Photograph No. 24
A classroom at Varieur.



Photograph No. 25
Varieur staff kitchen adjoining the staff breakroom.



Photograph No. 26
Varieur staff copy and print room.



Photograph No. 27
Varieur nurse's office.



Photograph No. 28

Varieur main entry with fire alarm and security system.



Photograph No. 29

Sign displaying site investigation information on front fence at Varieur.



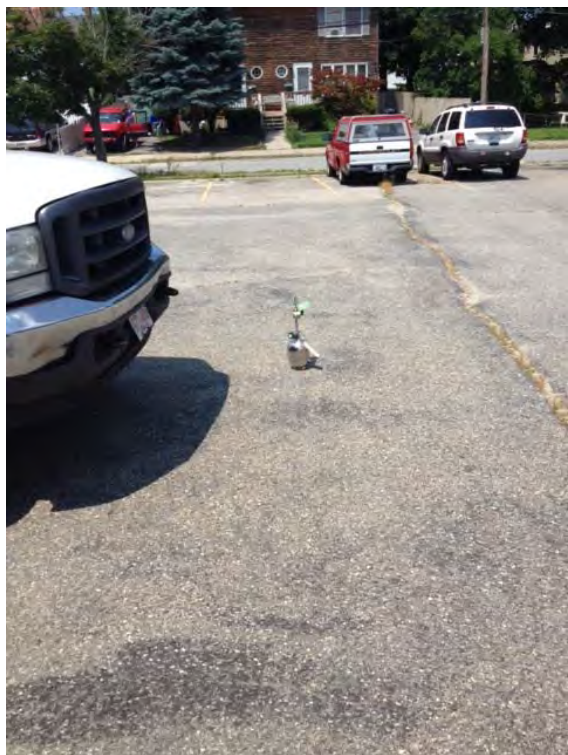
Photograph No. 30
Installation of SVP-13S with a geoprobe direct push rig.



Photograph No. 31
Installation of SVP-11S with the geoprobe direct push rig.



Photograph No. 32
Monitoring drilling atmosphere for VOCs during soil vapor point installation.



Photograph No. 33
Health and safety monitoring for VOCs with a daily composite sample.



Photograph No. 34
Installation of a concrete pad and protective roadbox on SVP-2S.



Photograph No. 35
Setup on SVP-3S for leak testing with helium tracer prior to sampling.



Photograph No. 36
Shroud for conducting a leak test on soil vapor points.



Photograph No. 37
Soil gas sample collection at SVP-1S in a 2.7L summa can with 30-minute regulator.



Photograph No. 38

Collection of a duplicate soil gas sample at SVP-14S using a splitter and two 2.7-L summa cans.



Photograph No. 39

Drilling SB-3 using a hollow-stem auger drill rig.



Photograph No. 40
A two-foot split spoon soil sample from SB-2.



Photograph No. 38
Collection of a soil sample from a split spoon.



Photograph No. 39

Gauging MW-3 for depth to water prior to collecting groundwater samples.

Appendix B

Historical Research Documentation



Francis J. Varieur Elementary

486 Pleasant Street

Pawtucket, RI 02860

Inquiry Number: 3965720.4

June 09, 2014

EDR Historical Topographic Map Report



6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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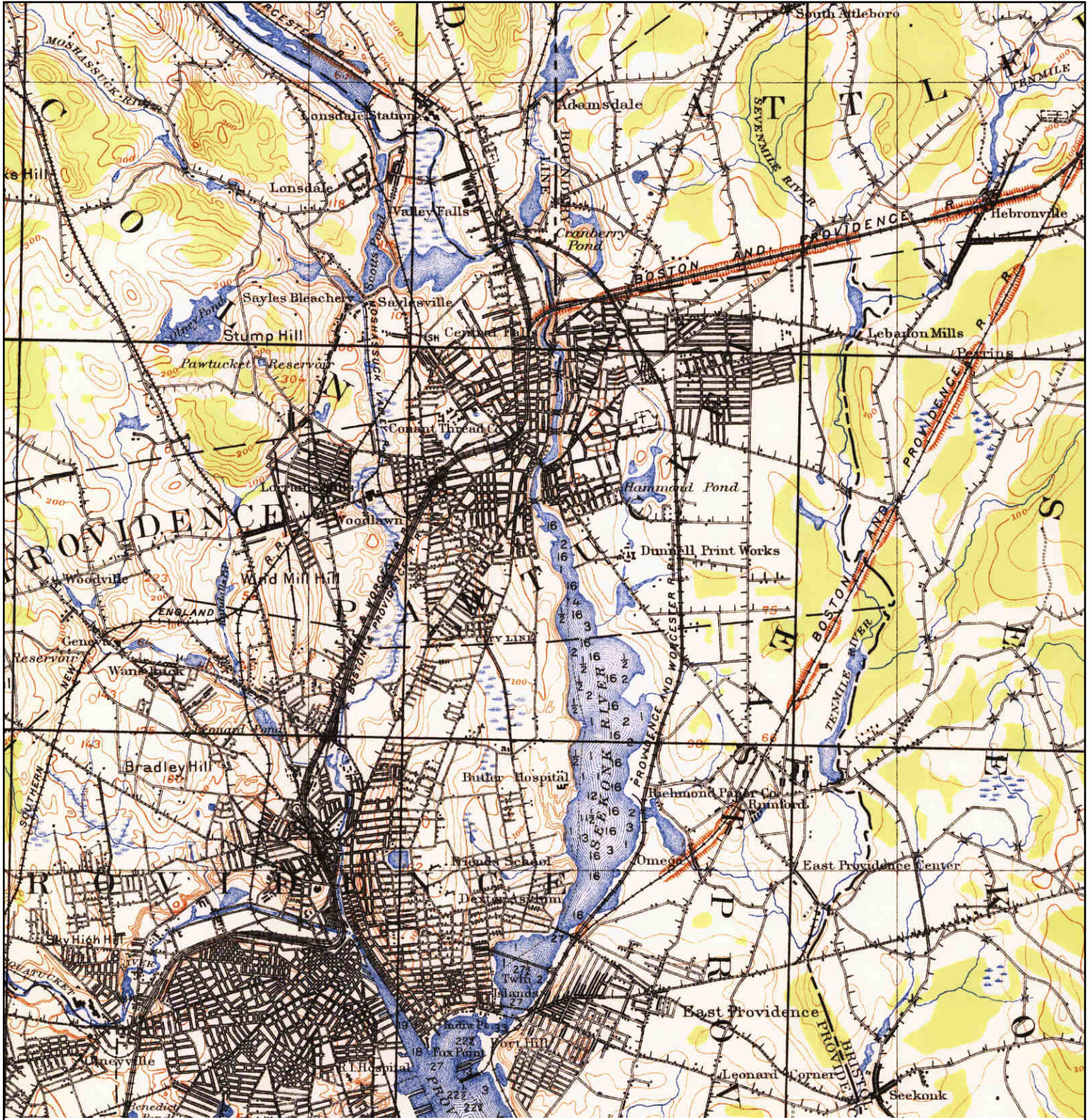
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Historical Topographic Map



<p>N</p> 	<p>TARGET QUAD</p> <p>NAME: PROVIDENCE</p> <p>MAP YEAR: 1894</p>	<p>SITE NAME: Francis J. Variour Elementary</p> <p>ADDRESS: 486 Pleasant Street Pawtucket, RI 02860</p> <p>LAT/LONG: 41.8661 / -71.3832</p>	<p>CLIENT: EA Engineering Science & Tech.</p> <p>CONTACT: Mary Russo</p> <p>INQUIRY#: 3965720.4</p> <p>RESEARCH DATE: 06/09/2014</p>
	<p>SERIES: 15</p> <p>SCALE: 1:62500</p>		

Historical Topographic Map



	TARGET QUAD	SITE NAME: Francis J. Variour Elementary	CLIENT: EA Engineering Science & Tech.
	NAME: PROVIDENCE	ADDRESS: 486 Pleasant Street	CONTACT: Mary Russo
	MAP YEAR: 1915	LAT/LONG: 41.8661 / -71.3832	INQUIRY#: 3965720.4
	SERIES: 15		RESEARCH DATE: 06/09/2014
	SCALE: 1:62500		


Historical Topographic Map



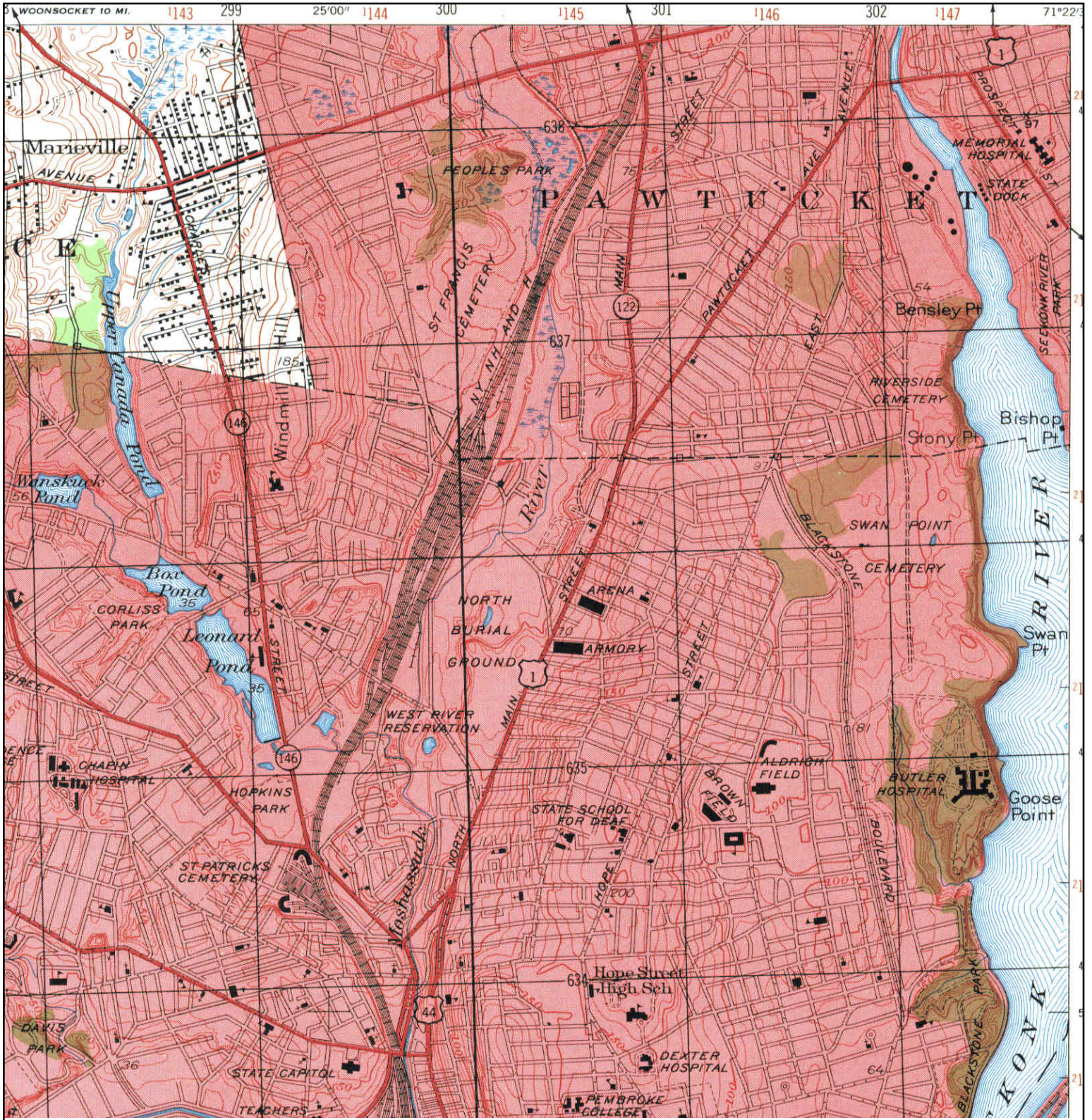
<p>N ↑</p>	<p>TARGET QUAD NAME: PROVIDENCE MAP YEAR: 1935</p>	<p>SITE NAME: Francis J. Variour Elementary ADDRESS: 486 Pleasant Street Pawtucket, RI 02860 LAT/LONG: 41.8661 / -71.3832</p>	<p>CLIENT: EA Engineering Science & Tech. CONTACT: Mary Russo INQUIRY#: 3965720.4 RESEARCH DATE: 06/09/2014</p>
	<p>SERIES: 7.5 SCALE: 1:24000</p>		


Historical Topographic Map



<p>N</p> 	<p>TARGET QUAD</p>	<p>SITE NAME: Francis J. Varieur Elementary</p>	<p>CLIENT: EA Engineering Science & Tech.</p>
	<p>NAME: PROVIDENCE</p>	<p>ADDRESS: 486 Pleasant Street Pawtucket, RI 02860</p>	<p>CONTACT: Mary Russo</p>
	<p>MAP YEAR: 1939</p>	<p>LAT/LONG: 41.8661 / -71.3832</p>	<p>INQUIRY#: 3965720.4</p>
	<p>SERIES: 7.5</p>		<p>RESEARCH DATE: 06/09/2014</p>
	<p>SCALE: 1:31680</p>		

Historical Topographic Map



	TARGET QUAD	SITE NAME: Francis J. Varieur Elementary	CLIENT: EA Engineering Science & Tech.
	NAME: PROVIDENCE	ADDRESS: 486 Pleasant Street	CONTACT: Mary Russo
	MAP YEAR: 1947	Pawtucket, RI 02860	INQUIRY#: 3965720.4
	SERIES: 7.5	LAT/LONG: 41.8661 / -71.3832	RESEARCH DATE: 06/09/2014
	SCALE: 1:25000		

Historical Topographic Map



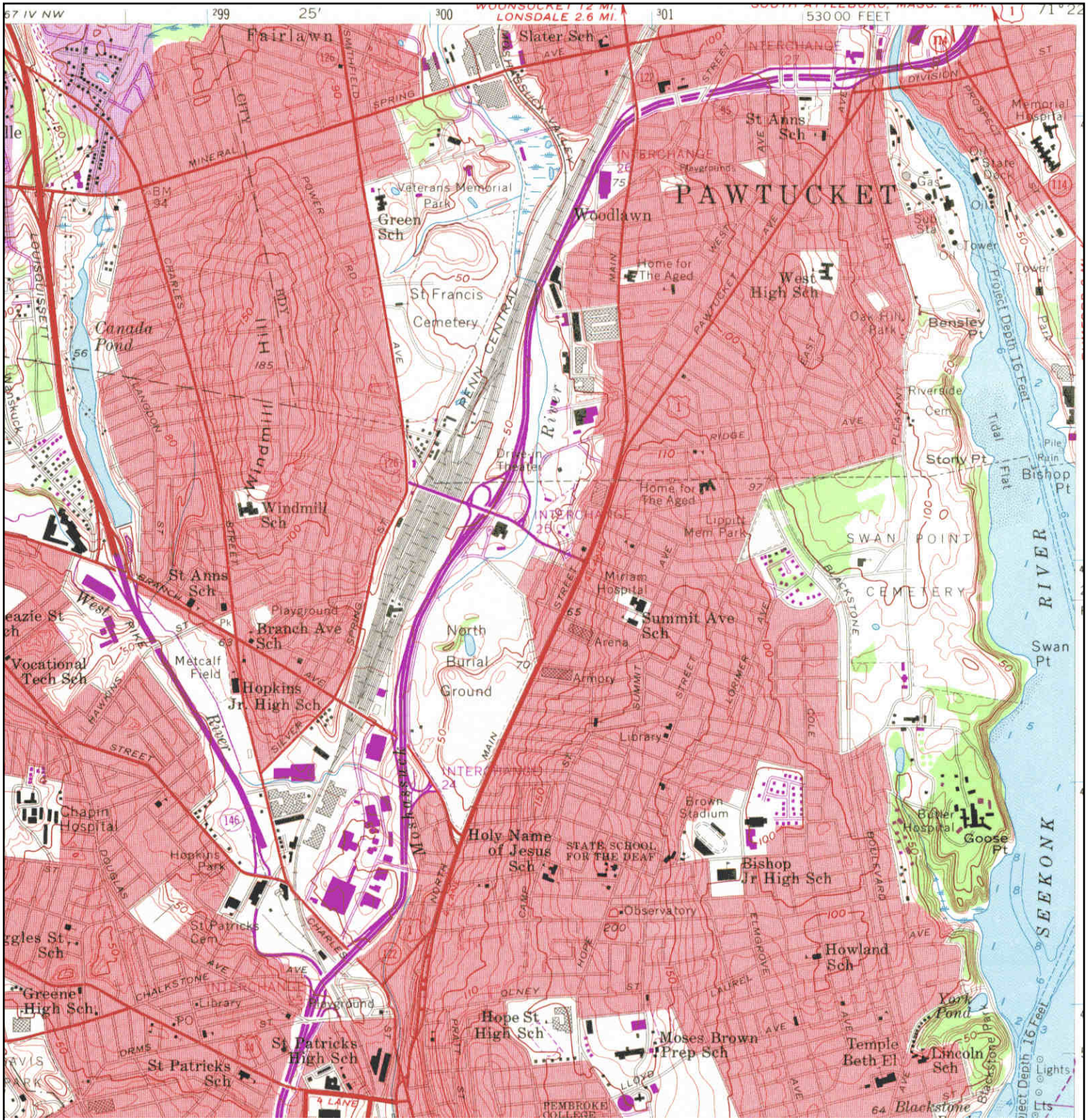
	ADJOINING QUAD		
	NAME:	EAST PROVIDENCE	SITE NAME: Francis J. Varietur Elementary
	MAP YEAR:	1949	ADDRESS: 486 Pleasant Street Pawtucket, RI 02860
	SERIES:	7.5	LAT/LONG: 41.8661 / -71.3832
	SCALE:	1:24000	CLIENT: EA Engineering Science & Tech. CONTACT: Mary Russo INQUIRY#: 3965720.4 RESEARCH DATE: 06/09/2014

Historical Topographic Map



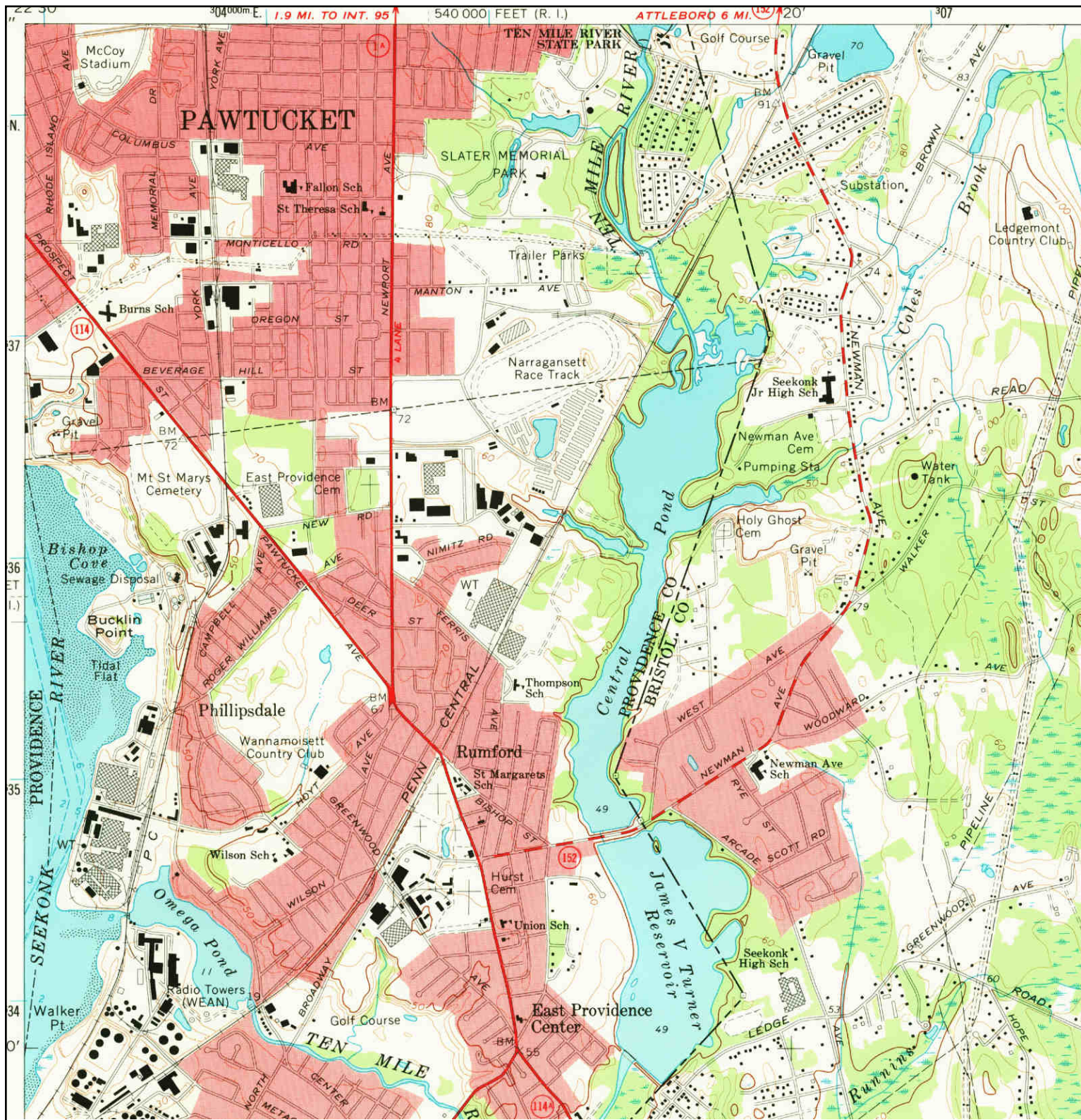
<p>N</p>	TARGET QUAD	SITE NAME: Francis J. Variour Elementary	CLIENT: EA Engineering Science & Tech.
	NAME: PROVIDENCE	ADDRESS: 486 Pleasant Street	CONTACT: Mary Russo
	MAP YEAR: 1957	Pawtucket, RI 02860	INQUIRY#: 3965720.4
	SERIES: 7.5	LAT/LONG: 41.8661 / -71.3832	RESEARCH DATE: 06/09/2014
	SCALE: 1:24000		

Historical Topographic Map



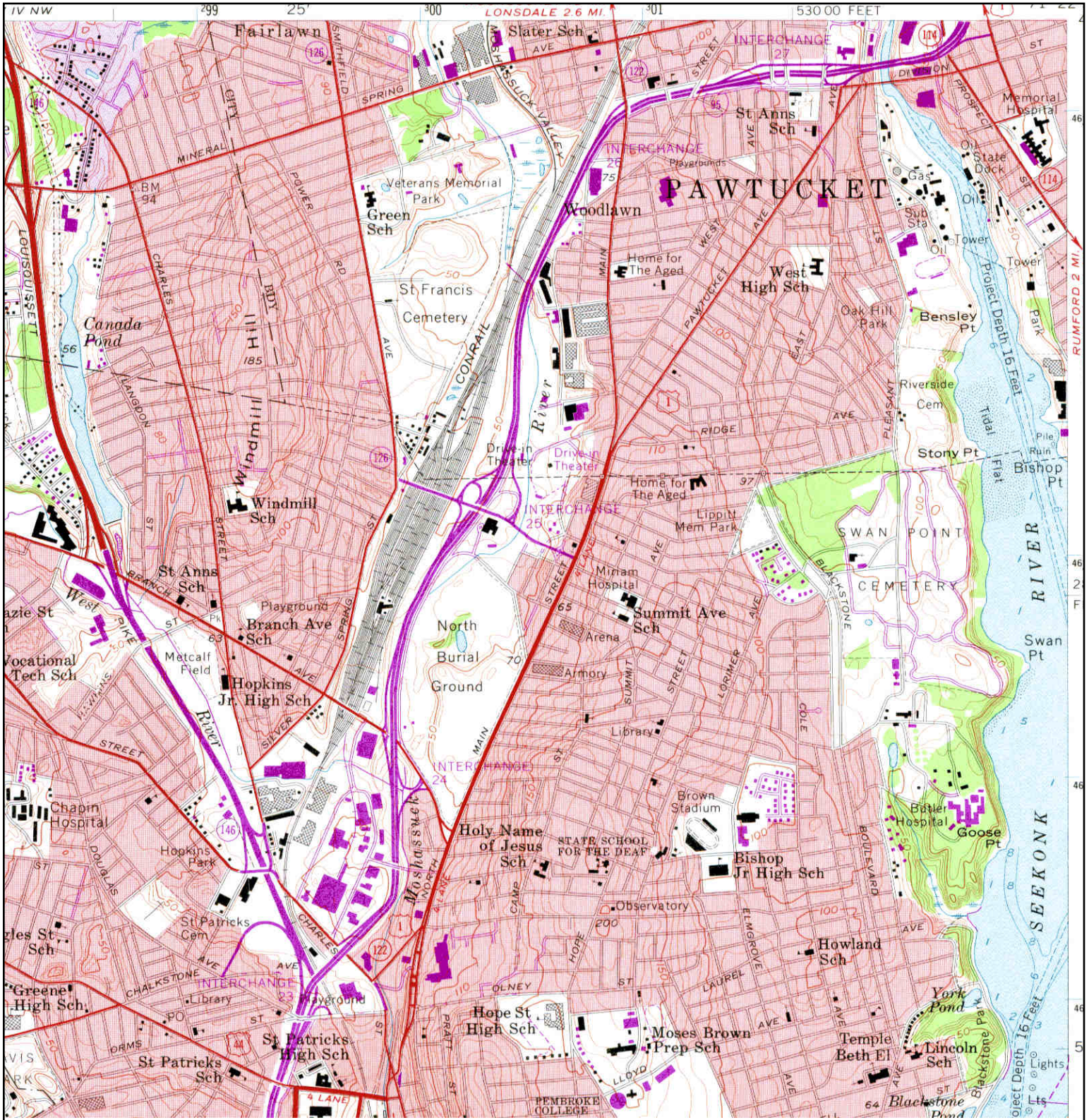
<p>N ↑</p>	TARGET QUAD	SITE NAME: Francis J. Variour Elementary	CLIENT: EA Engineering Science & Tech.
	NAME: PROVIDENCE	ADDRESS: 486 Pleasant Street	CONTACT: Mary Russo
	MAP YEAR: 1970	LAT/LONG: 41.8661 / -71.3832	INQUIRY#: 3965720.4
	PHOTOREVISED FROM :1957		RESEARCH DATE: 06/09/2014
	SERIES: 7.5		
	SCALE: 1:24000		

Historical Topographic Map



	ADJOINING QUAD		SITE NAME: Francis J. Varietur Elementary ADDRESS: 486 Pleasant Street Pawtucket, RI 02860 LAT/LONG: 41.8661 / -71.3832	CLIENT: EA Engineering Science & Tech. CONTACT: Mary Russo INQUIRY#: 3965720.4 RESEARCH DATE: 06/09/2014
	NAME: EAST PROVIDENCE			
	MAP YEAR: 1971			
	SERIES: 7.5			
SCALE: 1:24000				


Historical Topographic Map



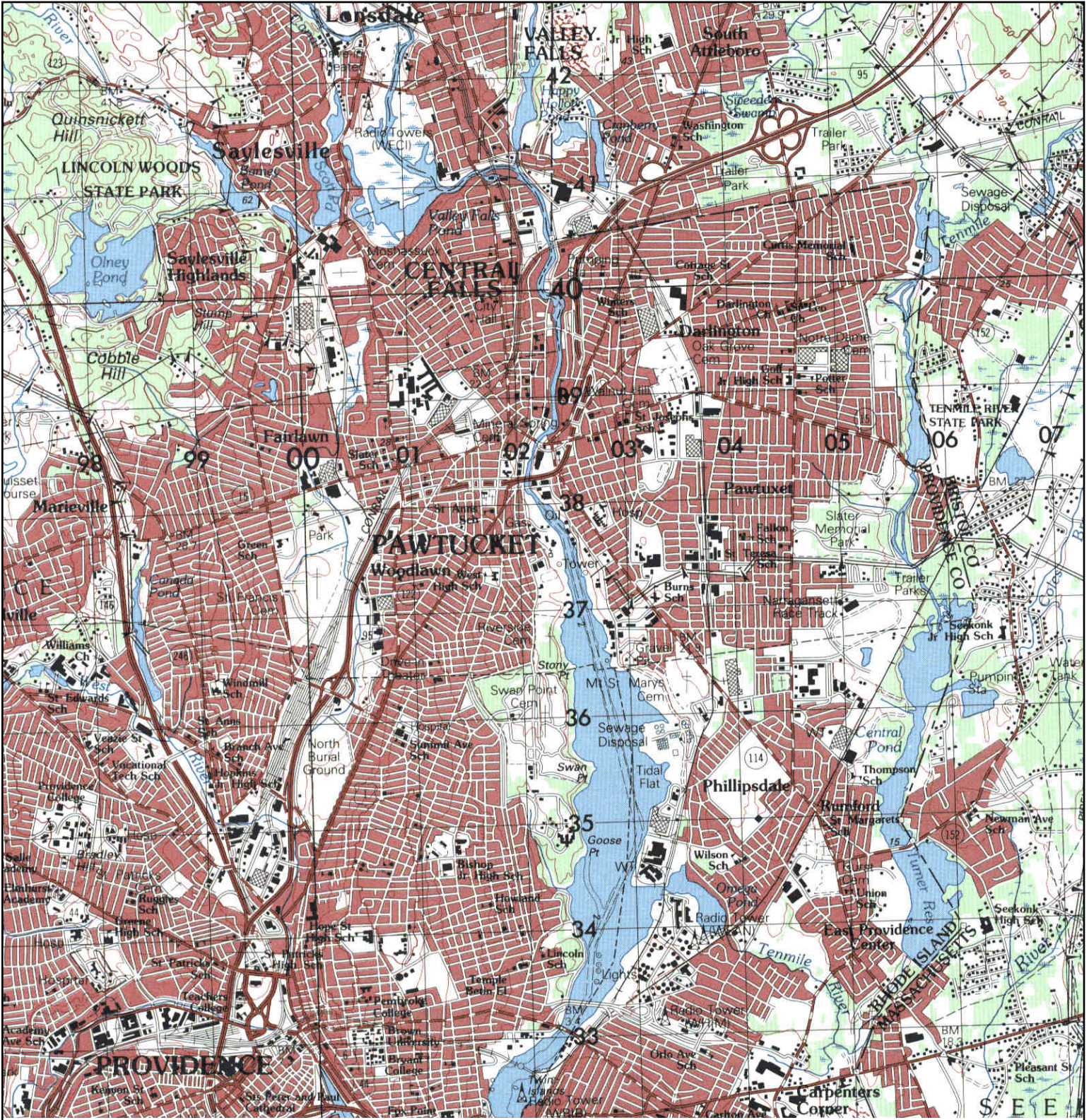
<p>N</p>	TARGET QUAD	SITE NAME: Francis J. Variour Elementary	CLIENT: EA Engineering Science & Tech.
	NAME: PROVIDENCE	ADDRESS: 486 Pleasant Street	CONTACT: Mary Russo
	MAP YEAR: 1975	LAT/LONG: 41.8661 / -71.3832	INQUIRY#: 3965720.4
	PHOTOREVISED FROM :1957		RESEARCH DATE: 06/09/2014
	SERIES: 7.5		
	SCALE: 1:24000		


Historical Topographic Map



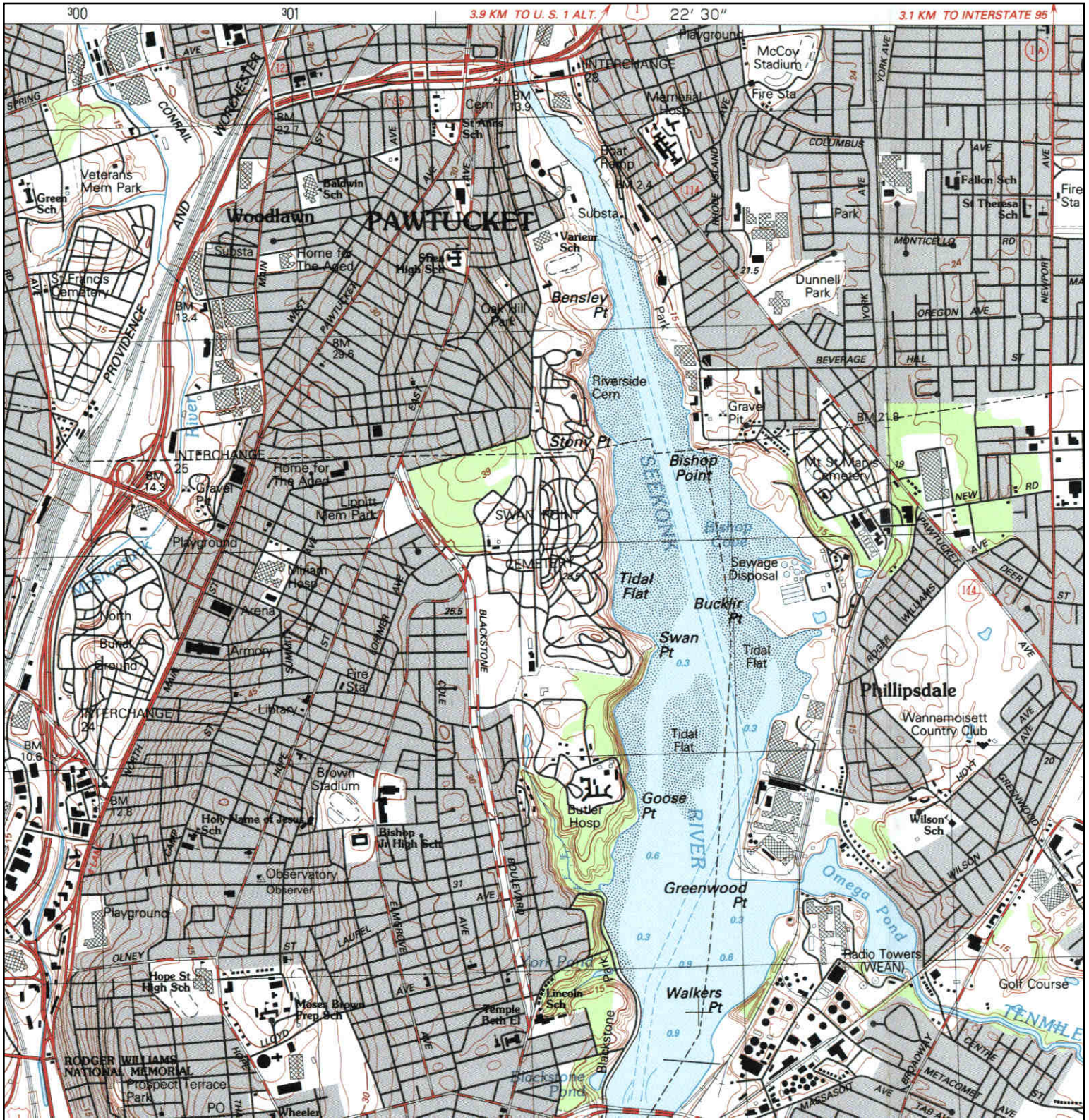
N 	ADJOINING QUAD	SITE NAME: Francis J. Varietur Elementary	CLIENT: EA Engineering Science & Tech.
	NAME: EAST PROVIDENCE	ADDRESS: 486 Pleasant Street	CONTACT: Mary Russo
	MAP YEAR: 1979	LAT/LONG: 41.8661 / -71.3832	INQUIRY#: 3965720.4
	PHOTOREVISED FROM :1971		RESEARCH DATE: 06/09/2014
	SERIES: 7.5		
	SCALE: 1:24000		

Historical Topographic Map



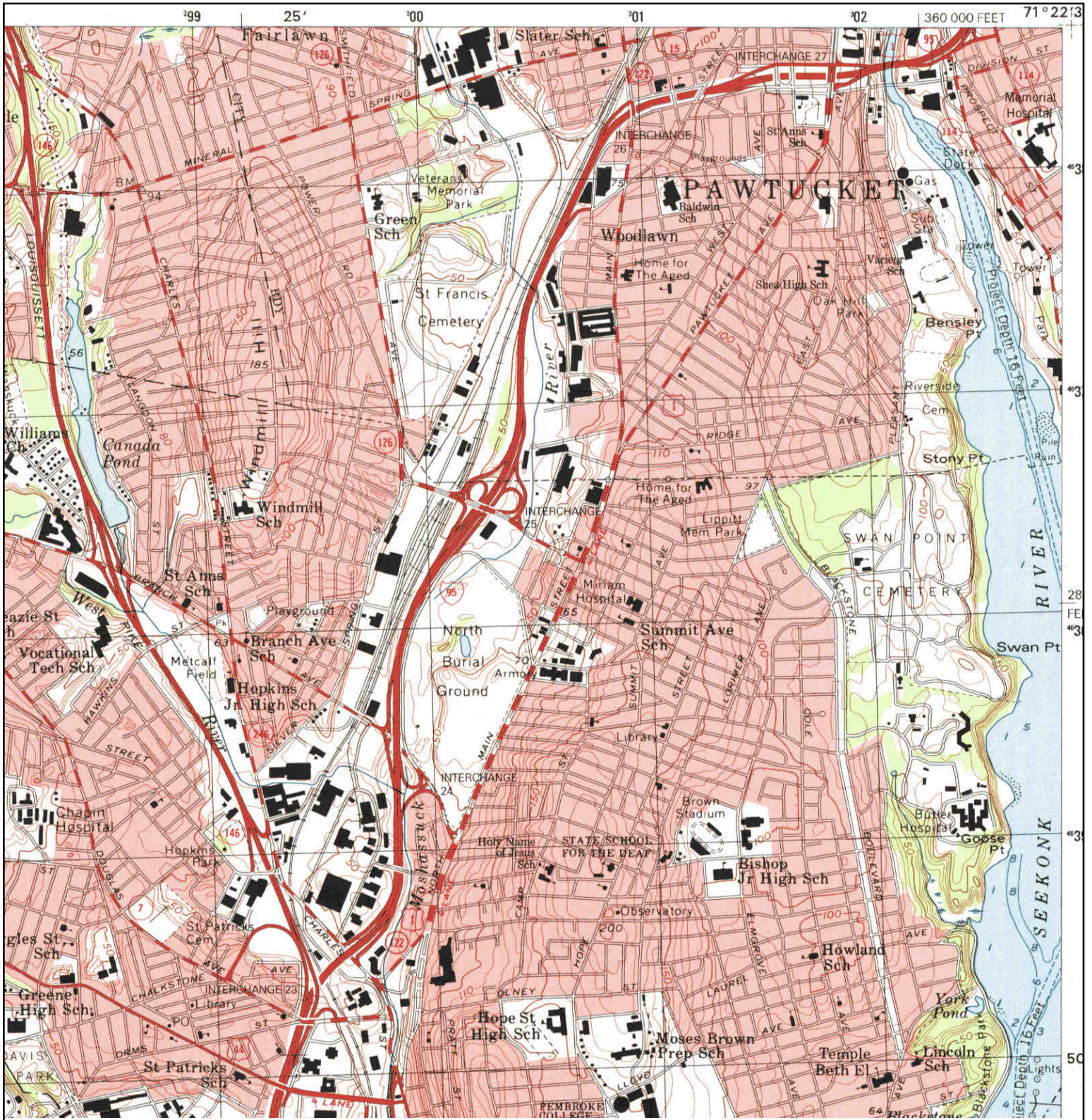
<p>N</p> 	TARGET QUAD	SITE NAME: Francis J. Varieur Elementary	CLIENT: EA Engineering Science & Tech.
	NAME: PROVIDENCE	ADDRESS: 486 Pleasant Street	CONTACT: Mary Russo
	MAP YEAR: 1979	Pawtucket, RI 02860	INQUIRY#: 3965720.4
	SERIES: 15	LAT/LONG: 41.8661 / -71.3832	RESEARCH DATE: 06/09/2014
	SCALE: 1:50000		


Historical Topographic Map



<p>N</p>	<p>TARGET QUAD</p> <p>NAME: PROVIDENCE</p> <p>MAP YEAR: 1987</p>	<p>SITE NAME: Francis J. Variour Elementary</p> <p>ADDRESS: 486 Pleasant Street Pawtucket, RI 02860</p> <p>LAT/LONG: 41.8661 / -71.3832</p>	<p>CLIENT: EA Engineering Science & Tech.</p> <p>CONTACT: Mary Russo</p> <p>INQUIRY#: 3965720.4</p> <p>RESEARCH DATE: 06/09/2014</p>
	<p>SERIES: 7.5</p> <p>SCALE: 1:25000</p>		

Historical Topographic Map



<p>N</p> 	TARGET QUAD	SITE NAME: Francis J. Varieur Elementary	CLIENT: EA Engineering Science & Tech.
	NAME: PROVIDENCE	ADDRESS: 486 Pleasant Street	CONTACT: Mary Russo
	MAP YEAR: 1996	Pawtucket, RI 02860	INQUIRY#: 3965720.4
	SERIES: 7.5	LAT/LONG: 41.8661 / -71.3832	RESEARCH DATE: 06/09/2014
	SCALE: 1:24000		