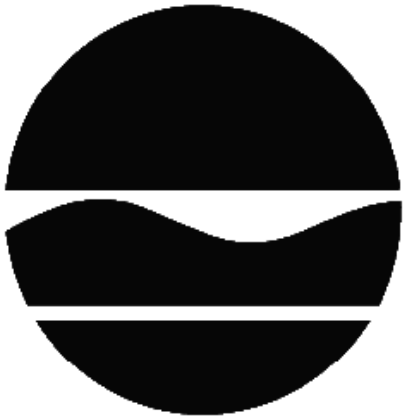
RECORD OF DECISION

Former IBM Endicott Facility
Operable Unit Number 01: Railroad Corridor Source Area
Operable Unit Number 02: North Street Area
State Superfund Project
Endicott, Broome County
Site No. 704014
EPA ID: NYD00233039
March 2019



Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - RECORD OF DECISION

Former IBM Endicott Facility
Operable Unit Numbers: 01 and 02
State Superfund Project
Endicott, Broome County
Site No. 704014
March 2019

Statement of Purpose and Basis

This document presents the remedy for Operable Unit Numbers: 01: Railroad Corridor Source Area and 02: North Street Area of the Former IBM Endicott Facility site, a Class 2 inactive hazardous waste disposal site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Parts 373 and 375, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended. As a site also subject to RCRA, this ROD also constitutes the Statement of Basis required for the site under Part 373.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for Operable Unit Numbers: 01 and 02 of the Former IBM Endicott Facility site and the public's input to the proposed remedy presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Description of Selected Remedy

For OU: 01 and OU: 02

The elements of the selected remedy are as follows:

- Enhancement and continued operation of the groundwater extraction and treatment system;
- Placement of a site cover over areas where contaminants in soils exceed the soil cleanup objectives for commercial use. It is anticipated that the site cover will consist of a mixture of soil covers, pavement, concrete, parking areas, sidewalks, building foundations and building slabs.
- Maintenance of engineering controls, which consist of groundwater pump and treat systems, HVAC systems, sub-slab depressurization systems and soil vapor extraction systems;
- Site management plan which addresses future excavation work, demolition work, further investigation and remediation should large scale redevelopment occur, evaluation of potential soil vapor intrusion for any redevelopment or new buildings, investigation and/or cover should a building foundation or slab be removed, notification to the Departments of

any change of use to an area of the site and additional investigation and source control when possible.

- and an Environmental Easement.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

March 30, 2019

Date

Michael J. Ryan, P.E., Director
Division of Environmental Remediation

RECORD OF DECISION

Former IBM Endicott Facility
Endicott, Broome County
Site No. 704014
March 2019

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment. The New York State Hazardous Waste Management Program (also known as the RCRA Program) also requires corrective action for releases of hazardous waste to the environment. This site is subject to both programs.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 373 and Part 375. As a site also subject to RCRA, this ROD also constitutes the Statement of Basis required for the site under Part 373. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

George F. Johnson Memorial Library
Attn: Reference Librarian
1001 Park Street
Endicott, NY 13760
Phone: (607) 757-5350

NYSDEC
Attn: Jessica LaClair
625 Broadway
Albany, NY 12233-7013
Phone: (518) 402-9821

NYSDEC - Region 7
Attn: Stephanie Webb
615 Erie Blvd. West
Syracuse, NY 13204
Phone: (315) 426-7400

A public meeting was also conducted. At the meeting, the findings of the remedial investigation (RI) and the focused feasibility study (FFS) were presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the proposed remedy.

Comments on the remedy received during the comment period are summarized and addressed in the responsiveness summary section of the ROD.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location:
The former IBM Endicott facility is located in the Village of Endicott and in the Town of Union in Broome County, New York. The 135-acre facility lies along and on either side of a railroad corridor in the village and in the town. The central portion of the facility is near the intersection of McKinley Avenue and the railroad in the village. Portions of the facility extend westward to Robble Avenue, northward to Watson Boulevard, eastward to Harding Avenue, and southward to south of North Street. Operable Unit 1 (Railroad Corridor Source Area) and Operable Unit 2 (North Street Area) (OU-1 and OU-2), the subjects of this document, are located north and south of the Norfolk Southern Railroad track and west and east of McKinley Avenue.

Site Features:
The site includes numerous current and former manufacturing buildings, office buildings, and ancillary support facilities. Paved parking areas are generally located around the periphery of the site buildings. An east-west railroad corridor bisects the facility and several public and private

roadways intersect or transect the facility. Commercial, industrial, and residential areas surround the facility on all sides. The Susquehanna River is approximately one mile south of the facility. Brixius Creek, a small tributary to the Susquehanna, passes along the eastern edge of the facility. The facility is served by a municipal water supply, sanitary sewers and storm sewers. A private well field also supplies production water to tenants of the facility for manufacturing purposes.

Current Zoning and Land Use:
The former IBM Endicott facility property is currently zoned Commercial Industrial. The portion of the site that encompasses OU1 and OU2 is currently zoned industrial. The facility is currently owned by Huron Real Estate Associates, LLC, a real estate leasing and property management company. Huron leases manufacturing and office space in the facility to a variety of tenants. Occupancy and use of the facility changes from time to time as tenant needs and availability of leasable space changes. Most of the facility footprint is currently occupied or available for occupancy. An exception is the group of buildings in the oldest portion of the facility (informally known as the Old Group buildings) located along the north side of North Street east of McKinley Avenue which are abandoned and not suitable for occupancy due to issues not related to the handling of hazardous substances.

Past Use of the Site:
The site was first developed by the Erie-Lackawanna Railroad around 1850. Additional development occurred beginning in 1901 by predecessors to the Endicott-Johnson Corporation, and beginning in 1904 by predecessors to the IBM Corporation. The site has a history of manufacturing and research and development beginning in the early 1900s.

Early industrial activity was associated primarily with shoe manufacturing by Endicott-Johnson and its predecessors in the western portion of the site. Associated on-site industries related to shoe manufacturing included leather tanning, box container manufacturing, chemical manufacturing, and an iron foundry. The railroad transported raw materials (including chemicals) to the site and finished products from the site. Solvents reportedly used by Endicott-Johnson as a part of its operations included carbon tetrachloride, trichloroethene (TCE), tetrachloroethene (PCE), 1,1,1-trichloroethane (TCA), methylene chloride, methyl ethyl ketone, toluene, xylene, and mixtures containing aromatics (gasoline, rubber solvent and mineral spirits). Endicott-Johnson ceased manufacturing operations in the village by about 1980.

IBM and its predecessors also operated at the site beginning in the early 1900s in the Old Group buildings east of McKinley Avenue. IBM gradually expanded into areas previously occupied by Endicott-Johnson as the latter company reduced its manufacturing capacity. Mechanical business machines were manufactured by IBM and its predecessors until the 1950s. From the 1950s to the early 1980s, the facility was engaged primarily in the manufacture of mid-range, mainframe computers. In the early 1980s, operations at the facility primarily shifted to the manufacture of components (circuit cards, circuit panels, and ceramic substrates) in support of other IBM electronics manufacturing activities. The primary solvents used by IBM as part of its mainframe computer and electronic component manufacturing operations included TCE, PCE, TCA, methylene chloride, and Freon 113. The site was sold to Huron Real Estate Associates, LLC in 2002. Huron is a real estate leasing and property management company that leases manufacturing and office space at the site to a variety of tenants.

Operable Units:
The former IBM Endicott site is divided into seven operable units. An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. Boundaries of the operable units at the Endicott site are generally defined by the limits of hydraulic capture in the various components of the groundwater remediation program or by convenient geographical features.

The various Operable Units (OUs) at the former IBM Endicott facility are identified in the Consent Order and are described below. Records of Decision were issued previously for OUs 3, 4, 5, 6 and 7. A site location map is attached as Figure 1. An area/OU designation map is attached as Figure 2.

- Operable Unit 1 (OU1), also known as the Railroad Corridor Source Area, is approximately 40 acres. It is the on-site source area in the main plant area where the bulk of contaminant releases occurred. OU1 generally incorporates the central portion of the facility from the railroad corridor northward. OU1 has eleven buildings that are leased for manufacturing space and several parking lots.

- Operable Unit 2 (OU2), also known as the North Street Area, is approximately 30 acres. It is the on-site portion of the main plant area south of the railroad and generally north of North Street. OU2 has 10 buildings which are leased, buildings referred to as the Old Group Buildings which are unusable, several parking lots and cooling towers.

For purposes of investigation and remediation, OU1 and OU2 are usually considered together because they are both on-site areas separated only by the railroad. OU1 and OU2 are located in the central portion of the site.

- Operable Unit 3 (OU3), also known as the Southern Area, is the southern portion of the groundwater plume associated with the OU1 and OU2 source areas. OU3 extends approximately from Monroe Street southward to the Susquehanna River, and from just west of McKinley Avenue to just east of Arthur Avenue.

For purposes of investigation and remediation, OU3 is generally considered together with an area identified in the Consent Order as Off-Site Capture Zone A because the two areas are contiguous and together represent the off-site plume area south of the main plant area. Off-Site Capture Zone A is the northern portion of the off-site groundwater plume associated with the OU1 and OU2 on-site source areas. Off-Site Capture Zone A extends approximately from North Street southward to north of Broad Street, and from just west of Jefferson Avenue to just east of McKinley Avenue. See attached Figure 2.

- Operable Unit 4 (OU4), also known as the Ideal Cleaners Area, is the source area and groundwater plume associated with the former dry-cleaning operation. Operable Unit 4 lies east of Off-Site Capture Zone A and extends southward from

North Street to approximately Monroe Street. An area identified in the Consent Order as Off-Site Capture Zone B is part of OU4. Off-Site Capture Zone B is the plume area associated with the former Ideal Cleaners and extends from the source area to a line of extraction wells located along Monroe Street between Adams Avenue and the alley east of McKinley Avenue.

- Operable Unit 5 (OU5), also known as the Building 57 Area, is the source area and groundwater plume associated with Building 57/57A which is separate from and east of the main facility. OU5 includes Building 57/57A east of Hayes Avenue and north of the railroad tracks, as well as a former parking lot (known as Parking Lot 26) south of the railroad tracks.

- Operable Unit 6 (OU6) is the bedrock groundwater plume and includes all facility-related contamination in the bedrock aquifer.

- Operable Unit 7 (OU7), also known as the Northwestern Area, is the source area and groundwater plume associated with historic releases in this area. OU7 includes the portion of the former IBM facility northwest of the main facility and located west of Oak Hill Avenue and north of the railroad tracks.

Site Geology and Hydrogeology:
The geology of the site is characterized by a sequence of unconsolidated glacial and post-glacial sediments overlying a buried bedrock valley. Three separate water-bearing units are defined in the vicinity of the site: the Upper Aquifer, the Lower Aquifer, and the Bedrock Aquifer. The Upper Aquifer extends beneath the site and is the water-bearing unit most impacted by site-related contamination. Natural groundwater flow in all three units is to the south, ultimately discharging to the Susquehanna River. Groundwater withdrawals for water supply or remediation purposes have altered the natural flow regime by creating artificial discharge and recharge points. Depth to groundwater at the site varies from about 10 to 40 feet below ground surface under pumping conditions.

Operable Unit (OU) Numbers 01 and 02 are the subject of this document.

Records of Decision were issued previously for OU 03, 04, 05, 06, and 07.

A site location map is attached as Figure 1, the OU boundary map is attached as Figure 2 and the detailed description of OU1 and OU2 is attached as Figure 3.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to industrial or commercial use as described in Part 375-1.8(g) were evaluated.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance

values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

IBM Corporate Environmental Affairs

The Department and IBM entered into a Consent Order on August 4, 2004 (Administrative Order on Consent No. A7-0502-0104). The Consent Order superseded a Part 373 Resource Conservation and Recovery Act (RCRA) Permit that IBM held for the facility. The Consent Order effectively continues the corrective action requirements of the RCRA Permit and obligates the responsible parties to implement a Site-Wide Source Area Evaluation, as well as Supplemental Remedial Investigations (SRIs), Focused Feasibility Studies (FFSs), and/or Interim Remedial Measures (IRMs) for each Operable Unit as described in the Consent Order. The Order requires Remedial Design/Remedial Action Work Plans for implementing the selected remedies.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- groundwater

- soil
- soil vapor
- indoor air
- sub-slab vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

For OU: 01

trichloroethene (TCE)
cis-1,2-dichlorothene (cis-1,2 DCE)
1,1-dichloroethene (11DCE)
vinyl chloride (VC)
1,1-dichloroethane (11DCA)
1,1,1-trichloroethane (TCA)
perfluorooctanesulfonate (PFOS)
tetrachloroethene (PCE)
chloroethane (CEA)
dichloromethane (DCM)
Freon 113
Freon 123a

For OU: 02

trichloroethene (TCE)
cis-1,2-dichlorothene (cis-1,2 DCE)
1,1-dichlorothene (11DCE)
vinyl chloride (VC)
dichloromethane (DCM)
1,1-dichloroethane (11DCA)
1,1,1-trichloroethane (TCA)
tetrachloroethene (PCE)
chloroethane (CEA)

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

groundwater
soil
indoor air

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

Soil Excavation

On December 14, 1979, IBM determined that approximately 4,200 gallons of TCA were released to the environment between the railroad tracks and Building 18. Immediate action was taken to excavate and remove contaminated soils down to the water table and dispose of them off-site. Removal was based on visual confirmation only. The excavation was completed by the end of January 1980 and IBM initiated an investigation to locate the contaminant plume related to the spill. The area was backfilled to grade and Dense Non-Aqueous Phase Liquid (DNAPL) Recovery began in January 1980 (see below).

DNAPL Recovery

After the initial release of TCA was discovered and the soil removal performed, a DNAPL recovery system was installed within the excavation area and well EN-4. The investigation identified an accumulation zone between Buildings 18, 41, 45 and 48. DNAPL recovery activities began at well EN-25, north of the railroad tracks between Buildings 45 and 48 in February 1980, and in March and April 1980 groundwater extraction and DNAPL recovery began at four wells south of the railroad tracks. This system was located in the Central Railroad Corridor Source Area and operated for about three years from 1980 to 1982. Between January 1980 and December 1982 more than 239,000 pounds of DNAPL solvent were recovered and placed in drums for off-site disposal. The DNAPL recovery and groundwater extraction lowered the water table and reversed the direction of groundwater flow beneath the rail siding. Once the active recovery diminished, the groundwater extraction continued to control the mobility of the remaining residual DNAPL.

Groundwater Extraction and Treatment

After the initial release of TCA was discovered and the soil removal completed, a groundwater extraction and treatment system was installed as an IRM and commenced operation in 1980. The groundwater extraction system was designed and installed so that the capture zones were sufficient to control groundwater flux crossing North Street within OU2 and to control groundwater within the railroad corridor. The extraction system has created a depression of the water table so that contaminated groundwater is directed toward the extraction wells within the plume area. Over the past 40 years IBM has been operating this extensive system of monitoring and extraction wells and treatment facilities in the OU2 and OU1 Areas. Currently, there are 77 monitoring wells and

five extraction wells operating within OU1 and OU2. This system is commonly referred to as a pump-and-treat system and is designed to extract contaminated groundwater and treat for removal of site-related contaminants. The purpose of the system was to shrink the size of the groundwater plume, reduce contaminant concentrations to below applicable groundwater standards to the extent practicable, and prevent further migration of site-related contaminants to off-site areas. Compared to the data from when groundwater treatment first began in 1980, the lateral extent of the groundwater plume has diminished greatly, and concentrations have reduced by two or more orders of magnitude. In 1980, concentrations of TCA, TCE and PCE were greater than 500,000 parts per billion (ppb) in the suspected source areas and based on groundwater data collected in these areas are now 75,000 ppb, 520 ppb and 40 ppb, respectively. There is still remaining contamination in the groundwater that needs to be addressed. (Figure 4a-4c)

Groundwater was extracted from the subsurface from the area of the groundwater contaminant plume via a well that withdrew contaminated water from the Upper Aquifer. Extracted groundwater was then transferred via double-walled underground pipes to Clark Street Groundwater Treatment Facility in OU1 (GTF) and the Garfield Groundwater Treatment Facility in OU2. The Garfield GTF uses liquid-phase granular activated carbon (GAC) as the primary treatment for extracted groundwater. An air stripping treatment system with vapor-phase treatment vessels for aerator off-gas treatment was installed in 2013. The Clark Street GTF uses a shallow tray air stripper and three in-series vapor-phase treatment vessels for aerator off-gas treatment. Two of the vapor-phase treatment vessels contain GAC and a third vapor-phase treatment vessel contains a special zeolite medium for polishing the air stripper effluent stream. The treated effluent from both treatment facilities is discharged to the municipal storm sewer system and, ultimately, to the Susquehanna River.

Sub-slab Depressurization (SSDS) & Soil Vapor Extraction (SVE)

Soil vapor intrusion sampling (sub-slab and indoor air) was conducted within buildings located in OU1 and OU2 by the State in 2005, including Buildings 14, 18, 19, 32, 40, 41, 45, and 47. IBM conducted a follow up indoor air assessment in 2016 to verify the 2005 sampling event. Twelve buildings were sampled; Buildings 14, 18 19, 32, 33, 40, 41, 42, 45, 46, 47, and 264/268. In 2005 the results of the 12 buildings in OU1 and OU2 ranged from non-detect to 22 ug/m^3 for TCE and in 2016 the same buildings ranged from non-detect to 3.1 ug/m^3. The completion of this work was documented in the September 2005 "Preliminary Site Assessment Data Report" and the September 2016 "Indoor Air Assessment Report".

Based on the 2016 results indicating slight exceedances of NYSDOH air guideline values for TCE, a sub-slab depressurization system was installed in Building 42 and a soil vapor extraction system was installed in Building 45/46 based on the potential and current exposures. Post mitigation samples collected in the two buildings confirmed the effectiveness of the systems and indoor air concentrations were either below or at background levels. The completion of this work was documented in the March 2018 "SSDS Completion and Startup Report: Building 42" and April 2018 "SVE Completion and Startup Report Building 45/46".

HVAC Controls

In 2017, a demonstration project began as a performance monitoring plan at ten buildings (14, 18, 19, 32, 33, 40, 41, 45, 47, and 264/268) that monitors the occupancy of buildings, includes sampling of indoor air and checks of the operational heating, ventilation, and air conditioning (HVAC) controls that maintain indoor air quality. The purpose of this ongoing performance monitoring plan is to collect data and information to evaluate the long-term effectiveness of engineering controls (ECs), specifically HVAC systems, and associated operational monitoring and observational checks, to maintain appropriate indoor air quality in the above-mentioned buildings that might otherwise be affected by soil vapor intrusion Other than building 264/268 results of this demonstration project monitoring plan indicate that HVAC controls are effective at controlling the potential for indoor air impacts as a result of soil vapor intrusion and will be maintained as engineering controls with ongoing indoor air monitoring. Indoor air results from Building 264/268, which was infrequently occupied, had TCE concentrations above 2 ug/m^3. This indoor air concentration was due to the HVAC not being maintained at the predetermined settings. The instillation of a sub-slab depressurization is being considered if HVAC control settings are not being maintained. IBM used summa sampling, hapsite air sampling screening, and 30-day passive sampling all to confirm TCE concentrations were below NYSDOH air guideline values. IBM has conducted this performance monitoring for a year as a study for an alternative way to monitor indoor air at active industrial sites. It is expected that this ongoing monitoring will continue as part of the site management plan.

Sediment Removal

Contaminated sediments were investigated and removed from storm sewer manholes and storm sewer piping near Buildings 46, 48, 18 and 41 in OU1 and OU2. A total of twenty 55-gallon drums of sediment were removed during the work. The highest levels of TCA (100,000 ppb) and TCE (19,000 ppb) were found in STM14 which is at the southwest corner of Buildings 46. Levels of TCA and TCE were low or non-detect in sediments of surrounding manholes sampled. The completion of this work was documented in the September 2012 "Storm Sewer Sediment Sampling, Analysis and Removal Report".

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OUs 01 and 02.

Nature and Extent of Contamination

Operable Unit 1 (Railroad Corridor Source Area), Sub-Surface Soil:
The primary contaminant of concern in OU1 soils TCA. TCA was found at up to 48 parts per million (ppm) at depth (17 feet below ground surface) near the railroad tracks between Buildings

46 and 48. TCE was detected at 14 ppm in the same location. Groundwater data suggests that inaccessible areas (i.e., beneath buildings) may have isolated areas of soil contamination resulting from leaks from solvent/waste tanks and/or pipelines. Surface soil was not sampled as the area comprising OU1 is overlain with pavement and buildings, except for a small grassy area.

Operable Unit 1 (Railroad Corridor Source Area), Groundwater:
The primary contaminants of concern in OU1 groundwater are PCE, TCE, TCA, Freon 113, and their respective breakdown products. The highest concentrations of all these are found in the immediate vicinity of the railroad. The highest concentrations from the 2018 sampling are as follows: PCE 540 ppb; TCE 520 ppb; cis-1,2-DCE (a breakdown product) 15,000 ppb; TCA 75,000 ppb; 1,1-DCA (a breakdown product) 27,000 ppb; Freon-113 190 ppb.

Operable Unit 1 (Railroad Corridor Source Area), Soil Vapor:
Soil vapor intrusion sampling (sub-slab and indoor air) was conducted within buildings located in OU1 and OU2 by the State in 2005, including Buildings 14, 18, 19, 32, 40, 41, 45, and 47. IBM conducted a follow up indoor air assessment in 2016 to verify the 2005 sampling event. Twelve buildings were sampled; Buildings 14, 18 19, 32, 33, 40, 41, 42, 45, 46, 47, and 264/268. In 2005 the results of the 12 buildings in OU1 and OU2 ranged from non-detect to 22 ug/m^3 for TCE and in 2016 the same buildings ranged from non-detect to 3.1 ug/m^3. The completion of this work was documented in the September 2005 "Preliminary Site Assessment Data Report" and the September 2016 "Indoor Air Assessment Report".

Results of 2016 sampling in buildings located within OU1 indicated that mitigation for soil vapor intrusion was needed in two buildings, which was performed as an IRM in Buildings 45/46. Post mitigation indoor air samples collected confirmed the effectiveness of the systems and indoor air concentrations were either below or at background levels. Building 47 indoor air results were below the NYSDOH air guideline value for TCE of 2ug/m^3 and no actions were required at the time.

Operable Unit 2 (North Street Area), Sub-surface Soil:
The primary contaminant of concern in OU2 soils is TCA. TCA was found at up to 11,000 ppm at depth (17 feet below ground surface) in one localized area north of Building 18 in the vicinity of a former TCA underground storage tank that was removed in 1980. TCE, toluene, and Freon 113 are found in a few localized areas, but at much lower concentrations (less than 100 ppm). Groundwater data suggests that inaccessible areas (i.e., beneath Buildings 18 and 41) may have isolated areas of soil contamination resulting from leaks from solvent/waste tanks and/or pipelines. Surface soil was not sampled as the area is covered with pavement or buildings, except for the grassy areas between the sidewalk and buildings along North Street.

Operable Unit 2 (North Street Area), Groundwater:
The primary contaminants of concern in OU2 groundwater are TCE, TCA, and their respective breakdown products. Highest concentrations are found between Buildings 18 and 41. Based on the 2018 groundwater sampling the highest TCE concentration is 11,000 ppb and the highest TCA concentration is 2,200 ppb. Contaminant concentrations decrease significantly from Buildings 18 and 41 towards the south of North Street.

Operable Unit 2 (North Street Area), Soil Vapor:
Soil vapor intrusion sampling (sub-slab and indoor air) was conducted within buildings located in OU1 and OU2 by the State in 2005, including Buildings 14, 18, 19, 32, 40, 41, 45, and 47. IBM conducted a follow up indoor air assessment in 2016 to verify the 2005 sampling event. Twelve buildings were sampled; Buildings 14, 18 19, 32, 33, 40, 41, 42, 45, 46, 47, and 264/268. In 2005 the results of the 12 buildings in OU1 and OU2 ranged from non-detect to 22 ug/m^3 for TCE and in 2016 the same buildings ranged from non-detect to 3.1 ug/m^3. The completion of this work was documented in the September 2005 "Preliminary Site Assessment Data Report" and the September 2016 "Indoor Air Assessment Report".

Results of 2016 sampling in buildings located within OU2 indicated that mitigation for soil vapor intrusion was needed in Building 42, which was mitigated in 2018. Post mitigation indoor air samples collected in Building 42 to confirm the effectiveness of the system indicated that indoor air concentrations were either below or at background levels. The indoor air of the remaining buildings, which included Building 14, 18, 32 and 40 were sampled and indoor air concentrations were below the NYSDOH guidelines for TCE. When the HVAC units were turned off in Buildings 19 and 41, the indoor air levels were at or slightly above the NYSDOH air guideline for TCE, 2 ug/m^3. However, once the HVAC were turned back on, then indoor air concentrations were below the NYSDOH air guideline for TCE which confirm that the HVAC unit is needed to be operating in order to ensure indoor air levels of VOCs remain below air guidelines. The Old Group buildings have not been evaluated for soil vapor intrusion since they are currently unoccupied and unusable. An evaluation of the potential for soil vapor intrusion to occur will be conducted prior to any future redevelopment of these buildings.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

Direct contact with contaminants in soil is unlikely since the majority of the site is an active industrial facility that is covered with buildings and pavement. In addition, access is restricted, further limiting the potential for contact exposures. People are not drinking the contaminated groundwater because the area is served by a public water supply that is routinely tested to ensure that it meets drinking water standards. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. Mitigation systems such as sub-slab depressurization systems or other engineering controls are in place and being maintained to reduce the potentials for indoor air impacts as a result of soil vapor intrusion in on-site buildings.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or

mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives chosen for OU1 and OU2 are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

To be selected the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the focused feasibility study (FFS) report.

A summary of the remedial alternatives that were considered for OU1 and OU2 are presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or

monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's remedy is set forth at Exhibit D.
For OU 01: Railroad Corridor Source Area and for OU 02: North Street Area the remedy is referred to as the **Enhanced Groundwater Extraction, Site Cover and Vapor Mitigation** remedy.

The estimated present worth cost to implement the remedy is $7,980,000. The cost to construct the remedy is estimated to be $765,000 and the estimated average annual cost is $469,000.

The elements of the remedy are as follows:

1. Enhanced Groundwater Extraction and Treatment

Groundwater extraction and treatment will continue to be implemented to treat contaminants in groundwater. The groundwater extraction system was designed and installed so that the capture zones are sufficient to control groundwater flux crossing North Street within OU2 and to control groundwater within the railroad corridor. The extraction system has created a depression of the water table so that contaminated groundwater is directed toward the extraction wells within the plume area. Groundwater will continue to be extracted and treated in OU1 and OU2. The system will be enhanced to include vacuum-assist pumping systems where feasible. The extracted groundwater will pass though one of the two existing Groundwater Treatment Facilities (GTF). OU1 extraction wells are pumped to the Clark Street GTF. OU2 extraction wells are pumped to the Garfield Avenue GTF. Granular active carbon (GAC) will be used to remove dissolved contaminants from extracted groundwater by adsorption. The GAC system will consist of one or more vessels filled with carbon connected in series and/or parallel. In addition, air stripping will be implemented ex-situ to remove any remaining volatile contaminants from the extracted groundwater. The groundwater will be contacted with an air stream to volatilize contaminants from groundwater to air. The extracted air stream containing the volatile contaminants will be treated prior to discharge to the atmosphere using a vapor phase GAC system. The treated water from both GTFs is discharged to the Susquehanna River through the Endicott municipal storm sewer system once it meets all State Pollutant Discharge Elimination System (SPDES) discharge requirements.

2. **Site Cover**

A site cover will be required to allow for **commercial** use of the site in areas where the upper **one foot** of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of **one foot** of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to:

pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

3. Vapor Mitigation

The sub-slab depressurization system installed in Building 42 and the soil vapor extraction system installed in Building 45/46 as interim remedial measures will continue to operate and be maintained. HVAC setting controls that are being maintained in buildings 14, 18, 19, 32, 33, 40, 41 and 47 to reduce the potential for indoor air impacts due to soil vapor intrusion will continue operating as necessary and will include indoor air monitoring to verify the effectiveness of HVAC settings at minimizing indoor air impacts resulting from soil vapor intrusion.

4. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for commercial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

5. Site Management Plan

A Site Management Plan is required, which includes the following:

1. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed above.
Engineering Controls: The sub-slab depressurization systems, the ongoing groundwater extraction system discussed in Section 6.2 above and the cover systems.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- a provision for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible**.** The nature and extent of contamination in areas where access was previously limited or unavailable will be immediately and thoroughly investigated pursuant to a plan

approved by the Department. Based on the investigation results and the Department determination of the need for a remedy, a Remedial Action Work Plan (RAWP) will be developed for the final remedy for the site, including removal and/or treatment of any source areas to the extent feasible. Citizen Participation Plan (CPP) activities will continue through this process. Any necessary remediation will be completed prior to, or in association with, redevelopment. This includes but is not limited to the buildings 18, 41, 46, 48 and the buildings referred to as the old group buildings;

- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any Old Group buildings that may be redeveloped for use and for any new buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph **1** above will be placed in any areas where the upper **one foot** of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs)
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

2. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
    - monitoring of groundwater to assess the performance and effectiveness of the remedy;
    - a schedule of monitoring and frequency of submittals to the Department;
    - monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.
3. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to
    - procedures for operating and maintaining the remedy;
    - compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
    - maintaining site access controls and Department notification; and
    - providing the Department access to the site and O&M records.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Focused Feasibility Study for all environmental media that were evaluated within OU1 and OU2. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable Standards, Criteria and Guidelines (SCGs) for the site. The constituents of concern for this site are volatile organic compounds (VOCs). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Groundwater

Groundwater samples were collected from the Upper Aquifer wells. The samples were collected to assess groundwater conditions in OU1 and OU2. The results indicate that contamination in the groundwater at the site still exceeds the SCGs for volatile organic compounds. The isoconcentration contour maps comparing PCE, TCE and 111-TCA in September 1980 and August 2017 are shown in Figure 4a-4c. Table #1 is based on data collected during the August 2018 sampling event.

Table #1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
1,1,1-trichloroethane	ND – 75,000	5	43/82
1,1,2-trichloro-1,2,2-trifluoroethane	ND – 190	5	18/82
1,1-dichloroethane	ND – 27,000	5	37/82
1,1-dichloroethene	ND – 1,200	5	27/82
1,2-dichloro-1,2,2-trifluoroethane	ND - 280	5	7/82
1,2-dichloroethane (EDC)	ND - 18	.6	20/82
Benzene	ND - .2	1	0/82
Chloroethane	ND – 29,000	5	8/82
cis-1,2-dichloroethene	ND – 15,000	5	44/82
Ethybenzene	ND – 2.2	5	0/82
Methylene chloride	ND – 2,200	5	5/82
Tetrachloroethene	ND – 540	5	29/82
Toluene	ND – 810	5	4/82
Trans-1,2-dichloroethene	ND - 44	5	10/82
Trichloroethene	ND – 11,000	5	17/82
Vinyl Chloride	ND – 14	2	17/82
Xylenes	ND - 14	5	1/82

Detected Constituents	Concentration Range Detected (ppt)[c]	SCG[b] (ppb)	Frequency Exceeding SCG
Poly- and Perfluorinated Alkyl Substances (PFAS)			
Perfluorobutanesultonate (PFBS)	ND – 4.7		
Perfluorodecanesulfonate (PFDS)	ND		
Perfluoroheptanesulfonate (PFHpS)	ND – 1.7		
Perfluorohexanesulfonate (PFHxS)	ND - 17		
Perfluorooctanesulfonate (PFOS)	ND - 200		
Perfluorobutanoic acid (PFBA)	ND - 70		
Perfluorodecanoic acid (PFDA)	ND – 6.9		
Perfluorododecanoic acid (PFDoA)	ND		
Perfluoroheptanoic acid (PFHpA)	ND - 120		
Perfluorohexanoic acid (PFHxA)	ND - 130		
Perfluorononanoic acid (PFNA)	ND - 170		
Perfluorooctanoic acid (PFOA)	ND - 58		
Perfluoropentanoic acid (PFPeA)	ND - 240		
Perfluorotetradecanoic acid (PFTeDA)	ND		
Perfluorotridecanoic acid (PFTrDA)	ND		
Perfluoroundecanoic acid (PFUnA)	ND - 220		
6:2 fluorotelomersulfonate (6:2FTS)	ND - 22		
8:2 fluorotelomersulfonate (8:2 FTS)	ND – 4.1		
Perfluorooctanesulfonamide (FOSA)	ND		
N-ethyl PFOSAA	ND – 1.6		
N-methyl PFOSAA	ND		

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).
c - ppt; parts per trillion, which is equivalent to nanograms per liter, ng/L, in water.

Based on the findings of the RI, the presence of trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2 DCE), 1,1-dichloroethene (1,1-DCE), vinyl chloride (VC), 1,1-dichloroethane (1,1-DCA), 1,1,1-trichloroethane (TCA), tetrachloroethene (PCE), chloroethane (CEA), dichloromethane (DCM), Freon 113 and Freon 123a has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which drive the remediation of groundwater to be addressed by the remedy selection process are: TCA, PCE, TCE, DCA and cis-1,2 DCE. Groundwater contamination identified during the RI began being addressed during the IRMs described in Section 6.2. Compared to the data from when groundwater treatment first began in 1980, the lateral extent of the groundwater plume has diminished greatly, and concentrations have reduced by two or more orders of magnitude. However, there is still contamination remaining in the groundwater. PFAS have been detected in OU1 and OU2 but are not the primary contaminants of concern.

Soil

The soil sampling and VOC analyses completed as part of the SRI for OU1 and OU2 was performed to screen for DNAPL presence, assess the lateral extent of VOC presence in Upper Aquifer outwash sand and gravel soils, and assess the vertical extent of VOC presence in lacustrine silt soils. As virtually all of Operable Units

01 and 02 are covered by buildings, pavement, rail lines, and other structures, there was no surface soil data collected. Lawn areas are generally limited to the southern portion of OU2 adjacent to buildings that front on North Street and the northern portion of OU1 in the area of Watson Boulevard. Therefore, soil sampling of surface soils was not performed as part of the RI.

Detected Constituents	Concentration Range Detected (ppm)[a]	Protection of GW SCG[b] (ppm)	Frequency Exceeding Protection of GW	Industrial Use SCG[c] (ppm)	Frequency Exceeding Industrial SCG	Commercial Use SCG[d] (ppm)	Frequency Exceeding Commercial SCG
1,1,1-Trichloroethane	ND - 11000	0.68	20/74	1000	1/74	500	1/74
1,1-Dichloroethane	ND – 9	0.27	40/74	480	0/74	240	0/74
1,1-Dichloroethene	ND – 2.3	0.33	28/74	1000	0/74	500	0/74
1,2-Dichloroethane	ND - .14	0.02	1/74	60	0/74	30	0/74
Acetone	ND – 3.9	0.05	20/74	1000	0/74	500	0/74
cis-1,2-Dichloroethene	ND - 140	0.25	47/74	1000	0/74	500	0/74
Ethylbenzene	ND - 4	1.0	4/74	780	0/74	390	0/74
Methylene chloride	ND - .88	0.05	3/74	1000	0/74	500	0/74
Tetrachloroethene	ND - .17	1.3	0/74	300	0/74	150	0/74
Toluene	ND - 180	0.7	1/74	1000	0/74	500	0/74
Trichloroethene	ND - 100	0.47	14/74	400	0/74	200	0/74
Vinyl chloride	ND - 2	0.02	20/74	27	0/74	13	0/74

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Industrial Use, unless otherwise noted.
d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.

Soil contamination identified during the RI was partially addressed during the IRM described in Section 6.2.

Based on the findings of the SRI, the past releases of hazardous constituents resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, are TCE, cis-1,2-DCE, TCA and 1,1-DCA. The dissolved groundwater plumes that developed due to solvent releases in apparent source areas are inferred to extend beneath a large segment of the Norfolk Southern railroad tracks, Huron manufacturing buildings 18 and 41, the western portion of the Old Group Buildings, segments of McKinley Avenue and North Street, and a small portion of the Huron parking lot areas south of North Street.

Soil Vapor

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site due to the presence of buildings in the impacted area a full suite of samples were collected to evaluate whether soil vapor intrusion was occurring.

Soil vapor intrusion sampling (sub-slab and indoor air) was conducted within buildings located in OU1 and OU2 by the State in 2005, including Buildings 14, 18, 19, 32, 40, 41, 45, and 47. IBM conducted a follow up indoor air assessment in 2016 to verify the 2005 sampling event. Twelve buildings were sampled; Buildings 14, 18 19, 32, 33, 40, 41, 42, 45, 46, 47, and 264/268. In 2005 the results of the 12 buildings in OU1 and OU2 ranged from non-detect to 22 ug/m^3 for TCE and in 2016 the same buildings ranged from non-detect to 3.1 ug/m^3. Results of 2016 sampling in buildings located within OU1 indicated that mitigation for soil vapor intrusion was needed in two buildings, which was performed as an IRM in Buildings 45/46. Post mitigation indoor air samples collected

confirmed the effectiveness of the systems and indoor air concentrations were either below or at background levels. Building 47 indoor air results were below the NYSDOH air guideline value for TCE of 2 ug/m^3 and no actions were required at the time.

Results of 2016 sampling in buildings located within OU2 indicated that mitigation for soil vapor intrusion was needed in Building 42, which was mitigated in 2018. Post mitigation indoor air samples collected in Building 42 to confirm the effectiveness of the system indicated that indoor air concentrations were either below or at background levels.

In 2017, a performance monitoring plan was conducted at ten buildings (14, 18, 19, 32, 33, 40, 41, 45, 47, and 264/268) to evaluate and determine if HVAC controls could be set to reduce the potential for indoor air impacts as a result of soil vapor intrusion and be considered an engineering control. Other than building 264/268 results of this performance monitoring plan indicate that HVAC controls are effective at controlling the potential for indoor air impacts as a result of soil vapor intrusion and will be maintained as engineering controls with ongoing indoor air monitoring. Indoor air results from Building 264/268, which was infrequently occupied, had TCE concentrations above 2 ug/m^3. This indoor air concentration was due to the HVAC not being maintained at the predetermined settings. The instillation of a sub-slab depressurization is being considered if HVAC control settings are not being maintained. Indoor air will continue to be monitored through the Performance Monitoring Program and HVAC controls will be used, as necessary.

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A. A remedy to achieve pre-disposal conditions was screened out as a potential alternative due to its technical and logistical infeasibility. To achieve pre-disposal conditions, excavation and off-site disposal of all soil exceeding 6 NYCRR Part 375 Soil Cleanup Objectives for unrestricted use would be required. It would be necessary to shut down and/or relocate the businesses operating at the property to allow for demolition of the on-site buildings and excavation of the source area. This still would not address the contamination under the operating rail line.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: No Further Action with Site Management

The No Further Action with Site Management Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2 and Site Management and Institutional Controls and Engineering Controls are necessary to confirm the effectiveness of the IRM. This alternative maintains engineering controls which were part of the IRM and includes institutional controls, in the form of and environmental easement and site management plan, necessary to protect public health and the environment from contamination remaining at the site after the IRMs.

This alternative includes:

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- restrict the use and development of the controlled property to industrial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

Development and implementation of a Site Management Plan which includes an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective. This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- a provision for further investigation and remediation should large scale redevelopment occur, if

any of the existing structures are demolished, or if the subsurface is otherwise made accessible. The nature and extent of contamination in areas where access was previously limited or unavailable will be immediately and thoroughly investigated pursuant to a plan approved by the Department. Based on the investigation results and the Department determination of the need for a remedy, a Remedial Action Work Plan (RAWP) will be developed for the final remedy for the site, including removal and/or treatment of any source areas to the extent feasible. Citizen Participation Plan (CPP) activities will continue through this process. Any necessary remediation will be completed prior to, or in association with, redevelopment. This includes but is not limited to the buildings 18, 41, 46, 48 and the buildings referred to as the old Group buildings;

- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any Old Group buildings that may be redeveloped for use and for any new buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
- a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
    - monitoring of groundwater to assess the performance and effectiveness of the remedy;
    - a schedule of monitoring and frequency of submittals to the Department;
    - monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.
- an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to
    - procedures for operating and maintaining the remedy;
    - compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
    - maintaining site access controls and Department notification; and
    - providing the Department access to the site and O&M records.

Present Worth: *$142,000*
Capital Cost: *$75,000*
Annual Costs: *$87,500*

Alternative 3: Enhanced Groundwater Extraction, Site Cover and Vapor Mitigation

Groundwater extraction and treatment will continue to be implemented to treat contaminants in groundwater. The groundwater extraction system was designed and installed so that the capture zones are sufficient to control groundwater associated with both OU1 and OU2. The extraction system has created a depression of the water table so that contaminated groundwater is directed toward the extraction wells within the plume area. Groundwater will continue to be extracted and treated in OU1 and OU2. The system will be enhanced to include vacuum-assist pumping systems where feasible. The extracted groundwater will pass though one of the two existing Groundwater Treatment Facilities (GTF). OU1 extraction wells are pumped to the Clark Street GTF. OU2 extraction wells are pumped to the Garfield Avenue GTF. Granular active carbon (GAC) will be used to remove dissolved contaminants from extracted groundwater by adsorption. The GAC system will consist of one or more vessels filled with carbon connected in series and/or parallel. In addition, air stripping will be implemented ex-situ to remove any remaining volatile contaminants from the extracted groundwater. The groundwater will be contacted with an air stream to volatilize contaminants from groundwater to air. The extracted air stream containing the volatile contaminants will be treated prior to discharge to the atmosphere using a vapor phase GAC system. The treated water from both GTFs is discharged to the Susquehanna River through the Endicott municipal storm sewer system once it meets all State Pollutant Discharge Elimination System (SPDES) discharge requirements.

A site cover will be required to allow for commercial use of the site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

Vapor mitigation measures designed as interim remedial measures will continue to operate and be maintained. HVAC setting controls that are maintained in buildings 14, 18, 19, 32, 33, 40, 41, 42 and 47 to reduce the potential for indoor air impacts as a result of soil vapor intrusion will continue operating as determined effective and will include indoor air monitoring to verify the effectiveness of HVAC settings at minimizing indoor air impacts resulting from soil vapor intrusion.

This alternative also includes the institutional and engineering control and site management plan described in Alternative 2.

Present Worth: *$7,980,000*
Capital Cost: *$765,000*
Annual Costs: *$469,000*

Alternative 4: Enhanced Bioremediation and Groundwater Extraction, Site Cover and Vapor Mitigation

In-situ enhanced biodegradation will be employed to treat contaminants in groundwater in an area to be determined during the remedial design. The biological breakdown of contaminants through anaerobic reductive dechlorination will be enhanced by injecting lactate, molasses, vegetable oils or another organic carbon source and water solution into the subsurface to promote microbe growth. Injection would be performed using wells or

direct-push borings. A type of applicable bacterial culture could also be added to supplement existing microorganism populations, where needed.

This alternative also includes the institutional and engineering controls and site management described in Alternative 1 and the enhanced groundwater extraction described in Alternative 2.

Present Worth: *$13,300,000*
Capital Cost: *$1,910,000*
Annual Costs: *$740,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Action	0	0	0
No Further Action with Site Management	$75,000	$87,500	$142,000
Enhanced Groundwater Extraction, Site Cover and Vapor Mitigation	$765,000	$469,000	$7,980,000
Enhanced Biodegradation and Groundwater Extraction, Site Cover and Vapor Mitigation	$1,910,000	$740,000	$13,300,000

Exhibit D

SUMMARY OF THE REMEDY

The Department has selected Alternative 3, Enhanced Groundwater Extraction, Site Cover and Vapor Mitigation as the remedy for OU1 and OU2. Alternative 3 will achieve the remediation goals for the site by containing source areas and reducing VOC mass in soil and groundwater. The elements of this remedy are described in Section 7. The remedy is for OU1 and OU2 which are shown in Figure 2.

Basis for Selection

The remedy is based on the results of the RI, SRI, Indoor Air Assessments and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FFS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The remedy Alternative 3 (Enhanced Groundwater Extraction) would satisfy this criterion by controlling the sources of groundwater contamination within the railroad corridor source area and controlling the groundwater migration crossing North Street in OU2. All of the Alternatives with the exception of Alternative 1 are protective of human health and the environment. Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternative 2 (No Further Action with Site Management) complies with this criterion but to a lesser degree than Alternatives 3 and 4. Alternative 4

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

Alternative 2 complies with this criterion but to a lesser degree than Alternatives 3 and 4. Alternative 2 will not be evaluated further because the timeframe for concentrations of COCs to decline to applicable groundwater standards would increase from current projected timeframes due to the shutdown of groundwater extraction operations and increases the potential vapor intrusion pathway in certain buildings in OU1 and OU2.
Because Alternatives 3 and 4 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

The long-term effectiveness of Alternatives 3 and 4 is high as they would effectively mitigate potential exposure pathways to VOC present in groundwater in apparent source areas and near-source groundwater plume areas. The groundwater extraction component of both alternatives is a proven technology with a long history of effectiveness. However, some uncertainty exists in the long-term effectiveness of the biodegradation component of this remedy due to severe access limitations that restrict where injection can be implemented, limiting the locations where the biodegradation portion of this alternative can be applied. Alternative 3 requires a cover system to mitigate any potential direct contact with soils above the SCGs. The cover system may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

4. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Both alternatives would reduce the mobility and volume of COCs by groundwater capture, with air stripping and activated vapor-phase carbon to remove VOCs from the groundwater withdrawals. Alternative 4 would also reduce the mobility and volume of the COCs in apparent source areas and near-source groundwater plume areas by encouraging the breakdown of contamination.

5. Short-term Impacts and Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

The short-term effectiveness for Alternative 3 is high and Alternative 4 is moderate. Alternative 4 has a lower effectiveness because it could result in some disruption to site operations during installation of injection points and/or wells, hauling and disposal of drilling wastes, short-term noise events and work in high-density utility corridors. Alternative 4 would also require periodic injection of amendments and possibly microorganisms could also cause temporary minor disruptions to site operations. Alternative 3 would not disrupt site operations as most of the active remediation infrastructure and operations are already in place as interim remedial measures.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Alternatives 3 and 4 are each implementable. Both Alternatives would require monitoring and maintenance of all the remedial systems. Alternative 4 would also require operation and maintenance of the bioremediation system.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The capital cost for Alternative 4 is significantly higher than Alternative 3. The annual costs for Alternative 3 and 4 are comparable.

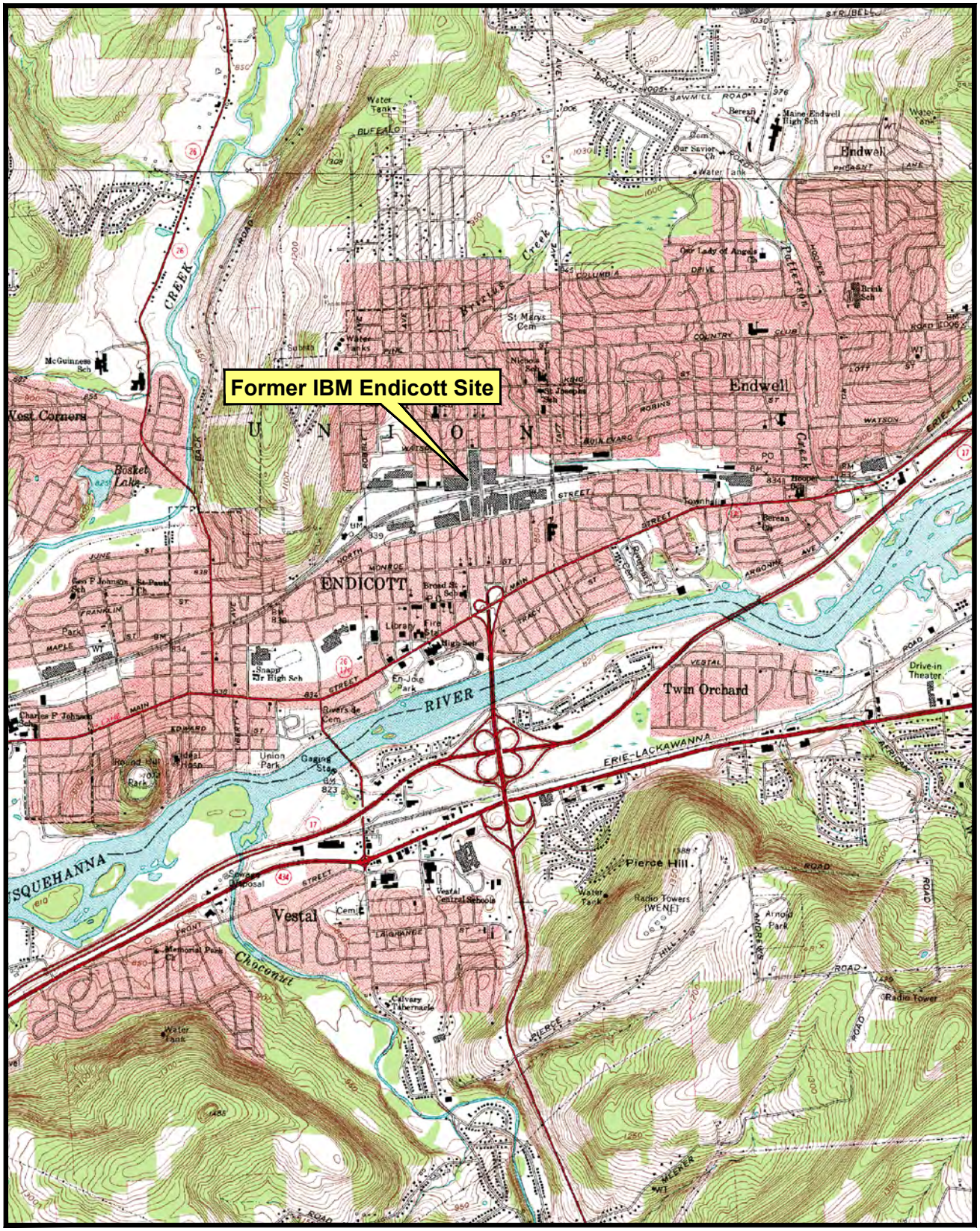
8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

Since the anticipated use of the site is commercial, either Alternative 3 and 4 would be appropriate. Groundwater contamination will remain for some time at the site. Both alternatives require the implementation of a Site Management Plan.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary has been prepared that describes public comments received and the manner in which the Department addressed the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public would have been issued describing the differences and reasons for the changes

Alternative 3 has been selected as the remedy for OU1 and OU2, as described above, as it satisfies the threshold criteria and provides the best balance of the balancing criterion.



Portion of the Endicott, NY and Maine, NY
7.5-minute USGS Quadrangles
(2000)

Figure 1

Former IBM Endicott Site
Site #704014

Site Location Map

GROUNDWATER SCIENCES CORPORATION

22007-008-H4 / 12-13-2018

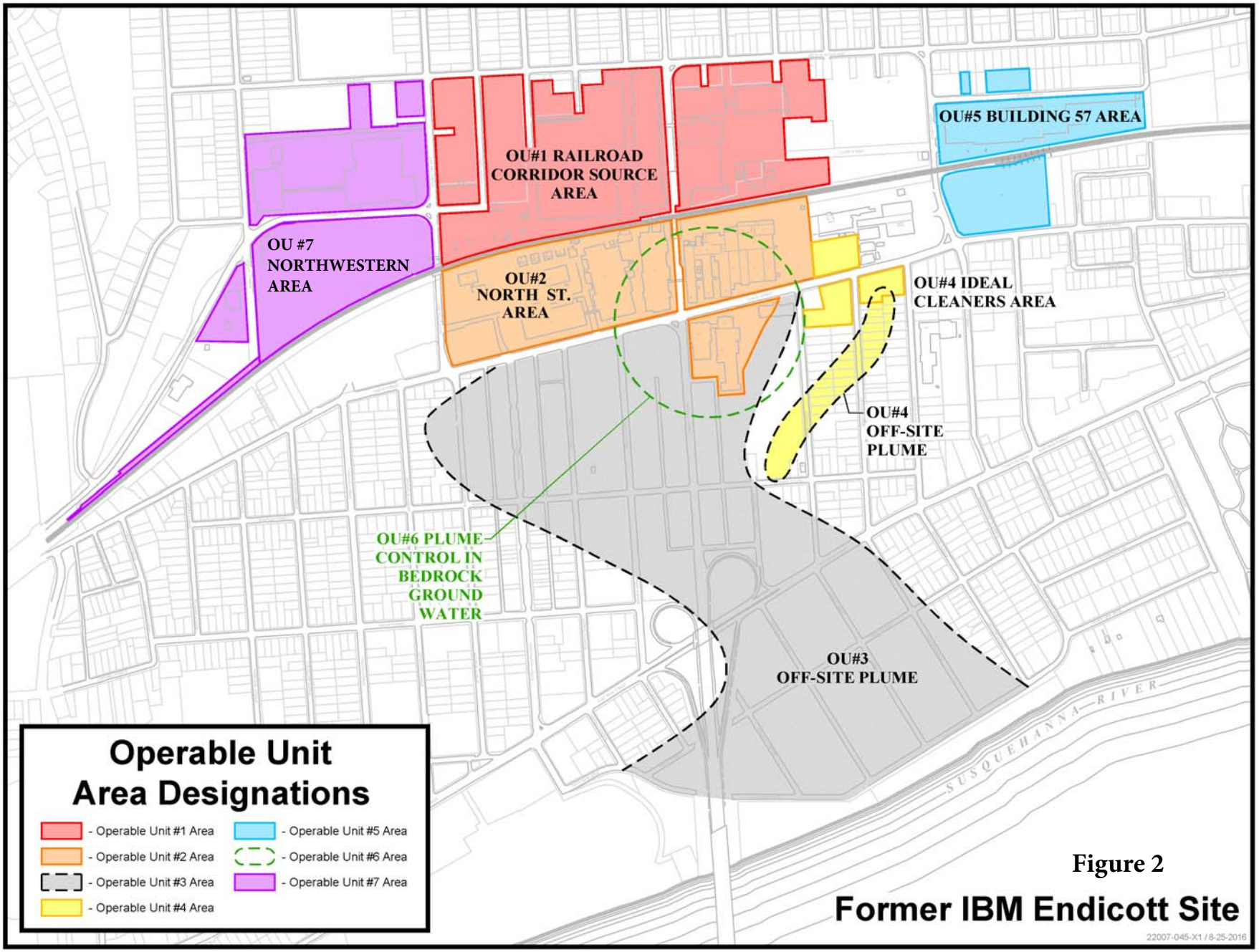
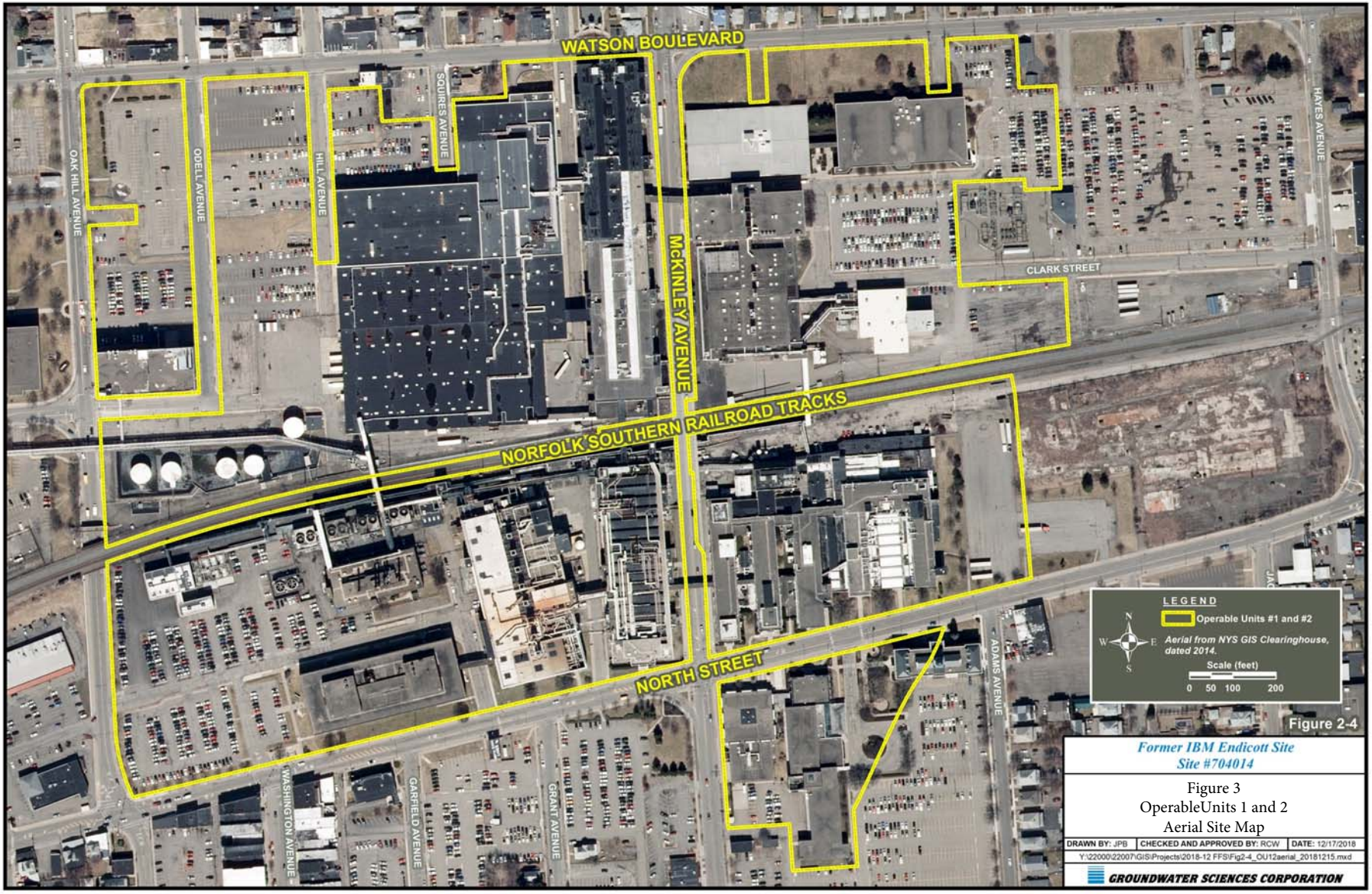
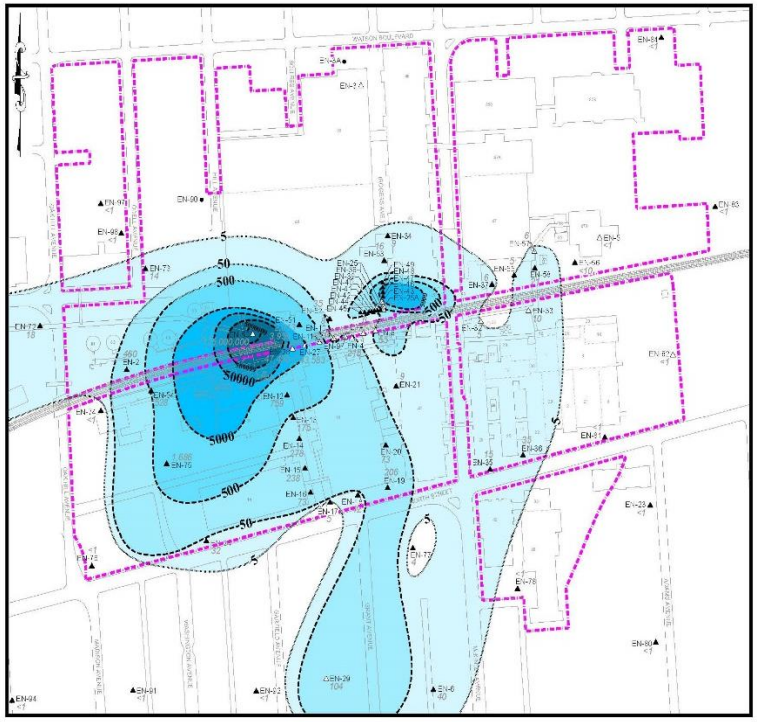


Figure 2

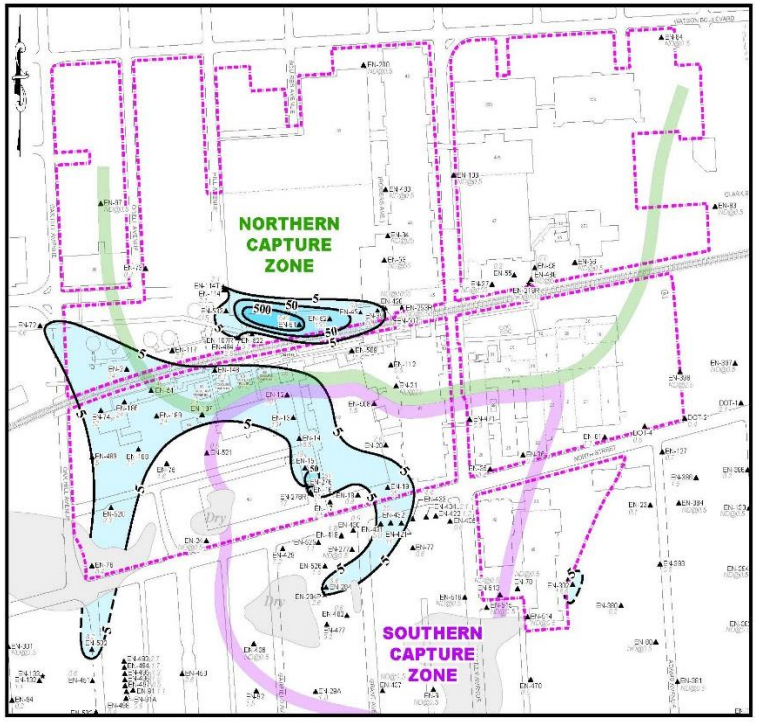
Former IBM Endicott Site


WATSON BOULEVARD
OAK HILL AVENUE
ODELL AVENUE
HILL AVENUE
SQUIRES AVENUE
McKINLEY AVENUE
HAYES AVENUE
CLARK STREET
NORFOLK SOUTHERN RAILROAD TRACKS
NORTH STREET
ADAMS AVENUE
WASHINGTON AVENUE
GARFIELD AVENUE
GRANT AVENUE
LEGEND
Operable Units #1 and #2
Aerial from NYS GIS Clearinghouse, dated 2014.
Scale (feet)
0 50 100 200
N
W
E
S
Figure 2-4
Former IBM Endicott Site
Site #704014
Figure 3
OperableUnits 1 and 2
Aerial Site Map
DRAWN BY: JPB
CHECKED AND APPROVED BY: RCW
DATE: 12/17/2018
Y:\22000\22007\GIS\Projects\2018-12 FFS\Fig2-4_OU12aerial_20181215.mxd
GROUNDWATER SCIENCES CORPORATION

PCE Isoconcentration



September 1980



August 2018

Figure 4a

PCE CONCENTRATIONS
- 5 - 50 µg/l
- 50 - 500 µg/l
- 500 - 5,000 µg/l
- 5,000 - 50,000 µg/l
- 50,000 - 500,000 µg/l
- Greater than 500,000 µg/l

TCE CONCENTRATIONS
- 5 - 50 µg/l
- 50 - 500 µg/l
- 500 - 5,000 µg/l
- 5,000 - 50,000 µg/l
- 50,000 - 500,000 µg/l
- Greater than 500,000 µg/l

TCA CONCENTRATIONS
- 5 - 50 µg/l
- 50 - 500 µg/l
- 500 - 5,000 µg/l
- 5,000 - 50,000 µg/l
- 50,000 - 500,000 µg/l
- Greater than 500,000 µg/l

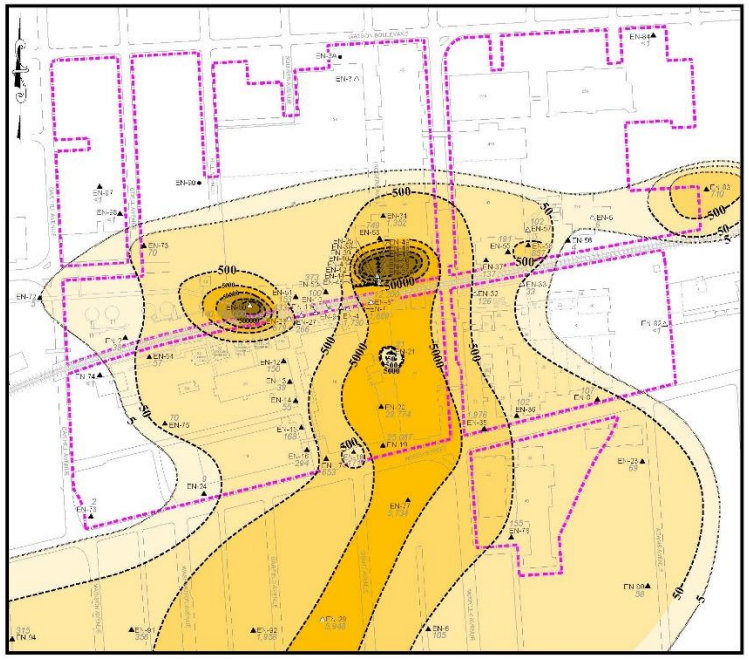
LEGEND

TCE - Trichloroethene
50 - TCE Isoconcentration Contour (µg/l; dashed where inferred)
50 - TCE Concentration (µg/l)
ND - Not Detected (various detection limits)
TCA - 1,1,1-Trichloroethane
50 - TCA Isoconcentration Contour (µg/l; dashed where inferred)
50 - TCA Concentration (µg/l)
ND - Not Detected (various detection limits)
PCE - Tetrachloroethene
50 - PCE Isoconcentration Contour (µg/l; dashed where inferred)
50 - PCE Concentration (µg/l)
ND - Not Detected (various detection limits)
- Area of Unsaturated Soil in the Upper Aquifer
- Operable Units #1 and #2

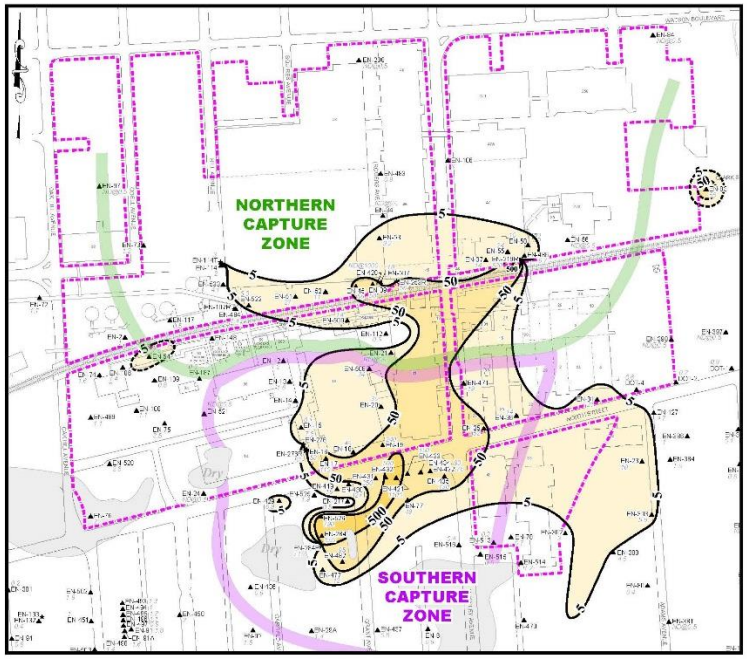
▲ - Upper Aquifer Monitoring Well
△ - Abandoned Upper Aquifer Monitoring Well
★ - Upper Aquifer Extraction Well
✱ - Inactive Upper Aquifer Extraction Well
◩ - Upper Aquifer Injection Well
● - Soil Boring

Scale
0 150' 300'

TCE Isoconcentration



September 1980



August 2018

Figure 4b

PCE CONCENTRATIONS	TCE CONCENTRATIONS	TCA CONCENTRATIONS
5 - 50 µg/l	5 - 50 µg/l	5 - 50 µg/l
50 - 500 µg/l	50 - 500 µg/l	50 - 500 µg/l
500 - 5,000 µg/l	500 - 5,000 µg/l	500 - 5,000 µg/l
5,000 - 50,000 µg/l	5,000 - 50,000 µg/l	5,000 - 50,000 µg/l
50,000 - 500,000 µg/l	50,000 - 500,000 µg/l	50,000 - 500,000 µg/l
Greater than 500,000 µg/l	Greater than 500,000 µg/l	Greater than 500,000 µg/l

LEGEND

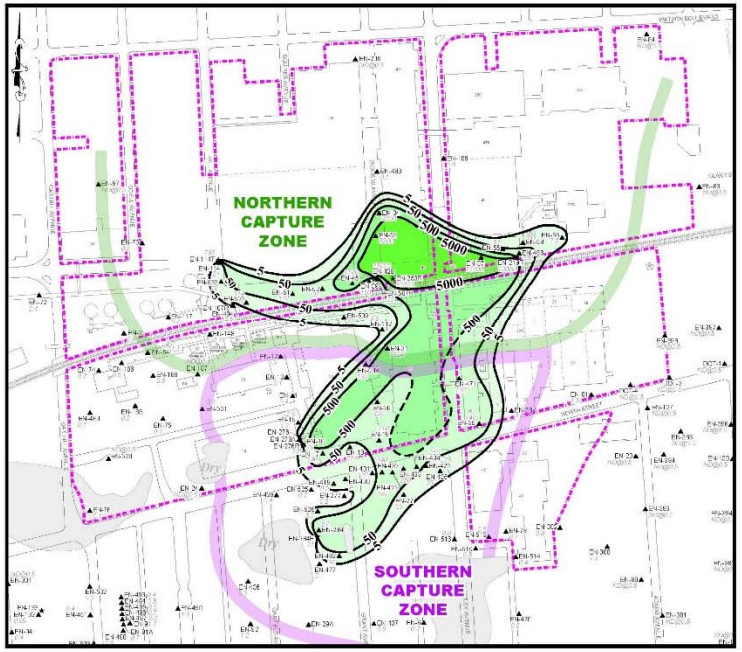
TCE - Trichloroethene
50 - TCE Isoconcentration Contour (µg/l; dashed where inferred)
TC - TCE Concentration (µg/l)
ND - Not Detected (various detection limits)
TCA - 1,1,1-Trichloroethane
50 - TCA Isoconcentration Contour (µg/l; dashed where inferred)
TA - TCA Concentration (µg/l)
ND - Not Detected (various detection limits)
PCE - Tetrachloroethene
50 - PCE Isoconcentration Contour (µg/l; dashed where inferred)
P - PCE Concentration (µg/l)
ND - Not Detected (various detection limits)
- Area of Unsaturated Soil in the Upper Aquifer
- Operable Units #1 and #2

▲ - Upper Aquifer Monitoring Well
△ - Abandoned Upper Aquifer Monitoring Well
★ - Upper Aquifer Extraction Well
★ - Inactive Upper Aquifer Extraction Well
◩ - Upper Aquifer Injection Well
● - Soil Boring

Scale
0 150' 300'

TCA Isoconcentration

September 1980



August 2018

PCE CONCENTRATIONS
- 5 - 50 µg/l
- 50 - 500 µg/l
- 500 - 5,000 µg/l
- 5,000 - 50,000 µg/l
- 50,000 - 500,000 µg/l
- Greater than 500,000 µg/l

TCE CONCENTRATIONS
- 5 - 50 µg/l
- 50 - 500 µg/l
- 500 - 5,000 µg/l
- 5,000 - 50,000 µg/l
- 50,000 - 500,000 µg/l
- Greater than 500,000 µg/l

TCA CONCENTRATIONS
- 5 - 50 µg/l
- 50 - 500 µg/l
- 500 - 5,000 µg/l
- 5,000 - 50,000 µg/l
- 50,000 - 500,000 µg/l
- Greater than 500,000 µg/l

LEGEND
- TCE - Trichloroethene
- 50 - TCE Isoconcentration Contour (µg/l; dashed where inferred)
- 10 - TCE Concentration (µg/l)
- ND - Not Detected (various detection limits)
- TCA - 1,1,1-Trichloroethane
- 50 - TCA Isoconcentration Contour (µg/l; dashed where inferred)
- 15 - TCA Concentration (µg/l)
- ND - Not Detected (various detection limits)
- PCE - Tetrachloroethene
- 50 - PCE Isoconcentration Contour (µg/l; dashed where inferred)
- 7 - PCE Concentration (µg/l)
- ND - Not Detected (various detection limits)
- Area of Unsaturated Soil in the Upper Aquifer
- Operable Units #1 and #2
- ▲ - Upper Aquifer Monitoring Well
- △ - Abandoned Upper Aquifer Monitoring Well
- ★ - Upper Aquifer Extraction Well
- ☆ - Inactive Upper Aquifer Extraction Well
- ◩ - Upper Aquifer Injection Well
- ● - Soil Boring

Scale
0 150' 300'

Figure 4c

CENTRAL RAILROAD CORRIDOR SOURCE AREA

1. Area of former TCA subsurface pipeline break, soil excavation, and DNAPL solvent recovery.
2. Former solvent storage Building 94 consisting of drums and tanks, including a 10,000-gallon TCE AST.
3. Former 15,000-gallon AST containing TCE.
4. Building 45 loading dock area, formerly consisting of exterior rail siding loading dock with TCA solvent transfer pumps.
5. Former TCA virgin AST and waste solvent AST adjacent to west side of Building 46.
6. Southern portion of Building 46, formerly containing TCA stills and holding tanks.

EASTERN RAILROAD CORRIDOR SOURCE AREA

1. Former Building 47 tank farm with TCA and methylene chloride tanks.
2. Building 47, formerly containing TCA and methylene chloride stills and holding tanks.
3. Building 47 truck turnaround area, formerly consisting of a rail yard with unloading operations.

WESTERN RAILROAD CORRIDOR SOURCE AREA

1. Former Building 263 waste solvent storage tank area.

APPROXIMATE LIMITS OF FORMER NEAR-SOURCE GROUNDWATER PLUME AREAS

WATSON BOULEVARD
HAYES AVENUE
NORTH STREET
(ROGERS AVE.)

LEGEND

- ▲ - Upper Aquifer Monitoring Well
- △ - Abandoned Upper Aquifer Monitoring Well
- ★ - Upper Aquifer Extraction Well
- ☆ - Inactive Upper Aquifer Extraction Well
- ☆ - Abandoned Upper Aquifer Extraction Well
- ◪ - Inactive Upper Aquifer Injection Well
- ◪ - Ice Contact/Till Monitoring Well
- ▼ - Bedrock Monitoring Well
- ⬢ - Bedrock Extraction Well
- - Operable Unit #1 and #2 Area

Approximate

Scale: 0 100' 200'

Figure 5

Former IBM Endicott Site
Site #704014

Apparent Source Areas and Near-Source Groundwater Plume Areas

DRAWN BY: JPB	DATE: 12/20/18	DRAWING NO. 22007-350-G1
CHECKED & APPROVED BY: RCW		

GROUNDWATER SCIENCES CORPORATION

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Former IBM Endicott
Operable Unit No. 01: Railroad Source Corridor Area
Operable Unit No. 02: North Street Area
State Superfund Project
Village of Endicott, Broom, County, New York
Site No. 704014

The Proposed Remedial Action Plan (PRAP) for the former IBM Endicott OU1 and OU2 site was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) (collectively, The Departments) and was issued to the document repositories on February 27, 2019. The PRAP outlined the remedial measure proposed for the contaminated soil, groundwater and indoor air at the former IBM Endicott OU1 and OU2 site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on March 19, 2019, which included a presentation of the remedial investigation focused feasibility study for SSF for the former IBM Endicott OU1 and OU2 site as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 29, 2019.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

The following comments were received during the public meeting held March 19, 2019:

COMMENT 1:
Why wasn't thermal remediation considered for this part of the site?

RESPONSE 1:
Thermal remediation was considered as a possible alternative but removed from further consideration due to technical difficulties with implementation. For OU1 and OU2 the majority of VOC mass in the unsaturated soil is inaccessible for wells that are needed to implement the technology. Thermal treatment requires closely-spaced multi-phase extraction wells and the buildings are currently occupied so installing a thermal treatment system would cause extreme disruptions to site operations. There is also an extensive network of buried utilities and overhead piping in the contaminated area that would interfere with the placement of these wells. Thermal treatment could also damage the structural integrity of the soil bedding beneath the railroad tracks. Based on previous discussions with Norfolk Southern during the planning stages for the thermal treatment IRM in OU5, this technology would not be allowed by Norfolk Southern within or near their railroad property corridor. Also, the severe access limitations would prohibit treatment in locations where VOC mass resides in the unsaturated zone and saturated zones. The residual VOC

mass not accessible would continue to impact the upper aquifer groundwater and concentrations would remain above the drinking water standard, even after implementation of this technology. The continued operation of the groundwater recovery and treatment systems will control migration of the remaining contaminated groundwater, preventing recontamination of the off-site aquifer system and will also be periodically reviewed to ensure that the remedy remains effective.

COMMENT 2:
I have heard stories about leaking rail cars. Can remedial work be conducted near the railroad?

RESPONSE 2:
Remedial work near the railroad is extremely limited due to the lack of accessibility within the large railroad property corridor based on required setbacks. The continued operation of the groundwater recovery and treatment systems will control migration of the remaining contaminated groundwater, preventing recontamination of the off-site aquifer system.

COMMENT 3:
Can you address the access issues with soils located beneath buildings?

RESPONSE 3:
The buildings are currently leased and have active operations which make access difficult. Active remediation through the slab would cause significant disruption to site operations. The active site operations would also make maintenance and sampling of remedial measures difficult and possibly inconsistent. If the area becomes accessible in the future, the Site Management Plan (SMP) requires an assessment of potential additional remedial actions that can be taken at that time.

COMMENT 4:
If buildings are ventilated, where is the vented air discharged?

RESPONSE 4:
The mitigation system installed on Building 42 consists of subslab vapor extraction ports, a vapor/liquid separator and a vacuum blower. The blower exhaust is discharged outside via an exhaust stack installed above the building roofline and away from building doors, windows, and air intakes. The mitigation system installed for Building 45/46 consists of soil vapor extraction ports, vapor liquid separator, granular activated carbon units and a vacuum blower. The treated blower exhaust is discharged outside via an exhaust stack installed above the building roofline and away from building doors, windows, and air intakes to prevent reentry into the building. As part of the monitoring program an evaluation will be conducted to ensure the vapor mitigation systems have not impacted the ambient air.

COMMENT 5:
There are many monitoring wells spread across Endicott. Are all these wells used?

RESPONSE 5:
Most of these wells are part of the groundwater monitoring program associated with the entire site. There are some wells that are no longer used for monitoring and are listed for decommissioning.

COMMENT 6:
Several citizens in the audience of the March 19, 2019 public meeting voiced concerns about the ambient air and questioned whether ambient air could be impacted by additional work conducted since it was last sampled in 2005. Specifically, they questioned whether the use of injection wells or disturbance of a dumping site create an ambient air impact or drive TCE into drinking water.

RESPONSE 6:
An ambient air study was conducted in 2005-2006 to assess the collective impact of operating more than four hundred mitigation systems in off-site buildings. The results indicated there were no discernible impacts at that time. Since then, contaminant levels in the off-site soil vapor plume have steadily decreased, so the potential for off-site ambient air impacts associated with operation of the off-site systems is even lower, and therefore less likely to be a concern. However, as part of the monitoring program for OU1 and OU2, indoor air will be evaluated to verify that the mitigation systems and other engineering controls where needed in buildings, remain effective at reducing the potential for indoor air impacts as a result of soil vapor intrusion. Outdoor air samples in OU1 and OU2 will also be collected as part of the evaluation. This data will be reviewed to verify that the vapor mitigation systems installed in the buildings within OU1 and OU2 have not impacted the ambient air. Please also see Response 4.

The aquifer that is impacted by site-related contamination (referred to as the Upper Aquifer) is not the source of the Village of Endicott's drinking water. The source of municipal water for the Village of Endicott and other municipalities in the area is a separate aquifer, referred to as the Lower Aquifer. Site-related contaminants have not been detected in IBM monitoring wells completed in the Lower Aquifer.

COMMENT 7:
Has DOH conducted a longitudinal study of exposure and consequences of exposure to workers employed at the site, both past and present?

RESPONSE 7:
The NYSDOH has conducted a number of health studies in the Endicott area. These studies can be viewed at the following link:

https://www.health.ny.gov/environmental/investigations/broome/index.htm

Additionally, National Institute for Occupational Safety and Health (NIOSH) has conducted a study of cancer incidences in former IBM workers. Information on that study can be found at the following link:

https://www.cdc.gov/niosh/updates/upd-01-06-14a.html

COMMENT 8:
The potential exists for future exposures if the slabs are disturbed at buildings 46 and 47 because contamination persists beneath them. Are those buildings ventilated? Why can't the area beneath the buildings be remediated?

RESPONSE 8:
There is a sub-slab depressurization system in Building 45/46 to reduce indoor air concentrations. In Building 47 the indoor air is monitored and controlled through HVAC controls. If it is determined through monitoring that the HVAC controls are insufficient to meet the Department of Health Indoor Air Guidance Values, the Departments will require the installation of a depressurization system to ensure that occupants of the building are not breathing site contaminants in the indoor air as a results of soil vapor intrusion. Currently, the buildings have ongoing operations and any intrusive remediation would significantly interfere with operations. At this point, the Departments do not believe there are any completed exposure pathways that need to be addressed. The continued operation of the groundwater extraction and treatment will maintain control of the groundwater plume while reducing the concentrations.

COMMENT 9:
Why can't thermal remediation by employed around and adjacent to occupied buildings?

RESPONSE 9:
Please see Response 1.

COMMENT 10:
What is the original source of contamination? How did it occur?

RESPONSE 10:
The first known release occurred from leaking pipes from an underground storage tank near Building 18. It is suspected that loading/unloading operations from railcars and into storage tanks around buildings 18, 41, 45/46 and 47 are source areas of contamination.

COMMENT 11:
How much TCE and other contaminants were lost?

RESPONSE 11:
It was estimated the 4,200 gallons of TCA were released to the environment in December 1979. The total amount of contaminants released is unknown.

COMMENT 12:
What are the limiting factors in completing remediation? Are funding or technology an issue?

RESPONSE 12:
The limiting factors are technology and access. The buildings are occupied and there is an extensive network of pipes both above and underground. There is not currently a technology available to overcome the issue of large buildings with active use blocking access to contaminated soil. Funding is not an issue for the remediation.

COMMENT 13:
Ideal Cleaners was a dry-cleaning service which has an offsite plume. How are dry-cleaning spills managed in New York City and other regions?

RESPONSE 13:
While this is not directly related to this PRAP, there are approximately 1,590 dry cleaning facilities operating in New York State. About 1,030 of these facilities use perchloroethylene (perc) as a dry-cleaning solvent, 540 use an alternative solvent and 20 use both perc and alternative solvents. The majority of these facilities are located in the New York City metropolitan area and most only use perc. All of these facilities are regulated under the newly revised Dry-Cleaning Facilities regulation, 6 NYCRR Part 232, which became effective on March 10, 2018. Facilities that only use water-based cleaning processes (wet cleaning) and/or liquid carbon dioxide dry cleaning machines are exempt from this regulation.

COMMENT 14:
Are workers and contractors who work on the site considered "the public"?

RESPONSE 14:
Yes, because site related contaminants are not used as part of the everyday processes at the facility, the workers and contractors are considered the public.

COMMENT 15:
Some of the buildings on site have crawl spaces. Do these areas have high levels of contaminants in the air? How are people entering those spaces being protected?

RESPONSE 15:
Indoor air samples were collected in two areas infrequently occupied. These are the confined space entry tunnels (crawlspaces) located beneath Building 18 and the tank farm located in the basement of Building 18. While levels were above air guidelines at that time, the expected occasional entry into this tunnel does not represent an exposure concern. In addition, certain precautions are necessary to be taken by anyone entering a confined space, regardless of potential for contamination.

COMMENT 16:
How and where can I access the data and other documents associated with the project?

RESPONSE 16:
There is a document repository for the site at the George F. Johnson Memorial Library located at 1001 Park Street, Endicott, NY 13760. Documents can also be obtained by sending a Freedom of Information Law request to the Department of Environmental Conservation using the following link https://www.dec.ny.gov/public/103696.html

COMMENT 17:
If concrete is disturbed on site, who is notified?

RESPONSE 17:
As a class 2 site any change of use as described by 375-2.2(a) already applies to the site and requires notification to the Department. A change of use means the erection of any structure on a site, the paving of a site for use as a roadway or parking lot, the creation of a par or other recreational facility on a site, any activity that is likely to disrupt or expose contamination or

increase direct human or environmental exposure, or any other conduct that will or may tend to prevent or significantly interfere with a proposed, ongoing, or completed remedial program. Once the remedy is selected for the site a SMP will be developed. Part of the SMP will require notifying the Department prior to scheduled work being performed that will disturb the site cover, such as a building foundation or slab.

COMMENT 18:
Since Huron owns the facility, who will pay for investigations if buildings come down?

RESPONSE 18:
IBM is the responsible party for the remediation of the contamination at the site. Huron owns the buildings and coordination will be needed between the two companies.

COMMENT 19:
Is there any impact to the mitigation process caused by hard rains in recent years and storm sewers not keeping up with the rain?

RESPONSE 19:
The overland flow of water caused by rain does not impact the mitigation process. The storm sewers do leak, which is why maintaining a reducing environment for bioremediation would be difficult. The extraction wells and groundwater treatment facilities have maintained control of the groundwater.

COMMENT 20:
How fast does the groundwater flow in Endicott?

RESPONSE 20:
The bulk hydraulic conductivity of the Upper Aquifer is estimated to be about 130 ft^3/ft^2/day on the basis of Supplemental Groundwater Assessment (SGA) pumping tests, pulse tests and comparisons with previous investigations performed by others. Assuming a bulk hydraulic conductivity of 130 ft^3/ft^2/day, a range in hydraulic gradient of 0.001 to 0.01 ft/ft, and a porosity of 0.35, the horizontal seepage velocity in the Upper Aquifer sand and gravel in the area of OU1 and OU2 is estimated to be in the range of approximately 0.4 to 3.7 ft/day.

COMMENT 21:
Is HVAC a reliable method for controlling exposure?

RESPONSE 21:
The previously identified HVAC settings, sealing of floor cracks and openings will be maintained and will continue to operate as necessary. Indoor air sampling will continue to be conducted to verify the effectiveness of the HVAC settings as an engineering control to minimize the indoor air impacts resulting from soil vapor intrusion.

COMMENT 22:
What is being done with the vacant buildings located at the northeast corner of the intersection of McKinley Avenue and North Street?

RESPONSE 22:
The large building complex is referred to as the "Old Group Buildings" and is currently abandoned and unusable. The inability to use these buildings is not due to the chemical contamination associated with the site from IBM operations. The Departments have not been notified of any proposed activities concerning the Old Group Buildings. The Departments have already informed IBM that if the buildings are demolished an investigation will be needed once demolition is completed and the area is structurally safe for sampling to occur. Also, if there are plans to redevelop buildings for use and occupancy in the future, an evaluation of the potential for soil vapor intrusion to occur must first be conducted, and any actions taken as necessary to address exposures associated with soil vapor intrusion.

COMMENT 23:
Would demolition of the 453 homes with sub-slab systems be a viable option?

RESPONSE 23:
This option was not considered. The option to buy out homes for demolition was not considered since immediate exposure concerns were addressed by actions taken. Installation of mitigation systems at 453 properties in the Village of Endicott was a feasible and cost-effective measure to address exposures related to soil vapor intrusion.

COMMENT 24:
Has IBM ever requested a reclassification of the site?

RESPONSE 24:
IBM has not requested a reclassification for this site.

COMMENT 25:
Is sub-slab data gathered even when HVAC is the control mechanism?

RESPONSE 25:
Previous environmental sampling has been collected at the buildings within these operable units. As part of that sampling, sub-slab sampling was conducted and evaluated. At this time, additional sub-slab sampling is not planned.

COMMENT 26:
How will the site be left for the future?

RESPONSE 26:
For the foreseeable future the groundwater extraction and treatment systems and the vapor mitigation systems will remain operational until there is no longer a potential for exposure to contaminants. A site management plan will be put into place that addresses;

- excavation work;
- demolition work;
- further investigation and remediation should large scale redevelopment occur;
- evaluation of potential soil vapor intrusion for any redevelopment or new buildings;
- investigation and/or cover should a building foundation or slab be removed;

- notification to the Departments of any change of use to an area of the site; and
- additional investigation and source control when possible.

COMMENT 27:
Frank Roma, citizen, submitted a letter dated March 28, 2019 which included the following:

The chosen Alternative 3 does little to clean-up the plume under the buildings and may not protect the buildings' occupants. The clean-up method of the soils outside of the buildings (and around the railroad tracks) is hampered by their position near the tracks. Without a great deal of disruption to railroad, the pump and treat and vacuum assisted pump and treat methods will eventually clean the area so that it is usable. Under the buildings, particularly the "hot spots," are not cleaned with this Alternative.

The studies for BAE compared the building vapor levels with the NYSDOH Guidelines of 2005. Please compare those results to the 2017 Guidelines.

Under the buildings the amount of contamination and its locations make the clean-up more complex. Alternative 3 uses the HVAC systems to pressurize the buildings. It seems this method is not a reliable method to keep the vapors from reaching the workers. Building leaks, doors opening and closing, and control systems not able to adjust are just a few of the possible problems. The procedures and engineering controls for the HVAC system and interactions with each other are complicated. if the gas were radon, would the same measures be used? What will happen to tenants or Huron in the future if new science shows a clean-up is mandatory?

The concern is IBM will eventually leave the village and leave the contamination in the soil under the buildings. The NYSDEC is asked to have IBM go back to the drawing board and propose a clean-up as in Alternative 4. The HVAC systems and sub-slab depressurization are adequate until the sub-slab contamination is removed.

RESPONSE 27:
As stated in Response 3 the buildings are currently leased and have active operations. Any type of active remediation through the slab would cause significant disruption to site operations. The Departments do not usually require demolition of buildings at an active site if the exposure pathways can be addressed though engineering controls. When any area of a building becomes unoccupied or accessible IBM is required to assess additional remedial actions to address the source areas.

As part of the monitoring program for OU1 and OU2, indoor air will continue to be evaluated to verify the vapor mitigation systems and the HVAC settings remain effective at preventing unacceptable exposures to contaminants in indoor air as a result of soil vapor intrusion. IBM has provided evidence which support the use of HVAC adjustments as engineering controls to improve ventilation, or in some cases increase building pressurization to reduce overall VOC concentrations in the indoor air. This information is summarized in the September 2016 Indoor Air Assessment Report which was submitted to the Agencies for review and acceptance. However, IBM will be required to continue to demonstrate the effectiveness of each building's HVAC setting at reducing the indoor air concentration of VOCs. If it is determined through monitoring that the HVAC

controls are insufficient to meet the NYSDOH Air Guidance Values, the Departments will require the installation of a sub-slab depressurization system to ensure that occupants of the building are not breathing site contaminants in the indoor air as a results of soil vapor intrusion. Also, if Air Guidance Values change the site will be re-evaluated to determine if additional actions are needed to address potential exposure to building occupants. Regarding the 2005 BAE study, when the guidance values changed in 2015, IBM conducted another round of sampling and evaluated the data against the new values. Based on the new guidance values, ventilation systems were installed in buildings 42, 45/46 and 268.

With regard to the concern for IBM failing to fulfill their obligations under the Order, the Department can require the remedial party to post financial assurance to ensure the long-term implementation, maintenance, monitoring, and enforcement of any institutional or engineering controls.

COMMENT 28:
James Little, citizen, submitted emails dated March 29 and March 30, 2019 which included the following:

I second Frank Roma's comments. In addition, my recommendation for Endicott IBM OU-1 and OU02 currently known as Huron Campus are:

1. I would like to have seen DEC option 4 which included some bio-remediation but it appears to be off the table.
2. I also would like to have seen thermo-remediation as was used successfully in Building 57 where BAE currently leases because that process uses lower temperatures and is less intrusive to underground infrastructure.

Since those options may be off the table, maybe the following would be possible:

1. Increase the presence of pump and treat by drilling extraction wells closer to the remaining contamination source under the buildings by drilling through the foundation floors near the pools of chemicals that remain.
2. In addition to increasing pump and treat, is it possible to inject water under the buildings in or near the underground chemical pools to dilute the contamination and help flush/push them to the extraction wells which remove and filter the contaminates?

This is similar to what was done near village of Endicott homes to re-hydrate the ground, speeding up the cleaning process.

3. I also think there should be an extraction well near the bedrock to ensure chemicals don't travel long distances and contaminate other parts of the village preventing what occurred with TCE in Ithaca.

When do we find out the final plan IBM and DEC decides based on public input?

RESPONSE 28:
Please see responses 1, 3, 12 and 27. Regarding the bedrock groundwater, Operable Unit 6 is the bedrock groundwater plume and includes all facility-related contamination in the bedrock aquifer. In 1991 groundwater extraction and treatment of the bedrock groundwater began as an interim remedial measure. The continued operated of the IRM was selected March 2009 as the final remedy for OU6 and it continues to contain the contaminants and reduce concentrations.

With regard to public notification of the final plan, once the Department issues the final Record of Decision, a notice describing the selected remedy will be posted in the Environmental Notice Bulletin, and a fact sheet will be distributed via the listserv. Also, a copy will be sent to the document repository and hard copies will be sent to those that had previously requested physical mailings instead of electronic.

APPENDIX B

Administrative Record

Administrative Record

Former IBM Endicott
Operable Unit No. 01: Railroad Source Corridor Area
Operable Unit No. 02: North Street Area
State Superfund Project
Village of Endicott, Broom, County, New York
Site No. 704014

1. Proposed Remedial Action Plan for the former IBM Endicott site, Operable Unit No. 01 and Operable Unit No. 02, dated February 2019, prepared by the Department.
2. Order on Consent, Index No. A7-0502-0104, between the Department and IBM Corporate Environmental Affairs, executed on August 4, 2004.
3. "Focused Feasibility Study Report", dated December 2018, prepared by Groundwater Sciences Corporation.
4. "Combined Groundwater Report for 2017", dated April 2018, prepared by Groundwater Sciences Corporation.
5. "Indoor Air Assessment Report", dated September 2016, prepared by Sanborn, Head Engineering, P.C.
6. "Storm Sewer Sediment Sampling, Analysis and Removal Report", dated September 2012, prepared by Groundwater Sciences Corporation.
7. "Supplemental Remedial Investigation Report: Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area", dated August 2009, prepared by Groundwater Sciences Corporation.
8. "Preliminary Site Assessment Data Report" (Huron), dated September 2005, prepared by ERM.

Correspondence

1. Letter dated March 28, 2019 from Frank Roma, citizen.
2. Emails dated March 29, 2019 and March 30, 2019 from James Little, citizen.