

# RECORD OF DECISION

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Former IBM Endicott Facility  
Operable Unit Number 03: Southern Area  
and Off-Site Capture Zone A  
State Superfund Project  
Endicott, Broome County  
Site No. 704014  
March 2015



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

# **DECLARATION STATEMENT - RECORD OF DECISION**

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Former IBM Endicott Facility  
Operable Unit Number: 03  
State Superfund Project  
Endicott, Broome County  
Site No. 704014  
March 2015

## **Statement of Purpose and Basis**

This document presents the remedy for Operable Unit Number 03 (Southern Area) and Off-Site Capture Zone A 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) Part 375, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for Operable Unit Number 03 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**

During the course of the investigation certain actions, known as interim remedial measures (IRMs), were undertaken at the above referenced site. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the remedial investigation (RI) or feasibility study (FS). The IRM(s) undertaken at this site are discussed in Section 6.2.

Based on the implementation of the IRM(s), the findings of the investigation of this site indicate that the site no longer poses a threat to human health or the environment; therefore No Further Action is the selected remedy. The remedy may include continued operation of a remedial system if one was installed during the IRM and the implementation of any prescribed institutional controls/engineering controls (ICs/ECs) that have been identified as being part of the remedy for the site.

The IRM(s) conducted at the site attained the remediation objectives identified for this site in Section 6.5 for the protection of public health and the environment.

## **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 31, 2015

Date



Robert W. Schick, P.E., Director  
Division of Environmental Remediation

# **RECORD OF DECISION**

Former IBM Endicott Facility  
Endicott, Broome County  
Site No. 704014  
March 2015

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## **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 resulted in threats to public health and the environment that were addressed by actions known as interim remedial measures (IRMs), which were undertaken at the site. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the remedial investigation (RI) or feasibility study (FS). The IRMs undertaken at this site are discussed in Section 6.2.

Based on the implementation of the IRM(s), the findings of the investigation of this site indicate that the site no longer poses a threat to human health or the environment. The IRM(s) conducted at the site attained the remediation objectives identified for this site, which are presented in Section 6.5, for the protection of public health and the environment. No Further Action is the remedy selected by this Record of Decision (ROD). A No Further Action remedy may include site management, which will include continued operation of any remedial system installed during the IRM and the implementation of any prescribed controls that have been identified as being part of the remedy for the site. This ROD identifies the IRM(s) conducted and discusses the basis for No Further Action.

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 Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. 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 from February 27 to March 29, 2015, during which the public was encouraged to submit comments 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: Alex Czuhanich  
625 Broadway  
Albany, NY 12233-7017  
Phone: (518) 402-9813

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

A public meeting was also conducted on March 5, 2015. At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) 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, Voluntary 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 approximately at 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.

#### 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 former Endicott Forging facility, a State Superfund site, is adjacent to the southeast portion of the former IBM facility. 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 municipal water supply, sanitary sewers and storm sewers. A private well field also supplies production water for manufacturing purposes.

#### Current Zoning and Land Use:

The former IBM Endicott facility property is currently zoned Commercial 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.

#### 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. IBM has reduced its presence and manufacturing capacity at the site since that time.

#### 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 at the former IBM Endicott facility are identified in the Consent Order and are described below. Operable Unit 3 (OU3) is the subject of this document. Records of Decision were issued previously for OUs 4 and 6. Records of Decision will be issued for OUs 1, 2, 5, and 7 in the future. A site location map is attached as Figure 1. An area designation map is attached as Figure 2.

- Operable Unit 1 (OU1), also known as the Railroad Corridor Source Area, 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.
- Operable Unit 2 (OU2), also known as the North Street Area, is the on-site portion of the main plant area south of the railroad and generally north of North Street.

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.

- 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 3.

- 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 and injections for water supply or remediation purposes have altered the natural flow regime by creating artificial discharge and recharge points. Depth to groundwater in the vicinity of the site varies from about 10 to 40 feet below ground surface under pumping conditions.

### **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. 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 Corporation - Endicott Facility
- 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.

All future references to “site” in this document will be referring to OU3 and the area of Off-site Capture Zone A.

## **SECTION 6: SITE CONTAMINATION**

### **6.1: Summary of the Remedial Investigation**

Remedial Investigations (RIs) have been conducted. The purpose of the RIs was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigations are described in the RI Reports.

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 Operable Unit include data for:

- air
- groundwater
- surface water
- soil vapor
- indoor air
- subsurface 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 contaminants of concern identified for this Operable Unit at this site are:

Trichloroethene (TCE)

cis-1,2-Dichloroethene (cis-DCE)

Other site-related compounds are detected in groundwater and soil vapor in this OU3 and Off-Site Capture Zone A, but generally at low concentrations near or below applicable SCGs and in localized areas immediately south of the plant site. These compounds include:

Tetrachloroethene (PCE)

1,1,1-Trichloroethane (TCA)

Vinyl Chloride

1,1-Dichloroethane

Freon 113

1,1-Dichloroethene

Based on the investigation results, comparison to the SCGs, and the potential public health and environmental exposure routes, certain media and areas of the Operable Unit required remediation. These media were addressed by the IRM(s) described in Section 6.2. More complete information can be found in the RI Report and the IRM Construction Completion Report.

### **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 IRMs have been completed at OU3 and Off-Site Capture Zone A based on conditions observed during the RI.

#### **Groundwater Extraction and Treatment**

As an interim remedial measure (IRM) beginning in 1981, IBM has been operating a system of extraction wells and treatment facilities in the Southern Area and Off-Site Capture Zone A. The system is commonly referred to as a pump-and-treat system and is designed to extract contaminated groundwater and treat it to remove site-related contaminants. The purpose of the system is to shrink the size of the groundwater plume south of North Street, to reduce contaminant concentrations to below applicable groundwater standards to the extent practicable, and to prevent further migration of site-related contaminants to off-site areas.

The extraction system creates a depression of the water table so that contaminated groundwater is directed toward the extraction wells within the plume area. Groundwater is extracted from the subsurface from the area of the groundwater contaminant plume shown on Figure 4 via a system of wells that withdraw contaminated water from the Upper Aquifer.

Extracted groundwater is then transferred via double-walled underground pipes to one of three groundwater treatment facilities (GTFs). At the treatment facilities, contaminated groundwater is passed through treatment vessels containing granular activated carbon. At one treatment facility (Garfield GTF), an air stripper is used as a second component of treatment because of the contaminant mix associated with that GTF. The activated carbon (and air stripper in Garfield GTF) removes contaminants from the groundwater and the treated water is then re-injected into the Upper Aquifer as a second component of the remedial program (see discussion below), or it is discharged to the municipal storm sewer system and, ultimately, to the Susquehanna River.

A monitoring system is in place to ensure the complete and effective treatment of contaminated groundwater prior to its re-injection or discharge.

#### Clean Water Injection

As an interim remedial measure beginning in 2008, IBM has been operating a system of clean water injection wells in the Southern Area and Off-Site Capture Zone A. The purpose of the clean water injection system is to flush clean water through the Upper Aquifer in order to enhance plume reduction and improve contaminant recovery in the Southern Area and in Off-Site Capture Zone A.

Treated groundwater from each of the three groundwater treatment facilities is conveyed via single-walled underground pipes to each of the active injection wells in the off-site plume area where it is injected into the Upper Aquifer. Injected, clean water then flows through the Upper Aquifer and picks up additional contamination from the aquifer solids (e.g., sand, silt, etc.). The water is then captured by the extraction wells and the process is repeated. By continuously passing clean water past contamination that is adsorbed onto aquifer solids, a concentration gradient is maintained whereby contaminant movement from the aquifer solids to the water is enhanced.

To maintain injection capacity, municipal water is occasionally used to supplement water from the GTFs for injection.

#### Vapor Intrusion Mitigation

As an interim remedial measure beginning in 2003, IBM has installed mitigation systems on impacted properties in off-site areas south of the main plant facility. The mitigation systems are sub-slab depressurization systems, or similar engineered systems, to prevent the migration of contaminant vapors into buildings from soil and/or groundwater.

The evaluation of the potential for soil vapor intrusion resulting from the presence of site-related soil and groundwater contamination was evaluated as part of the IBM Groundwater Vapor Project.

The extent of the area impacted by vapor intrusion was defined, and property owners within the defined area were offered mitigation systems to address the potential vapor intrusion related exposures. IBM will continue to inspect and maintain the mitigation systems and reimburse property owners for the cost of their operation. Cleanup of the off-site plume should ultimately eliminate the need for these systems, but they will remain in operation, and be maintained by IBM, as long as necessary to preclude site-related exposures.

IBM has an ongoing soil vapor monitoring program in place to track changes in the soil vapor concentrations and to confirm that the established limits of the mitigation area remain protective. IBM also has an ongoing program in place to operate and maintain the mitigation systems and to track properties in the defined area of impact to identify new or modified structures that may require mitigation systems.

### **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 OU3 and Off-Site Capture Zone A.

#### **Nature and Extent of Contamination in OU3 and Off-Site Capture Zone A**

##### **Soil:**

OU3 and Off-Site Capture Zone A are off-site areas. There is no site-related soil contamination in off-site areas.

##### **Soil Vapor:**

The primary contaminant of concern in OU3 and Off-Site Capture Zone A soil vapor is TCE. Concentrations range from 33,000  $\mu\text{g}/\text{m}^3$  to non-detect. Concentrations are highest near the plant (opposite Building 41 along North Street) and decline with distance to the south. Most areas are less than 350  $\mu\text{g}/\text{m}^3$ .

##### **Groundwater:**

The primary contaminant of concern in OU3 and Off-Site Capture Zone A groundwater is TCE. Concentrations in most areas are below the groundwater standard of 5 ppb. A couple areas have concentrations of 20-30 ppb. In a localized area immediately south of North Street across from Building 18, several wells have TCE concentrations between 1,700 ppb and 13,000 ppb.

### **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. This process, which is similar to the movement of radon gas from the subsurface into the overlying buildings, is referred to as soil vapor intrusion. Soil vapor intrusion and the potential for soil vapor intrusion has been identified in both on- and off-site buildings. The on-site indoor air results indicate that either the air levels are consistent with background indoor air levels and are not of concern or that levels are below or slightly above the NYSDOH air guidelines. In the later, the possibility of health effects in workers exposed to these levels is low, but monitoring within the on-site occupied buildings is on-going. NYSDOH has recommended that reasonable and practical actions be taken to reduce indoor air concentrations within the on-site buildings to the extent that is possible. Mitigation systems (systems that ventilate/remove the air beneath the building) have been and will be installed in all buildings within the off-site defined soil vapor intrusion mitigation area to prevent the indoor air quality from being affected by the contamination in soil vapor beneath the buildings. The responsible party will also continue to track properties within the soil vapor intrusion mitigation area to identify new or modified buildings that might require mitigation systems.

#### **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 on-site and off-site areas 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 (RAOs) for OU3 and Off-Site Capture Zone A 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.

## Soil Vapor

RAOs for Public Health Protection:

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings. This will be achieved through continued operation of vapor mitigation systems and through decreasing contaminant levels in groundwater.

## **SECTION 7: SUMMARY OF SELECTED REMEDY**

Based on the results of the investigations, the IRMs that have been performed, and the evaluation presented here, the Department is selecting No Further Action as the remedy for these off-site areas: Operable Unit 3 (Southern Area) and Off-Site Capture Zone A. This No Further Action remedy includes continued operation of the interim remedial measures and continued implementation of the institutional and engineering controls as part of the selected remedy. The Department believes that this remedy is protective of human health and the environment, and satisfies the remediation objectives described in Section 6.5.

The elements of the selected remedy, including the IRMs already completed and the institutional and engineering controls, are listed below:

### 1. Groundwater Extraction and Treatment

The groundwater extraction and treatment IRM described in Section 6.2 will continue to be implemented to treat contaminants in groundwater and to ensure contaminated groundwater does not migrate off-site.

### 2. Clean Water Injection

The clean water injection IRM described in Section 6.2 will continue to be implemented to flush clean water through the Upper Aquifer in order to enhance plume reduction and improve contaminant recovery.

### 3. Vapor Mitigation

The soil vapor mitigation IRM described in Section 6.2 will continue to be operated and maintained by IBM to ensure contaminants in soil vapor do not migrate into occupied buildings.

### 4. Institutional and Engineering Controls

Institutional controls for the off-site areas that are the subject of this document include the operation, maintenance, and monitoring plans for groundwater remediation, soil vapor monitoring, and mitigation systems that are already in effect. The institutional controls will remain in place to ensure that the elements of the interim remedial measures will continue to be operated and maintained in a manner that is consistent with their design and with the remedial action objectives for the site.

Engineering controls for the off-site areas that are the subject of this document include the engineered remedial systems for groundwater extraction and treatment, clean water injection, and soil vapor monitoring as well as the mitigation systems on off-site structures.

A village ordinance requiring all water users to be connected to the municipal water supply will ensure residents are not exposed to site-related contaminants through drinking water.

The responsible party (IBM) will continue to provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies IBM in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the Record of Decision unless otherwise approved by the Department.

## 5. Green Remediation

Green remediation principles and techniques will be implemented to the extent feasible in the site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste.

## 6. Site Management Plan

A Site Management Plan will be required for the full site. Elements of the plan that are applicable to the off-site areas covered by this document will include the following:

- a. An Institutional and Engineering Control Plan that identifies all institutional and engineering controls for the off-site areas 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 for the areas covered by this document: the groundwater, soil vapor, and mitigation system O&M plans listed above.



- Engineering Controls for the areas covered by this document: the groundwater extraction and treatment systems, clean water injection systems, and soil vapor mitigation systems listed above.

This plan will include provisions for the management and inspection of the identified engineering controls and the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

- b. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
  - monitoring of groundwater and soil vapor to assess the performance and effectiveness of the remedy;
  - a schedule of monitoring and frequency of submittals to the Department.
- c. 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:
  - 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 Remedial Investigation for all environmental media that were evaluated. 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 SCGs for the site. 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.

Contamination in Operable Unit 3 (Southern Area) and Off-Site Capture Zone A – together, the off-site plume area south of the former IBM-Endicott plant – is found in groundwater and in soil vapor above the contaminated groundwater. The contaminants in the plume are the primary industrial solvents used by IBM and by Endicott-Johnson (PCE, TCE, TCA, and Freon 113), as well as the degradation products of these primary solvents. The degradation products include: cis-1,2-dichloroethene (cis12DCE) and vinyl chloride, both degradation products of PCE and TCE; 1,1-dichloroethane (DCA) and 1,1-dichloroethene (DCE), both degradation products of TCA; and Freon 123a, a degradation product of Freon 113. Of these constituents, TCE has been the most prominent and widespread in OU3 and Off-Site Capture Zone A. Other contaminants occur at lower concentrations and over smaller areas as compared to TCE. Table 1, below, provides information on the current (2014) concentrations of the various constituents in the off-site groundwater plume.

Figure 4, attached, depicts the approximate limits and concentration contours of the TCE groundwater plume in 2004, prior to the start of the groundwater IRMs, and in 2014, ten years after the beginning of the IRMs. The plume area has been reduced by more than 80 percent since 2004, and most of the area of the original groundwater plume now meets applicable groundwater standards as a result of the IRMs. The majority of the remaining plume is approaching groundwater standards. The portion of the plume that currently exceeds 50 ppb is limited to a relatively small area near the intersection of North Street and Grant Avenue.

Results of groundwater monitoring between 2004 and 2014 indicate the IRM activities have resulted in the following additional improvements in the groundwater plume area for OU3 and Off-Site Capture Zone A:

- Ninety-seven (97) percent reduction of the average concentration of TCE in the groundwater plume from 79.5 ppb in 2004 to 2.3 ppb in 2014.
- Ninety-seven (97) percent reduction in the TCE mass dissolved in groundwater within the plume from 89.5 pounds in 2004 to 2.6 pounds in 2014, continuing to exceed the ten-year plume reduction goal of 80 percent that was initially attained in 2012.
- Substantial removal of the smaller plume areas exceeding the 6 NYCRR Part 703 groundwater standards for the other constituents of potential concern (i.e., PCE, TCA, Freon 113 and their degradation products) in OU3 and Off-Site Capture Zone A.

## Waste/Source Areas

As described in the RI reports, waste/source materials were identified on the former IBM site and are impacting groundwater and soil vapor in the off-site areas that are the subject of this document.

Wastes are defined in 6 NYCRR Part 375-1.2(aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375-1.2(au). Source areas are areas of concern at a site where substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas that were identified at the site include industrial solvents that were spilled in solvent handling areas or leaked from tanks and pipelines.

The wastes identified in on-site source areas include the primary industrial solvents found in the off-site plume (PCE, TCE, TCA, and Freon 113) as well as the degradation products of these primary solvents. Other compounds have been found on site (such as benzene, toluene and dichlorobenzene), but they are not found in significant quantities and they are not impacting off-site areas.

Source areas for the contamination in the off-site plume in OU3 and in Off-Site Capture Zone A are found on the former IBM plant site. Source areas include: solvent loading and unloading areas along the railroad corridor; solvent handling and storage areas on loading docks of various site buildings; underground and above ground storage tanks for virgin chemicals and waste solvents; underground and above ground pipelines for transfer of virgin chemicals and waste materials. Contamination migrated from these on-site source areas through the soil to the groundwater in the Upper Aquifer, and then to the off-site areas of OU3 and Off-Site Capture Zone A by the natural southward flow of the groundwater.

No IBM-related source areas have been identified in the off-site areas that are the subject of this document. A number of non-IBM-related facilities, both historic and contemporary (e.g., dry cleaners, automotive repair shops, printers, etc.), were identified during the course of site investigations, and some of these facilities may have contributed to the off-site groundwater plume. However, none appear to have been significant sources (if at all) in OU3 and Off-Site Capture Zone A, and there is no indication of any ongoing sources of contamination in these off-site areas.

As a result of IRMs implemented both on site and off site, the waste/source areas identified are no longer significant contributors to the off-site plume areas that are the subject of this document. The waste/source areas identified will be addressed in the future remedy selection process for Operable Units 1 (Railroad Corridor Source Area) and 2 (North Street Area) of the former IBM facility.

## Groundwater

Groundwater samples from the Upper Aquifer are collected on a regular schedule from 136 wells located in OU3 (Southern Area) and in Off-Site Capture Zone A. Samples are analyzed for volatile organic compounds. Other compounds (semi-volatile organic compounds, alcohols, acetates, aldehydes, ketones and metals) were not commonly found above applicable SCGs, so sampling for these compounds was discontinued prior to issuance of the consent order. Table 1, below, summarizes the concentrations of contaminants of concern in Upper Aquifer groundwater in off-site areas. The Table also provides the applicable groundwater standards for each contaminant, as well as the percentage of sampled wells that exceeded that standard. The data are the most recent available (May 2014).

**Table 1 - Groundwater**

Contaminant	Concentration Range Detected (ppb)		SCG (ppb)	Frequency Exceeding SCG
	Off-Site Capture Zone A	OU3 – Southern Area		
VOCs				
Tetrachloroethene (PCE)	ND – 59	ND – 5.1	5	5%
Trichloroethene (TCE)	ND – 13,000	ND – 23	5	24%
cis-1,2-Dichloroethene (cis12DCE)	ND – 1,700	ND – 1.5	5	10%
Vinyl Chloride	ND – 52	ND	2	4%
1,1,1-Trichloroethane (TCA)	ND – 480	ND – 4.5	5	8%
1,1-Dichloroethane (DCA)	ND – 1,600	ND – 0.4	5	7%
1,1-Dichloroethene (DCE)	ND – 110	ND – 0.6	5	5%
Freon 113	ND – 34	ND	5	1%
Freon 123a	ND – 4.4	ND	5	<1%

Notes:

Data are as of May, 2014

ppb = parts per billion, which is equivalent to micrograms per liter (µg/L) in water.

SCG = Standard Criteria or Guidance – Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), Surface Water and Groundwater Quality Standards (6 NYCRR Part 703), and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

ND = Not Detected at the applicable quantitation limit

The data summarized in Table 1 indicate that contamination in Upper Aquifer groundwater continues to impact off-site areas. However the number of sample locations where groundwater standards were exceeded in 2014 is relatively low compared to 2004. Less than 25 percent of sample locations had TCE concentrations that exceeded the groundwater standard, and ten percent or less of sample locations exceeded SCGs for the remaining contaminants. These numbers are expected to continue to decline with the continued operation of the IRMs.

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

### Soil

No site-related soil contamination of concern was identified during the RI. There were no releases or disposal of site-related contaminants in off-site areas that are the subject of this document. Therefore, no remedial alternatives need to be evaluated for soil.

### Surface Water

No site-related surface water contamination of concern was identified during the RI. Some low level (~1 to 2 ppb) groundwater contamination extends to the Susquehanna River, however samples from the river did not contain elevated levels of contaminants. Therefore, no remedial alternatives need to be evaluated for surface water.

### Soil Vapor

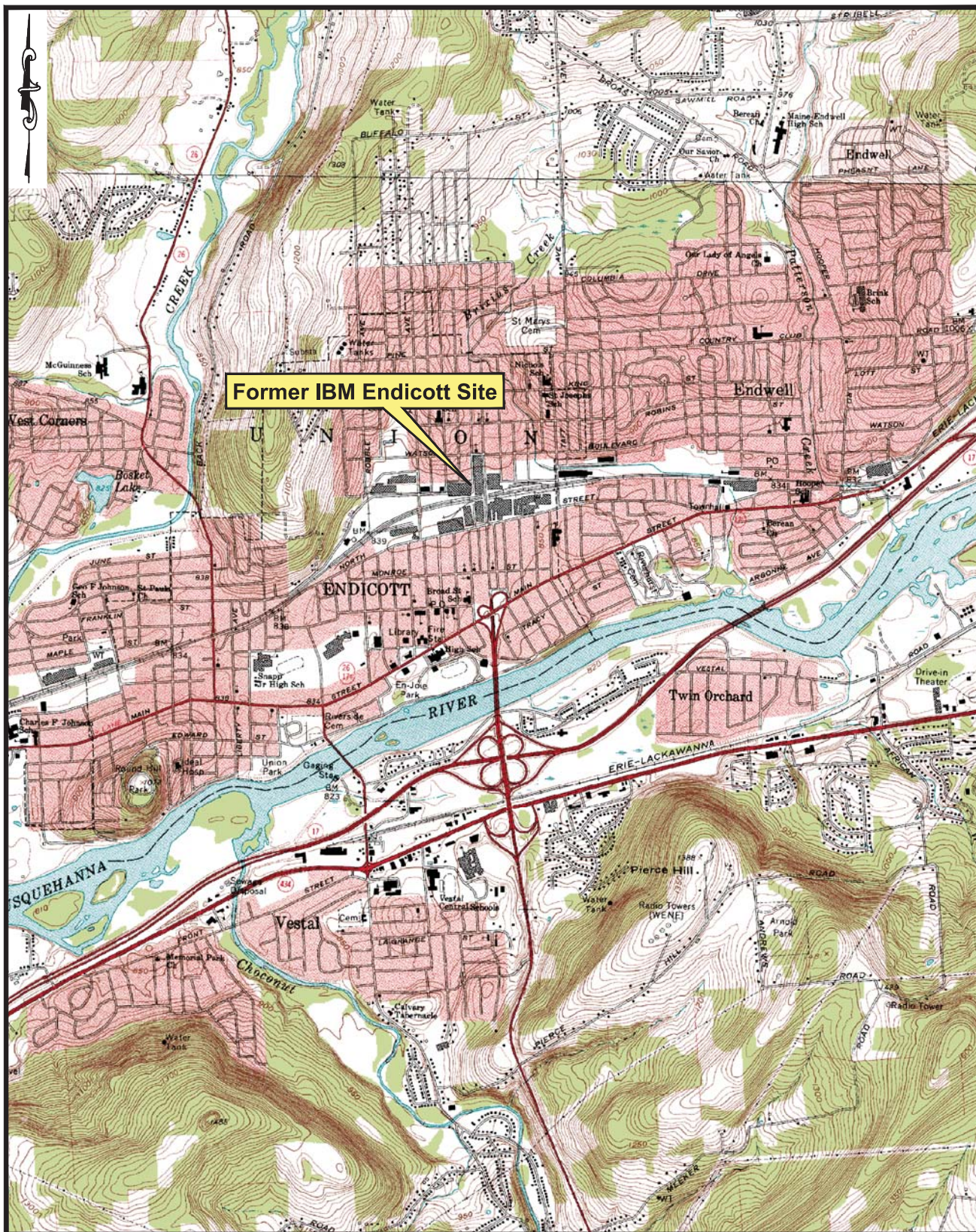
The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site due to the presence of buildings in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

Contamination in soil vapor was identified in areas generally overlying the historic groundwater plume. As in the underlying groundwater, TCE is the primary contaminant of concern in soil vapor in OU3 and in Off-Site Capture Zone A. Soil Vapor contamination identified during the RI was addressed under the Groundwater Vapor Project

IRM described in Section 6.2. The evaluation of the potential for soil vapor intrusion resulting from the presence of Site-related groundwater contamination was evaluated in 2003 – 2005 as part of the IBM Groundwater Vapor Project. The extent of the area impacted by vapor intrusion was defined (see attached Figure 5) and property owners were offered mitigation systems to address the potential vapor intrusion related exposures.

Based on the concentration detected, and in comparison with the NYSDOH Soil Vapor Intrusion Guidance, soil vapor contamination identified during the RI was addressed during the IRM described in Section 6.2.





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

Scale  
0 1500' 3000'

**GROUNDWATER SCIENCES CORPORATION**

22007-008-H1 / 09-10-2014



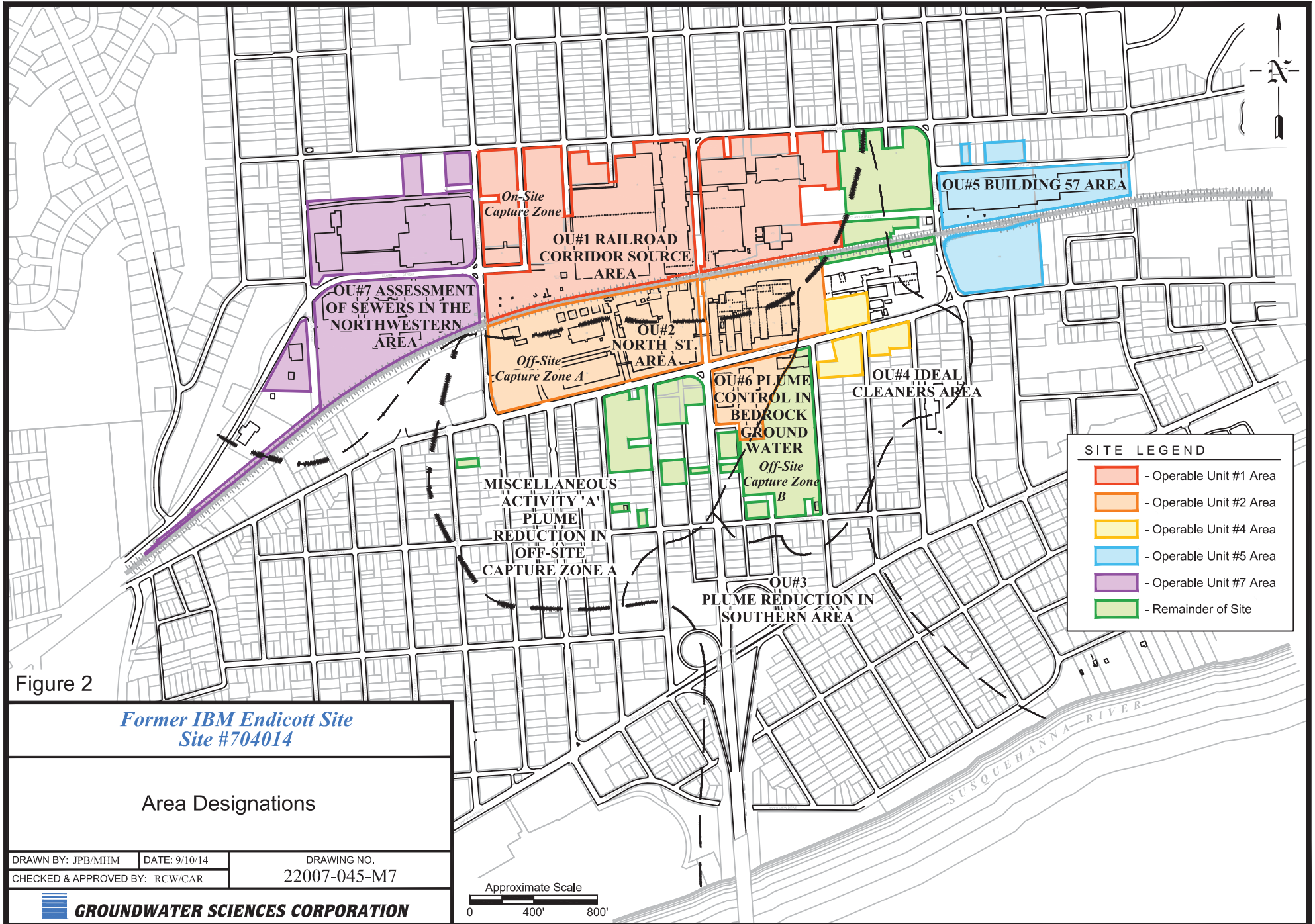


Figure 2

**Former IBM Endicott Site  
Site #704014**

### Area Designations

DRAWN BY: JPB/MHM

DATE: 9/10/14

DRAWING NO.

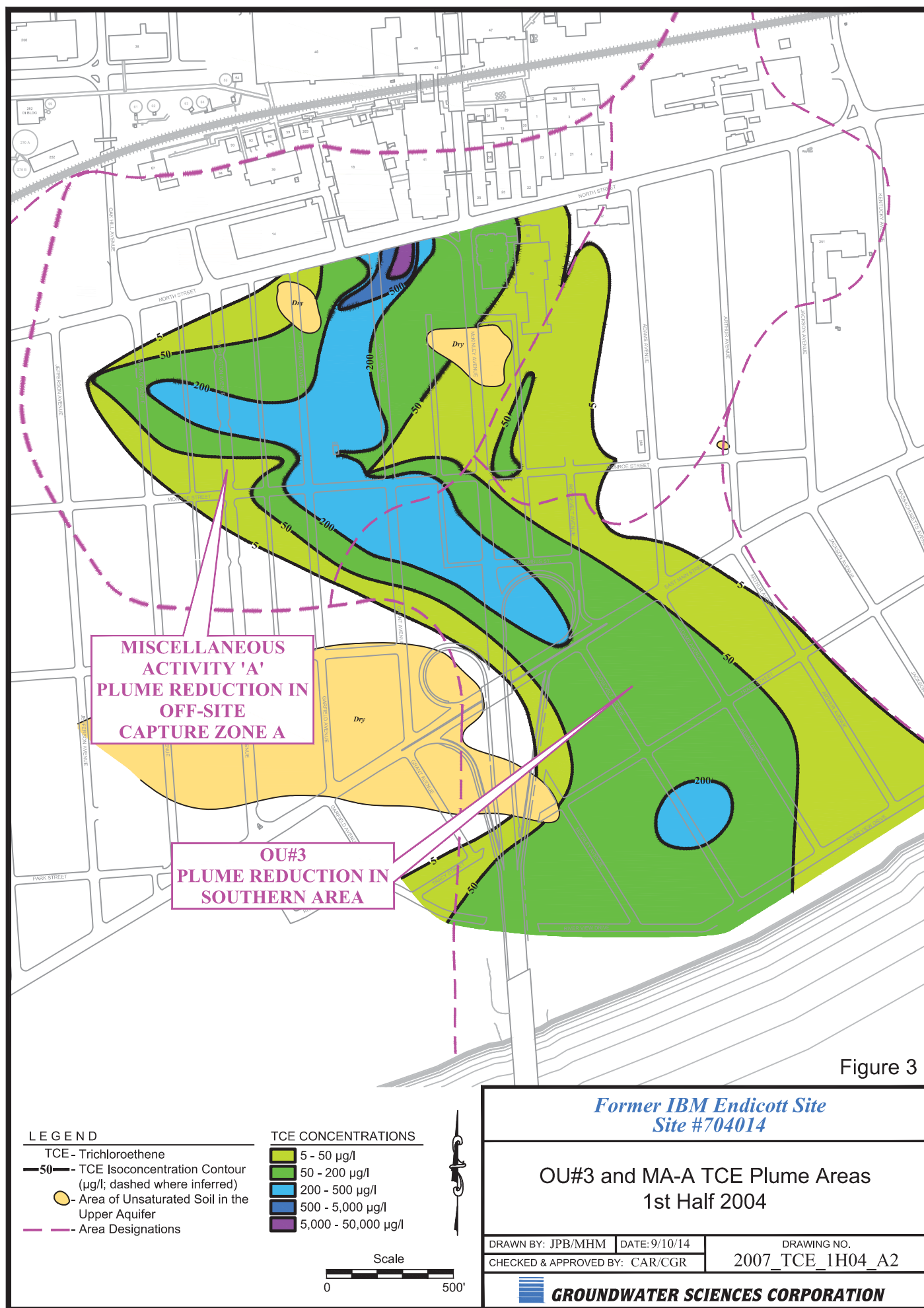
22007-045-M7

CHECKED & APPROVED BY: RCW/CAR



**GROUNDWATER SCIENCES CORPORATION**





Upper Aquifer Groundwater  
First Half 2004



Upper Aquifer Groundwater  
August 2014



Figure 4

**LEGEND**  
TCE - Trichloroethene  
—50— TCE Isoconcentration Contour (µg/l; dashed where inferred)  
○ Area of Unsaturated Soil in the Upper Aquifer

**TCE CONCENTRATIONS**  
5 - 50 µg/l  
50 - 200 µg/l  
200 - 500 µg/l  
500 - 5,000 µg/l  
5,000 - 50,000 µg/l

Scale  
0 500'

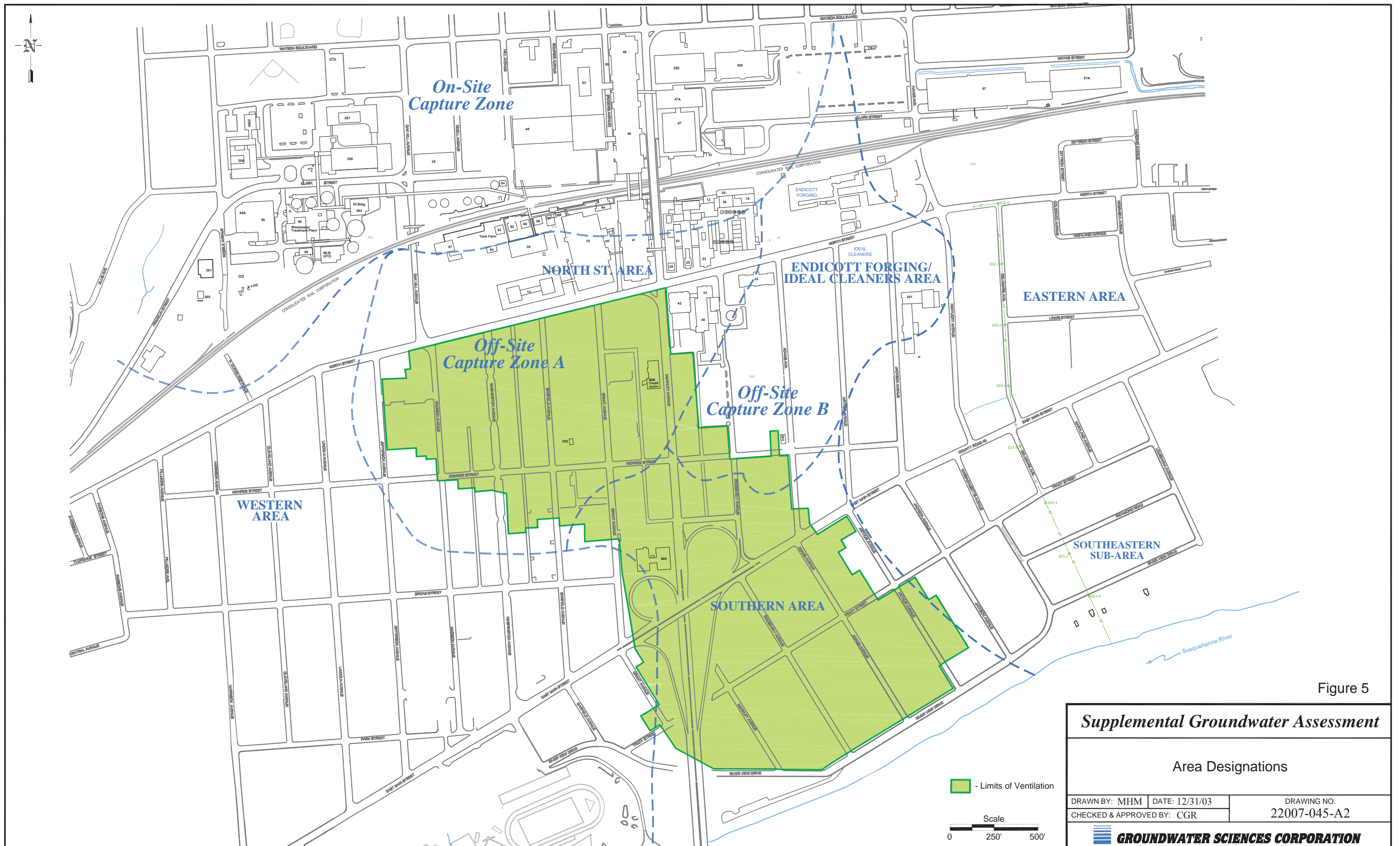
**Former IBM Endicott Site  
Site #704014**

**Comparative TCE Isoconcentration Contour Map  
Upper Aquifer  
(First Half 2004 vs. August 2014)**

DRAWN BY: MHM	DATE: 9/24/14	DRAWING NO.
CHECKED & APPROVED BY: SMF/RCW		2007-TCE_2014-08_B4

**GROUNDWATER SCIENCES CORPORATION**





# **APPENDIX A**

## **Responsiveness Summary**

# RESPONSIVENESS SUMMARY

**Former IBM Endicott Facility  
Operable Unit No. 3: Southern Area and Off-Site Capture Zone A  
State Superfund Project  
Village of Endicott and Town of Union, Broome County, New York  
Site No. 704014**

The Proposed Remedial Action Plan (PRAP) for Operable Unit 3 (Southern Area) and Off-Site Capture Zone A of the former IBM Endicott facility was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 27, 2015. The PRAP outlined the remedial measures proposed for the contaminated groundwater and soil vapor at the 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 5, 2015, which included a presentation of the remedial investigation and interim remedial measures, as well as a discussion of the proposed remedy for the off-site areas listed. 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, 2015.

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:

**COMMENT 1:** Some areas of the residual off-site plume continue to exceed groundwater standards. Are other remedies being considered for those areas?

**RESPONSE 1:** No additional remedies are planned or being proposed for these areas. The areas in question (such as an area beneath the Main Street – McKinley Avenue interchange) are within the area covered by the proposed remedy and have exhibited similar declines in contaminant concentrations as the rest of the off-site plume area that currently meets groundwater standards. Sampling data as well as the results of investigations in off-site areas indicate that these areas are simply remnants of the former plume. The Department expects that the selected remedy will be effective in remediating these areas, and that contaminant concentrations in those areas will continue to decline.

**COMMENT 2:** The remedy only includes extracting groundwater. IBM should have to clean the village water.

**RESPONSE 2:** 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 in the area of the off-site plume.

**COMMENT 3:** Don't we get our drinking water from under the river?

**RESPONSE 3:** Yes. The Lower Aquifer that is the source for several municipal water systems in the area is a glacial deposit that is found primarily under and along the axis of the Susquehanna River.

**COMMENT 4:** What will happen if/when vapor intrusion controls or extraction wells go "offline"?

**RESPONSE 4:** Any determination by the Department that components of the selected remedy can be discontinued will be contingent on a period of testing to determine the effects of turning off the components, as well as a period of post-shutdown monitoring to ensure public health and the environment remain protected in accordance with the requirements of the Consent Order.

**COMMENT 5:** How many monitoring wells are monitored on a daily basis?

**RESPONSE 5:** No monitoring wells are regularly monitored for chemical contamination on a daily basis. Monitoring wells are sampled on a Department-approved schedule. Most monitoring wells are sampled either quarterly, semiannually, or annually. Occasionally some wells are sampled more frequently as part of a special task or if conditions suggest more frequent monitoring is warranted. Extraction wells are sampled monthly.

**COMMENT 6:** To what depth are the injection wells installed?

**RESPONSE 6:** Drilled depths for injection wells range from 28 to 43 feet below ground surface. All injection wells are completed in the silt/clay layer at the bottom of the Upper Aquifer. Most are screened over two intervals within the Upper Aquifer – one interval below the water table and one above.

**COMMENT 7:** Will contamination reach the bedrock?

**RESPONSE 7:** Contamination is unlikely to reach the bedrock from the off-site plume area covered by the remedy. A confining unit (a thick layer of silt and clay) separates the contaminated Upper Aquifer from underlying geologic units, including the bedrock, in the off-site area. Some contamination did reach the bedrock from on-site areas by migrating downward along building structural units that penetrated the confining silt/clay layer. Contamination in the bedrock is being addressed through a 2009 Record of Decision for that area which is known as Operable Unit 6: Bedrock Groundwater.

**COMMENT 8:** Is remedial progress due to rehydration (clean water injection)?

**RESPONSE 8:** Remedial progress in the off-site areas is due to the combined effects of extraction and treatment of contaminated groundwater together with the injection of clean water.

**COMMENT 9:** Was chemical chelation considered as a remedial alternative?

**RESPONSE 9:** Chelation was not considered as an alternative. Chelation is used to remediate heavy metal contamination which is not a concern in this area.

**COMMENT 10:** What happens to the contamination that is removed from the groundwater through the treatment process?

**RESPONSE 10:** Contamination is removed by passing the contaminated water through treatment vessels containing granular activated carbon. Contaminants in the water are adsorbed onto the activated carbon thereby removing the contamination from the water. When the adsorptive capacity of the carbon is reached, the spent carbon is removed from the treatment vessels by the vendor and replaced with fresh carbon. The spent carbon is sent to a facility where it is regenerated or reactivated, generally by heating. The temperatures used for reactivation are high enough to drive off the contaminants from the carbon and also to destroy the contamination. The reactivated carbon can then be reused.

**COMMENT 11:** Is there any chance on-site contamination will migrate to clean (off-site) areas?

**RESPONSE 11:** The possibility of recontamination of off-site areas exists so long as contamination remains on site. However, elements of the proposed remedy along with remedial measures in place in on-site areas are designed to prevent this from occurring. Continued progress in cleaning up on-site areas will reduce the risk further. A cornerstone of the remedial programs at the site is to prevent recontamination of off-site areas.

**COMMENT 12:** Are there plans to test the (ambient) air again?

**RESPONSE 12:** There are no plans to test the ambient air again. 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, the off-site soil vapor plume has steadily decreased, so the potential for impacts is even lower now.

**COMMENT 13:** Did the 2011 floods have any adverse impacts on the remedial systems already in place?

**RESPONSE 13:** The groundwater remedial systems (extraction wells, injection wells and treatment facilities) were not adversely affected by the flooding. Vapor mitigation systems in some homes in the flooded areas were damaged. Once the floods receded and cleanup began, IBM began inspecting and repairing damaged systems. That task has been completed.



**COMMENT 14:** Steven Richards, a local resident, submitted general comments on the site in two telephone calls on March 3, 2015. Mr. Richards' comment specific to the PRAP is his concern about contamination being allowed to cross North Street south of Building 18.

**RESPONSE 14:** An extraction well designated EN-284P operates south of North Street across from Building 18. EN-284P intercepts contaminated groundwater from an apparent source area beneath Building 18. EN-284P is a critical component of the proposed remedy and has been a major factor in reducing the off-site plume to its current level. Its continued operation is important to further reducing contaminant levels in off-site groundwater. The hydrogeologic conditions at the site are such that the location of EN-284P cannot be changed without reducing its effectiveness and risking re-contamination of off-site areas. As such, contaminated groundwater will continue to be drawn across North Street toward the well. EN-284P is located only a short distance from the plant site, so the Department believes that the benefits of continued remediation far outweigh the risks associated with allowing the contaminated groundwater to move off site a short, controlled distance.

**COMMENT 15:** James Little, a local resident, submitted an email dated March 4, 2015 which included the following comment:

My name is James Little former IBMer (workplace safety advocate) and member of Western Broome Environmental Stakeholder Coalition, a group assembled by the department of health assigned to evaluate, advocate and communicate for those affected by the IBM Endicott chemical spill. We have met with DOH, DEC, ASTAR, NIOSH, and the CDC for the past decade as citizen volunteer stakeholders to understand and guide health studies, various cleanup methods to rid Endicott homes, businesses, and land of contamination from chemicals for residents as well as former workers exposed to chemicals in the workplace. Political leaders, health officials, Department of Environmental Conservation have fully engaged to cleanup Endicott for decades to an extent I believe is safe for families and business to live and thrive safely. I agree with the DEC designation change of 2 to 4 for much of Endicott. The exception being there are still toxic chemicals that are still in need of remediation under the old IBM buildings off North St. Building 57 would be one exception where thermo remediation has already cleaned chemicals underneath.

So the former IBM/EIT buildings currently known as Huron campus still need additional cleanup in my opinion which hopefully is in the planning stages. Once that is complete, I am comfortable in saying "mission accomplished" after IBM has spent millions of dollars and years of effort. I feel Endicott is now safe so long as efforts continue under the facility where toxic chemicals still await cleanup. We want to make sure they don't spread back under homes in Endicott if the filter pumps are someday turned off.

**RESPONSE 15:** The comments are noted. One clarification, however: the Department has not re-classified the site from Class 2. The Department and NYSDOH have determined that conditions in the off-site areas that are the subject of the PRAP no longer pose a significant threat to human health or the environment. Such a determination for those areas, however, does not constitute a reclassification of the site.

**COMMENT 16:** Jonathon Strong, a local resident, submitted an email dated March 6, 2015 which included the following comment:

I attended the public meeting on the above-referenced matter that you conducted at the Johnson Memorial Library in Endicott last night. I found it informative and useful. I was the one who asked whether the Proposed Plan had a proposed end date and/or further evaluation date that would be accompanied by a further public meeting and an opportunity for further public comment. Mr. Czuhanych stated that he did not believe that it did. I then stated that I felt that it should and that that was my comment. Ms. Boyd appeared to be writing that down.

As I did not identify myself at the time, I want to do that now to better ensure that my comment was officially received and that the DEC would respond to it in its Record of Decision. In addition, having had time to reflect on the discussion, I wish to flesh out my comment more fully and precisely. My comment is that the Final Remedial Plan should contain:

- (a) scheduled evaluation dates (say every two years) at which time the DEC would issue an Interim Progress Report to be followed by a public meeting similar to that which you conducted last night and an opportunity for public comments; and
- (b) a firm commitment that, before the State stops remedial action, it will issue a Proposed Termination Report to be followed by a public meeting and an opportunity for public comment.

**RESPONSE 16:** Annual and semiannual progress reports are available for public review at the document repository for the site which is the George F. Johnson Memorial Library in Endicott. Also, going forward, the Department will continue to distribute fact sheets and other notices as appropriate, highlighting project milestones and opportunities for public availability sessions, including a notice to the site contact list when a Certificate of Completion or other similar site closure document is issued. All fact sheets will have contact information where the public can submit comments or obtain more information. To assure you receive these notices, please sign up for the Broome County DEC listserv here: <http://www.dec.ny.gov/chemical/61092.html> or go to DEC's public website and enter "listserv" in the search box. For additional ways to stay informed of environmental issues in your area, visit DEC's Public Involvement and News webpage here: <http://www.dec.ny.gov/54.html>.

**COMMENTS 17-24:** Lenny Seigel, Executive Director, Center for Public Environmental Oversight, Mountain View, California, submitted a letter via email dated March 28, 2015 which included the following comments and questions (Comments 17-24). Similar, related questions were submitted by Mr. Seigel in an email dated March 19, 2015:

**COMMENT 17:** Thank you for the opportunity to comment on the Proposed Remedial Action Plan for DEC Site #704014 – Operable Unit 03 at the former IBM Endicott Facility. I also appreciate your response to my e-mail questions and your making available background documents in electronic form. As you may know, I have been asked by residents of the area to review the Proposed Plan.

**RESPONSE 17:** Comment noted.

**COMMENT 18:** By any measure, the extraction, treatment, and flushing Interim Remedy has been quite successful. The concentrations and mass of volatile organic compounds, including trichloroethylene (TCE), as well as the plume size, have been reduced significantly. However a hotspot of TCE at the northern edge of Off-Site Capture Zone A remains high, with sampling results as high as 13,000 parts per billion.

**RESPONSE 18:** See Response 14.

**COMMENT 19:** Since this may be the last time that remedial decisions will be made for this downgradient plume, I believe that DEC should conduct additional analysis before extending the current Interim Remedy for groundwater. How long will it take for pump-treat-flush to achieve the remedial action objectives within Operable Unit and Capture Zone? Is this approach, which at a majority of sites has lost much of its effectiveness, likely to reach a state of diminishing returns? If DEC has already conducted such analysis, then please include it in the Remedial Action Plan.

**RESPONSE 19:** One of the remedial action objectives of the proposed remedy is to restore the groundwater to applicable standards. This applies to the entire operable unit and the Department believes this is achievable. However, there is no estimate of how long this will take. The remaining remedial action objectives for groundwater have been achieved or substantially achieved.

**COMMENT 20:** If indeed continuation of the Interim Remedy is likely (to) take an extended amount of time to complete the cleanup, then I suggest the DEC conduct a Transition Assessment, as envisioned by the National Research Council's 2013 report, "Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites." Now that the plume is concentrated in a small area, perhaps an in situ method, such as in situ bioremediation, in situ chemical oxidation, a permeable reactive barrier, or enhanced phytoremediation could accelerate the removal of the contamination. Such methods may not only save time, but energy, water, and money while reducing greenhouse gas emission. Such a transition assessment should be part of the long-term remedial planning at any complex groundwater site.

**RESPONSE 20:** See Response 14 regarding contamination being concentrated in a small area (referring to the area immediately upgradient of extraction well EN-284P). Also, remedial alternatives were evaluated prior to implementation of the IRMs. These included in situ alternatives for both flux control and direct remediation of the off-site plume. The proposed remedy has proven very effective as an interim remedy in reducing the plume, so that is why its continuation has been proposed.

**COMMENT 21:** Furthermore, I recognize that the installation and maintenance of vapor mitigation system in private homes and businesses – more than five hundred buildings – has protected the off-site public from vapor intrusion. DEC's "blanket" strategy has been well worth it. However, as I mentioned on the phone, the apparent elimination of contamination in much of

the plume has opened up the unusual possibility of removing mitigation systems that are no longer needed. DEC's likely approach, including testing for rebound, makes sense.

**RESPONSE 21:** Comment noted.

**COMMENT 22:** I suggest, though, that DEC begin discussions with the community well before making any proposal to reduce mitigation. For example, residents may wish to continue system operation to address the intrusion of naturally occurring radon. What kind of arrangements should be made for that?

**RESPONSE 22:** See Response 4 and Response 16. There have been no decisions regarding the disposition of vapor mitigation systems after they are no longer needed for site-related contamination. Leaving systems in place and transferring operation and maintenance responsibilities to the property owner(s) may be an option.

**COMMENT 23:** In addition, I think DEC should pledge to manage risk to the TCE thresholds derived from U.S. EPA's 2011 Toxicity Assessment for TCE. In particular, care must be taken to ensure that women of child-bearing age not be exposed to TCE in indoor air above 2 micrograms per cubic meter for any length of time.

**RESPONSE 23:** New York State has a comprehensive and sophisticated program in place to manage TCE exposures related to soil vapor intrusion. This program takes into account exposures for sensitive population groups, including those mentioned in the comment. This program also includes the goal of implementing actions to reduce indoor air contaminant levels to as close to background as practical. In New York State, background TCE levels in the indoor air of homes and office settings typically are less than 1 microgram per cubic meter. The Department works closely with NYSDOH on implementing this program at sites across the state and will continue to do so at this site to ensure all actions taken are protective of public health.

**COMMENT 24:** In summary, I believe DEC has done a great job at this site. But I believe it would be a mistake to continue as is without evaluating more sustainable alternatives.

**RESPONSE 24:** Comment noted. Also, see Response 20.

**COMMENT 25:** Frank Roma, a local resident and member of Western Broome Environmental Stakeholders' Coalition, submitted an email dated March 29, 2015 which included the following comment:

Thank you for the opportunity to comment here and at the public meeting.

IBM has significantly reduced the TCE in the plume it created years ago. It is apparent that this phase of the clean-up is ending. My concern is that the clean-up will stop. I appreciated your assurances that the pump and treat system and the vapor mitigation measures will continue.

There needs to be continued study of the soil vapor since there is still a chance the vapor could still enter structures if, and when, the mitigation systems are de-activated. You did mention more testing, such as stopping and starting the pump and treat systems, will add to the knowledge of contamination.

Lastly, the northern part of OU-3 takes the on-site plume to form a barrier to further spread. We are, however, concerned about the on-site contamination and its remediation. The containment measure is successful, and I would be interested in what other measures are to be performed.

We look forward to working with DEC to getting the site cleaned.

**RESPONSE 25:** Regarding soil vapor monitoring and deactivating mitigation systems, see Response 4. Regarding on-site contamination and remediation, interim remedial measures are in place and effective, and work is continuing in on-site areas. See also Response 16 regarding staying informed of site activities.

## **APPENDIX B**

### **Administrative Record**

# **Administrative Record**

**Former IBM Endicott Facility  
Operable Unit No. 3: Southern Area and Off-Site Capture Zone A  
State Superfund Project  
Village of Endicott and Town of Union, Broome County, New York  
Site No. 704014**

1. *Proposed Remedial Action Plan for the Former IBM Endicott Facility, Operable Unit No. 3 (Southern Area) and Off-Site Capture Zone A*, dated February 2015, prepared by the Department.
2. *Order on Consent, Index No. A7-0502-0104*, between the Department and International Business Machines Corporation, executed on August 4, 2004.
3. *Evaluation of Existing Corrective Measures Systems, Village of Endicott / Town of Union, Broome County, New York*, dated April 2004, prepared by Groundwater Sciences, P.C.
4. *Supplemental Groundwater Assessment Final Report – Volume 1, Village of Endicott / Town of Union, Broome County, New York*, dated May 2004, prepared by Groundwater Sciences, P.C.
5. *Supplemental Groundwater Assessment Final Report – Volume 2, Village of Endicott / Town of Union, Broome County, New York*, dated May 2004, prepared by Groundwater Sciences, P.C.
6. *Supplemental Remedial Investigation Report, Route 26 / McKinley Avenue Interchange Area, Operable Unit #3: Plume Reduction in the Southern Area, Order on Consent Index #A7-0502-0104, Site #704014, Village of Endicott / Town of Union, Broome County, New York*, dated January 2005, prepared by Groundwater Sciences Corporation.
7. *Supplemental Remedial Investigation Report for the Southern Area Eastern Boundary, Operable Unit #3: Plume Reduction in the Southern Area, Order on Consent Index #A7-0502-0104, Site #704014, Village of Endicott / Town of Union, Broome County, New York*, dated April 2005, prepared by Groundwater Sciences Corporation.
8. *Supplemental Remedial Investigation Report for the Verizon Property Area, Operable Unit #3: Plume Reduction in the Southern Area, Order on Consent Index #A7-0502-0104, Site #704014, Village of Endicott / Town of Union, Broome County, New York*, dated July 2005, prepared by Groundwater Sciences Corporation.
9. *Final Pre-characterization Technical Memorandum Operable Unit #1: Railroad Corridor Source Area and Operable Unit #2: North Street Area Village of Endicott / Town of Union, Broome County, New York*, dated July 2006, prepared by Groundwater Sciences, P.C.



10. *Ambient Air Monitoring, Quarterly Report No. 4 and Final 12-Month Report, IBM Corporation, Endicott, NY*, dated September 2006, prepared by O'Brien & Gere.
11. *Re: Work Plan Modification, Fast-Track Interim Remedial Measures, Miscellaneous Activity A: Plume Reduction in Off-Site Capture Zone A, Operable Unit #3: Plume Reduction in the Southern Area, Order on Consent Index #A7-0502-0104, Site #704014.* Letter from Mitchell E. Meyers of IBM to Robert C. Knizek, P.E. of NYSDEC, IBM Corporation, dated December 18, 2006.
12. *Interim Remedial Measures Progress Report, Operable Unit #3: Plume Reduction in the Southern Area and Miscellaneous Site Activity A: Plume Reduction in Off-Site Capture Zone A, Village of Endicott / Town of Union, Broome County, New York*, dated February 2011, prepared by Groundwater Sciences Corporation and Groundwater Sciences, P.C.
13. *Combined Groundwater Report for 2013, Order on Consent Index #A7-0502-0104, Site #704014, Village of Endicott / Town of Union, Broome County, New York*, dated April 2014, prepared by Groundwater Sciences, P.C. and Groundwater Sciences Corporation.
14. *Annual Report, Soil Vapor Monitoring through August 2014, Comprehensive Operations, Maintenance, and Monitoring Program, Endicott, New York*, dated November 2014, prepared by Sanborn, Head & Associates, Inc.
15. Email from James Little to Alex Czuhanich (NYSDEC) dated March 4, 2015.
16. Email from Jonathon Strong to Alex Czuhanich (NYSDEC) dated March 6, 2015.
17. Email from Lenny Seigel (CPEO) to Alex Czuhanich (NYSDEC) dated March 19, 2015.
18. Letter from Lenny Seigel (CPEO) to Alex Czuhanich (NYSDEC) dated March 28, 2015.
19. Email from Frank Roma to Alex Czuhanich (NYSDEC) dated March 29, 2015.