UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION III

STATEMENT OF BASIS

FORMER KEYSTONE COLOR WORKS
YORK, PENNSYLVANIA

EPA ID NO. PAD003018256

Prepared by
Office of Remediation
Land and Chemicals Division

June 2014

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Figures

Attachments

List of Commonly Used Acronyms

Act 2	Pennsylvania's Land Recycling and Environmental Remediation Standards Act
AR	Administrative Record
ARM	ARM Group Inc.
COC	Constituent of Concern
EC	Engineering Control
EI	Environmental Indicator
EPA	Environmental Protection Agency
FDRTC	Final Decision and Response to Comments
HSWA	Hazardous and Solid Waste Amendments
IC	Institutional Control
KCW	Keystone Color Works
MSC	Medium-Specific Concentration
NWT	Northwest Triangle
PADEP	Pennsylvania Department of Environmental Protection
RCRA	Resource Conservation and Recovery Act
RDA	City of York Redevelopment Authority
SB	Statement of Basis
SVOC	Semi-Volatile Organic Compound
SWDA	Solid Waste Disposal Act
UECA	Uniform Environmental Covenant Act
VOC	Volatile Organic Compound

Section 1: Introduction

The U.S. Environmental Protection Agency, Region 3 (EPA) has prepared this Statement of Basis (SB) under the Corrective Action Program to solicit public comment on its proposed remedy for the Former Keystone Color Works (KCW) facility located at 109-151 West Gay Avenue, York, Pennsylvania 17401 (Facility). This SB highlights the key information relied upon by EPA in selecting its proposed remedy for the Facility. A detailed description of EPA's proposed remedy for the Facility may be found in Section 6.

The Facility is subject to EPA's Corrective Action Program under the Solid Waste Disposal Act (SWDA), as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. §§ 6901 et seq. (Corrective Action Program). The Corrective Action Program is designed to ensure that certain facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and hazardous constituents that have occurred at their property. The Commonwealth of Pennsylvania (Commonwealth) is not authorized for the Corrective Action Program under Section 3006 of RCRA. Therefore, EPA retains primary authority in the Commonwealth for the Corrective Action Program.

For additional information, please refer to the Administrative Record (AR) for the Facility, which contains all documents, including data and quality assurance information, on which EPA's proposed remedy is based. The Index to the AR may be found in Section 10 of this SB. See Section 9, Public Participation, for information on how you may review the documents contained in the AR and submit any comments you may have concerning EPA's proposed remedy for the Facility.

Section 2: Facility Background

2.1 Description and History

The former Keystone Color Works Facility operated at 109 and 151 West Gay Avenue, and consisted of two adjoining parcels (Tract #1 at approximately 0.33 acres, and Tract #2 at approximately 0.4 acres) that together encompassed approximately 0.73 acres of land. The portion of the building that was previously located at 151 West Gay Avenue (Tract #2) was demolished and removed, while the portion of the building located at 109 West Gay Avenue (Tract #1) remains. The Facility property is bordered by North Beaver Street to the east, West Gay Avenue to the south, and railroad tracks to the west and north.

The earliest known use of the Facility was for the manufacture of farm machinery from 1887 to 1908. From 1919 until the 1990s, KCW produced organic and inorganic pulp pigments for the wallpaper and surface coating trades. Some of these pigments contained chromium and lead. Wastes from their production are considered hazardous. Large

quantities of wastewater and small quantities of waste sludge were generated at the Facility. Wastewater was treated on site and discharged to the sewer system. Waste sludge was placed in drums and disposed at off-site landfills.

Investigation and remediation of the Facility is primarily being conducted in accordance with Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2) with oversight by Pennsylvania's Department of Environmental Protection (PADEP). KCW is part of a larger cleanup initiative referred to as the Northwest Triangle (NWT), which is a multi-block area of separate properties that cover 14.5 acres in the northwestern corner of the City of York. A combined Remedial Investigation Report (RIR) and Final Report (FR) for the NWT properties were submitted to PADEP for final review and approval on October 14, 2013. The Act 2 RIR/FR was revised and resubmitted to PADEP on March 7, 2014. PADEP approved the March 2014 RIR/FR via letter dated May 29, 2014, included in the AR for KCW.

The City of York Redevelopment Authority (RDA), a non-profit organization, is remediating, rehabilitating, and/or redeveloping these impacted and underutilized properties as part of the City of York's revitalization activities. For additional information regarding the NWT Initiative, please refer to the March 2014 Act 2 RIR/FR which has been included in the AR for KCW. A Site Location Map and a Local Area Map depicting surrounding properties are attached to this SB as **Figures 1 and 2**, respectively.

2.2 Environmental Setting

The Facility is underlain by the Conestoga Formation and the Pure Limestone Member of the Kinzers Formation. The Conestoga Formation consists of impure, grey limestone. Both units are susceptible to sinkholes and a highly irregular, pinnacled bedrock surface may occur below a deceptively smooth land surface.

The Facility is located within the Codorus Creek watershed, and the Creek is the receptor for local surface water and groundwater. Groundwater and surface water in the vicinity of the Site flow to the north and northwest; groundwater is encountered from 13 to 21 feet below the ground surface.

Section 3: Summary of Environmental Investigations and Remediation

Various investigations[1] were conducted at the Facility between 2004 and 2012 and are summarized below:

- Edge Environmental completed a preliminary Phase I Environmental Assessment Report dated June 1, 2004 (June 2004 Phase I). State and federal records were reviewed, a Site

[1] On September 22, 2008, ARM Group Inc. submitted a Notice of Intent to Remediate (NIR) for the Northwest Triangle properties on behalf of the Redevelopment Authority of the City of York. Investigations conducted at the Facility prior to the submittal of the NIR were conducted independently without PADEP or EPA oversight.

reconnaissance was performed, and interviews were conducted with local officials, owners, and occupants. The June 2004 Phase I identified prior Facility uses and potential environmental issues.

- Pennoni Associates, Inc prepared a Revised Phase I Environmental Assessment Report dated June 2, 2005 (Revised Phase I). This Revised Phase I expanded on the June 2004 Phase I, and included Sanborn maps, historical aerial photographs, and an Environmental Data Resources (EDR) Report.

- GTS Technologies completed an Interim Site Characterization Report dated December 21, 2005 which included data for six surface soil samples that were collected along the western side of the KCW building. Lead was detected in four of the six samples at concentrations exceeding the Act 2 Statewide Health Standards.

- ARM Group Inc. (ARM) performed additional investigation and site characterization work at the Facility between 2008 and 2012 to identify contamination, and to support the development and implementation of environmental remediation plans as part of the NWT redevelopment activities.

A. Soil Investigation

As generally depicted on **Figure 3** (attached), the Facility consists of the existing, triangular shaped KCW industrial building (KCW Building) and associated parking lot to the east, with a small tract of gravel-covered soil along the western edge of the building. Railroad tracks and an associated right-of-way, owned by York Rail, mark the Facility's western property boundary.

The soil investigations conducted by ARM were completed pursuant to PADEP's Act 2 Program and sampling results were compared to Act 2 Statewide Health Standards (SHSs) established for residential and non-residential direct contact values (i.e., Medium Specific Concentrations (MSCs)), in addition to Act 2's soil-to-groundwater values. Unless otherwise noted, these standards are equivalent to EPA standards for the identified constituents of concern (COCs).

ARM initially collected ten (10) soil samples on July 18, 2007 from the area along the western side of the KCW Building. These samples were collected from the surface or shallow subsurface using a decontaminated hand bucket-auger, and were submitted for analysis of lead. The sample locations and depths were selected to supplement the previous characterization and to support delineation of the elevated lead concentrations previously detected. As summarized on **Table 2** (included as **Attachment A**) and shown on **Figure 3** of the March 2014 RIR/RF, lead was detected in four of the surface samples (C-SS2 (6"); C-SS3(6"); C-SS4 (6"); and C-SS6 (6")) at concentrations exceeding the Act 2 residential direct contact MSC (500 mg/kg). Lead was also detected in one surface sample (C-SS5 (6")) and one subsurface sample (C-SS8 (16")) at a concentration at or above the non-residential direct contact MSC (1,000 mg/kg). For each of

the surface and subsurface soil samples where lead was detected above the residential and/or non-residential direct contact MSCs, lead concentrations also exceeded the soil-to-groundwater MSC (450 mg/kg).

Based on the July 18, 2007 sampling results, supplemental sampling was conducted on November 1, 2007 to refine the vertical and lateral delineation of the lead contamination along the western side of the KCW Building. Eight (8) supplemental soil samples were collected, and the results and sample locations are shown in **Table 2** (**Attachment A**) and **Figure 3**, respectively. Lead results that exceeded the Act 2 residential and non-residential direct contact MSCs were generally limited to the upper two feet of soil and fill along the western side of the KCW Building. A single sample collected from within the York Rail right-of-way (C-SS14 (6")) exceeded the soil-to-groundwater MSC, but a deeper sample at 16 inches in the same location did not exceed the MSC, and the depth to groundwater in this location is greater than 13 feet. Thus, EPA does not expect the soil to have impacted groundwater in this area.

Twelve soil samples (samples C-SS15 (6") through C-SS20 (18")) were also collected from six test pits located in the parking lot immediately to the east of the KCW Building on November 1, 2007. All samples were analyzed for lead, and two of the samples were also analyzed for arsenic. The analytical results for these samples, which are summarized in **Table 2** (**Attachment A**) were all below the applicable Act 2 MSCs with the exception of one surface sample (C-SS14 (6")) that had a detection of lead (460 mg/kg) just slightly above the soil-to-groundwater MSC (450 mg/kg).

Supplemental soil sampling activities per the request of EPA were conducted in May 2012 to evaluate the soil beneath the KCW Building concrete slab. The sampling involved the completion of cores through the concrete floor slab at 15 locations, and the collection of five subslab soil equal-part composite samples and two subslab grab samples that were analyzed for RCRA-8 metals and hexavalent chromium. Sampling of soils located below the concrete floor slab of the KCW Building on Tract #1 (as shown on **Figure 1** included under Appendix L of the March 2014 Act 2 RIR/FR which is attached to this SB as **Attachment B**) indicated concentrations of arsenic above the Act 2 residential direct contact MSC (12 mg/kg) in three of the composite samples (KCWA; KCWC; and KCWE) and one of the grab samples (KCW7). Concentrations of lead were detected above the Act 2 residential direct contact MSC (500 mg/kg) in two of the composite samples (KCWB and KCWE) and above the non-residential direct contact MSCs (1,000 mg/kg) in one composite sample (KCWA) and one grab sample (KCW7). The results of the May 2012 subslab soil sampling are summarized in **Table 1** under Appendix L of the March 2014 Act 2 RIR/FR, which is included with this SB as **Attachment C**.

For the full characterization and attainment demonstration activities completed for the Facility, please refer to the following report:

- "Remedial Investigation Report and Final Report for the Northwest Triangle Properties," prepared by ARM Group Inc., March 7, 2014.

In addition to being included as part of the AR for the Facility, the above-listed report is also maintained by PADEP in its Southcentral Regional Office file room and is available for inspection at that location in accordance with PADEP's document retention and public access policies.

B. Groundwater Investigation

Between January 2008 and June 2009, the RDA installed a total of eight monitoring wells (shallow and deep) across the NWT properties to characterize groundwater flow directions and groundwater quality across the area. Groundwater contour maps were developed from the depth-to-groundwater data to estimate groundwater flow directions and gradients. Based on the groundwater contours, the groundwater flow direction in the area is generally toward the northwest corner of the Ohio Blenders property, towards monitoring wells MW-4S and MW-4B. The monitoring well locations and groundwater contours are shown on **Figures 10 through 12** of the March 2014 Act 2 RIR/FR and are included with this SB as **Attachment D**.

Because soil samples collected at the Facility demonstrated lead concentrations in excess of the Act 2 soil-to-groundwater MSC for lead, one shallow groundwater monitoring well (MW-1S) was installed in January 2008 near the center of the northwestern property boundary. MW-1S is a shallow well intended to monitor the upper water-bearing zone at an upgradient location across the NWT properties. MW-1S is approximately 48 feet deep, and was drilled along the west side of the KCW Building where the highest lead concentrations were detected in site soils.

MW-1S was sampled for select volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals in January, February and September 2008. Results showed that no COCs exceeded Act 2 residential used aquifer MSCs which are equivalent to federal Maximum Contaminant Limits (MCLs) promulgated at 40 C.F.R. Part 141 pursuant to Section 1412 of the Safe Drinking Water Act, 42 U.S.C. Section 300g-1, for drinking water. The groundwater sampling results are summarized in Table 14 of the March 2014 Act 2 RIR/FR, which has been included with this SB as **Attachment E**.

C. Remediation/Containment

Contaminated soil was excavated from along the western side of the KCW Building to a depth of up to approximately two feet in the areas delineated during the investigations. Ten additional samples were collected in March 2009 and analyzed for lead during the soil remediation activities to complete the lateral and horizontal delineation of Site-related lead contamination. The results of this soil sampling are summarized in **Table 2 (Attachment A)** and the sample locations and the delineated boundary of lead contamination are shown on **Figure 3**.

Following soil excavation, additional soil sampling for lead was conducted to confirm the effectiveness of the soil removal. Sample locations are generally shown on **Figure 2** of Appendix H, and the results are summarized on **Table 8** of the March 2014 Act 2 Remedial Investigation Report and Final Report and have been included with this SB as **Attachment F**.

As evidenced by **Table 8**, all post excavation sample results were below the Act 2 residential MSC.

All excavated soils were sent to Clean Earth Landfill for disposal or treatment/recycling, and the excavated areas were backfilled with clean fill. Approximately 156 tons (104 cubic yards) of contaminated soils were removed from the Facility. Although not part of the RCRA Corrective Action or PADEP Act 2 process, EPA notes that additional cleanup activities were completed within the KCW Building as part of the site remediation work. This work included the off-site disposal of all chemicals, products, production equipment, asbestos, and other interior materials and debris, and the inspection, cleaning and closure of all sumps and tanks within the building.

Following completion of the building interior cleanup, soil samples were collected from below the concrete floor slab. As discussed above in Section 3.A., concentrations of arsenic above the PADEP MSC, and concentrations of lead above the PADEP residential and non-residential MSCs were detected. Because excavation and removal of these soils is not considered to be practical without the demolition of the KCW Building and removal of the concrete floor slab, contaminants in the soils beneath the concrete floor slab will remain in place. The contaminants are contained (i.e., not mobile) and the concrete floor slab, which is stable and serves as a competent barrier, prevents any direct contact exposures to contaminated soils. Because contaminants will remain in place, EPA is also proposing activity and use restrictions for the Facility through the establishment of an Environmental Covenant as discussed in Section 6, below.

Section 4: Summary of Facility Risks

EPA has determined that soils and groundwater at the Facility do not pose a threat to human health or the environment under the current and anticipated future use scenarios. EPA sets national goals to measure progress toward meeting the nation's major environmental goals. For Corrective Action, EPA evaluates two key environmental indicators for each facility: (1) current human exposures under control and (2) migration of contaminated groundwater under control. EPA has determined that the Facility met the goals of the indicators on March 6, 2014.

Section 5: Corrective Action Objectives

5.1 Soil

EPA's Corrective Action Objective for Facility soils is to control exposure to contaminated soils by maintaining the existing building concrete floor slabs which eliminate the direct contact pathway. Institutional controls will be established through an environmental covenant for the inspection and maintenance of the existing concrete floor slabs.

5.2 Groundwater

EPA's Corrective Action Objective for Facility groundwater is to meet federal drinking water standards. Based on the findings of the larger scale groundwater investigation that encompassed the NWT properties, no constituents in Facility groundwater exceeded federal drinking water standards. Therefore, EPA's objective for Facility groundwater has been met.

Section 6: Proposed Remedy

EPA's proposed remedy for Facility soils consists of the inspection and maintenance of the existing concrete slab in the KCW Building. The concrete slab eliminates direct contact with contaminated soils and prevents migration of contamination.

EPA's proposed remedy would allow some contaminants to remain in the soils directly beneath the concrete floor above levels appropriate for residential and non-residential (e.g., commercial, industrial) uses. Therefore, EPA proposes to establish activity and use restrictions for the Facility, in addition to inspection and maintenance requirements for the concrete slab through an enforceable control such as an order and/or an Environmental Covenant pursuant to the Pennsylvania Uniform Environmental Covenants Act, 27 Pa. C.S. Sections 6501-6517, (UECA).

If EPA determines that additional corrective actions are necessary, including additional activity and use restrictions, to protect human health or the environment, EPA has the authority to require and enforce such additional corrective actions.

The proposed remedy includes the following activity and use restrictions:

1. The Facility is prohibited from any use that requires removal or disturbance of the concrete floor slab and exposure to the underlying soils as outlined in **Attachment G**, unless it is demonstrated to EPA that such activity will not pose a threat to human health or the environment and EPA provides prior written approval for such use.

2. All earth moving activities in the area outlined in **Attachment G**, including excavation, drilling and construction activities, shall be prohibited unless it is demonstrated to EPA that such activity will not pose a threat to human health or the environment and EPA provides prior written approval for such use. Earth moving activities include, but are not limited to, temporary (i.e., less than 30 calendar days) removal of isolated portions of the concrete floor slab for utility installation or similar site development activities. Such activities shall include the following provisions: (1) the work is to be conducted by experienced contractors in accordance with applicable Occupational Safety and Health Administration (OSHA) requirements; (2) any soils removed from below the concrete floor slab are managed in accordance with all applicable local, state and federal laws and regulations; and (3) the concrete floor slab is immediately restored upon completion of construction activities to

minimize the potential for human exposure to contamination in the underlying soils.

3. The Facility property will not be used in a way that will adversely affect or interfere with the integrity and protectiveness of the final remedy.

4. The Facility owner shall allow EPA, PADEP, and/or their authorized agents and representatives, access to the Facility property to inspect and evaluate the continued effectiveness of the final remedy.

5. After written request by the EPA, the owner and each subsequent owner of the Facility property shall submit to EPA written documentation stating whether or not the activity and use limitations of the final remedy are being abided by. In addition, within thirty (30) calendar days after any of the following events, the then current owner of the Facility property shall submit to EPA written documentation describing the following: noncompliance with the activity and use limitations in the final remedy; transfer of the Facility property; changes in use of the Facility property; or filing of applications for building permits for the Facility property and any proposals for any site work, if the building or proposed site work will affect the contamination on the Facility property.

Section 7: Evaluation of Proposed Remedy

This section provides a description of the criteria EPA used to evaluate the proposed remedy consistent with EPA guidance. The criteria are applied in two phases. In the first phase, EPA evaluates three decision threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, EPA then evaluates seven balancing criteria.

Threshold Criteria	Evaluation
1) Protective of Human Health and the Environment	EPA's proposed remedy protects human health and the environment from exposure to contamination. Prior to the excavation and disposal activities, the primary human health and environmental threats posed by contaminated soils at the Facility were related to direct contact with those soils. Those threats were greatly reduced through the excavation and disposal activities and there are no remaining large, discrete sources of waste from which constituents would be released to the environment. Soil contamination beneath the existing concrete slab of the Facility building will remain in place. The contaminated soil is below the surface and contained within Facility property.

	To prevent or control the exposure to impacted soil where contamination above residential and/or industrial screening levels remains in place, EPA is proposing the inspection and maintenance of the concrete slab and restrictions on earth moving activities including excavation, drilling and construction activities that would impact the concrete floor slab and/or result in direct contact with contaminated soil to minimize the potential for human exposure to contamination.
2) Achieve Media Cleanup Objectives	The Facility's excavation and disposal activities have greatly reduced the levels of hazardous constituents in the soil at the Facility. EPA's proposed remedy also requires the implementation and maintenance of activity and use limitations to minimize the potential for human exposure to contamination that will be left in place and to protect the integrity of the remedy.
3) Remediating the Source of Releases	In all proposed decisions, EPA seeks to eliminate or reduce further releases of hazardous wastes and hazardous constituents that may pose a threat to human health and the environment. There are no remaining large, discrete sources of waste at the Facility from which constituents would be released to the environment. Therefore, EPA has determined that this criterion has been met.

Balancing Criteria	Evaluation
4) Long-term effectiveness	The proposed remedy will maintain protection of human health and the environment over time by controlling exposure to the hazardous constituents remaining in soils. EPA's proposed remedy requires the compliance with the proposed inspection and maintenance requirements for the existing concrete slab. EPA anticipates that the inspection and maintenance requirements will be implemented through an environmental covenant to be recorded with the deed for the Facility property. The environmental covenant will run with the land and as such, will be enforceable by EPA and the State against future land owners.
5) Reduction of toxicity, mobility, or volume of the Hazardous Constituents	The reduction of toxicity, mobility and volume of hazardous constituents at the Facility has already been achieved through the excavation and removal of contaminated soils. With respect to hazardous constituents remaining in the soils beneath the already existing concrete slab of the Facility building, such soils are not subject to infiltration or leaching, thus, the concrete slab prevents the migration of contaminants.

6) Short-term effectiveness	EPA's proposed remedy does not involve any activities, such as construction or excavation, which would pose short-term risks to workers, residents, and the environment.
7) Implementability	EPA proposes to implement its proposed remedy through an enforceable mechanism such as an order and/or an Environmental Covenant to be recorded with the deed for the Facility property. Environmental Covenants are readily implemented. In addition, EPA does not anticipate any regulatory constraints in issuing orders.
8) Cost	EPA's proposed remedy is cost effective. The costs associated with the inspection and maintenance of the already constructed concrete slab associated with the Facility building are minimal.
9) Community Acceptance	EPA will evaluate community acceptance of the proposed remedy during the public comment period and it will be described in the Final Decision and Response to Comments.
10) State/Support Agency Acceptance	PADEP has reviewed and concurred with the proposed remedy for the Facility.

Section 8: Financial Assurance

EPA has evaluated whether financial assurance for corrective action is necessary to implement EPA's proposed remedy at the Facility. The costs to obtain orders or environmental covenants are minimal. Also, given that EPA's proposed remedy does not require any further engineering actions to remediate soil, groundwater or indoor air contamination at this time and given that the costs of implementing the activity and use restrictions at the Facility will be minimal, EPA is proposing that no financial assurance be required.

Section 9: Public Participation

Before EPA makes a final decision on its proposed remedy for the Facility, the public may participate in the decision selection process by reviewing this SB and documents contained in the Administrative Record (AR) for the Facility. The Index to the AR may be found in Section 10 of this SB.

The AR contains all information considered by EPA in reaching this proposed decision and is available for public review during normal business hours at:

U.S. EPA Region III
1650 Arch Street
Philadelphia, PA 19103
Contact: Jeanna R. Henry
Phone: (215) 814-2820
Fax: (215) 814-3113
Email: henry.jeannar@epa.gov

Interested parties are encouraged to review the AR and comment on EPA's proposed remedy. The public comment period will last thirty (30) calendar days from the date that notice is published in a local newspaper. You may submit comments by mail, fax, or e-mail to Ms. Jeanna Henry. EPA will hold a public meeting to discuss this proposed remedy upon request. Requests for a public meeting should be made to Ms. Jeanna Henry.

EPA will respond to all relevant comments received during the comment period. If EPA determines that new information warrants a modification to the proposed remedy, EPA will modify the proposed remedy or select other alternatives based on such new information and/or public comments. EPA will announce its final decision and explain the rationale for any changes in a document entitled the Final Decision and Response to Comments (FDRTC). All persons who comment on this proposed remedy will receive a copy of the FDRTC. Others may obtain a copy by contacting Jeanna Henry at the address listed above

Date: 6.20.14

John A. Armstead, Director
Land and Chemicals Division
US EPA, Region III

Section 10: Index to Administrative Record

1. *Act 2 Remedial Investigation Report and Final Report for Northwest Triangle Properties*, prepared by ARM Group Inc, March 7, 2014.

2. *Phase I Environmental Assessment Report for Northwest Triangle*, prepared by Edge Environmental Inc., June 1, 2004.

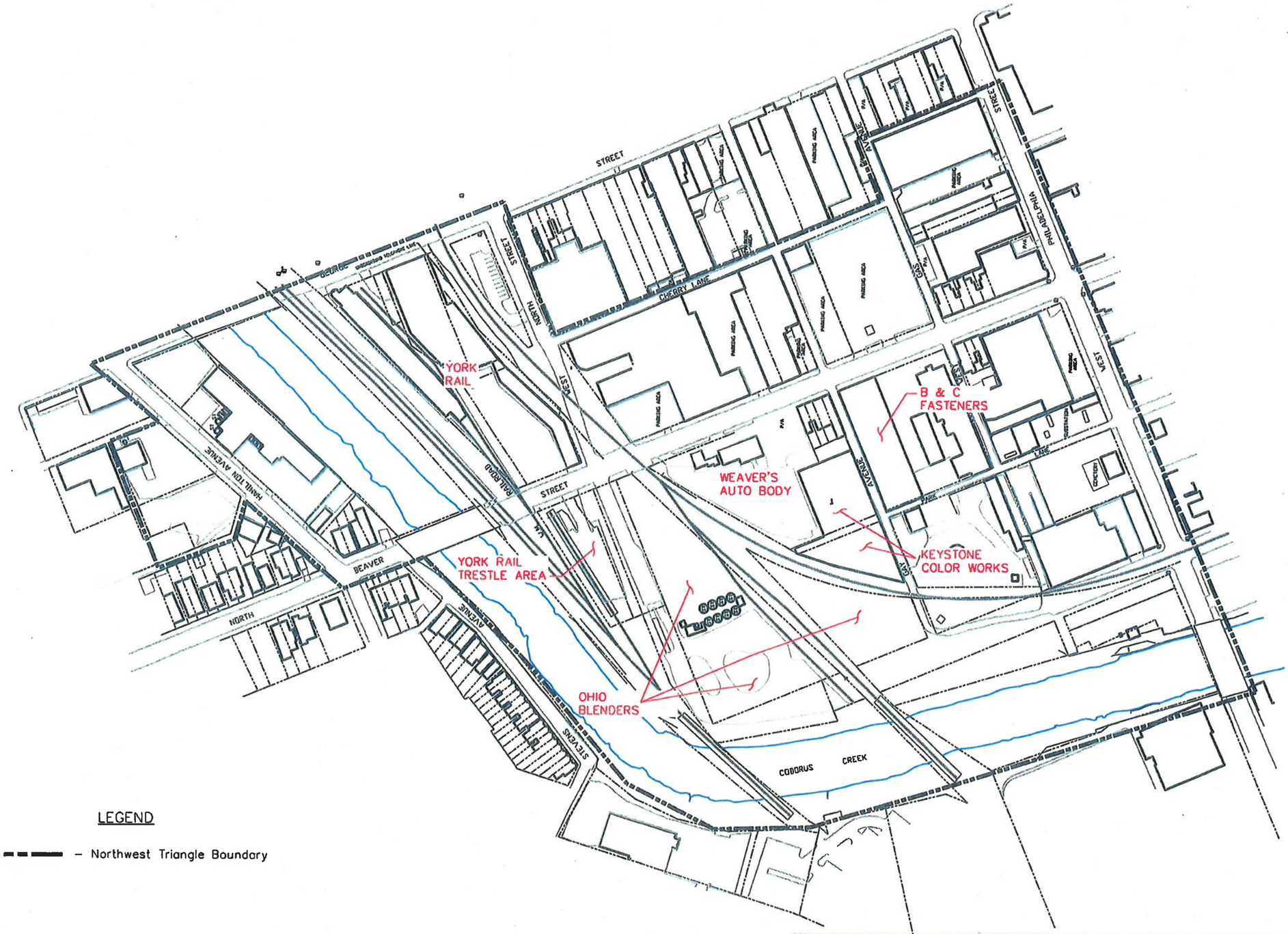
3. *Phase I Environmental Site Assessment for Northwest Triangle*, prepared by Pennoni Associates, Inc., December 23, 2004.

4. *Interim Site Characterization Report for Keystone Color Works and Ohio Blenders Properties*, prepared by GTS Technologies, Inc., December 1, 2005.

5. *Combination Statewide Health and Site-Specific Standards Final Report Approval, Northwest Triangle Properties*, issued by PADEP, May 29, 2014.

Figure 1

Site Location Map



LEGEND

– Northwest Triangle Boundary

0 200 400 600

SCALE IN FEET

T:\07214 NWT Act 2 Project_Drwg\07214_Figure1_rev.dwg

ARM Group Inc.
Earth Resource Engineers and Consultants
1129 West Governor Road • Hershey, PA 17033-0797

Site Layout
Northwest Triangle Initiative
City of York
York County, PA

December 2011
1" = 200'
07214

Figure
1

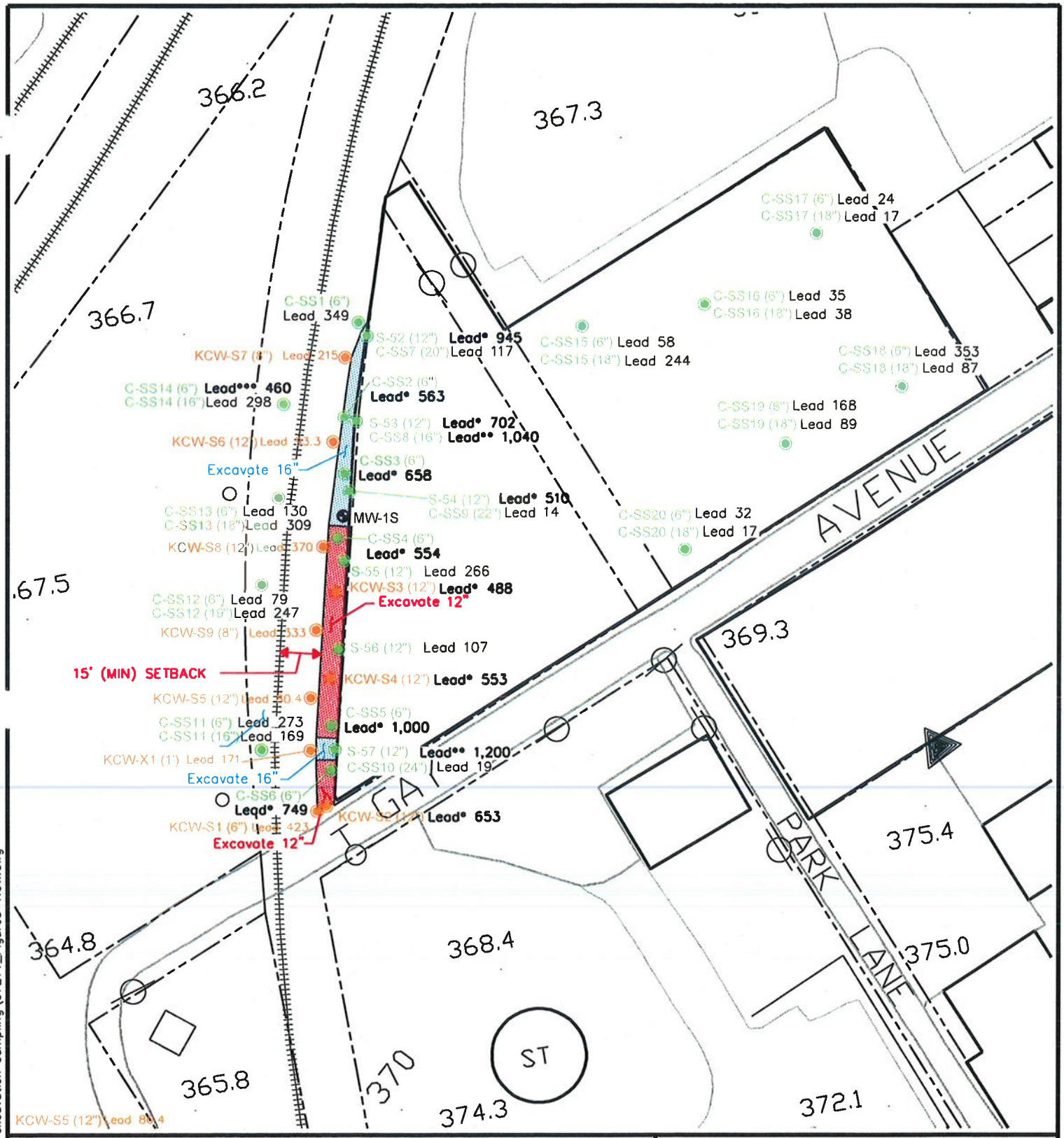
Figure 2

Local Area Map


Jefferson
Pershing
Fairmount
Hamilton
Washington
N
W
E
S
Cottage Hill
Stevens
CODORUS CREEK
North
George
Smith
Union
Beaver
Former Keystone Color Works
109-151 West Gay Avenue
York, PA 17401
Gay
Cherry
Gas
Grant
Clark
Philadelphia
Park
Cherry
Clarke
Newberry
Clarke
Figure 2 - Local Area Map
Former Keystone Color Works Site Boundary
0 100 200 400 600 800 1,000
Feet
Copyright ©2013 Esri, DeLorme, NAVTEQ, Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 3

Soil Sampling Summary for Keystone Color Works



LEGEND

- Excavate 12"
- Excavate 16"
- MW-1S – Monitoring Well
- C-SS1 (6") – Sample Location

Lead 107 – Result in Milligrams per Kilogram (mg/Kg)

Lead• – Result exceeds Residential Direct Contact and Soil to Groundwater Standard

Lead•• – Result exceeds Non-Residential Direct Contact and Soil to Groundwater Standard

Lead••• – Result exceeds Soil to Groundwater Standard

0 50 100 150

SCALE IN FEET

Soil Sampling Summary For Keystone Color Works

Northwest Triangle Initiative City of York, PA

September 2008	Scale: 1" = 50'	07214

ARM Group Inc.

Earth Resource Engineers and Consultants

1129 West Governor Road • Hershey, PA 17033-0797

Figure 3

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Table 2: Summary of Soil Sample Delineation Results

Table 2
Summary of Soil Sample Delineation Results: Keystone Color Works Property
Northwest Triangle Initiative
York City, York County, Pennsylvania

Soil Analytical Results
Sample Date July 18, 2007

Parameter	Residential Direct Contact MSC (0-15')	Non-Residential Direct Contact MSC (0-2')	Soil to Groundwater MSC	C-SS1 (6")	C-SS2 (6")	C-SS3 (6")	C-SS4 (6")	C-SS5 (6")	C-SS6 (6")	C-SS7 (20")	C-SS8 (16")	C-SS9 (22")	C-SS10 (24")
Lead	500	1,000	450	349	563	658	554	1,000	749	17	1,040	14	19

Notes:
All values in milligrams per kilogram (mg/kg)
MSC = PADEP Statewide Health Medium Specific Concentration
2.93 = Result exceeds PADEP MSC

Table 2 (cont.)
Summary of Soil Sample Delineation Results: Keystone Color Works Property
Northwest Triangle Initiative
York City, York County, Pennsylvania

Soil Analytical Results
Sample Date November 1, 2007

Parameter	Residential Direct Contact MSC (0-15')	Non-Residential Direct Contact MSC (0-2')	Soil to Groundwater MSC	C-SS11 (6")	C-SS11 (16")	C-SS12 (6")	C-SS12 (19")	C-SS13 (6")	C-SS13 (18")	C-SS14 (6")	C-SS14 (16")	C-SS15 (6")	C-SS15 (18")
Lead	500	1,000	450	273	169	79	247	130	309	460	295	58	244

Parameter	Residential Direct Contact MSC (0-15')	Non-Residential Direct Contact MSC (0-2')	Soil to Groundwater MSC	C-SS16 (6")	C-SS16 (18")	C-SS17 (6")	C-SS17 (18")	C-SS18 (6")	C-SS18 (18")	C-SS19 (6")	C-SS19 (18")	C-SS20 (6")	C-SS20 (18")
Arsenic	12	190,000	29	NA	6	NA	NA	NA	NA	NA	6	NA	NA
Lead	500	1,000	450	35	38	24	17	353	87	168	89	32	17

Sample Date March 5 and 11, 2009

Parameter	Residential Direct Contact MSC (0-15')	Non-Residential Direct Contact MSC (0-2')	Soil to Groundwater MSC	KCW-S1 (6")	KCW-S2 (12")	KCW-S3 (12")	KCW-S4 (12")	KCW-S5 (10")	KCW-S6 (12")	KCW-S7 (8")	KCW-S8 (8")	KCW-S9 (8")	KCW-X1 (1')
Lead	500	1,000	450	423	653	488	553	80.4	93.3	215	370	333	171

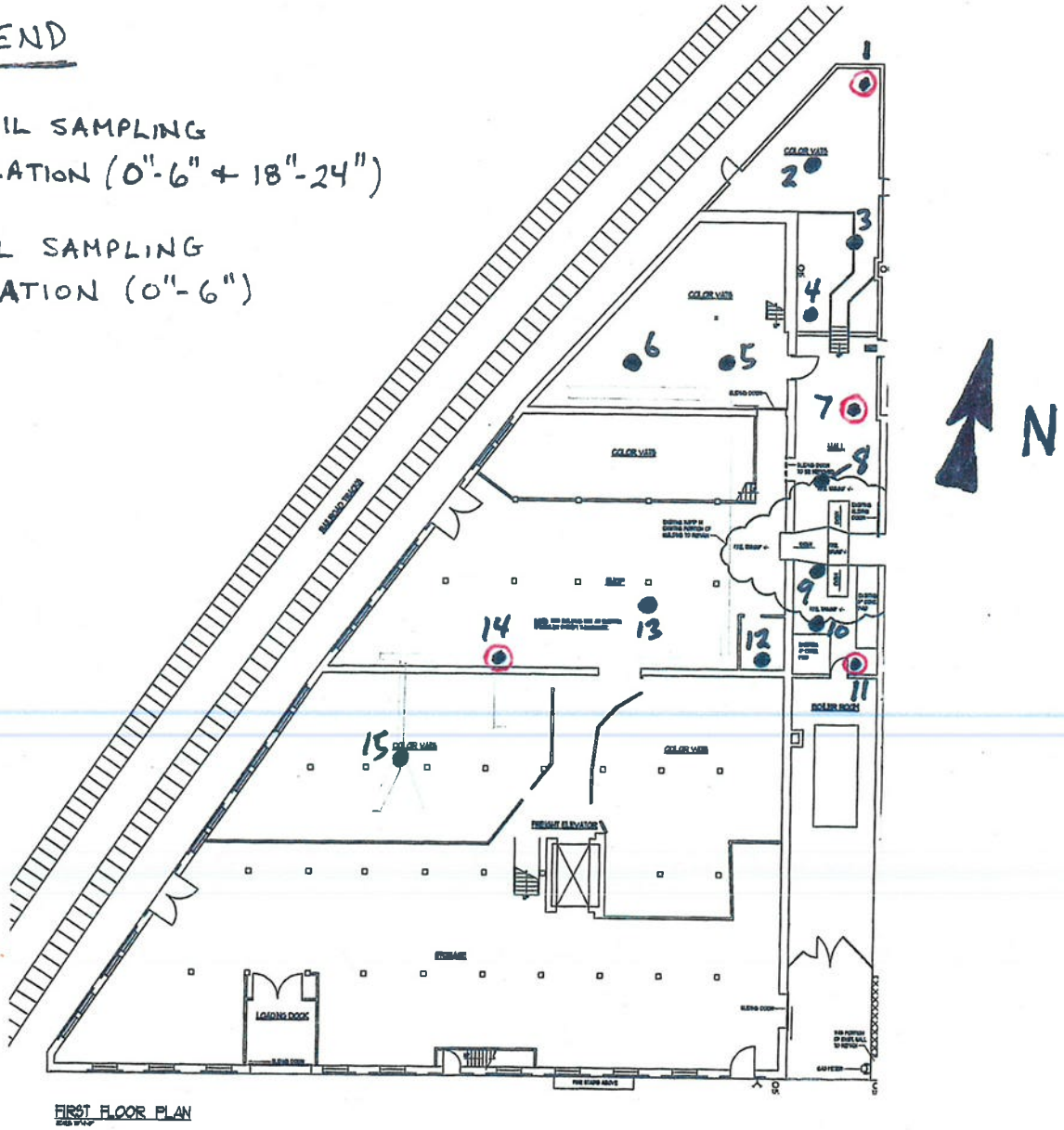
Notes:
All values in milligrams per kilogram (mg/kg)
MSC = PADEP Statewide Health Medium Specific Concentration
NA = Not Analyzed
2.93 = Result exceeds PADEP MSC

Figure 1 of Appendix L of the March 2014 Act 2 Remedial Investigation Report and Final Report

LEGEND

1 ⊙ = SOIL SAMPLING LOCATION (0"-6" & 18"-24")

2 • = SOIL SAMPLING LOCATION (0"-6")



FIRST FLOOR PLAN

FIGURE 1

KEYSTONE COLOR WORKS BUILDING
SUBSLAB SAMPLING (5/18/2012)

Table 1 of Appendix L of the March 2014 Act 2 Remedial Investigation Report and Final Report

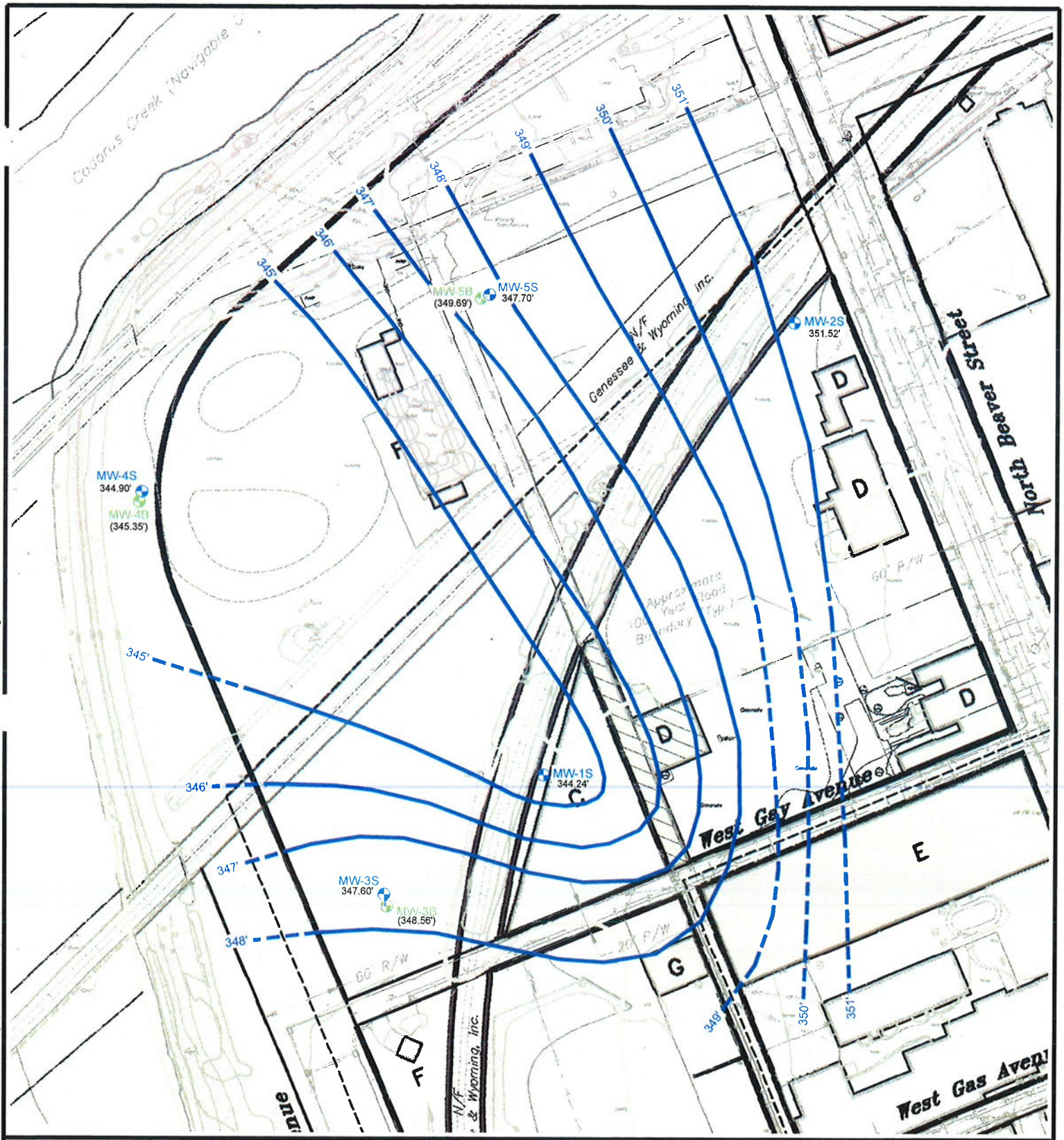
Table 1
Summary of Soil Sample Results: Keystone Color Works Subslab Sampling
Northwest Triangle Initiative
York City, York County, Pennsylvania

Soil Total Metals Analytical Results
Sample Date: May 18, 2012

Parameter	Residential Direct Contact MSC (0-15')	Non-Residential Direct Contact MSC (0-2')	Non-Residential Direct Contact MSC (2-15')	Soil to Groundwater MSC	KCWA [0-6"]	KCWB [0-6"]	KCWC [0-6"]	KCWD [0-6"]	KCWE [18-24"]	KCW7 [0-6"]	KCW12 [0-6"]
Arsenic	**12**	**53**	**190,000**	**29**	**13.0**	7.8	**13.7**	6.4	**16.2**	**14.4**	5.9
Barium	**44,000**	**190,000**	**190,000**	**8,200**	3,210	1,910	759	872	1,450	5,200	280
Cadmium	**110**	**1,400**	**190,000**	**38**	5.1	3.0	1.3	0.60	2.7	10.2	ND
Chromium (total)	**190,000**	**190,000**	**190,000**	**190,000**	664	69.0	74.3	31.7	72.3	338	38.2
Hexavalent Chromium	**660**	**8,400**	**190,000**	**190**	87.7	54.9	ND	10.3	3.3	159	3.4
Lead	**500**	**1,000**	**190,000**	**450**	**7,140**	**596**	249	215	**518**	**2,060**	35.6
Mercury	**35**	**450**	**190,000**	**10**	1.2	0.16	0.28	0.088	0.50	0.19	0.18
Selenium	**1,100**	**14,000**	**190,000**	**26**	ND	ND	ND	ND	ND	ND	ND
Silver	**1,100**	**14,000**	**190,000**	**84**	ND	ND	ND	ND	ND	ND	ND

Notes:
All values in milligrams per kilogram (mg/kg)
MSC = PADEP Statewide Health Medium Specific Concentration
ND = Not Detected
29 = Result exceeds PADEP MSC
Equal-part compsite soil samples were derived from the grab sample locations as follows: KCWA from 1, 2, 3 & 4; KCWB from 5, 6, 7 & 8; KCWC from 9, 10, 11 & 12; KCWD from 13, 14 & 15; and KCWE from 1, 7, 11 & 14. See Figure 1 for sample locations.

Figures 10 through 12 of the March 2014 Act 2 Remedial Investigation Report and Final Report



Base map from C.S. Davidson, Inc.

LEGEND

- MW-3S — Shallow Monitoring Well
- MW-3B — Bedrock Monitoring Well
- 347.60' — Relative Groundwater Elevation
- (348.56') — Bedrock Groundwater Elevation Not Used For Mapping
- Groundwater Elevation Contour

0 100 200 300

SCALE IN FEET

Groundwater Elevations June 29, 2009

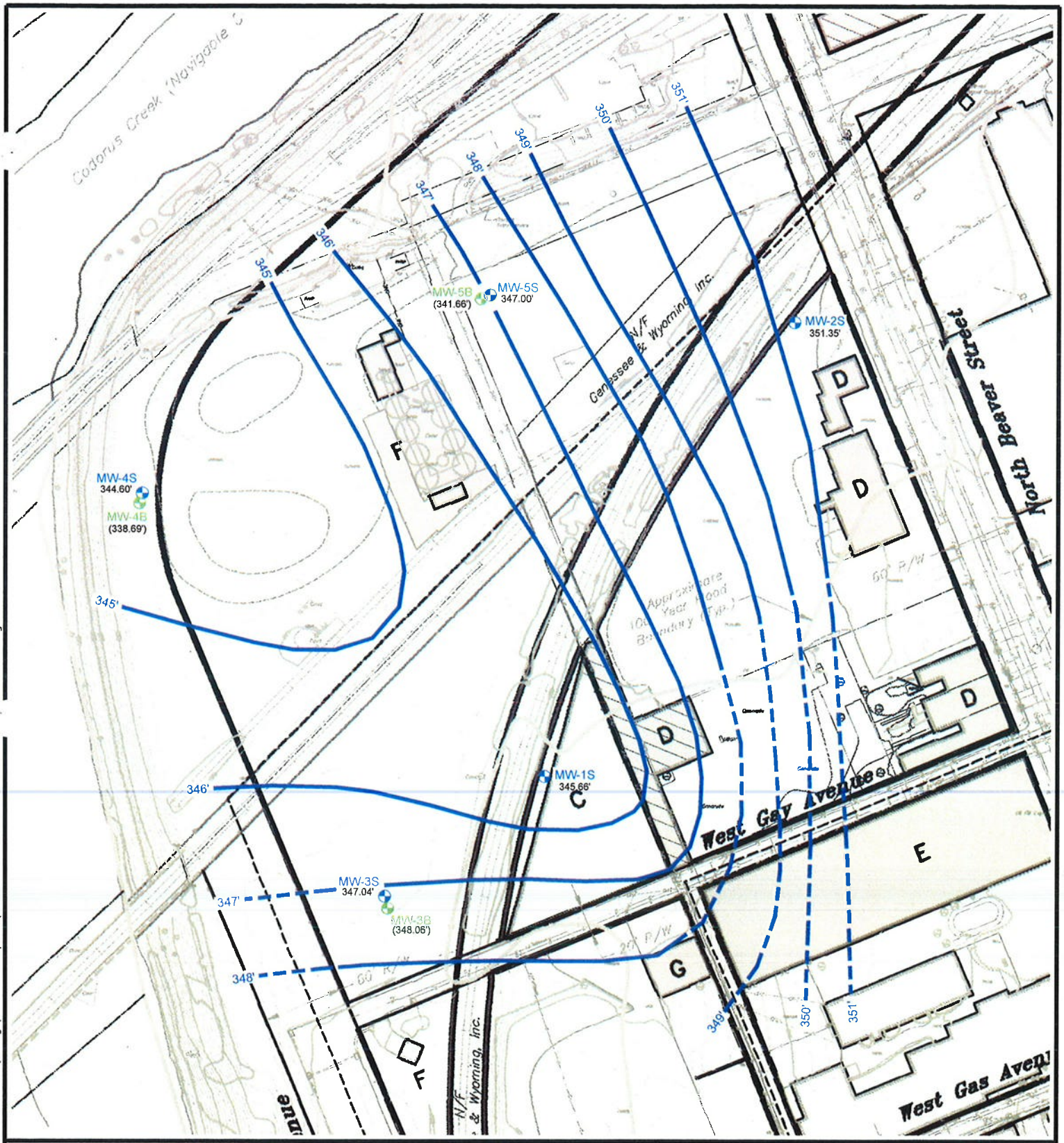
Ohio Blenders
Northwest Triangle Initiative
City of York, PA

July 2009	Scale: 1" = 100'	07214

ARM Group Inc.
Earth Resource Engineers and Consultants
1129 West Governor Road • Hershey, PA 17033-0797

Figure 10

T:\07214 NWT Act Project\STAGE2_OHIO_BLENDERS_Dwg\Phase II Report\Ohio Blenders GW Contours 6-__-09_REV.dwg



Base map from C.S. Davidson, Inc.

LEGEND

MW-3S — Shallow Monitoring Well

MW-3B — Bedrock Monitoring Well

347.04' — Relative Groundwater Elevation

(348.06') — Bedrock Groundwater Elevation Not Used For Mapping

— Groundwater Elevation Contour

0 100 200 300

SCALE IN FEET

Groundwater Elevations July 27, 2009

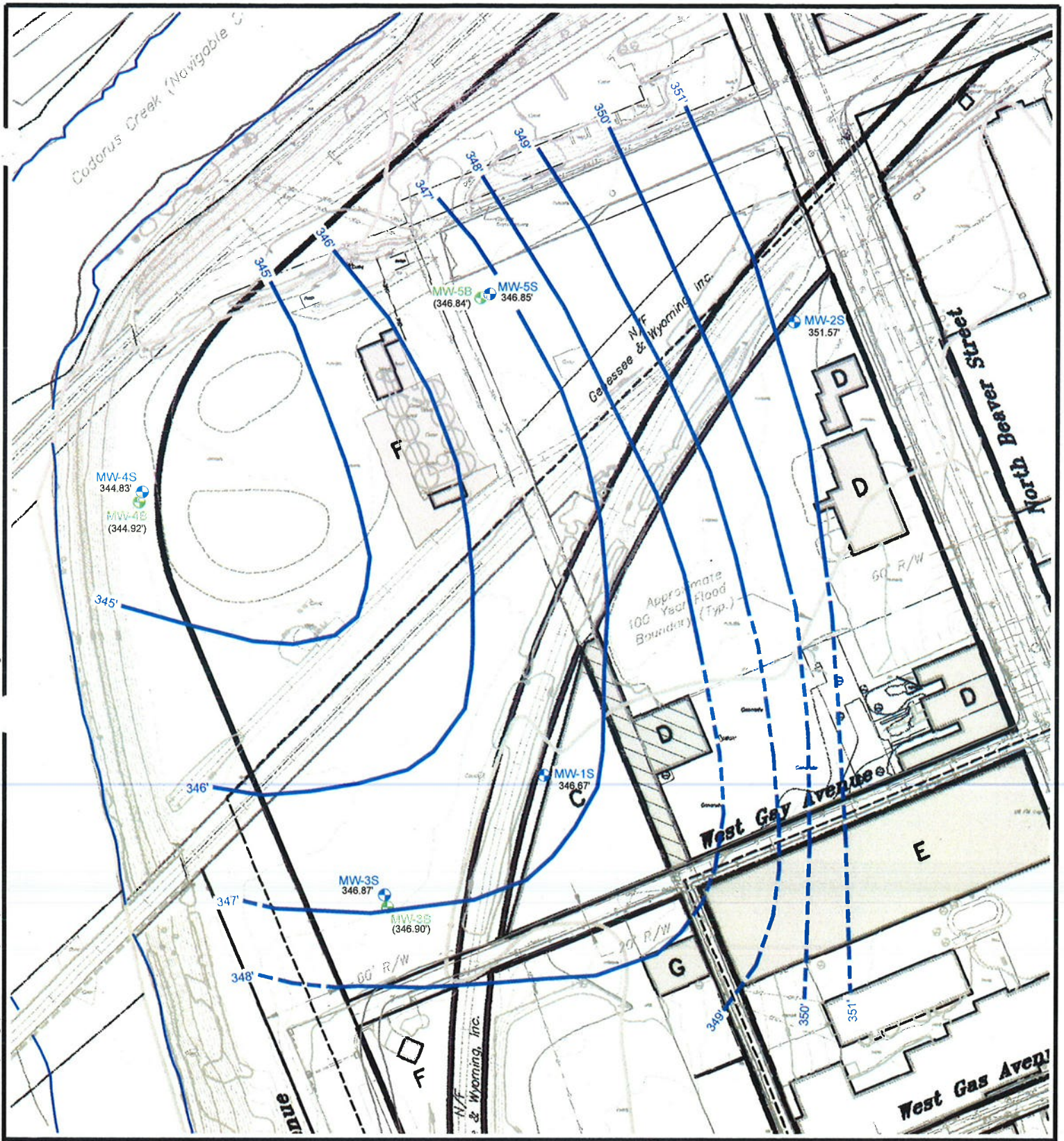
Ohio Blenders
Northwest Triangle Initiative
City of York, PA

July 2009	Scale: 1" = 100'	07214

ARM Group Inc.
Earth Resource Engineers and Consultants
1129 West Governor Road • Hershey, PA 17033-0797

Figure 11

T:\07214 NWT Act\Project\STAGE2_OHIO_BLENDERS_Dwg\Phase II Report\Ohio Blenders GW Contours 7-09_rev.dwg



Base map from C.S. Davidson, Inc.

LEGEND

MW-3S – Shallow Monitoring Well

MW-3B – Bedrock Monitoring Well

347.04' – Relative Groundwater Elevation

(348.06') – Bedrock Groundwater Elevation Not Used For Mapping

– Groundwater Elevation Contour

0 100 200 300

SCALE IN FEET

Groundwater Elevations August 19, 2011

Ohio Blenders
Northwest Triangle Initiative
City of York, PA

August 2011	Scale: 1" = 100'	07214

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Figure 12

T:\07214 NWT Act Project\STAGE2_OHIO_BLENDERS_Dwg\Phase II Report\Ohio Blenders GW Contours 8-[illegible]-11.dwg

Attachment E

Table 14 of the March 2014 Act 2 Remedial Investigation Report and Final Report

Table 14
Groundwater Analytical Results

Northwest Triangle Initiative
City of York, Pennsylvania

Parameter	PADEP Residential Used Aquifer MSC	PADEP Residential Non-Use Aquifer MSC	MW-1S			MW-2S					MW-3S				MW-3B			
			1/15/2008	2/21/2008	9/10/2008	1/15/2008	2/21/2008	7/27/2009	4/26/2011	8/19/2011	6/29/2009	7/27/2009	4/26/2011	8/19/2011	6/29/2009	7/27/2009	4/26/2011	8/19/2011
VOLATILES																		
Acetone	33,000	100,000	8.3J	7.0J	NA	<10.0	7.0J	NA	NA	NA	<10.0	<10.0	<10.0	NA	9.3J	<10.0	<10.0	<10.0
2-Butanone	4,000	400,000	<10.0	<10.0	NA	<10.0	<10.0	NA	NA	NA	<10.0	<10.0	<10.0	NA	7.0J	<10.0	<10.0	<10.0
Carbon Disulfide	1,500	1,500	1.6	0.27J	NA	<1.0	<1.0	NA	NA	NA	0.42J	<1.0	<1.0	NA	0.73J	1.6	1.1	1.1
Chloroform	80	800	<1.0	0.23J	NA	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	31	310	<1.0	<1.0	NA	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	70	700	<1.0	0.98J	NA	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	5	500	<1.0	1.2	NA	<1.0	1.0	NA	NA	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	5	50	<1.0	0.62J	NA	<1.0	<1.0	NA	NA	NA	0.41J	0.47J	<1.0	NA	<1.0	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	200	2,000	<1.0	<1.0	NA	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0
Trichloroethene	5	50	<1.0	0.30J	NA	<1.0	<1.0	NA	NA	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0
SEMIVOLATILES																		
Acenaphthene	2,200	3,800	NA	<2.9	<2.9	3.2	1.7J	NA	NA	NA	0.33J	<1.4	NA	NA	<1.4	<1.4	NA	NA
Di-n-Butylphthalate	3,700	400,000	NA	<2.9	<2.9	0.60J	<2.8	NA	NA	NA	0.32J	<2.9	NA	NA	0.41J	<2.9	NA	NA
bis(2-Ethylhexyl)phthalate	6	290	NA	0.92J	<2.9	<2.9	<2.8	NA	NA	NA	0.86J	<2.9	NA	NA	6.9	3.1	<2.8	8.5
Fluorene	1,500	1,900	NA	<1.9	<1.9	3.8	2.0	NA	NA	NA	0.49J	<1.4	NA	NA	<1.4	<1.4	NA	NA
Phenanthrene	1,100	1,100	NA	<1.4	<1.4	1.6	<1.4	NA	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA
Pyrene	130	130	NA	<1.4	<1.4	<1.4	<1.4	NA	NA	NA	0.49J	<1.4	NA	NA	<1.4	<1.4	NA	NA
METALS																		
Arsenic	10	10,000	<10	3J	NA	7J	7J	8.3	<3	NA	<8.0	3.7J	<3	NA	<8.0	4.6J	<3	<3
Chromium	100	100,000	47	7	NA	<5	<5	2.3J	NA	NA	2.2J	2.2J	NA	NA	26	3.2J	NA	NA
Copper	1,000	1,000,000	<10	12	NA	<10	<10	<10	NA	NA	3.7J	<10	NA	NA	<10	<10	NA	NA
Lead	5	5,000	<2	<2	NA	7J	<2	<2	<2	<2	5.7J	<2	<2	<2	4.6J	<2	<2	<2
Nickel	100	100,000	3J	2J	NA	<20	<20	<20	NA	NA	7.6J	<20	NA	NA	9.5J	<20	NA	NA
Zinc	2,000	2,000,000	6J	390	NA	5J	<20	<20	NA	NA	30	<20	NA	NA	<20	<20	NA	NA

All values in micrograms per liter (ug/L)
MSC = PADEP Statewide Health Medium Specific Concentration (25 PA Code Chapter 250)
6.9 Result exceeds PADEP Used Aquifer MSC
NA = Not Analyzed
J = indicates concentration estimated by laboratory

Table 14 (cont.)
Groundwater Analytical Results

Northwest Triangle Initiative
City of York, Pennsylvania

Parameter	PADEP Residential Used Aquifer MSC	PADEP Residential Non-Use Aquifer MSC	MW-4S				MW-4B				MW-5S				MW-5B				Trip Blank		
			6/29/2009	7/27/2009	4/26/2011	8/19/2011	6/29/2009	7/27/2009	4/26/2011	8/19/2011	6/29/2009	7/27/2009	4/26/2011	8/19/2011	6/29/2009	7/27/2009	4/26/2011	8/19/2011	2/21/2008	6/29/2009	7/27/2009
VOLATILES																					
Acetone	33,000	100,000	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<10.0
2-Butanone	4,000	400,000	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<10.0
Carbon Disulfide	1,500	1,500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Chloroform	80	800	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.79J	<1.0	<1.0	<1.0	0.52J	<1.0	<1.0	NA	<1.0	0.35J	<1.0
1,1-Dichloroethane	31	310	<1.0	<1.0	<1.0	<1.0	1.1	0.78J	<1.0	<1.0	0.60J	0.62J	<1.0	<1.0	<1.0	0.45J	<1.0	NA	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	70	700	1.5	0.47J	<1.0	<1.0	2.5	1.7	2.3	1.7	2.7	3.2	2.1	2.6	1.7	1.7	1.8	NA	<1.0	<1.0	<1.0
Methylene Chloride	5	500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Tetrachloroethene	5	50	0.63J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	1.5	1.0	1.0	0.57J	0.55J	<1.0	NA	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	200	2,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.56J	0.46J	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Trichloroethene	5	50	4.4	1.8	<1.0	<1.0	4.5	3.1	<1.0	<1.0	3.8	6.3	1.6	4.8	2.5	2.9	1.7	NA	<1.0	<1.0	<1.0
SEMIVOLATILES																					
Acenaphthene	2,200	3,800	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	NA	NA	NA
Di-n-Butylphthalate	3,700	400,000	<2.9	<2.9	NA	NA	<2.8	<2.9	NA	NA	<2.9	<2.9	NA	NA	<2.8	<2.8	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	290	0.79J	<2.9	NA	NA	<2.8	0.88J	NA	<2.8	4.8	<2.9	<2.8	<2.8	<2.8	0.82J	<2.8	NA	NA	NA	NA
Fluorene	1,500	1,900	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	NA	NA	NA
Phenanthrene	1,100	1,100	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	NA	NA	NA
Pyrene	130	130	0.57J	<1.4	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	<1.4	<1.4	NA	NA	NA	NA	NA
METALS																					
Arsenic	10	10,000	<8.0	6.6J	<3	NA	<8.0	4.1J	<3	NA	<8.0	3.4J	<3	NA	<8.0	4.0J	<3	NA	NA	NA	NA
Chromium	100	100,000	2.8J	4.5J	NA	NA	2.4J	1.9J	NA	NA	2.6J	3.9J	NA	NA	1.8J	<5	NA	NA	NA	NA	NA
Copper	1,000	1,000,000	<10	<10	NA	NA	<10	<10	NA	NA	<10	<10	NA	NA	<10	<10	NA	NA	NA	NA	NA
Lead	5	5,000	4.9J	<2	<2	<2	7.0	<2	<2	<2	2.8J	<2	<2	NA	5.6J	<2	<2	<2	NA	NA	NA
Nickel	100	100,000	6.7J	14J	NA	NA	<20	<20	NA	NA	<20	<20	NA	NA	<20	<20	NA	NA	NA	NA	NA
Zinc	2,000	2,000,000	59	44	NA	NA	18J	8.0J	NA	NA	19J	63	NA	NA	9.4J	8.7J	NA	NA	NA	NA	NA

All values in micrograms per liter (ug/L)
MSC = PADEP Statewide Health Medium Specific Concentration (25 PA Code Chapter 250)
6.9 Result exceeds PADEP Used Aquifer MSC
NA = Not Analyzed
J = indicates concentration estimated by laboratory

Figure 2 of Appendix H and Table 8 of the March 2014 Act 2 Remedial Investigation Report and Final Report

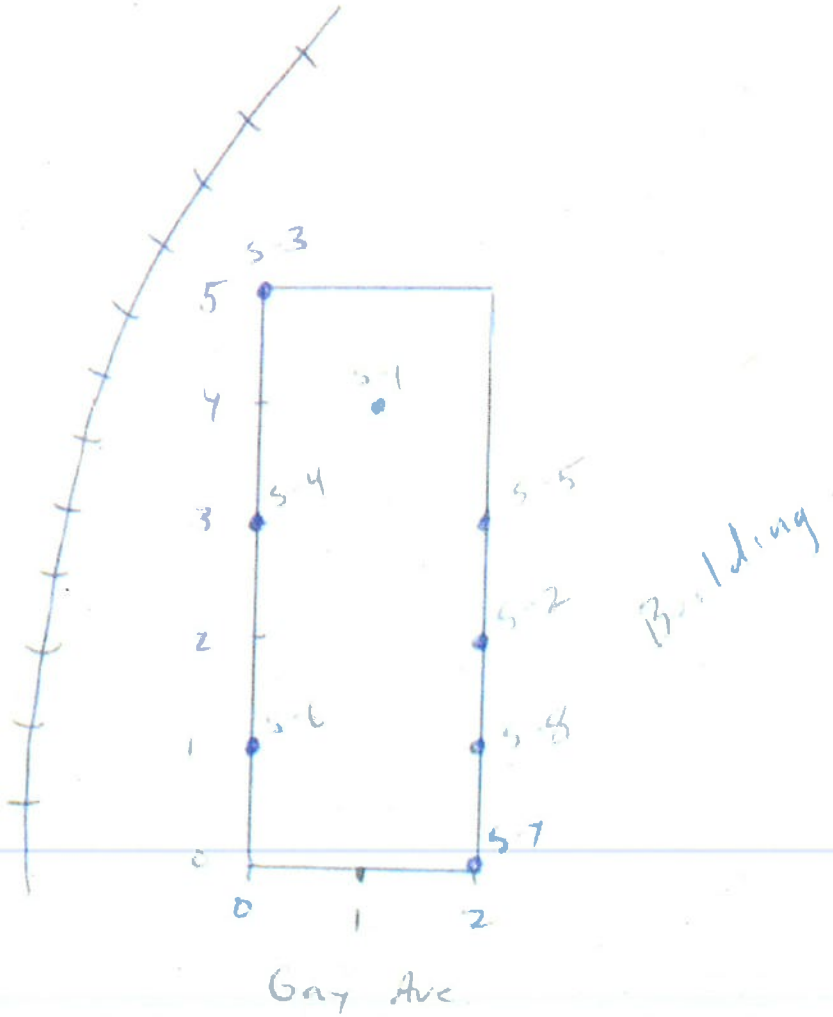

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Figure 2

Random Sample Location Map

York Northwest Triangle
Keystone Color Works Excavation
(3/10/09)

May 2009

07214

ARM Group Inc.
Earth Resource Engineers and Consultants
1129 West Governor Road • Hershey, PA 17033-0797

Table 8
Summary of Attainment Demonstration Data: Keystone Color Works
Northwest Triangle Initiative
City of York, York County, Pennsylvania

Post-Excavation Sample Results
Sample Date March 10, 2009

Parameter	Residential Direct Contact MSC (0-15')	Non-Residential Direct Contact MSC (0-2')	Soil to Groundwater MSC	KCW2-S1 (1') 3-09	KCW2-S2 (1') 3-09	KCW2-S3 (6") 3-09	KCW2-S4 (6") 3-09	KCW2-S5 (1') 3-09	KCW2-S6 (8") 3-09	KCW2-S7 (1') 3-09	KCW2-S8 (1') 3-09
Lead	**500**	**1,000**	**450**	74.3	32.1	275	144	75.2	110	24.1	28.4

Notes:
All results in milligrams per kilogram (mg/kg)
MSC = PADEP Statewide Health Medium Specific Concentration
NA = Not Analyzed

Figure: Impacted Soils Beneath KCW Building

Former Keystone Color Works Property