

August 23, 2012

Mr. Tony Foster II  
City of Richmond  
Executive Director  
Director of Metropolitan Development  
50 North 5<sup>th</sup> Street  
Richmond, Indiana 47374

**Subject: Remedial Action Plan  
Former Manufactured Gas Plant Site  
16 East Main Street, Richmond, Indiana  
Brownfields Number 4980004**

Dear Mr. Foster,

Enclosed is the Remedial Action Plan requested by the State of Indiana Brownfields and SRF loan representatives. This document includes a description of the activities to be performed and the estimated costs associated with the activities. Please review the enclosed document and should you have any questions or comments, please do not hesitate to contact Brooks Bertl at 317-735-3015 or Jeffrey Nelson at 812-334-8315.

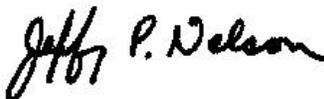
Sincerely,



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**City of Richmond**  
**Remedial Action Plan**  
**Former Manufactured Gas Plant Site**

**I. Project Identification**

Project Name and Address: City of Richmond  
Former Manufactured Gas Plant  
16 East Main Street  
Richmond, Indiana 47374

SRF Funding Number: \_\_\_\_\_

Authorized Representative: Mr. Tony Foster II, Executive Director  
City of Richmond  
Department of Metropolitan Development

**II. Project Location**

The City of Richmond is located in Wayne County in east central Indiana. A Site Location Map is attached as Figure 1. The area of interest and project site (the Site) is located to the west of downtown Richmond, Indiana (see Figure 1).

The contaminated area is a hillside where a former manufactured gas plant (MGP) was located and is adjacent to the floodplain for the Whitewater River, which runs through Richmond. The area of impacted soil on and adjacent to the Site is approximately 2 acres in size. The area of impacted groundwater extends approximately 300 feet to the west of the Site and covers an area of approximately 0.5 acre. These features are included on the Site Layout Map, attached as Figure 2.

**III. Project Need and Purpose**

**A. Site History**

Previous Site investigations were conducted between 1994 and 2011 to delineate soil and groundwater impacts associated with the MGP operations through means of records searches, subsurface structure identification, local hydrogeological investigations, surface and subsurface sampling, installation of groundwater monitoring wells, and laboratory analysis of soil and groundwater samples. The results of these investigations provided data used to delineate source areas in the soil at the Site.

Several alternatives were evaluated to address impacts identified during these investigations including no further action. The no action alternative was dismissed because unless contaminated soil and groundwater is remediated, chemicals of concern (COC) including; benzene, toluene, ethylbenzene, total xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) heavy metals, and total cyanide will remain at the site and will continue posing risks to human health and the environment. Source removal was selected as the best alternative to initiate activities to address Site impacts.

The City of Richmond has an approved Removal Action Work Plan (RAWP) to address source areas and COC in soil in the tar well area, the former building basement area, and the SB-14 area associated with former MGP operations at the Site (see Figure 2). A targeted removal action for these known source areas is presented in the existing RAWP and is currently scheduled for October 2012.

**B. Regulatory Funding Considerations**

The Site is currently enrolled in the Indiana Brownfields Program and is assigned the site number 4980004. Following the approval of the RAWP, the Indiana Department of Environmental Management (IDEM) Brownfields representatives requested that the City's cleanup efforts include remediation of groundwater by

elimination and/or mass destruction of COC mass in the plume and the installation of a permanent impermeable clay cap following source removal activities.

These additional activities are being incorporated to the RAWP and completed in order to secure United States Environmental Protection Agency (US EPA) approval and maintain Brownfields and Indiana State Revolving Fund (SRF) loan eligibility for these activities. The Brownfields redevelopment program for this Site includes installation of a recreational pedestrian walk and bike trail for the citizens of Richmond. These activities are also associated with a larger sewer improvement project which results in SRF eligibility.

#### **IV. Project Description**

This project will be performed in a phased approach over a period of 24 to 36 months and will include source removal, capping activities, and groundwater treatment and post-treatment monitoring in order to reduce the mass of contaminants. These activities will be documented in detail in the RAWP Addendum to be submitted to IDEM. A summary of these activities and their associated costs are presented below.

##### **A. Brownfields Remedial Action Program**

Source removal activities will include the excavation and removal of impacted soil in source areas defined in the approved RAWP. These source removal activities are scheduled for October 2012 and are currently funded by an existing IDEM Brownfields grant. Based upon the availability of Brownfields grant funding and efficiency of excavation activities, this source removal program will be expanded to include excavation and disposal of impacted soil at the Site beyond the source areas.

The source removal activities also include free product removal from monitoring well MW-001, located adjacent to the northwest corner of the former MGP property (see Figure 2). This well has historically contained free product measured between 0.6 and eight feet in thickness. During each Site visit, this well will be inspected and gauged for the accumulation of free product. Any free product identified during these inspections will be removed manually and transferred to a Department of Transportation-approved 55 gallon drum stored on-site to await proper disposal upon filling. This inspection and removal program will continue throughout all current and subsequent Site activities.

The current Brownfields grant funding has also been utilized to conduct cleanup efforts to define the plume and to determine groundwater remedial options to reduce and/or destroy COC mass in the plume. Data from this field program is currently being evaluated. Conceptually, In-Situ Chemical Oxidation (ISCO) has been selected as the preferential remedial option to reduce residual mass and destroy COC in the groundwater plume. Figure 3 includes the currently defined groundwater plume.

##### **B. SRF Remedial Action Plan**

SRF funds are being requested to finance the remediation program for the Site, which will include placement of an impermeable clay cap selectively across the Site and implementation of ISCO to address impacted groundwater.

The initial phase of this Remedial Action Plan (RAP) will be to install the impermeable clay cap across targeted areas of the Site to minimize surface water infiltration to groundwater following the completion of the on-site excavation activities and to eliminate the potential for direct contact exposure from remaining soil. The configuration and size of the cap is dependent upon the pending design of an access road across the Site by the City's engineers. Impermeable surfaces of this access road may be incorporated into cap design. Limited clearing and grubbing will be performed in order to facilitate cap placement. The cap will consist of a 1.5-foot thick layer of compacted clay. Following placement and compaction, the clay cap will be covered with approximately 6 inches of topsoil and seeded to match the surrounding greenway conditions.

The second phase of this RAP will include the implementation of the groundwater ISCO program. This program may include up to three injection events, referred to as the primary, secondary, and tertiary injection events. In order to allow for confirmatory sampling and analysis considerations, these events will be performed quarterly for three consecutive quarters, assuming that all three events are necessary to reduce mass and destroy COC in the groundwater plume. The ISCO injection program may be considered complete after the primary or secondary injection events if significant COC mass reduction and destruction is demonstrated; therefore, the secondary and tertiary injection event costs are included below as optional.

Once COC mass reduction is achieved and the ISCO injection program is considered complete, a subsequent groundwater monitoring program will be implemented. This monitoring program will continue for a period of 8 quarters to demonstrate elimination or mass reduction of the plume and stabilization of indicator parameters. Interim status reports will be prepared and submitted to IDEM following each monitoring event. Assuming plume stability is maintained or mass reduction is demonstrated, the groundwater monitoring well network will be abandoned and a closure report will be prepared for this project at the end of the 8 quarter period. Submission of this report to IDEM will be considered as completion of this remedial program.

**V. Estimated Project Costs, Affordability and Funding**

**A. Brownfields Funds**

Source Removal	\$285,000
Impacted Soil Removal	
Site Grading	
Free Product Removal	
Cleanup Efforts to Define the Plume	\$58,000
Well Installation	
GW Sampling	
Groundwater Flow	
Potentiometric Evaluation	
Porosity and Permeability Evaluation	
Free Product Evaluation	
Delineation	
Fingerprinting	
<b>Brownfields Total</b>	<b>\$343,000</b>

**B. SRF Funds**

Capping Activities	
Clearing & Grubbing	\$19,000
Cap Placement	\$190,000
Topsoil Placement	\$52,000
Groundwater Remediation	
Initial Injection	\$901,000
Secondary Injection	(\$492,000)
Tertiary Injection	(\$246,000)
Groundwater Monitoring	
Groundwater Sampling (8 quarters @ \$6,000/event)	\$48,000
Progress Reporting (8 Reports @ \$3,500/event)	\$28,000
Laboratory Analysis (8 samples X 8 events X \$275/sample)	\$17,600
Site Closure	

Reporting	\$15,000
Regulatory Coordination	\$9,000
IDEM VRP	
IDEM/USEPA Brownfields	
SRF	
<b>SRF Total</b>	<b>\$1,279,600</b>

The City of Richmond will finance the SRF Total noted above with a 20 year loan from the State Revolving Fund Program at an interest rate to be determined at the time of closing.

## VI. Environmental Impacts of the Feasibility Alternatives

The City of Richmond, through the authority of its council, planning commission or other means, will ensure that future development, as well as future collection system or treatment projects connecting to SRF-funded facilities will not adversely affect wetlands, archeological/historical/structural resources or other sensitive environmental resources. The city will require new development and treatment projects to be constructed within the guidelines of the U.S. Fish and Wildlife Service, IDNR, IDEM, and other environmental review authorities. A summary of these considerations is presented below.

**Undisturbed/Disturbed Land:** Excavation activities associated with COC source removal will disturb the land surface at the subject property. Capping activities will also disturb the land surface; however, the resultant graded and seeded land surface will add to the surrounding park aesthetics and improve surface water drainage.

**Structural Resources:** No historical or surface structural resources will be impacted by this project. Subsurface structures associated with the former MGP facility may be impacted by excavation activities.

**Surface Water & Wetlands:** Wetland areas should not be impacted by this project. Completion of this project will protect the Whitewater River, located to the west of the Site.

**Floodplain:** Groundwater remediation activities will be conducted in the Whitewater River floodplain; however, remediation efforts will consist of subsurface injections and will not negatively impact the floodplain.

**Groundwater:** The remedial program will positively impact the groundwater conditions at the Site by removing the groundwater contaminant sources and eliminating or reducing COC mass in the groundwater. Elemental metal concentrations in the groundwater may elevate initially following injection activities and will be monitored.

**Plant and Animals:** Vegetative removal, including some trees, may be necessary as part of the soil capping to remediate the Site. The Indiana Department of Natural Resources (IDNR) will be contact to identify and avoid impact on state and federally listed endangered species or their habitat during the remedial activities. The project will be implemented to minimize impact to non-endangered species and their associated habitats.

**Prime Farmland:** The proposed project will not impact prime farmland.

**Air Quality:** Excavation in contaminant source areas has the potential to impact Site air quality. Continuous air quality monitoring will be performed during invasive excavation activities and activities will be suspended if airborne COC concentrations exceed their respective Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels (PELs) and the risk based action levels presented in the approved RAWP.

**Open Space and Recreational Opportunities:** Site capping activities will create open space that will add to the aesthetic value of the adjacent park and recreational trail.

**Lake Michigan Coastal Zone:** This project is neither located in nor will it impact the Lake Michigan Coastal Zone.

**National Natural Landmarks:** This project will not impact any National Natural Landmarks or archaeological resources.

**Indirect Impacts:** The aesthetic value provided to the adjacent park and recreational trail will be a positive indirect impact. No negative indirect impacts will be associated with this project.

**VII. Comments From Environmental Review Authorities**

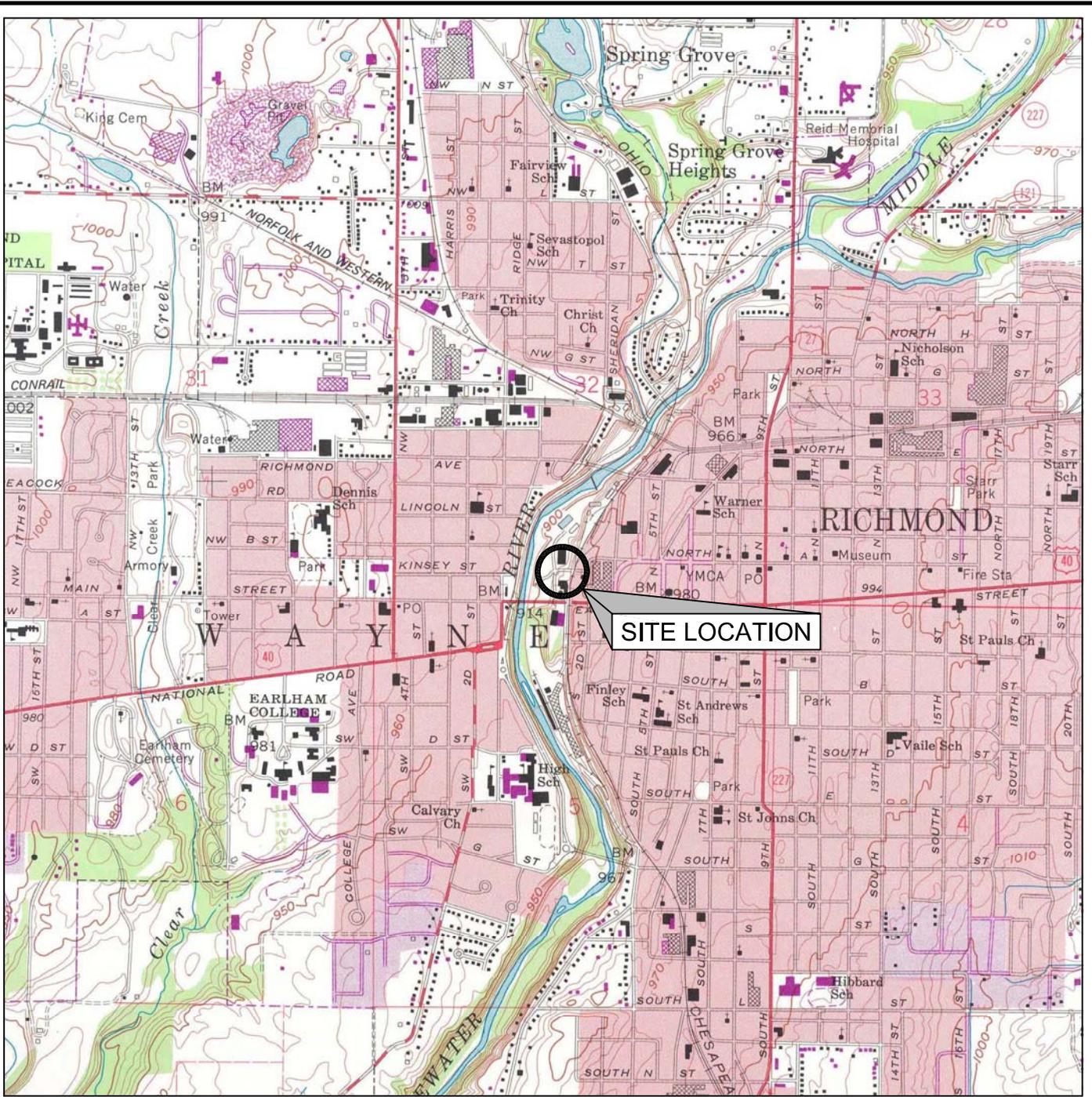
This document serves as the first notice to the U.S. Fish and Wildlife Service, the IDNR Division of Historic Preservation and Archaeology, the IDNR Environmental Unit, and the Natural Resources Conservation Services.

**VIII. Mitigation Measures**

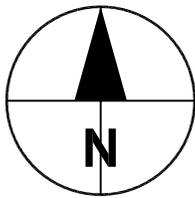
The City of Richmond will follow Best Management Practices with regard to local, state and federal rules and regulations associated with environmental remediation. These practices will include at a minimum: preparation and implementation of a Site-specific health and safety plan, erosion control, ambient air monitoring during construction activities, and utilization of comprehensive waste characterization and disposal procedures.

**IX. Public Participation**

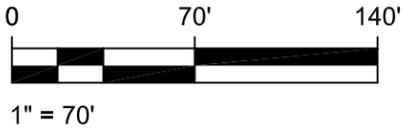
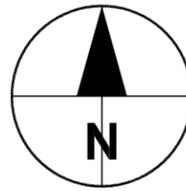
A properly noticed public hearing will be held in the Community Room on the third floor of the Richmond Municipal Building, 50 North 5<sup>th</sup> Street, Richmond, Indiana at a time to be selected by the City.



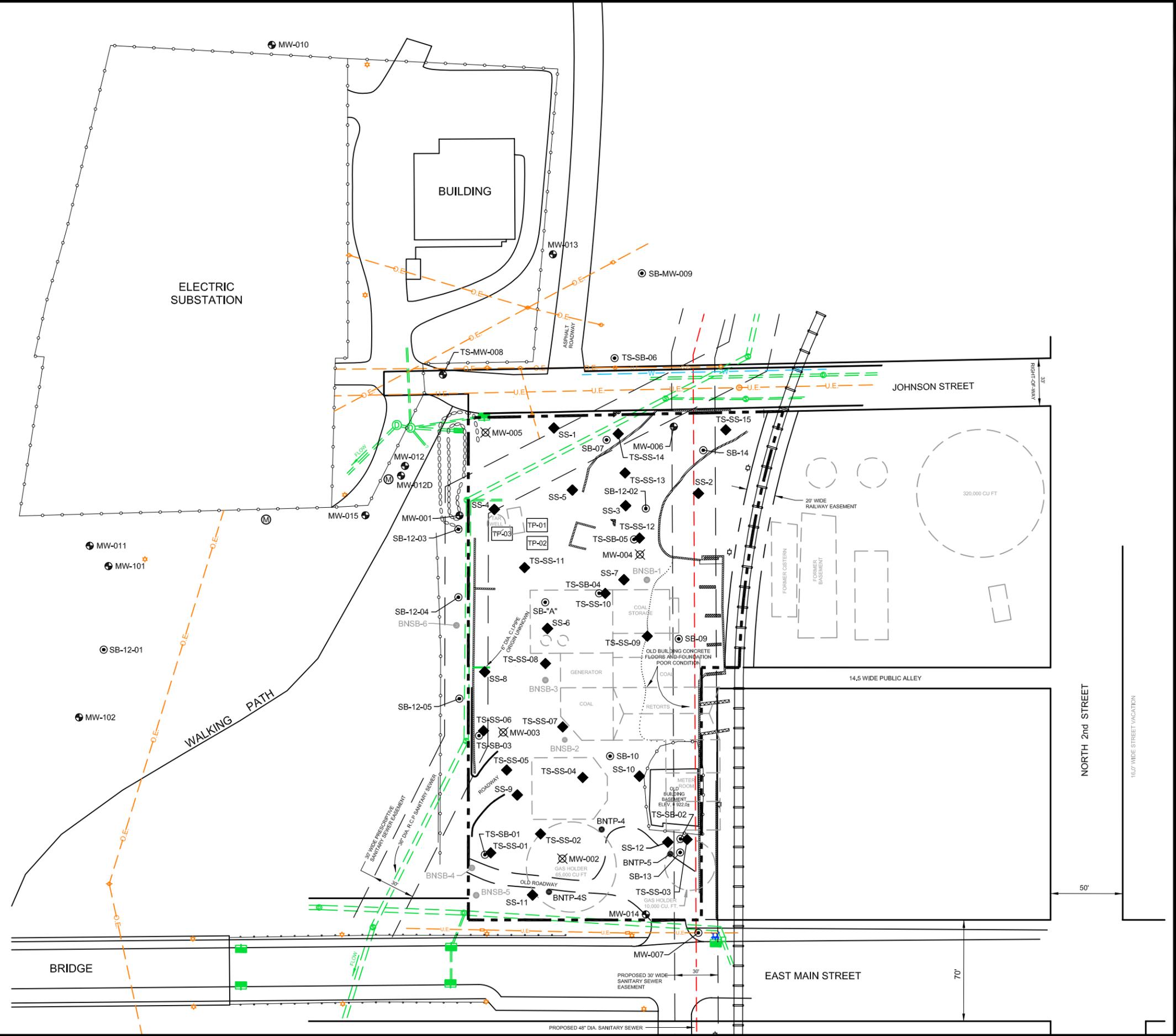
BASE TAKEN FROM USGS RICHMOND, IND.  
7.5'-SERIES TOPOGRAPHIC QUADRANGLE.  
DATE 1981. SCALE 1:24,000.



- LEGEND**
- ⊕ MONITORING WELL
  - ⊗ DESTROYED MONITORING WELL
  - ⊙ SOIL BORING
  - SOIL SAMPLE
  - SOIL SAMPLE - NOT ANALYZED
  - ◆ SURFACE SAMPLE
  - TP TEST PIT
  - ⚡ FIRE HYDRANT
  - ◇ UTILITY POLE
  - ⊕ LIGHT POLE
  - ⊕ R.R. UTILITY POLE
  - ⊙ SANITARY SEWER MANHOLE
  - ⊙ STORM SEWER MANHOLE
  - CURB STORM INLET
  - CURB STORM INLET
  - PROPERTY LINE
  - - - HISTORICAL MGP STRUCTURE
  - - - CHAIN LINK FENCE
  - - - GUARD RAIL
  - - - SANITARY/STORM SEWER LINE
  - - - PROPOSED SANITARY SEWER LINE
  - - - U.E. UNDERGROUND ELECTRIC LINE
  - - - O.E. OVERHEAD ELECTRIC LINE
  - - - W WATER LINE
  - ▨ CONCRETE/STONE WALL
  - ▨ CONCRETE PAD
  - ▨ CONCRETE PIER



BASE MAP PREPARED BY RICK L. McAVENE, CITY SURVEYOR, ENGINEERING DEPARTMENT, CITY OF RICHMOND, INDIANA. DATE: MARCH 18, 2011.



SITE LAYOUT MAP

FORMER MGP SITE  
RICHMOND, INDIANA

**AECOM**

Project No.: 60194081 Date: 2012-08-24

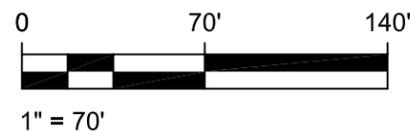
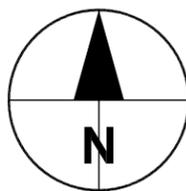
Figure: 2

**LEGEND**

- MONITORING WELL
- DESTROYED MONITORING WELL
- SOIL BORING
- NO EXCEEDANCES
- RESIDENTIAL EXCEEDANCES
- INDUSTRIAL EXCEEDANCES
- LNAPL PRESENT IN WELL
- APPROXIMATE EXTENT OF CONTAMINANT PLUME
- PROPERTY LINE
- HISTORICAL MGP STRUCTURE
- CHAIN LINK FENCE
- GUARD RAIL
- CONCRETE/STONE WALL
- CONCRETE PAD
- CONCRETE PIER

Constituents	RISC Residential Default Groundwater Level	RISC Industrial Default Groundwater Level
Benzene	0.005	<b>0.052</b>
Ethylbenzene	0.7	<b>10</b>
2-Methylnaphthalene	0.031	<b>0.41</b>
Benzo(a)anthracene	0.0012	<b>0.0039</b>
Benzo(a)pyrene	0.0002	<b>0.00039</b>
Benzo(b)fluoranthene	0.0012	<b>0.0039</b>
Dibenzo(a,h)anthracene	0.00012	<b>0.00039</b>
Indeno(1,2,3-cd)pyrene	0.0012	<b>0.0039</b>
Naphthalene	0.0083	<b>2</b>
Phenanthrene	0.023	<b>0.31</b>
Cyanide, Total	0.2	<b>2</b>

- NOTES:**
- ALL ANALYTICAL RESULTS ARE MEASURED IN mg/L.
  - A BOLD CONCENTRATION DENOTES A RISC INDUSTRIAL DEFAULT GROUNDWATER EXCEEDANCE.



BASE MAP PREPARED BY RICK L. McAVENE, CITY SURVEYOR, ENGINEERING DEPARTMENT, CITY OF RICHMOND, INDIANA. DATE: MARCH 18, 2011.

