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**ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES
FORMER CENTRAL STATE HOSPITAL
2800-3000 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA
KERAMIDA PROJECT NO. 14241 Task 13**

Prepared for:

**INDIANAPOLIS DEPARTMENT OF
METROPOLITAN DEVELOPMENT**
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1.0 INTRODUCTION

KERAMIDA Inc. (KERAMIDA) has completed an Analysis of Brownfields Cleanup Alternatives (ABCA) at the former Central State Hospital located at 2800 – 3000 West Washington Street, Indianapolis, Indiana (Site). The most recent field activities were conducted during the period of August 25, 2011 through September 3, 2011. This document was prepared as part of the application for funding under EPA FY 12 Brownfield Cleanup Grants.

2.0 PROJECT BACKGROUND

2.1 SITE DESCRIPTION

The former Central State Hospital facility is located at 2800 – 3000 West Washington Street, Indianapolis, Marion County, Indiana (Figures 1 and 2). The entire Site consists of approximately 150 acres located in the southwest quarter of Section 4 of Range 3 East, Township 15 North.

The Site had been used for housing a state mental health hospital complex, known as Central State Hospital. It began operation in 1848 and closed in 1993. The City of Indianapolis currently owns the property, which was purchased from the State of Indiana in 2004. The Site contains 20 buildings in various states of disrepair. Some of the buildings are connected by various tunnel systems.

The property is bounded on the east by Warman Avenue, on the south by Washington Street, on the southwest and west by Tibbs Avenue, and on the north by West Vermont Street. The Indiana State Medical Museum is located within the Site boundaries. Site development for residential use on portions of the site began in the Fall of 2011.

2.1.1 Geographic Information

The Site is located in a mixed commercial and residential area in the western portion of Indianapolis, Indiana. Location information for the Site is presented below.

Township: 15N (Wayne)
Range: 3E
Section: 4 (SW¼)
Latitude: 39° 45' 54.1" N
Longitude: 86° 12' 34.7" W
UTM: Zone 16
4401978 m N
567696 m E

2.1.2 Geologic Setting

Regional

Regional geologic information was obtained from the Quaternary Geologic Map of Indiana (Henry H. Gray, 1989), the Bedrock Geologic Map of Indiana, (Henry H. Gray, Curtis H. Ault, Stanley J. Keller, 1987), and the Map of Indiana Showing Thickness of Unconsolidated Deposits (Henry H. Gray, 1983). Marion County is underlain by northwest to southeast trending bedrock formations ranging in age from Silurian in the northeast to Mississippian in the southwest. The former Central State Hospital site is near the boundary of the Mississippian-Devonian Aged New Albany Shale and the Devonian Aged North Vernon Limestone.

The Site is located on the eastern flank of the Illinois Basin. Bedrock slopes west and southwest into the basin. Bedrock is present at depths between approximately 50 and 100 feet below the surface.

The unconsolidated material beneath the Site is composed of glacial outwash of the Atherton Formation. The outwash is valley fill composed of coarse-grained glaciofluvial deposits. These deposits generally consist of sands and gravels.

Site-Specific

The eastern portions of the Site have a ground surface elevation between approximately 705 feet and 710 feet above mean sea level. The topography of the eastern portion of the Site is relatively flat. The western portion of the Site has a ground surface elevation between 715 and approximately 720 feet above mean sea level. The topography of the western portion of the Site is also relatively flat. Between the east and west flat lying areas is a fairly narrow, sloping band with steep banks.

Site soil is mapped as Urban land-Fox complex soil (Sturm and Gilbert, 1978). The relatively flat eastern and western areas are described as Urban land-Fox complex, 0 to 3 percent slopes. Fox soils have a loam textured surface layer to a depth of 1.5 feet, underlain by sandy to gravelly clay loam to a depth of approximately 3.3 feet. Beneath the gravelly clay loam is sand and gravel. The eastern and western flat-lying areas are separated by a band of Urban land-Fox complex, 6 to 12 percent slope soil. This soil has the same profile as the flat lying soils, but has moderate to steep slopes.

2.1.3 Hydrogeologic Setting

Regional

The largest aquifer in the area is the water-bearing sand and gravel deposits associated with the present and pre-Pleistocene valley of the White River. The sand and gravel forms a continuous hydrogeologic system in which both water table and artesian characteristics are present. The aquifer is unconfined in the area near the White River. Wells yielding greater than 500 gallons per minute (gpm) are possible in the aquifer (Hartke, *et al.*, 1980).

City water is provided to the Site and the immediate vicinity. However, water supply wells are also located in the area and may still be used for potable or other purposes. According to water well records available from Indiana Department of Natural Resources (IDNR), several wells may be on Site, but stratigraphic data is only available for a well located near the pump house, north of the old powerhouse. This on-Site well is reportedly 61 feet deep. The described stratigraphy is sandy fill to 1 foot bgs, gritty clay to 5 feet bgs, sand and gravel to 51 feet bgs, clay to 56 feet bgs, sand and gravel to 59 feet bgs, then 2 feet of shale. The presence of shale in this log indicates that the New Albany Shale extends at least part way across the former Central State Hospital Site.

Few well logs with confirmed locations are located within ¼-mile of the Site. A log with the address of 25 South Hancock, 1 block south of Washington Street, has a stratigraphy of 0 to 42 feet bgs of gravel, clay to 59 feet bgs, black shale to 127 feet bgs, and limestone to a completion depth of 134 feet bgs. A second bedrock well within ½ mile south of the Site encountered shale bedrock at 47 feet below the surface. Wells within a mile west of the Site are shallow completed in sand and gravel. A well 1 mile north of the Site encountered black shale at the bedrock surface at 110 feet bgs. A well within ½ mile northeast of the Site was completed in sand and gravel at a depth of 101 feet bgs. In general, the Site appears to be over a local bedrock high with the New Albany Shale at the bedrock surface, while depth to bedrock increases east of the Site toward White River.

A cluster of high capacity wells are located approximately 2 miles northwest of the Site. These wells appear to be associated with an industrial facility. Additionally, one industrial high capacity well is located approximately 2 miles northeast of the Site, and two industrial wells are located 2 miles east of the Site. These three wells are located near the White River.

Site-Specific

Unconfined groundwater is encountered in the sand and gravel at depths ranging from approximately 18 to 35 feet bgs depending on the topographic elevation of the location.

2.2 PAST SITE ASSESSMENTS

Several site assessment studies have been performed with the ultimate goal of facilitating the redevelopment of the property. The purpose of the studies has been to identify the extent of contamination at the Site and determine cleanup alternatives. A summary of the site investigations is provided in Table 1.

Table 1 Site Investigation Summary	
Completion Date	Activity
7/24/2002	Sagamore Environmental Services, Inc. Phase I
7/7/2003	Douglass Draft Phase II
5/1/2007	KERAMIDA Phase I
12/12/2007	KERAMIDA Brownfield Investigation & Remediation Report
9/12/2011	KERAMIDA Phase II
9/12/2011	KERAMIDA Asbestos Investigation

Detailed information regarding the findings of these site assessments is detailed in Section 3.0.

2.3 REUSE PLAN

A comprehensive land use document was prepared by Central Greens, LLC on August 1, 2007. The development team initiated the land use planning phase in the Fall of 2006. Part of evaluation process included the involvement of the community leadership and area residents. The input obtained as part of the community development process was incorporated into the final plan.

Several factors were considered as part of determining the final set of land use objectives. The short and long term market opportunities were evaluated as well as the historical institutional utilization of the site. Another factor taken into consideration was the needs and desires of the surrounding neighborhood. In addition, the size of the site and the existing conditions both on and adjacent to the site were key factors. A significant factor that was also considered was the amount of green space that has historically been associated with the Site. The evaluation of all of these factors resulted in the following key land use objectives, which influenced the land use plan:

- A mixed use development that fits well with the existing character and needs of the surrounding area
- Open passive and active spaces should be planned throughout the Site.
- The Site should allow for easy access by both the surrounding neighborhoods as well as the greater Indianapolis market place.
- The residential nature of the eastern and northern boundaries should be incorporated into the Site.
- The Washington Street commercial corridor provides a strong opportunity to attract investment that will result in job creation and new services for the neighborhood.
- The Site should incorporate land uses that are likely to impact surrounding properties in a substantial positive fashion.

The plan recommends four primary land uses, which are:

- Commercial that includes both office, retail, and possibly educational-institutional development.
- Residential that includes single family along with multi family detached and attached housing.
- Cultural Village that consists of a pedestrian oriented commercial village with museum, theatre, entertainment,, possibly educational venues in both the existing historic structures and newly constructed facilities.
- Open Space that includes active recreational and passive trails and quiet parks.

Additional detail on the location of the site and the Land Use Plan is provided at:

http://imaps.indygov.org/ed_portal/pdf/central_state/central_state_land_use_plan.pdf

3.0 SUMMARY OF SITE ASSESSMENT FINDINGS

3.1 Sagamore Environmental Services, Inc., Phase I

The first site assessment that was conducted at the Site was a Phase I by Sagamore Environmental Services, Inc. on July 24, 2002. The main issues identified as part of the site investigation included:

1. Suspect asbestos containing materials (ACMs) in buildings and tunnels
2. Recommendation to conduct subsurface investigation of areas around former the powerhouse that was used to provide steam via the burning of coal
3. Recommendation to conduct subsurface investigation in the vicinity of a former laundry building
4. Combination of chemicals stored on site, such as paints, waste paints, thinners, solvents, waste oil, antifreeze, water treatment chemicals, cyclohexylamine morpholine along with other miscellaneous chemicals and some unlabeled 55-gallon drums
5. Stained concrete in the vicinity of unmarked 55-gallon drums
6. Aboveground storage tanks:
 - a. 1-5,000 gallon gasoline
 - b. 1-2,000 gallon gasoline
 - c. 1-1,000 gallon waste oil
 - d. 1-1,000 gallon oil and grease
 - e. 1-2,000 gallon fuel oil
 - f. 1-250 gallon diesel
7. Underground storage tanks:
 - a. 3-1,000 gallon diesel
8. Unregulated underground storage tanks (6-8) of unknown size and contents
9. Previously removed 30,000 gallon underground storage tank containing diesel (October 28, 2000). Soils were properly analyzed and showed no impact in the vicinity of the tank.
10. Records indicating "Request for Closure" forms with no documented closure report or soil sampling, therefore, a recommendation was made to conduct research to determine the locations of former underground storage tanks and to conduct soil sampling to determine impacts, if any.
11. Transformers on site as indicted below with a recommendation to resolve ownership and to analyze unmarked transformers for PCB content:
 - a. 6- transformers marked as non-PCBs
 - b. 9- transformers not labeled
 - c. 7- pole mounted transformers not labeled
12. Well house with 3 wells with other potential wells on site that should be closed if encountered during construction

3.2 Douglass Environmental Services, Inc., Phase II

A Phase II was conducted in July of 2003 by Douglass Environmental Services, Inc. for the City of Indianapolis. The purpose of the study was to assess, clarify, or quantify potential or confirmed environmental concerns identified in the Phase 1 site assessment completed on July 24, 2002.

Subsurface conditions investigated by Douglass included coal storage areas, potential dry cleaning operations at the former Laundry Building, underground storage tanks (USTs), unmarked graves and buried human remains, and former buildings demolished and buried in-place.

Surface soil testing for metals in former coal storage areas did not show the presence of metals above Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Residential Default Closure Levels (RDCLs) except for arsenic, which was detected in one sample at a concentration typical of background arsenic in Marion County. Surface soil testing for polynuclear aromatic hydrocarbons (PAHs) and Resource Conservation and Recovery Act (RCRA) 8 metals was proposed in the SAP.

Volatile organic compounds (VOCs) were not detected in the soil and groundwater samples collected around the former Laundry Building. Therefore, no additional sampling was proposed in this area.

Petroleum impacts were detected by Douglass around former USTs. (The impacts were investigated and remediated under the Petroleum Remediation Grant Initiative through the Indiana Brownfields Program (IBP) and are documented below in Section 3.4 - Brownfield Investigation and Remediation Report (KERAMIDA, December 12, 2007).)

3.3 KERAMIDA Environmental, Inc., Phase I

During May 2007, KERAMIDA Environmental, Inc. (KERAMIDA) performed a Phase I environmental site assessment of the Site. The Assessment was performed in general conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Process*, designation E 1527-05. The Assessment consisted of a review of records, a visual survey of the Site and surrounding area, and interviews with local government representatives. Any exceptions to, or deletions from, this practice were described in the individual sections of the main report.

This Assessment revealed the following Recognized Environmental Conditions (RECs) associated with the Site:

1. According to the regulatory database search, eight underground storage tanks (USTs) are registered at the Site. There is believed to be one tank each at the Bahr, Bolton and Evans buildings, and one tank in the vicinity of the Red Cross warehouse. The locations of the other four reputed tanks are unknown. Previous investigation revealed evidence of releases of petroleum at the Bolton and Evans buildings USTs.
2. Old transformers, switches and breakers at the Site may contain fluids with PCBs or mercury.
3. The steam pipes in the utility tunnels are wrapped in a fibrous insulation that may be asbestos containing material (ACM).
4. Old fencing, posts, furniture and general “junk” has been placed on the west side of the Old Powerhouse.
5. If the buildings are to be demolished, fluorescent light tubes will need to be removed and treated as universal waste. The ballasts will need to be removed and handled as PCB containing waste unless the ballast is labeled as “PCB free”.
6. Based on the age of the buildings and the large number of Asbestos Management Plans located in the Administration Building, asbestos containing materials are likely pervasive in the facility buildings. Management of asbestos will be a consideration in either the reuse or demolition of the facility structures.
7. East and west of the incinerator are mounds composed of dirt, brick and concrete, and a powdery gray material that may be ash. Northwest of the incinerator at the west end of wood chip area are mounds of wood chips, some soil with asphalt and brick, and two piles at least partially composed of manure.

This Assessment revealed the following Historical Recognized Environmental Conditions (HRECs) associated with the Site:

8. The location of historic gasoline service stations and dry cleaners upgradient of the Site pose the potential the groundwater beneath the Site may be contaminated with petroleum products or dry cleaning solvents from off-Site sources.
9. Areas of the Site along Tibbs Avenue are use restricted as cemeteries.
10. The debris generated by the demolition of the Seven Steeples building was placed in the former structures basement and buried. Materials containing asbestos, PCBs, lead and other hazardous construction materials may be present in the debris. The “cottages” of the men’s ward were demolished at approximately the same time and may have been demolished in a similar manner, with potentially hazardous materials subsequently buried on-Site.

11. Interviews indicated that glass jars containing medical specimens preserved in formalin were buried near the Indiana Medical History Museum.
12. The presence of unmarked graves along the western boundary of the property.
13. During the time period between the closure of the facility and purchase by the City, the Indiana Department of Transportation operated a body shop in the Beckman Theater and a paint booth in one of the barns by the Old Motel. Solvents for cleaning metal and paint likely were used and present the risk of a release to the environment if not properly managed.
14. There appears to be a casing for an unused well adjacent to the pump house (Building 35). Logs for additional wells are on file at the Indiana Department of Natural Resources Division of Water. The locations and status of these other wells are not known. If not properly abandoned, the well casings present a direct conduit for contaminant migration to the aquifer.

This assessment revealed the following *de minimis* conditions associated with the Site:

- Numerous containers of paint, and retail sized bottles/cans/spray cans of maintenance and cleaning chemicals are scattered through the buildings. There are also full and empty drums in some of the outbuildings, but particularly in the Old Powerhouse. These containers and drums should be collected, characterized, and properly disposed.

The following data gaps were identified during this assessment:

- No individuals from the operational era of the facility were available to be interviewed.
- Many buildings could not be entered.
- No copy of the Phase I ESA prepared by Sagamore was available for review.
- UST registration documents were not available for review at the IDEM file room

A number of buildings including the former Seven Steeples hospital were demolished in place with much of the debris buried in the basement. These areas were backfilled with soil and are currently grass covered. The primary concern with construction debris is the presence of asbestos-containing materials and lead from lead-based paint. Development plans are not likely to include new structures in these areas because of engineering and cost challenges of removing or building over debris and old foundations. Based on the presumption that the soil used to backfill these areas was clean, no soil testing was proposed. Groundwater sampling in each area was proposed to investigate potential groundwater impacts resulting from leaching of lead through the debris layer.

3.4 Brownfield Investigation and Remediation

In addition, KERAMIDA prepared a Brownfield Investigation and Remediation report that was completed on December 12, 2007. The investigation was conducted on behalf of the City of Indianapolis using Petroleum Remediation Grant (PRG) funds through the Indiana Finance Authority and the Indiana Department of Environmental Management (IDEM) Brownfields Program. The Investigation consisted of a geophysical survey to locate underground storage tanks (USTs), soil sampling to delineate known petroleum impacts, groundwater sampling to investigate groundwater quality, and petroleum impacted soil excavation/disposal and confirmation sampling. The purpose of the investigation was to obtain a No Further Action letter for petroleum-related impacts at the Site to facilitate redevelopment.

The geophysical survey did not detect the presence of USTs in any of the four investigated areas, confirming previous information that the USTs had been removed. A total of approximately 205 tons of diesel petroleum impacted soil were removed from the Bolton and Evans buildings. Confirmation soil sample results were all below the Risk Integrated System of Closure (RISC) Residential Default Closure Levels (RDCLs). Groundwater sample results were below RDCLs, with the exception of one sample from the Evans building which contained a Total Petroleum Hydrocarbon (TPH) Extended Range Organic (ERO) concentration above the RDCL, but below the RISC Industrial Default Closure Level (IDCL).

3.5 KERAMIDA Inc., Phase II

A Phase II site investigation was conducted by KERAMIDA, which was completed on September 9, 2011. KERAMIDA advanced 18 soil borings with soil and groundwater sampling across the Site. Soil borings were located at Recognized Environmental Conditions identified during the Phase I Environmental Site Assessment conducted by KERAMIDA in 2007. Soil and groundwater samples were submitted for analysis of selected contaminants of concern including: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs); and the Resource Conservation and Recovery Act (RCRA) 8 metals. The soil and groundwater analytical results were screened with Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) Commercial/Industrial Default Closure Levels (IDCLs) and Residential Default Closure Levels (RDCLs).

The following recommendations and conclusions were made in the KERAMIDA Phase II.

Areas recommended for further cleanup or risk assessment:

REC #7 – Incinerator Dirt Mounds

VOC and SVOC constituents were not detected in the mounded dirt, debris, and apparent incinerator ash materials, or soils and groundwater near the mounds above the RDCLs.

Lead occurrence above the IDCL (230 mg/kg) was identified in near surface fill materials encountered near the mounded materials. The mounded material contained arsenic above the IDCL and lead above the RDCL. Arsenic was detected in the mounded material at a concentration typical of background arsenic in Marion County. The detected concentration was also below the current RISC Commercial/Industrial Closure Level for direct contact soil (20 mg/kg).

The horizontal extent of lead occurrence in surficial fill encountered around the mounded dirt, debris, and apparent incinerator ash material should be defined. Once defined, the surficial fill and mounded materials should be removed and disposed of off-Site at a properly licensed disposal facility. Additional waste characterization, such as toxicity characteristic leaching procedure (TCLP) lead, may be required prior to disposal approval.

Total metals (arsenic, chromium, and lead) were detected in groundwater (KB-1 GW) near the mounded dirt, debris, and apparent incinerator ash at concentrations above the IDCLs. Dissolved lead was detected in a second groundwater sample (KB-2 GW) collected near the mounded material above the IDCL.

Information gathered during a risk assessment will quantify the total and dissolved metals related to sediment interference. KERAMIDA recommends installing a permanent monitoring well near the mounded material (at KB-2) and collecting a groundwater sample for metals using low-flow procedures.

REC #10 – Demolition Areas

Possible soil and groundwater impacts from buried debris layers in former demolition areas were investigated during the SI activities. Soil and groundwater downgradient of the demolition areas do not appear to have been impacted from the buried debris. VOC and SVOC constituents were not detected in soil and groundwater downgradient of the demolition areas. Metals were detected in soil at concentrations typical of background levels in Marion County. Dissolved lead, however, was detected in a groundwater sample (KB-8 GW) collected downgradient of a demolition area near the downgradient property boundary above the RDCL, but is believed to be related to sediment interference. Groundwater collected at this location was extremely turbid due the limited groundwater yield and sampling technique employed (bailing). Due to the sample volume, total metals were not analyzed at this location.

Information gathered during a risk assessment will quantify the total and dissolved metals related to sediment interference. KERAMIDA recommends installing a permanent monitoring well near the mounded material (at KB-2) and collecting a groundwater sample for metals using low-flow procedures.

Areas determined to require no further investigation or cleanup:

REC #8 – Potential Upgradient Sources

VOCs were not detected in groundwater at the northern property boundary. Therefore, historic dry cleaners and service stations located north and assumed upgradient of the Site do not appear to have impacted the groundwater quality at the Site.

Downgradient Groundwater

Three soil borings were advanced along the southern property line to investigate groundwater quality leaving the Site and evaluate the potential for unknown environmental concerns. Groundwater quality leaving the Site does not appear to have been impacted by possible unknown environmental concerns or other historic Site operations. VOC and SVOC constituents were not detected in groundwater at the southern property boundary above the RDCLs. No additional environmental concerns were identified by the SI analytical data.

REC #11 – Medical Specimen Burial Area

Soil and groundwater do not appear to have been impacted from alleged burial of formalin-preserved medical specimens near the Indiana Medical History Museum. VOC and SVOC constituents were not detected in soil and groundwater in the alleged burial area. Metals were detected in soil at concentrations typical of background levels in Marion County. Total metals (arsenic, chromium, and lead) were detected in groundwater above the IDCLs. Dissolved metals were not detected in a filtered sample.

REC #13 – Body Shop and Paint Booth Areas

Soil and groundwater do not appear to have been impacted from former body shop and paint booth operations. VOC and SVOC constituents were not detected in soil and groundwater collected immediately outside of Buildings #17 and #28, and inside Building #29. Metals were detected in soil at concentrations typical of background levels in Marion County. Total metals (arsenic, chromium, and lead) were detected in groundwater above the IDCLs. Dissolved metals were below the RDCLs in filtered samples.

Car Wash and Paint Booth Area (Building #15)

Soil and groundwater do not appear to have been impacted from paint shop and possible car wash operations at Building #15. Metals were detected in soil at concentrations typical of background levels in Marion County. Total metals (arsenic and lead) were detected in groundwater above the IDCLs. Dissolved metals were below the RDCLs in a filtered sample.

Area of Proposed Mixed-Use Development

The vapor intrusion pathway does not appear to be a concern in the proposed mixed use development area in the eastern portion of the Site. VOCs were not detected in the two groundwater samples collected from this area.

Former Coal Storage Areas

PAH constituents were not detected in surface soil samples collected from former coal storage areas above the RDCLs. Arsenic was detected at one sample location (SS-1) above the IDCL and slightly above the typical background level for surface soils in Marion County. The detected arsenic concentration (18.8 mg/kg) in SS-1, however, was below the current RISC Commercial/Industrial Closure Level for direct contact soil, which is 20 mg/kg.

In general, groundwater samples collected from the soil borings were very turbid due to the nature of push-probe groundwater sampling and collection techniques. Total metal concentrations in groundwater above the IDCLs are likely attributable to the presence of sediment in the samples. A comparison of total metals concentrations with dissolved concentrations supports the conclusion that total metals detections in groundwater are generally related to suspended solids and therefore are not indicative of actual groundwater concentrations.

3.6 KERAMIDA Asbestos Investigation

On September 12, 2011, KERAMIDA, following State and Federal regulations, completed an asbestos inspection of the Evans, Bolton, Bahr, Administration Buildings and the tunnel located at the Site. (Note: the parcel that the Bahr building is on has been sold to a private developer and is not included in the grant application).

The main scope of work for the Inspection was to determine if there was Suspect Asbestos Containing Material (SACM) at the noted buildings and tunnel at the Site that was not previously addressed and the condition of the material that was not Regulated Asbestos Containing Material (RACM), such as floor tile, mastic, shock joints, etc from the 1989 inspection and KERAMIDA's 2007 inspection to ensure the

condition of these materials had not changed making the materials a RACM. The known or assumed Asbestos Containing Material (ACM) was also noted.

Based on the 1989 compliant sampling and analysis and the subsequent 2011 inspection by KERAMIDA, it is confirmed that asbestos material is present in the four buildings (Evans, Bolton, Bahr, and the Administration Building) and in the tunnel.

The report findings and recommendations were:

- Prior to demolition of the buildings and tunnel the regulated materials are required to be compliantly removed and disposed of by an IDEM accredited abatement contractor using accredited personnel and proper environmental controls.
- The floor tile and mastic in the buildings that remains non-friable is not regulated. These materials may remain in the buildings for the demolition and be disposed of as construction waste.
- The floor tile in the buildings that have become loose or friable must be compliantly removed and disposed of prior to demolition of the building.
- If the buildings will be renovated rather than demolished removal of all asbestos materials is not required. However it is recommended that if the buildings are renovated at a minimum all exposed and/or damaged asbestos material be repaired and preferably all exposed and/or damaged asbestos material be compliantly removed.

4.0 SUMMARY OF AREAS PROPOSED FOR CLEANUP

The intent is to utilize the Brownfield Cleanup funds to conduct the following activities:

- Incinerator Dirt Mounds - The area contains approximately 1,200 cubic yards of contaminated waste. Final quantities of material requiring cleanup will be determined by the horizontal extent of lead occurrence.
- Asbestos Containing Materials – There are three (3) buildings (Evans, Bolton Administrative) and a tunnel on Site that have Asbestos-containing Materials (ACMs). Due to the significant amount of work that must be conducted with regard to asbestos abatement, the cleanup work exceeds the grant amount. The intent is to use the grant funds to abate as much as funding will allow.

- Final risk assessment in accordance with Indiana Department of Environmental Management (IDEM), RISC Technical Guidance Document. The risk assessment is required prior to receiving a site status letter from the Indiana Department of Environmental Management and will document the approved ultimate uses of the site.

5.0 APPLICABLE REGULATIONS AND CLEANUP

The City of Indianapolis will be responsible for the cleanup oversight of the Site. The City will contract with certified environmental professionals to assist with the oversight responsibilities. All contractors will be licensed as required by all applicable rules and regulations. All materials will be managed and disposed according to all ordinances, rules and regulations.

Incinerator Dirt Mounds -

Applicable regulations regarding the cleanup of the hazardous materials are dependent upon the results of the waste characterization. Potential applicable regulations include:

- Indiana Department of Environmental Management (IDEM) Nonrule Policy Risk Integrated System of Closure (RISC), Technical Guide and User's Guide
- Indiana Department of Environmental Management (IDEM), RISC Technical Guidance Document
- House Enrolled Act (HEA) 1162, which changed the remediation provisions of several statutes with particular emphasis on IC 13-25-5.
- Article 3.1, Hazardous Waste Management Permit Program and Related Hazardous Waste Management, which governs the management of hazardous waste.
- Article 10, Solid Waste Land Disposal Facilities, which governs solid waste disposal.

Asbestos Containing Materials -

Applicable regulations with respect to the asbestos remediation include:

- 29 CFR 1926.1101, Asbestos in Construction Standard
- 29 CFR 1210 Subpart I, Personnel Protective Equipment (PPE) Standard
- 40 CFR 61 Subpart M, Asbestos NESHAP
- 326 IAC Article 14 Rules 2, 10, Indiana Asbestos NESHAP
- 329 IAC Article 10 Rule 8.2 Management Standards for Certain Solid Wastes
- Indiana Department of Environmental Management (IDEM) Guidance Document for Disposal of Nonfriable Asbestos-Containing Materials

- Indiana Department of Environmental Management (IDEM) Nonrule Policy for the Disposal Facility Contingency Plan for Improperly Packaged Asbestos Containing Materials
- Indiana Department of Environmental Management (IDEM) Guidance Document for Asbestos Handling, and Disposal Requirements
- 326 IAC Article 18 Rule 1, Indiana Asbestos Licensing Requirements. This standard applies to all persons performing asbestos inspections, preparing project designs, or conducting asbestos projects above the state’s work practice limits on regulated asbestos-containing materials
- Indianapolis Air Pollution Control Board, Indianapolis Asbestos Air Rule, Regulation 14, Section 10, which applies to all NESHAP regulated work performed in Marion County, Indiana

Risk Assessment

Applicable regulations regarding the final risk assessment include:

- Indiana Department of Environmental Management (IDEM) Nonrule Policy Risk Integrated System of Closure (RISC), Technical Guide and User’s Guide
- Indiana Department of Environmental Management (IDEM), RISC Technical Guidance Document
- House Enrolled Act (HEA) 1162, which changed the remediation provisions of several statutes with particular emphasis on IC 13-25-5.

6.0 EVALUATION OF CLEANUP ALTERNATIVES

- **Incinerator Dirt Mounds** - The area contains approximately 1,200 cubic yards of contaminated waste. Final quantities of material will be determined by the horizontal extent of lead occurrence.
 - **Alternative 1 – Leave in place** – This option would require more extensive characterization of the materials and demonstration that the constituents present in the mounds meet acceptable health and environmental risk levels to stay in place. The alternative is not considered feasible due to the additional sampling cost, intended use of the site, and low likelihood of meeting applicable risk levels. This alternative would not be effective in that it would not allow for future development and negatively impacts the environment. It would, however, be easy to implement.
 - **Alternative 2 – Treat and leave in place** – Similar to Alternative 1, this option would require more extensive characterization of the materials and demonstration that the constituents present in the mounds after treatment meet acceptable health and environmental risk levels to stay in place. The alternative is not considered feasible due

to the additional sampling and treatment cost, intended use of the site, and low likelihood of meeting applicable risk levels. This alternative is would be more effective than Alternative 1; however it may negatively impact the future development of the site. It would be more difficult to implement than Alternative 3.

- **Alternative 3 – Remove and Dispose off-site at licensed disposal facility** – This alternative would require profile sampling of the materials per requirements of the licensed disposal facility. The sampling would confirm if the materials are a hazardous or non-hazardous waste. If the materials are hazardous waste, although it is not likely, the site would be required to obtain a hazardous waste generator identification number. Regardless of its hazardous or non-hazardous status the waste would be placed in approved roll-offs or dump trucks, documented for transport, and transported to an appropriate licensed disposal facility. This alternative is considered the most feasible, would be easy to implement, and would be the most effective of the options.

Alternative 3 is the cleanup alternative selected for cleanup of the incinerator dirt mounds.

- **Asbestos Containing Materials** - Removal of asbestos materials in building structures and/or tunnel. There are three (3) buildings (Evans, Bolton Administrative) and a tunnel on Site that have Asbestos-containing Materials (ACMs). Due to the significant amount of work that must be conducted with regard to asbestos abatement, the cleanup work exceeds the grant amount. The intent is to use the grant funds to abate as much as funding will allow.

- **Alternative 1 – Remove and Dispose off-site at licensed disposal facility** - Due to applicable regulations, only one alternative is considered feasible for cleanup. The asbestos will be removed in accordance with the applicable regulations cited above.
- **Alternative 2 –No Action** – The no action alternative would involve leaving the asbestos-containing materials located throughout the area on Site. This is not a feasible option as the Site could not be developed. This alternative would not be effective in that it would not allow for future development and could negatively impact the area. It would, however, be easy to implement. There would be no cost associated with this alternative.

- **Risk Assessment** - Completion of a final risk assessment in accordance with the Indiana Department of Environmental Management (IDEM), RISC Technical Guidance Document.
 - **Alternative 1** – Due to applicable regulations, only one alternative is considered feasible to meet the goal of receiving a site status letter from the Indiana Department of Environmental Management and documenting options for ultimate use of the site. Information gathered in the 2011 Phase II investigation and installation of permanent monitoring wells in several locations will be used to complete the Risk Assessment.
 - **Alternative 2 - No Action** – This alternative would require no further action. It is not considered feasible as it would limit the City's ability to develop the Site. There would be no cost associated with this alternative.