



REMEDIAL ALTERNATIVES EVALUATION REPORT

**FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS**

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1.0 INTRODUCTION AND PURPOSE

Conestoga-Rovers & Associates (CRA) has prepared this Remedial Alternatives Evaluation Report (RA Report) for the former GM Fairfax I Plant in Kansas City, Kansas (Site) in accordance with the "Remedial Alternatives Evaluation Work Plan and Schedule" (CRA, 2012). The Site location map is provided as Figure 1.1.

This RA Report has been prepared on behalf of the Revitalizing Auto Communities Environmental Responses Trust (RACER), for the Kansas Department of Health and Environment (KDHE) pursuant to the Consent Agreement and Final Order (Order) Case No. 11-E-109 BER dated November 21, 2011. The Site is being managed under the KDHE Bureau of Environmental Remediation State Co-operative Program. The Order identified five known Areas of Concern (AOC) which required further characterization and/or remediation. The results of the investigations conducted to date are discussed in this report and described in detail in other reports, submitted under separate cover.

The objectives of this RA Report are to:

- Provide background information and a description of the nature and extent of contamination for the five known AOCs
- Describe clean-up objectives and goals
- Describe the potentially applicable remedial technologies
- Identify the potentially applicable remedial alternatives and evaluate the alternatives against screening criteria

The five known AOCs are identified on Figure 1.2, and include:

- The area around soil boring S-8
- The area around soil boring SB-110
- The area around temporary monitoring well TMW-127
- The area around monitoring well MW-103A
- The area around temporary monitoring well TMW-130

The following sections of this report provide information regarding the identification and screening of remedial technologies and alternatives, as listed below:

- Section 2.0 includes a summary of the Site investigations conducted at each AOC and a description of the nature and extent of contamination based on current conditions
- Section 3.0 presents the remedial action objectives and goals
- Section 4.0 presents the screening of remedial technologies
- Section 5.0 provides a description of the remedial alternatives for each AOC
- Section 6.0 presents the screening evaluation of remedial alternatives
- Section 7.0 lists the references cited in the report

2.0 SITE INVESTIGATION RESULTS

The Site has a long history of investigations (since the late 1980s) and remedial activities. These were performed under a variety of regulatory oversight by the KDHE and in anticipation of the sale of distinct land parcels under the KDHE Voluntary Cleanup and Property Redevelopment Program (VCPRP). Currently the Site is being managed under the KDHE Bureau of Environmental Remediation State Co-operative Program.

2.1 SITE LOCATION

The Site is located at 100 Kindelberger Road in Kansas City, Kansas in an industrial area known as the Fairfax District. To the west and south of the Site are industrial facilities, including industrial operations, chemical companies, and refining and pipeline facilities. The Site is located south of a bend in the Missouri River, with the river located north, east, and southeast of the Site. A levee is present between the Site and the Missouri River (Figure 1.1). The active Fairfax II Plant is located to the southeast of the Site, between the Site and the Missouri River. The original Site property, that associated with the former Fairfax I Plant operations, covered over 107 acres. The western portion of the Site, which covered approximately 16 acres and is referred to as "Tract 2", was sold to a third party. The property associated with Tract 2 was entered into the VCPRP and received a No Further Action Letter from the KDHE in February 2007. The remaining Site property, approximately 91 acres, was also entered into the KDHE VCPRP, until the GM bankruptcy filing, at which time KDHE determined the Site no longer qualified for the VCPRP. The Site was transferred to the KDHE State Cooperative Program in March 2011.

2.2 SITE HISTORY

The Fairfax I Plant consisted of several buildings, a tank farm, rail support, and drum storage areas. The assembly building and former aircraft hangar provided over 2.2 million square feet of covered work area. The U.S. Government constructed the Fairfax I Plant in 1940 for North American Aviation. North American Aviation assembled B-25 bombers at the facility through 1944 for use in World War II. In 1945, GM negotiated a lease for this facility from the U.S. Government and began assembling automobiles. During the Korean conflict GM Corp. assembled F84F jet aircraft in addition to continuing to assemble automobiles. GM Corp. purchased the facility from the U.S. Government in 1960 and continued automobile assembly operations until 1986/1987.

The Fairfax I Site is vacant. Operations at the facility ceased in 1986/1987, and the facility was demolished in 1987. All structures were taken down to the ground surface and current land is undeveloped. The Site was transferred to the RACER Trust as a result of the bankruptcy of the former General Motors Corporation. The newer Fairfax II Plant was constructed by GM Corp. on land adjacent to the Fairfax I property beginning in 1998. This is an active automobile assembly plant now owned and operated by General Motors LLC (GM LLC).

2.3 GEOLOGY AND HYDROGEOLOGY

The Site is located in the floodplain of the Missouri River. Underlying Site geology typically consists of an upper layer of silty clay ranging in thickness from approximately 7 to 15 feet (ft). This silty clay is underlain by fine to medium sands to depths of 25 to 40 ft, which grade into medium to coarse sands with some gravel and clay interbeds to depths of 60 to 80 ft. This interbedded layer is underlain by medium to coarse sands and gravels to the top of the bedrock. The thick sequence of sands and gravels comprise alluvial deposits that are underlain by shale bedrock at approximately 102 to 117 ft below grade. The present Missouri River channel follows a deeper valley cut into the bedrock by the ancestral Missouri River.

Groundwater flows beneath the Site area within a fining upward sequence of alluvial sands and gravels. Groundwater flow direction is seasonal and is dependent on precipitation events and the stage of the Missouri River. In general, groundwater flow direction is to the north and east, toward the Missouri River, in the fall and to the south and west, away from the Missouri River, in the spring. Significant vertical hydraulic gradients do not exist between deep and shallow groundwater zones, as water levels are similar in deep and shallow monitoring wells. Groundwater elevation is dependent on precipitation events and on the stage of the Missouri River, which is controlled by the Army Corps of Engineers. Depth to groundwater generally ranges from 15 to 25 ft below ground surface (bgs) but greater variation has occurred.

2.4 PREVIOUS INVESTIGATIONS

In preparation for demolishing the Fairfax I Plant buildings, HDR Engineering, Inc. (HDR) performed an Environmental Site Assessment (ESA) for GM between August 1987 and January 1988 that was designed to determine potential impacts to soil

and groundwater. All aboveground storage tanks (ASTs) and underground storage tanks (USTs) were removed during that time.

In 2003, the KDHE requested that GM perform a confirmatory soil and groundwater investigation of the whole Site to address uncertainties remaining from the 1987 and 1988 studies. A number of groundwater and soil investigations had been performed by GM at a number of areas on the Site (i.e., the MW-103A area and a comprehensive groundwater investigation program). These confirmatory investigations addressed a number of sample locations and data generated previously by HDR. The confirmatory investigations were completed in a number of stages starting in 2004 and continuing through 2006.

Appendix A presents a summary of the investigation activities conducted to date at the individual AOCs. This includes the investigations described above and subsequent investigations through May 2012.

Appendix A also includes tables that provide detected soil and groundwater analytical data, organized by AOC. Appendix A tables also include the soil and groundwater data collected from the Site that were not specifically assigned to an AOC. The detected chemical concentrations are compared to the KDHE Tier 2 risk-based standards, for both residential and non-residential property use, (hereafter referred to as "Tier 2 standards"). Off-Site soil and groundwater analytical data not assigned to a specific AOC are not included as part of this evaluation.

Figure 2.1 shows the soil and groundwater sample locations for the Site investigations. Figures 2.2 through 2.15 show the investigation locations and detected analytical results for the individual AOCs.

2.5 AREAS OF CONCERN

This section provides a summary of the current conditions for each AOC based on the investigations completed to date, as presented in Appendix A.

2.5.1 S-8 AREA

The soil stratigraphy in the immediate area of S-8 is characterized by the description provided on the log for TMW-147E, which identifies clay and silt/clay material from the ground surface to approximately 2 ft bgs. This is underlain by sand to the bottom of the

borehole at 27 ft bgs. The stratigraphic log for SB-113 located approximately 70 ft south of S-8 identifies sand from ground surface to the bottom of the borehole at 12 ft bgs. The depth to groundwater is approximately 17.8 ft bgs as recorded at TMW-147E in May 2012.

The analytical results for detected volatile organic compounds (VOCs) in soil samples above Tier 2 standards are shown on Figure 2.3 and provided in Table A-1. As discussed in Appendix A and shown on Figure 2.3, no VOCs were detected at concentrations above the Tier 2 standards with the exception of tetrachloroethene (PCE) at S-8, collected in 1987. The detected concentrations of PCE at S-8 were 2.5 milligrams per kilogram (mg/kg) at 10 ft bgs and 0.76 mg/kg at 15 ft bgs. These concentrations are above the Tier 2 standard for soil based on groundwater protection (0.121 mg/kg) but are below the Tier 2 standards for both the residential and non-residential soil pathways. Overall, the available analytical data indicates very limited residual presence of VOCs in soil, and it is likely that the historical concentrations detected at S-8 in 1987 have dissipated such that an area of VOC concentrations above the Tier 2 standards is not discernible. Supplemental sampling is recommended to characterize the VOC concentrations in soil prior to determining if remediation is required.

The analytical results for detected VOCs in groundwater above Tier 2 standards are shown on Figure 2.4 and provided in Table A-2. As discussed in Appendix A and shown on Figure 2.4, the VOCs detected above the Tier 2 standards include: cis-1,2-dichloroethene (cis-1,2-DCE); PCE; and trichloroethene (TCE) in 2012 at TMW-147E and cis-1,2-DCE and VC at MW-109 in 2008. Supplemental sampling is recommended to further delineate the extent of VOCs in groundwater as part of remedial design.

2.5.2 SB-110 AREA

The shallow soil stratigraphy in the SB-110 Area is characterized by the description provided on the logs for SB-110 and various other boreholes that were advanced to depths of approximately 12 ft bgs. Generally these logs identify clay as the predominant soil type encountered, and some of the logs identify the presence of thin layers of sand (less than 2 ft thick). The boreholes that extend to depths greater than 12 ft bgs include SB-119A, SB-119B, SB-119C, SB-120A, and SB-137. The logs for these boreholes also identify the presence of clay and silt in the shallow soil extending to depths ranging from approximately 11 to 20 ft bgs. At SB-119A, sand was encountered over most of the interval from approximately 12 ft bgs to the base of the borehole at 27 ft bgs. Conversely, at SB-119B, SB-119C, and SB-120A, the predominant soil type encountered is

clay and silt to approximately 20 ft bgs, which is underlain by sand. Sand was encountered at the base of each of these boreholes, at depth of approximately 20 ft bgs. The depth to groundwater was approximately 18 ft bgs as recorded at MW-125 and TMW-152 in May 2012. The water level measurements recorded at MW-125 since 2007 indicate that the depth to water at MW-125 varies from approximately 12 to 23 ft bgs. It is noted that soil investigations in this area identified the presence of concrete associated with former building foundations, which impeded borehole advancement in some locations.

The analytical results for detected VOCs in soil samples are shown on Figure 2.6 and summarized in Table A-3. As discussed in Appendix A and shown on Figure 2.6, VOCs that were detected in soil at concentrations above the Tier 2 standards include PCE at: SB-110 (10 to 12 ft bgs), SB-119 (10 to 12 ft bgs), and SB-121 (9 to 10 ft bgs). The detected concentrations of PCE in these samples were 0.19 mg/kg, 0.45 mg/kg, and 0.15 mg/kg, respectively. These concentrations are above the Tier 2 standard for soil based on groundwater protection (0.121 mg/kg) but are below the Tier 2 standards for both the residential (7.45 mg/kg) and non-residential (16.5 mg/kg) soil pathways. Overall, the available analytical data indicates a limited area of residual VOCs, within soil described as silty sand (at SB-110) and clay (at SB-119 and SB-121).

The analytical results for detected VOCs in groundwater are shown on Figure 2.7 and summarized in Table A-4. As discussed in Appendix A and shown on Figure 2.7, the VOCs detected above the Tier 2 standards include TCE at TMW-150 and TMW-151. No VOCs were detected above Tier 2 standards at MW-125 and TMW-152, which are located in closer proximity to SB-110. Although the detected concentrations of PCE in soil at SB-110, SB-119, and SB-121 in samples collected in 2004/2005 are above the Tier 2 standards for soil based on groundwater protection, the groundwater monitoring data do not show a corresponding effect above Tier 2 standards at the nearby monitoring wells based on current data. Methylene chloride and lead were also detected above the Tier 2 standards in one historical sample collected in 1988 from MW-101.

Supplemental sampling is recommended to further delineate the extent of VOCs in groundwater as part of remedial design.

2.5.3 TMW-127 AREA

The shallow soil stratigraphy in the TMW-127 Area is characterized by the description provided on the logs for SB-127 and various other boreholes (SB-125, SB-128, TMW-145, TMW-153, TMW-154, TMW-155) that were advanced to depths of up to 35 ft bgs.

Generally these logs identify layers of clay, silt and sand within the upper 10 to 20 ft bgs, underlain by sand. The depth to groundwater is approximately 20 ft bgs as recorded at TMW-127 and other wells in the area in May 2012.

As discussed in Appendix A and summarized in Table A-5, no VOCs in soil were detected at concentrations above the Tier 2 standards in this area. The analytical results for detected VOCs in groundwater are shown on Figure 2.9 and summarized in Table A-6. As discussed in Appendix A and shown on Figure 2.9, the VOCs detected above the Tier 2 standards include cis-1,2-DCE, methylene chloride and vinyl chloride (VC) at TMW-127; cis-1,2-DCE and VC at MW-156; and cis-1,2-DCE; TCE; and VC at TMW-155. All VOCs were less than the Tier 2 standards in the other monitoring wells in the general vicinity of TMW-127.

Arsenic was detected in groundwater at a concentration above Tier 2 standards at TMW-127 (2006 and 2007). Lead was detected at a concentration greater than the Tier 2 standard in one sample collected from MW-108 in 1998. Manganese was detected at a concentration greater than the Tier 2 standard in samples collected from TMW-127 (2006), MW-110 (2004 and 2006) and TMW-124, TMW-125, TMW-126, and TMW-128 (2006).

Supplemental sampling is recommended to further delineate the extent of VOCs in groundwater as part of remedial design.

2.5.4 MW-103A AREA

The soil stratigraphy in the MW-103A area is characterized by various boreholes, the most recent of which is SB-50 and SB-51 completed in April 2012. These logs identify layers of clay, silt and sand within the upper 16 ft bgs, underlain by sand. The depth to groundwater at MW-103A is typically around 20 ft bgs, but variation has been noted. The water levels recorded in January 2006 and June 2008 were approximately 30 ft bgs and approximately 15 ft bgs, respectively. The analytical results for soil and groundwater are summarized in Tables A-7 and A-8, respectively.

The analytical results for VOCs/benzene, toluene, ethylbenzene, and xylenes (BTEX) detected above Tier 2 standards in soil samples are shown on Figures 2.11a and 2.11b. The Figure also shows the approximate limits of the area around MW-103A where detected concentrations of organic compounds in soil exceed the Tier 2 standards. Within the defined limits shown on the figure, the locations exhibiting the highest concentrations include SB-42 (10 to 12 ft bgs), SB-101 (8 to 10 ft bgs and 12 to 14 ft bgs),

SB-102 (12 to 14 ft bgs), SB-104 (8 to 10 ft bgs and 12 to 14 ft bgs), and SB-105 (12 to 14 ft bgs). At other sample locations within the defined limits shown on the figure, lower or non-detect concentrations are observed, indicating the variability in concentration values between locations. At other nearby locations, outside of the defined limits shown on the Figure sporadic detections of VOCs above the Tier 2 standards were observed (at SB-40, F-26, S-26, S-27, S-29, and SB-30).

The intermittent presence of light non-aqueous phase liquid (LNAPL) has been identified at MW-103A. In January 2006 the measured LNAPL thickness was approximately 1.3 ft, at a depth of approximately 30 ft bgs, but LNAPL has not been observed during more recent monitoring events.

The analytical results for detected VOCs and total petroleum hydrocarbon (TPH) in groundwater are shown on Figure 2.12. As shown on Figure 2.12, the organic parameters detected above the Tier 2 standards at MW-103A, where the intermittent presence of LNAPL is observed, include methyl-iso-butyl-ketone (MIBK), acetone, BTEX, and TPH (diesel range and gasoline range). The analytical results for other monitoring wells in the area (MW-102A, MW-102B, MW-102C, MW-103A, MW-103B, MW-103C, MW-104, MW-105, and MW-115A) indicate generally non-detect values. Overall, the groundwater monitoring data demonstrate that observations of chemical concentrations above Tier 2 standards are limited to MW-103A where the intermittent presence of LNAPL is observed.

2.5.5 TMW-130 AREA

The soil stratigraphy in the TMW-130 Area is characterized by various boreholes advanced to depths up to 35 ft bgs. The logs identify layers of clay, silt and sand within the upper 10 to 15 ft bgs, underlain by sand. The depth to groundwater at TMW-130 and other nearby monitoring wells is typically around 22 to 24 ft bgs. The analytical results for soil and groundwater are summarized in Tables A-9 and A-10, respectively.

The analytical results for VOCs detected above Tier 2 standards in soil samples are shown on Figure 2.14. In November 2006 a sample collected from soil boring SB-130 (5 to 7.5 ft bgs) had exceedances of the Tier 2 standards for 2-methylnaphthalene, dibenzofuran, and naphthalene. In September 2009 methylene chloride was detected in four locations (SB-B3-A [13 to 15 ft bgs], SB-D4-A [1 to 3 ft bgs], SB-E4-A [17 to 19 ft bgs]), and SB-F4-A (17 to 19 ft bgs). Also TPH – diesel range organics (DRO) was detected at concentrations greater than the Tier 2 standards in four locations (SB-B3-A, SB-D4-A, SB-E4-A, and SB-F4-A) and TPH – gasoline range organics (GRO) in

two locations (SB-B3-A and SB-E4-A). Figure 2.14 also shows the approximate extent of observed LNAPL and the average fluorescence based on the laser induced fluorescence/ultraviolet optical screening tools (LIF/UVOST) survey conducted in 2008. As shown on Figure 2.14, there are relatively few detected concentrations in soil that are above the Tier 2 standards although it is apparent that the presence of hydrocarbon-impact potentially extends over an area approximately 200 ft by 350 ft. This difference in observations may be related to the scope of soil sampling conducted to date.

Based on examination of the LIF/UVOST survey logs, it is apparent that the vertical extent of potential hydrocarbon impact is variable. At some survey locations the apparent hydrocarbon impact extends through the unsaturated soil zone and into the underlying saturated soil, while at other survey locations the apparent hydrocarbon impact exists within discrete zones within the saturated zone only. The survey results indicate the maximum vertical extent of potential hydrocarbon impact is found in the center of the LNAPL body in the vicinity of TMW-130 (LIF-D4) from approximately 1 to 35 ft bgs. The vertical extent of potential hydrocarbon impact tapers off significantly toward the periphery (e.g., 26 to 29 ft bgs at LIF-F2). Given the average depth to the water table in the area, it is apparent that the potential hydrocarbon impact extends 10+ ft into the saturated zone (but may be limited in thickness).

The areal extent where LNAPL is observed in monitoring wells (or the area where LNAPL is more likely to be present at saturation levels high enough that mobile/recoverable fractions may be present) is represented by the "approximate extent of observed LNAPL" shown on Figures 2.14 and 2.15. This area encompasses TMW-130, TMW-139, TMW-140, TMW-141, and TMW-142, with a diameter of around 160 ft. The LNAPL was identified through fingerprint testing as a significantly degraded middle distillate type product such as diesel fuel or heating oil, and would not be expected to result in significant dissolved or vapor phase effects based on these characteristics.

The analytical results for detected VOCs and TPH in groundwater are shown on Figure 2.15. As shown on the figure, the organic parameters detected above the Tier 2 standards include benzene at TMW-139, TCE at TMW-144 and TPH (GRO) at TMW-130. Manganese was also detected above Tier 2 standard at TMW-132 in 2006. The latter result was not confirmed in subsequent sampling. The presence of benzene at TMW-139 may be related to the presence of LNAPL in that monitoring well.

In general, the groundwater analytical data indicates very limited groundwater impact associated with the presence of LNAPL in this area. This finding is consistent with the properties of the LNAPL as discussed above.

3.0 REMEDIAL ACTION OBJECTIVES AND GOALS

In general, the remedial action objectives include:

- Provide protection of public health and the environment
- Comply with applicable local, State, and Federal regulations
- Mitigate or eliminate the AOCs
- Provide practical, cost-effective remediation
- Utilize remedies which may be completed in a short time frame, where applicable

To achieve the remedial action objectives, selected remedial technologies and remedial alternative goals have been evaluated.

Section 4.0 provides information regarding general response action, remedial technologies and process options that have been considered and screened for purposes of assembling alternatives (in Section 5.0).

The remedial action goals that have been assessed include KDHE Tier 2 risk-based standards (residential and non-residential). KDHE Tier 3 risk-based standards have not been developed for the Site at this time.

The implementation of an Environmental Use Control (EUC) has been considered where required to eliminate potential exposure pathways through the development of permanent land use restrictions.

The remedial alternative evaluation has been completed on an AOC basis; however, the remedial technologies may be applied to multiple AOCs if appropriate.

Long-term operation, maintenance, and monitoring (OMM) has also been evaluated where necessary to demonstrate achievement of the remedial action objectives and goals.

4.0 IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES

This section describes the list of remedial technologies that have been considered and the screening procedure used to identify suitable technologies for the assembly of remedial alternatives for the AOCs.

4.1 SOIL AND LNAPL

To address soil impacts, including the presence of LNAPL, the general response actions and associated remedial technologies evaluated as part of this feasibility evaluation included:

- No Action
- Institutional Controls (i.e., access restrictions)
- In Situ Treatment including biological treatment, physical/chemical treatment, and thermal treatment
- Ex Situ Treatment assuming excavation and including biological treatment and thermal treatment
- Soil Removal (i.e., excavation)
- Containment (i.e., cap)
- LNAPL remedial technologies including mass recovery, mass control, and phase-change remediation

Specific process options for each of the above noted response actions and remedial technologies were identified, and a description for each alternative considered, is provided in Table 4.1.

Each remedial response action, technology, and process option, was evaluated based on relative effectiveness, implementability, and costs. The results of this screening evaluation are also provided in Table 4.1.

Based on this evaluation, certain remedial technologies were retained for the development of remedial alternatives, as indicated in Table 4.1.

4.2 GROUNDWATER

To address groundwater impacts, the general response actions and associated remedial technologies evaluated as part of this feasibility evaluation included:

- No Action
- Institutional Controls including access restrictions and monitoring
- Monitored Natural Attenuation (MNA)
- In Situ Treatment including biological treatment, physical/chemical treatment, and thermal treatment
- Removal/Treatment including ex situ biological treatment, ex situ physical/chemical treatment, and off-Site treatment
- Containment including capping and vertical barriers

Specific process options for each of the above noted response actions and remedial technologies were identified, and a description for each alternative considered, is provided in Table 4.2.

Each remedial response action, technology, and process option, was evaluated based on relative effectiveness, implementability, and costs. The results of this screening evaluation are also provided in Table 4.2.

Based on this evaluation, certain remedial technologies were retained for the development of remedial alternatives, as indicated in Table 4.2.

5.0 IDENTIFICATION AND DESCRIPTION OF REMEDIAL ALTERNATIVES

The following sections present the alternatives that are considered for each AOC based on the current conditions information (Section 2.0 and Appendix A) remedial action objectives and goals (Section 3.0), and technology screening (Section 4.0). In some cases the AOC is further subdivided by impacted media to facilitate the evaluation. The list of alternatives for each AOC (and impacted media) represents a range that extends from no action through full removal. Intermediate alternatives that consider limited removal and/or in-place management of impacted media are also included.

5.1 S-8 AREA

As discussed in Section 2.5.1 and Appendix A, VOCs were detected in soil samples from one borehole in the S-8 Area at concentrations above Tier 2 standards for soil based on groundwater protection. The groundwater monitoring data for TMW-147E indicates the presence of VOCs above Tier 2 standards. Therefore the remedial alternatives described below focus on the presence of VOCs in soil at S-8 and shallow groundwater as indicated by the analytical results for TMW-147E. The estimated extent of soil impacted above Tier 2 standards for protection of groundwater is shown on Figure 2.3. The estimated extent of VOC-impacted groundwater in this area is shown on Figure 2.4.

The remedial alternatives developed for this area include the following:

Soil (S-8)

- No Action
- Engineering controls/containment
- Soil Vapor Extraction (SVE)
- Soil excavation

Groundwater (TMW-147E)

- No Action
- Groundwater Monitored Natural Attenuation (MNA)
- Groundwater enhanced in situ biological treatment
- Groundwater in situ chemical oxidation (ISCO)

5.1.1 S-8 AREA - SOIL

The No Action alternative is included to provide a basis for comparison to other alternatives that involve specific actions to remediate groundwater impacted above the Tier 2 standards.

Engineering controls/containment includes the use of physical barriers to prevent direct contact and/or to reduce potential leaching of contaminants in the unsaturated soil zone to underlying groundwater. Examples of controls/containment include capping with soil cover or other types of impervious surface material such as concrete or asphalt pavement. This alternative may also include institutional controls to prevent disturbance and maintain integrity of the containment system.

Soil vapor extraction (SVE) includes installation and operation of vapor extraction wells screened within the unsaturated soil zone and application of a vacuum to draw soil gas and VOCs from the soil matrix. The extracted vapors are directed into a treatment system, if required, to remove VOCs prior to discharge to the atmosphere.

Soil excavation includes physical removal of impacted soil above or near the level of the water table. Deeper excavation may also be possible in combination with dewatering to temporarily lower the water table, or other means such as the use of bentonite slurry to prevent ingress of water. The excavated material would be managed during the excavation process to segregate impacted and non-impacted soil, and other types of material (e.g., concrete rubble and debris) that may be encountered. Each type of excavated material would be stockpiled near the excavation area pending sampling and analysis for characterization purposes. The general options for managing the excavated material include off-Site treatment/disposal, on-Site treatment and re-use as backfill, and re-use as backfill without treatment. Restoration would include backfilling and re-instatement of suitable cover.

5.1.2 S-8 AREA - GROUNDWATER

The No Action alternative is included to provide a basis for comparison to other alternatives that involve specific actions to remediate groundwater impacted above the Tier 2 standards.

Groundwater MNA relies on natural processes to attenuate the groundwater impacts to concentrations below the Tier 2 standards, and incorporates groundwater monitoring to

confirm that remedial goals are attained within a reasonable time frame. The attenuation processes that may be functional include both destructive (e.g., biodegradation) and non-destructive (e.g., dispersion) processes, according to Site-specific conditions. This alternative also includes the implementation of groundwater use restrictions as necessary to prevent exposure to impacted groundwater until such time as remedial goals are attained.

Groundwater enhanced in situ biological treatment includes the introduction of nutrients and other substances in groundwater via injection wells and/or galleries to promote and accelerate in situ biodegradation processes leading to more rapid attainment of remedial goals relative to No Action and MNA alternatives. Examples of the types of enhancement that can be considered include emulsified soy lactate and nutrients (ammonium sulfate, sodium dihydrogen phosphates). This alternative may also include implementation of groundwater use restrictions, if necessary, based on the overall remedial time frame.

Groundwater ISCO includes the introduction of chemical oxidizers in groundwater via injection wells and/or galleries to promote chemical reactions leading to the destruction of chemical compounds. Examples of typical chemical oxidizers used for treatment of dissolved VOCs in groundwater include potassium persulfate, potassium permanganate, and Fenton's reagent. This alternative may include implementation of groundwater use restrictions; however this may not be necessary due to the relatively short implementation time frame that would be expected.

5.2 SB-110 AREA

As discussed in Section 2.5.2 and Appendix A, VOCs were detected in soil samples from three boreholes in the SB-110 Area at concentrations above Tier 2 standards for soil based on groundwater protection. The current groundwater monitoring data for the immediate area where the soil exceedances were identified indicates that groundwater is not impacted above Tier 2 standards. However the groundwater monitoring results for TMW-150 and TMW-151, located approximately 150 ft northeast of SB-110, indicate the presence of VOCs slightly above the Tier 2 standards. Therefore the remedial alternatives described below focus on two sub-areas, soil at the SB-110 Area, and shallow groundwater at TMW-150 and TMW-151. The estimated extent of soil impacted above Tier 2 standards for protection of groundwater is shown on Figure 2.6. The estimated extent of VOC-impacted groundwater in this area is shown on Figure 2.7.

The remedial alternatives developed for this area include the following:

Soil (SB-110, SB-119, SB-121)

- No Action
- Engineering controls/containment
- Soil Vapor Extraction (SVE)
- Soil excavation

Groundwater (TMW-150, TMW-151)

- No Action
- Groundwater Monitored Natural Attenuation (MNA)
- Groundwater enhanced in situ biological treatment
- Groundwater in situ chemical oxidation (ISCO)

5.2.1 SB-110 AREA - SOIL

The No Action alternative is included to provide a basis for comparison to other alternatives that involve specific actions to remediate groundwater impacted above the Tier 2 standards.

See Section 5.1.1 for the general description of engineering controls/containment, SVE, and soil excavation alternatives.

5.2.2 SB-110 AREA - GROUNDWATER

The No Action alternative is included to provide a basis for comparison to other alternatives that involve specific actions to remediate groundwater impacted above the Tier 2 standards.

See Section 5.1.2 for the general description of MNA, enhanced in situ biological treatment, and ISCO alternatives.

5.3 TMW-127 AREA

As discussed in Section 2.5.3 and Appendix A, there is no indication of soil contamination above Tier 2 standards in the TMW-127 Area based on current information. Therefore the remedial alternatives described below focus on the presence of VOCs in shallow groundwater as indicated by the analytical results for TMW-127 and TMW-155, and intermediate groundwater at MW-156. The estimated extent of VOC-impacted groundwater in this area is shown on Figure 2.9.

The remedial alternatives developed for this area include the following:

Groundwater (TMW-127, TMW-155 and MW-156)

- No Action
- Groundwater Monitored Natural Attenuation (MNA)
- Groundwater enhanced in situ biological treatment
- Groundwater in situ chemical oxidation (ISCO)
- Groundwater pump and treat (intermediate depth)

5.3.1 TMW-127 AREA - GROUNDWATER (SHALLOW)

The No Action alternative is included to provide a basis for comparison to other alternatives that involve specific actions to remediate groundwater impacted above the Tier 2 standards.

See Section 5.1.2 for the general description of MNA, enhanced in situ biological treatment, and ISCO alternatives.

5.3.2 TMW-127 AREA - GROUNDWATER (INTERMEDIATE)

The No Action alternative is included to provide a basis for comparison to other alternatives that involve specific actions to remediate groundwater impacted above the Tier 2 standards.

See Section 5.1.2 for the general description of MNA, enhanced in situ biological treatment, and ISCO alternatives.

Groundwater pump and treat includes physical removal of impacted groundwater via extraction wells positioned within the plume area and/or hydraulic containment to prevent plume expansion. The extracted groundwater is typically treated prior to discharge to reduce chemical concentrations in accordance with permissible discharge limits. The options for treated water discharge may include surface water outfall, groundwater re-injection, municipal sewers, and re-use for industrial purposes, e.g., cooling water. The level of treatment to be applied may vary according to the discharge option that is selected. Typical treatment technologies that are utilized for dissolved VOCs in groundwater include air stripping and carbon adsorption. Pre-treatment may also be needed to prevent fouling depending on the general chemistry characteristics of the extracted groundwater.

5.4 MW-103A AREA

As discussed in Section 2.5.4 and Appendix A, VOCs were detected in soil samples from boreholes in the MW-103A area at concentrations above Tier 2 standards for soil based on direct contact and groundwater protection. The current groundwater monitoring data indicates that groundwater is not impacted above Tier 2 standards with the exception of MW-103A where the intermittent presence of LNAPL has been observed. Therefore the remedial alternatives described below focus on impacted soil in the unsaturated zone and LNAPL in the area around MW-103A¹. The estimated extent of soil impacted above Tier 2 standards and the location of MW-103A is shown on Figures 2.11a and 2.11b.

The remedial alternatives developed for this area include the following:

Soil and LNAPL

- No Action
- Engineering controls/containment and monitoring
- Engineering controls and LNAPL recovery
- Engineering controls and LNAPL stabilization
- Soil and LNAPL excavation
- In situ treatment (soil and LNAPL)

¹ The potential existence of preferential LNAPL migration pathways via buried infrastructure should also be considered during remedy selection and/or remedial design.

5.4.1 MW-103A AREA - SOIL AND LNAPL

The No Action alternative is included to provide a basis for comparison to other alternatives that involve specific actions to remediate soil impacted above the Tier 2 standards and LNAPL.

Engineering controls/containment and monitoring includes the use of physical barriers to prevent direct contact and/or to reduce potential leaching of contaminants in the unsaturated soil zone to underlying groundwater. Examples of controls/containment include capping with soil cover or other types of impervious surface material such as concrete or asphalt pavement. This alternative may also include institutional controls to prevent disturbance and maintain integrity of the containment system. This alternative would also include monitoring to assess the presence of LNAPL and to determine groundwater quality conditions within the area.

Engineering controls and LNAPL recovery includes the containment components described above with the addition of a new well and mechanical system for removing LNAPL using skimming and/or pumping technology. The recovered LNAPL would be containerized and removed for off-Site disposal.

Engineering controls and LNAPL stabilization includes the containment components described above in conjunction with the use of stabilization agents injected directly into the saturated zone where LNAPL is present. The objective is to convert the LNAPL from liquid to solid form and mitigate the presence of free product.

Soil and LNAPL excavation includes physical removal of impacted soil above or near the level of the water table and deeper excavation (with dewatering if necessary) around MW-103A to remove LNAPL and impacted soil. The excavated material would be managed during the excavation process to segregate impacted and non-impacted soil, LNAPL, and other types of material (e.g., concrete rubble and debris) that may be encountered. LNAPL that is recovered during excavation would be containerized for off-Site disposal. Each type of excavated solid material would be stockpiled near the excavation area pending sampling and analysis for characterization purposes. The general options for managing the excavated solid material include off-Site treatment/disposal; on-Site treatment and re-use as backfill; and re-use as backfill without treatment. Restoration would include backfilling and re-instatement of suitable cover.

In situ treatment includes the use of technologies designed to remove or destroy the VOC and hydrocarbon components in the soil above and below the water table, without the need for excavation. Electrical resistance heating technology is potentially applicable and involves use of electrodes placed in the ground and application of electrical current to heat the soil to temperatures sufficient to drive chemical constituents to a gaseous state such that they can be withdrawn, collected and treated. this technology can be applied to unsaturated zone soil and to saturated zone soil and liquids.

5.5 TMW-130 AREA

As discussed in Section 2.5.5 and Appendix A, VOCs were detected in soil samples from boreholes in the TMW-130 Area at concentrations above Tier 2 standards for soil based on direct contact and groundwater protection. The current groundwater monitoring data indicates that groundwater is not impacted above Tier 2 standards but the presence of LNAPL has been observed in some wells. Therefore the remedial alternatives described below focus on impacted soil in the unsaturated zone and LNAPL in the area around TMW-130². The estimated extent of impacted soil and observed LNAPL is shown on Figure 2.14.

The remedial alternatives developed for this area include the following:

Soil and LNAPL

- No Action
- Engineering controls/containment and monitoring
- Engineering controls and LNAPL recovery
- Engineering controls and LNAPL stabilization
- Soil and LNAPL excavation
- In situ treatment (soil and LNAPL)

² The potential existence of preferential LNAPL migration pathways via buried infrastructure should also be considered during remedy selection and/or remedial design.

5.5.1 TMW-130 AREA - SOIL AND LNAPL

The No Action alternative is included to provide a basis for comparison to other alternatives that involve specific actions to remediate soil impacted above the Tier 2 standards and LNAPL.

See Section 5.4.1 for the general description of the alternatives involving engineering controls/containment and monitoring, LNAPL recovery, LNAPL stabilization, excavation, and in situ treatment.

For the soil and LNAPL excavation alternative, two options are considered. Option 1 includes excavation of soil and LNAPL within the area of observed LNAPL. Option 2 includes the area for Option 1 plus an expanded area of potentially hydrocarbon-impacted soil (unsaturated zone) extending beyond the limits of observed LNAPL. These areas are illustrated on Figure 2.14.

6.0 EVALUATION OF REMEDIAL ALTERNATIVES

6.1 SCREENING CRITERIA

The remedial alternatives have been screened against the short- and long-term aspects of effectiveness, implementability, cost, reliability, risks, and timeliness consistent with relevant KDHE guidance for conducting Feasibility Studies and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), as detailed below.

Effectiveness

The effectiveness of each remedial alternative is assessed based on the following:

- The effectiveness of a remedial alternative in handling the estimated areas or volumes of contaminated media and meeting the remediation goals identified
- The effectiveness of a remedial alternative in protecting human health and the environment during the construction and implementation phase
- The effectiveness of a remedial alternative with respect to the Chemicals of Concern (COCs) and conditions at the Site

Implementability

The implementability of each remedial alternative is assessed from both the technical perspective and the administrative perspective in terms of:

- Technical complexity
- Ability to obtain necessary permits for off-Site actions, if required
- Availability of treatment, storage, and disposal services
- Availability of necessary equipment and workers to implement the technology

Costs

The relative cost of each remedial alternative is estimated based on previous CRA experience, available applicable guidance, industry cost averages, and engineering judgment. Cost estimate details for each alternative (except No Action) are included in Appendix B.

Reliability

Each remedial alternative is evaluated in terms of their reliability of:

- Attaining a degree of certainty that the alternative will be successful
- Achieving long-term effectiveness of any measures that are required to manage the residues or remaining wastes or control emission or discharges to the environment

Risks

Each remedial alternative is evaluated for their risks, including:

- Short-term risk of implementation (including excavation, transportation, disposal, construction, operation, or maintenance activities) or discharges or damages to the environment from remedial activities
- Risk posed over the period of time required to attain applicable remedial goals (including transportation, disposal, containment, operation, or maintenance activities) or discharges from remedial systems
- Risk of harming health, safety, public welfare, or the environment by contaminants remaining after completion of remedial actions

Timeliness

Each remedial alternative is evaluated for their timeliness of mitigating or eliminating the AOCs.

6.2 SCREENING EVALUATION

The remedial alternatives screening evaluation is presented in tabular format for each AOC and media, as follows:

- Table 6.1a – S-8 Area Soil
- Table 6.1b – S-8 Area Groundwater
- Table 6.2a – SB-110 Area Soil
- Table 6.2b – SB-110 Area Groundwater
- Table 6.3 – TMW-127 Area Groundwater
- Table 6.4 – MW-103A Area Soil and LNAPL
- Table 6.5 – TMW-130 Area Soil and LNAPL

Each table includes a discussion of each alternative relative to the screening criteria listed in Section 6.1 and other considerations (e.g., environmental footprint) as applicable. Each table also includes a comparative evaluation of the alternatives.

Table 6.6 provides a summary of each AOC alternative and the costing for each alternative.

7.0 REFERENCES

CRA report dated April 2012. "Remedial Alternatives Evaluation Work Plan and Schedule".

KDHE request in 2003. Request to perform a confirmatory soil and groundwater investigation of the whole site to address uncertainties.

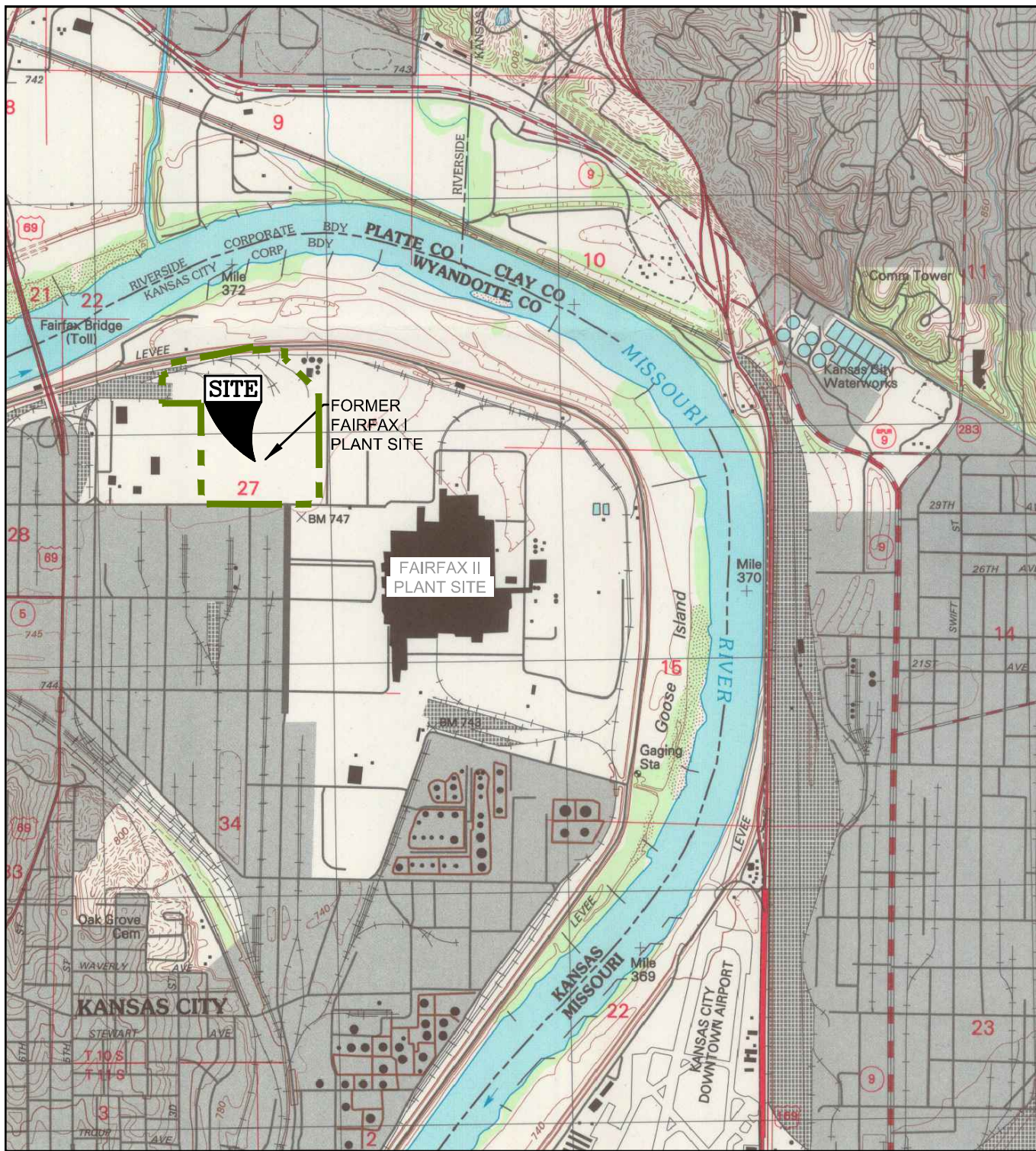
KDHE letter dated August 2006. Request to perform additional investigative work in areas where little to no investigations have occurred.

KDHE letter dated February 2007. No further action letter.

KDHE letter dated March 12, 2007. Request to re-develop and re-sample TMW-127.

KDHE request in September 2008. Request to install additional borings to complete soil delineation.

Order dated November 21, 2011. Consent Agreement and Final Order Case No. 11-E-109 BER.



LEGEND



FORMER FAIRFAX I PROPERTY BOUNDARY
(MLC PROPERTY ID 1289-1)



0 1/4 1/2 mile

BASE SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE;
NORTH KANSAS CITY, MO-KS 1990

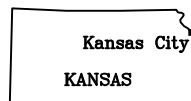
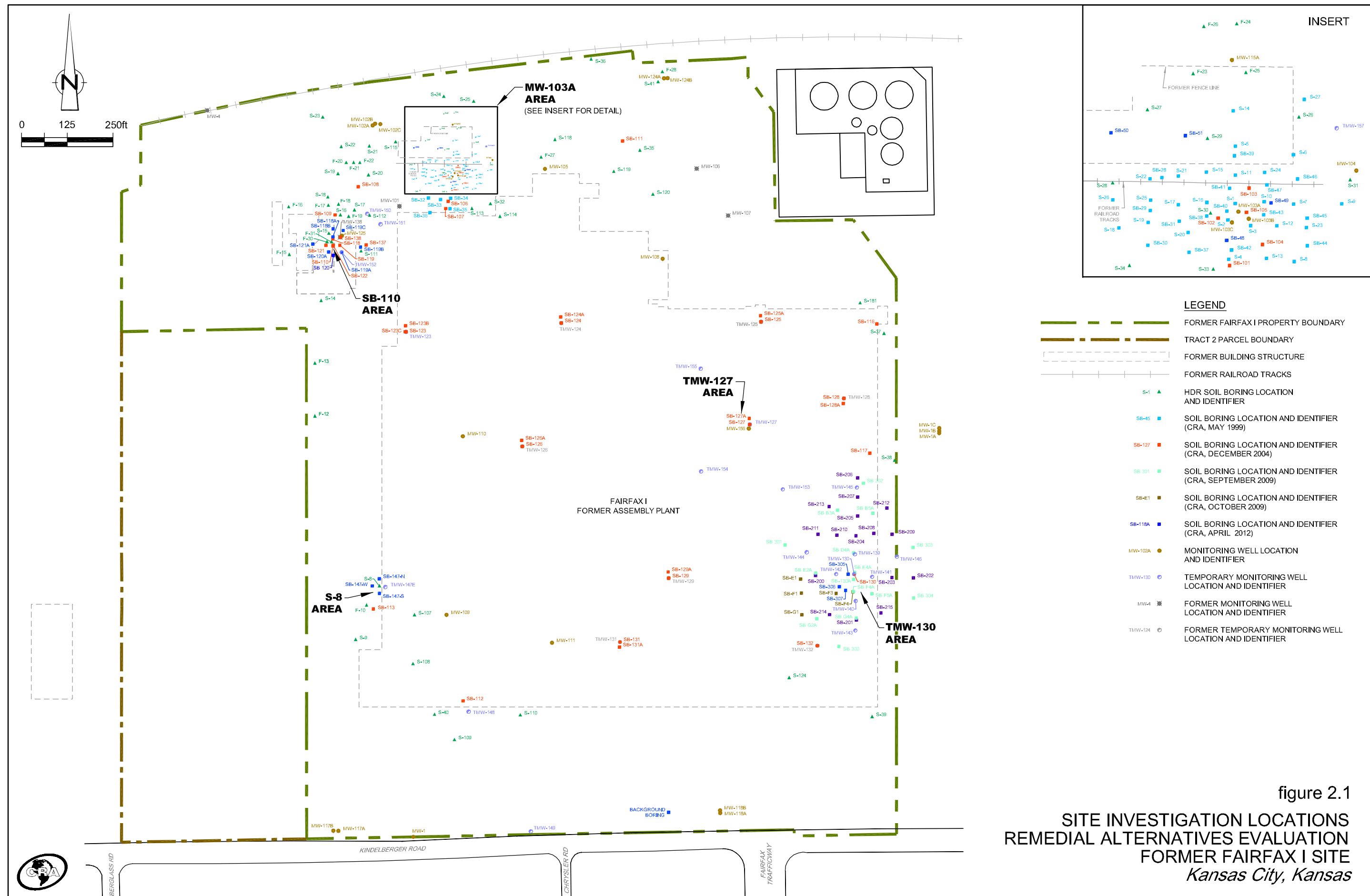
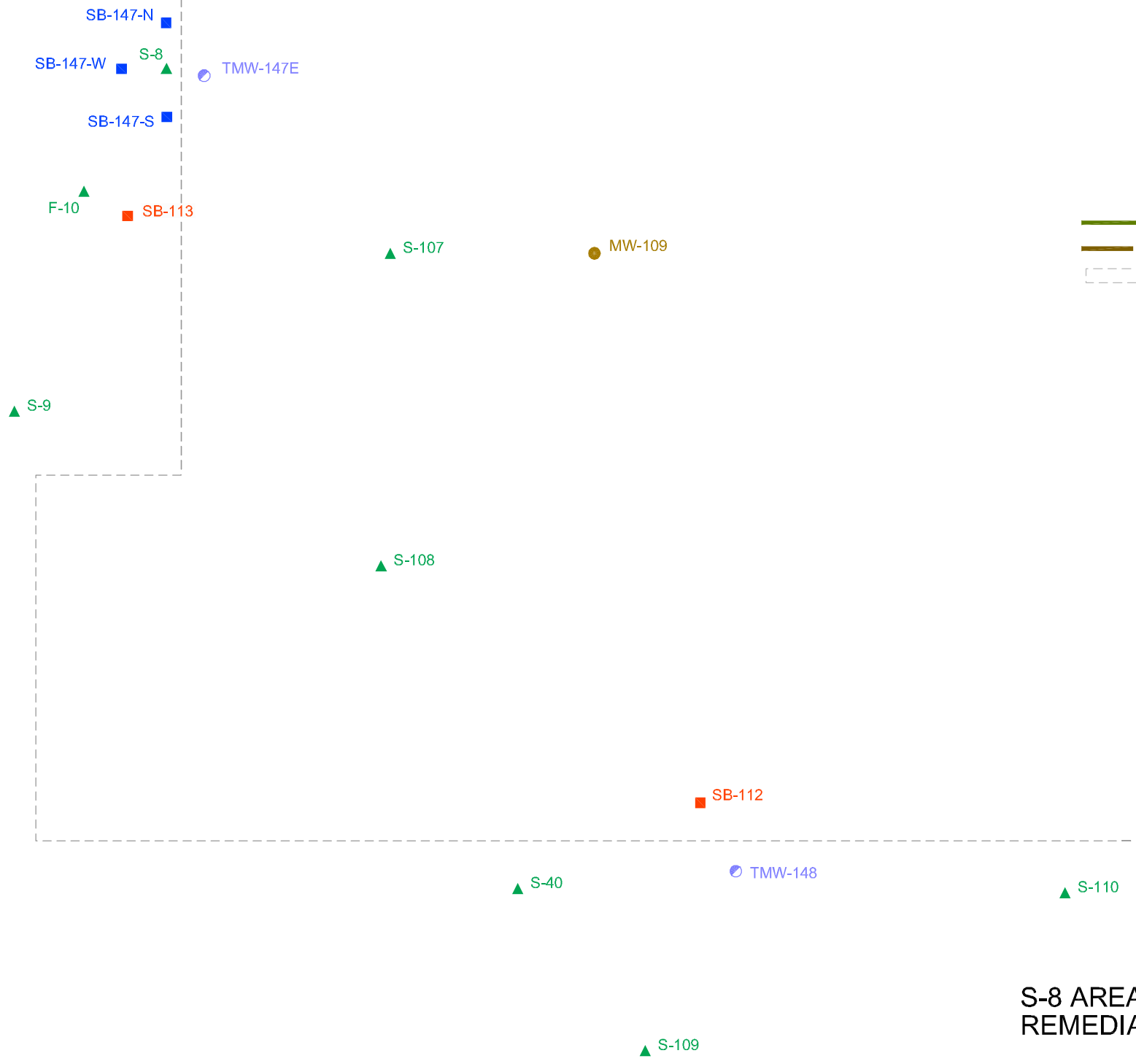
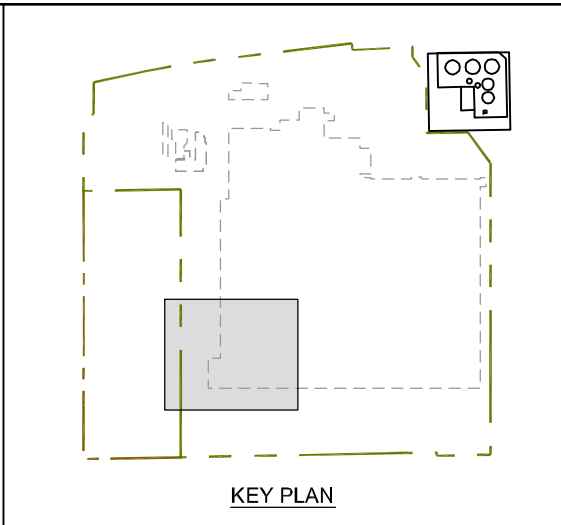
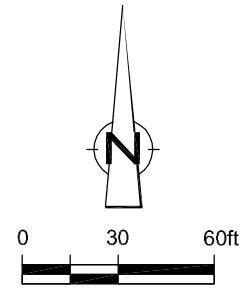


figure 1.1

SITE LOCATION
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
Kansas City, Kansas



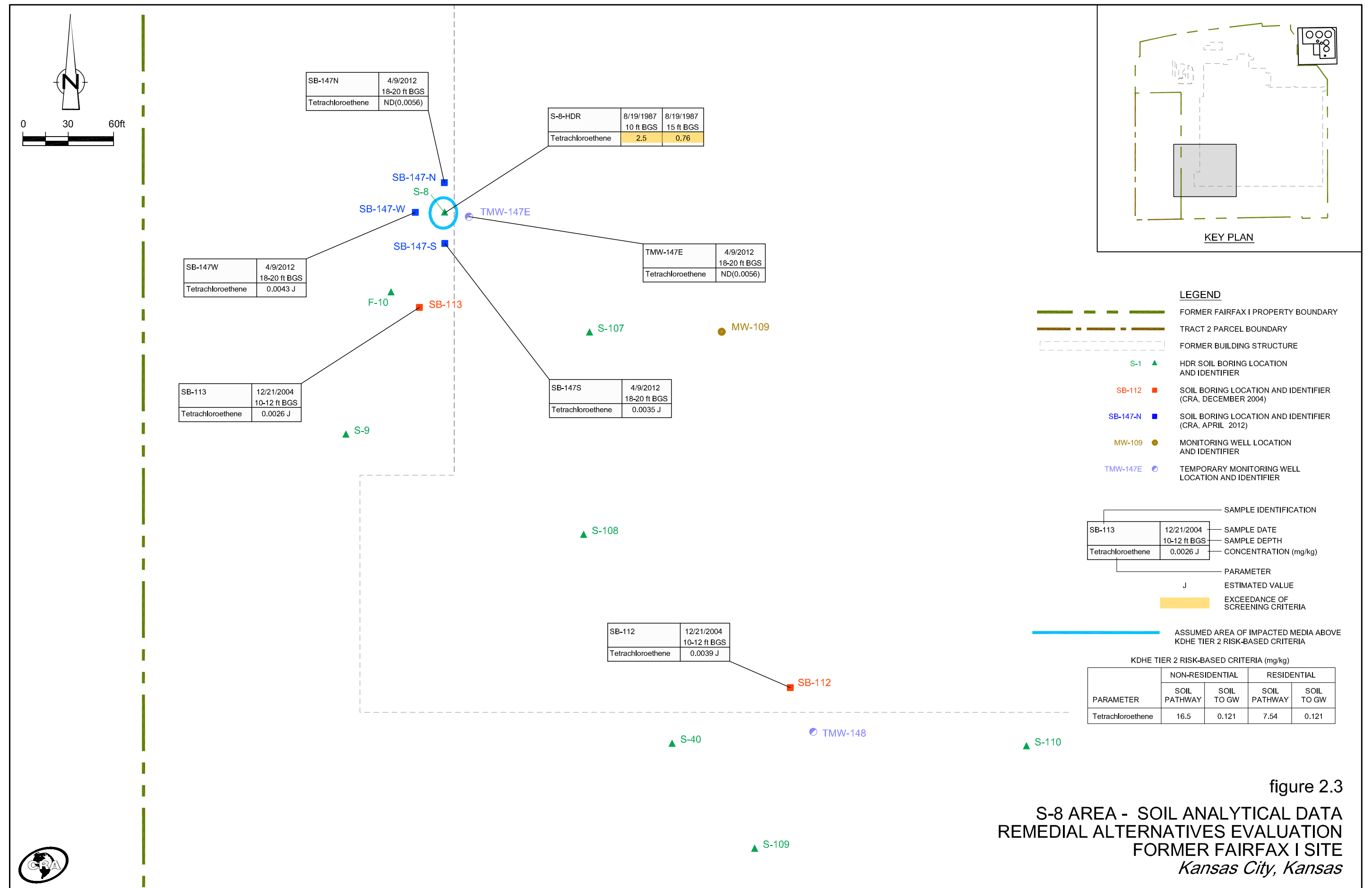


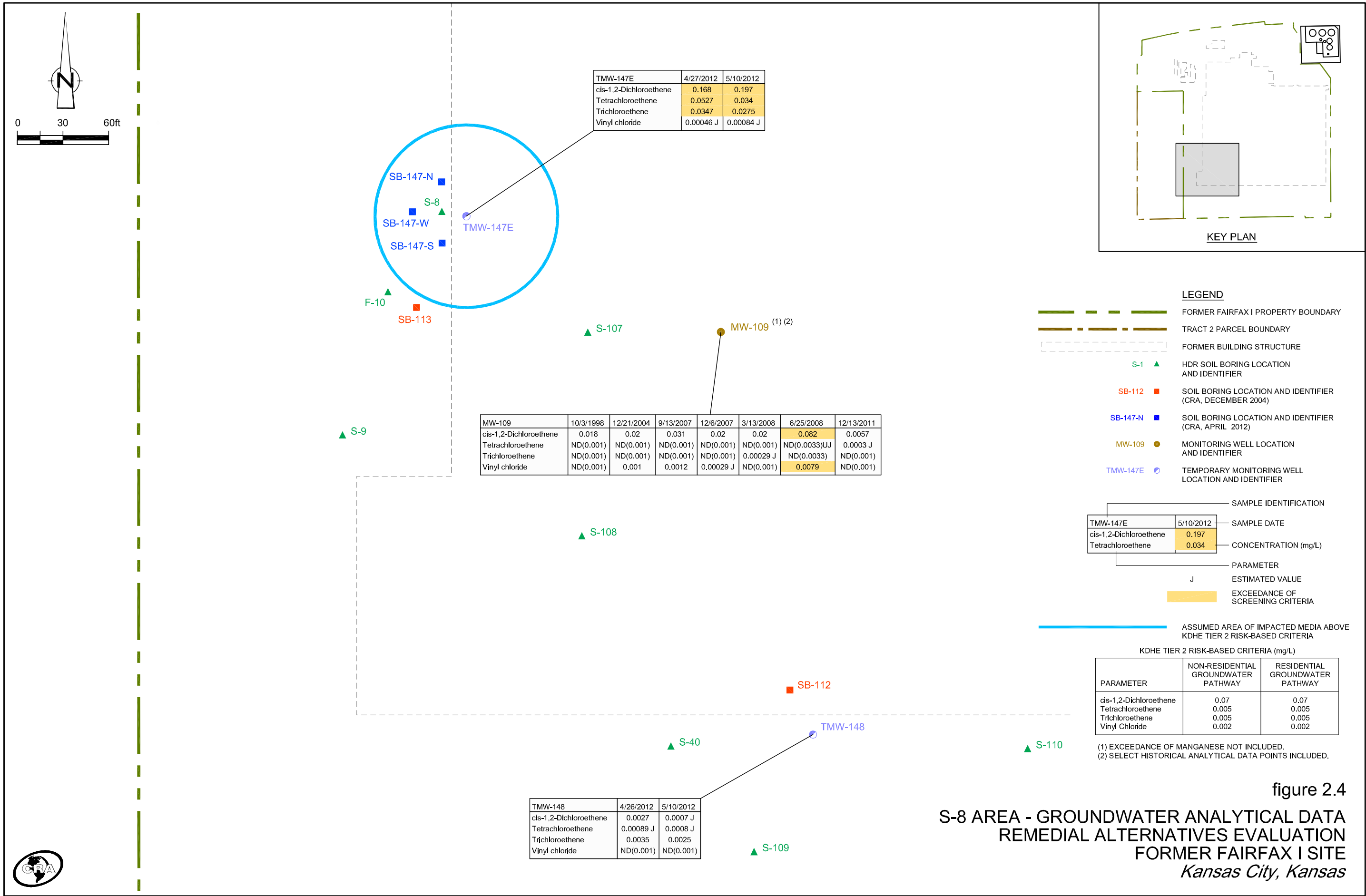


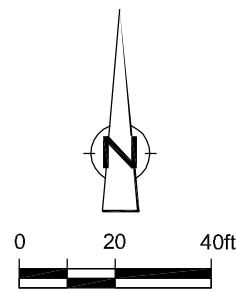
- LEGEND**
- FORMER FAIRFAX I PROPERTY BOUNDARY
 - TRACT 2 PARCEL BOUNDARY
 - FORMER BUILDING STRUCTURE
 - S-1 ▲ HDR SOIL BORING LOCATION AND IDENTIFIER
 - SB-112 ■ SOIL BORING LOCATION AND IDENTIFIER (CRA, DECEMBER 2004)
 - SB-147-N ■ SOIL BORING LOCATION AND IDENTIFIER (CRA, APRIL 2012)
 - MW-109 ● MONITORING WELL LOCATION AND IDENTIFIER
 - TMW-147E ● TEMPORARY MONITORING WELL LOCATION AND IDENTIFIER

figure 2.2
S-8 AREA - INVESTIGATION LOCATIONS
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
Kansas City, Kansas









S-4
FC
RAIL
TF

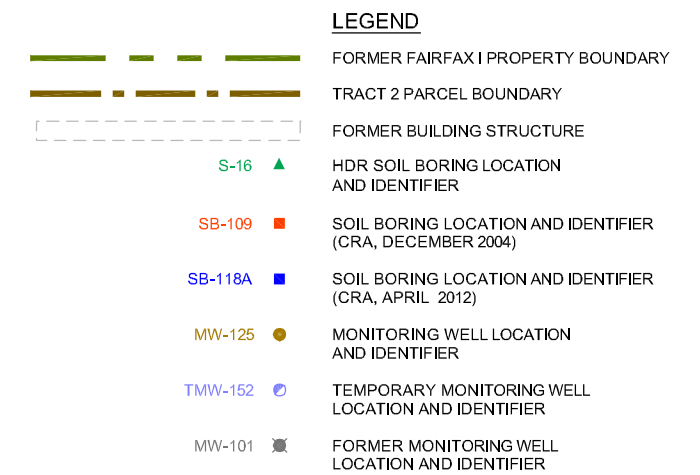
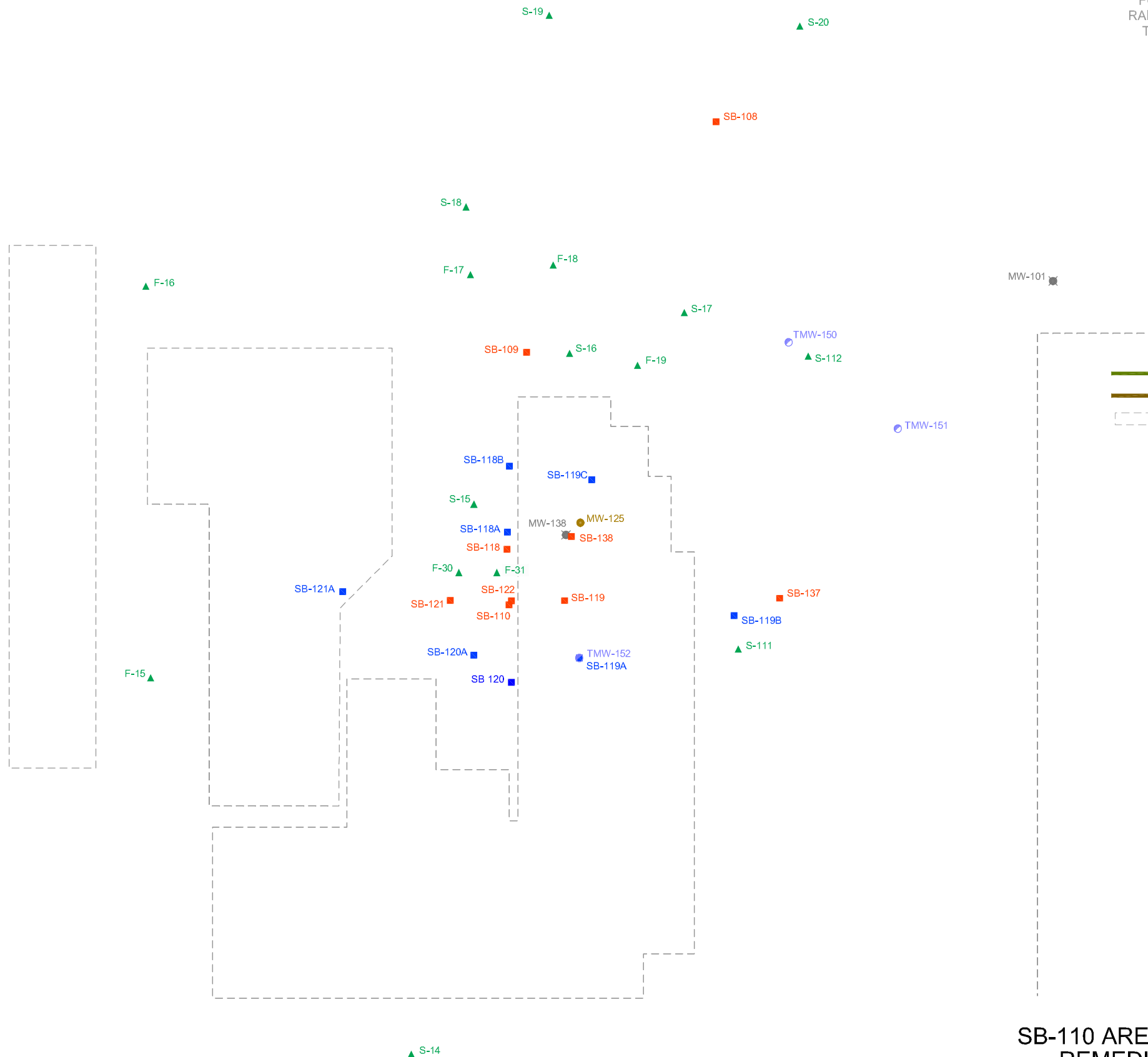
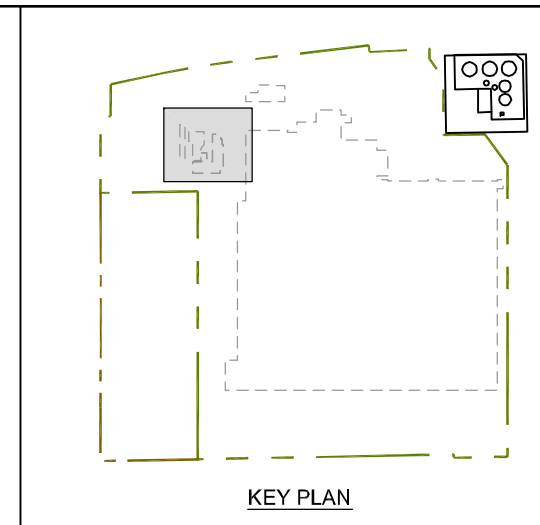
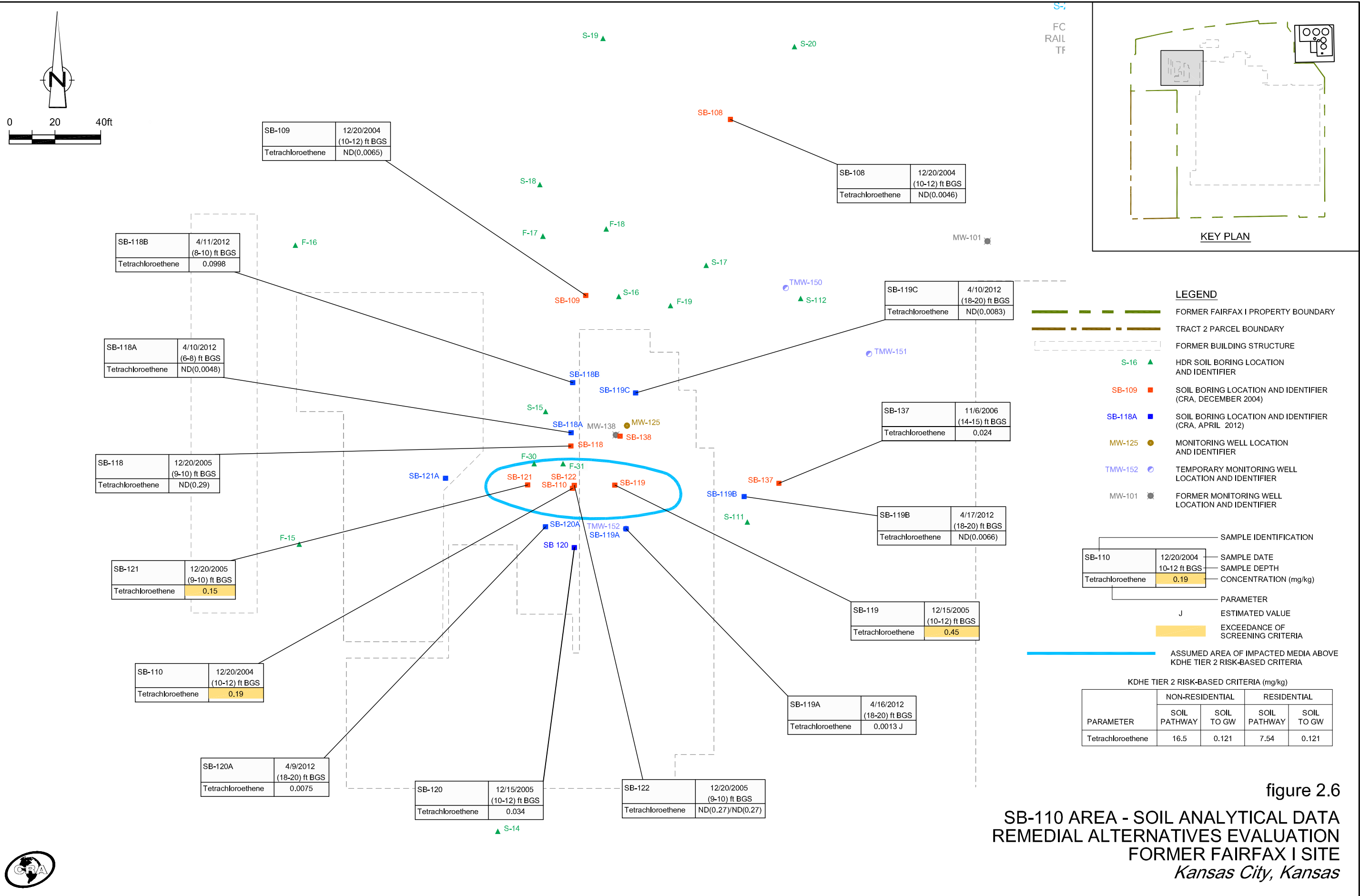
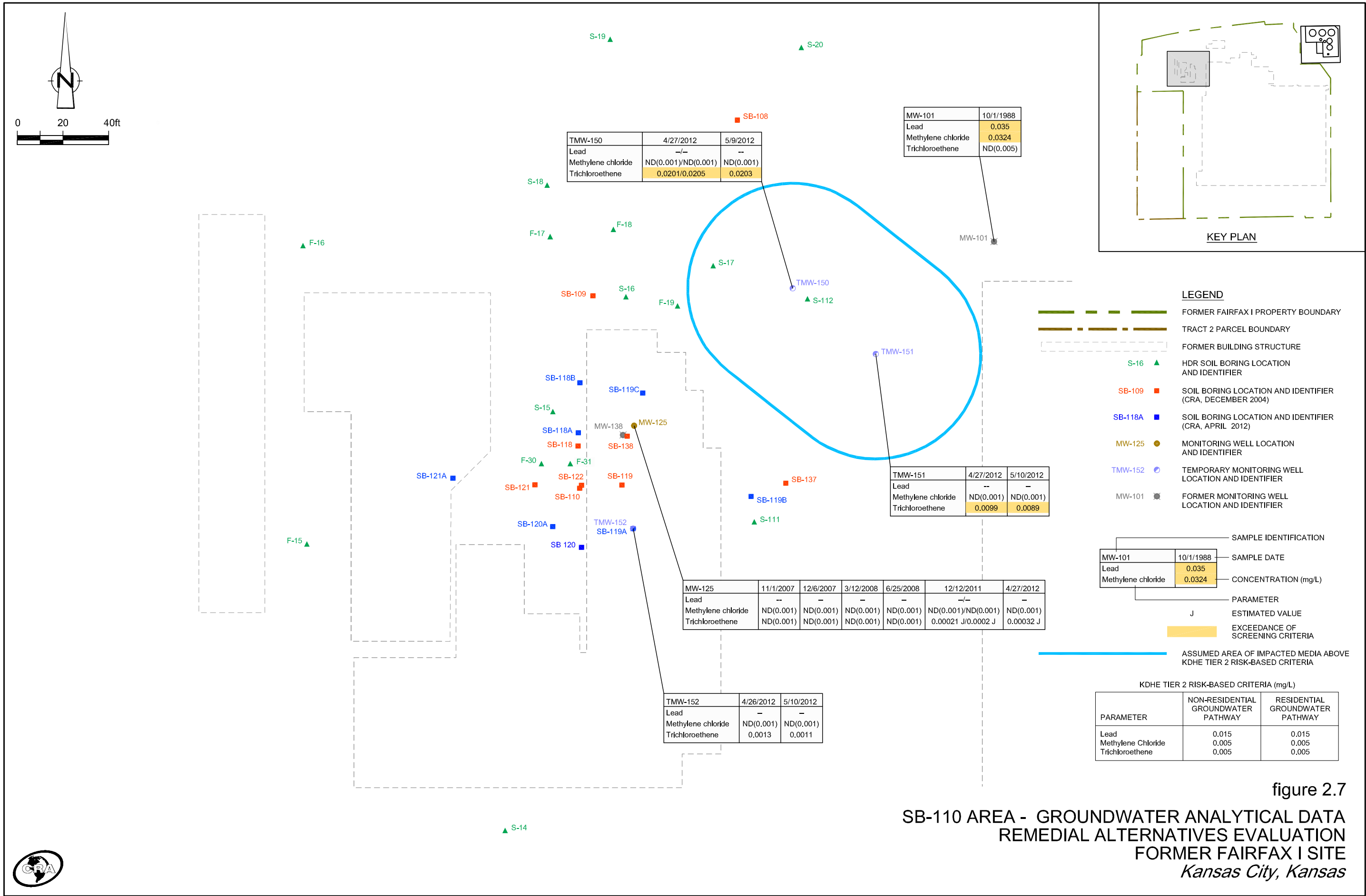
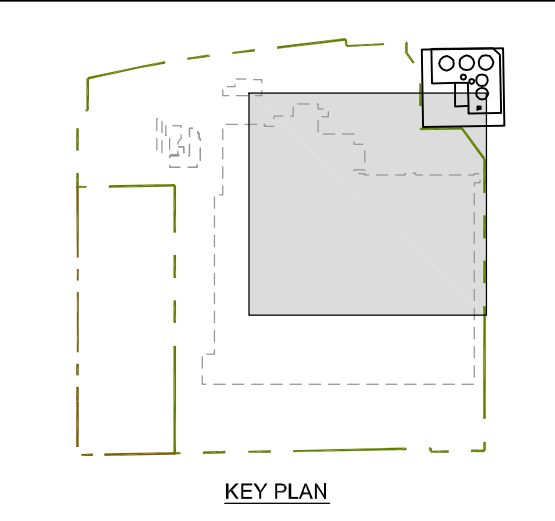
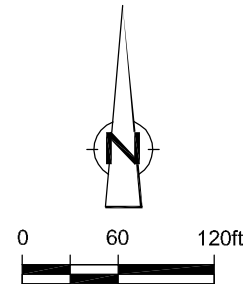


figure 2.5
SB-110 AREA - INVESTIGATION LOCATIONS
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
Kansas City, Kansas









- LEGEND**
- FORMER PROPERTY BOUNDARY
 - TRACT 2 PARCEL BOUNDARY
 - FORMER BUILDING STRUCTURE
 - FORMER RAILROAD TRACKS
 - MONITORING WELL LOCATION AND IDENTIFIER
 - TEMPORARY MONITORING WELL LOCATION AND IDENTIFIER
 - FORMER MONITORING WELL LOCATION AND IDENTIFIER
 - FORMER TEMPORARY MONITORING WELL LOCATION AND IDENTIFIER

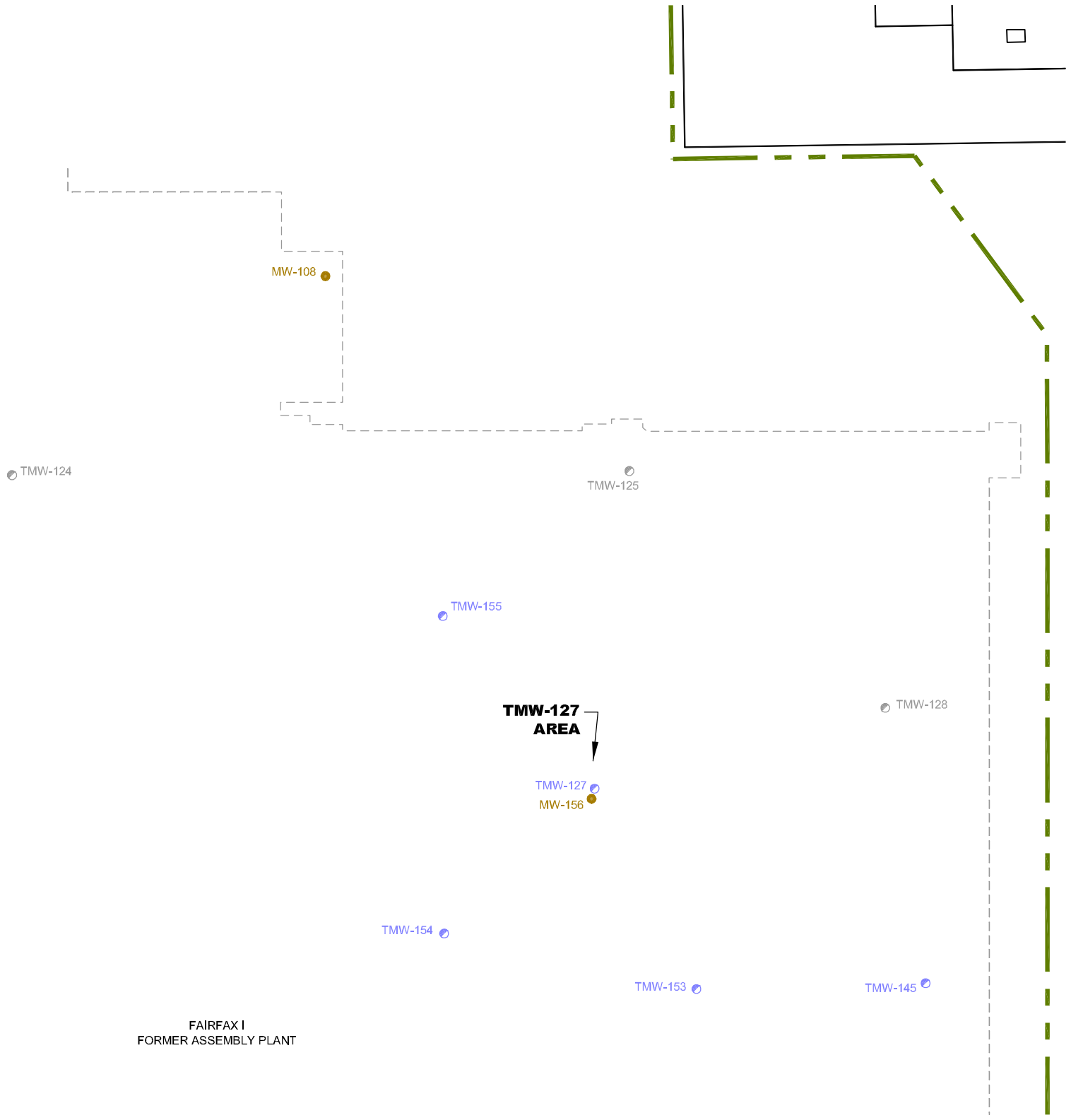
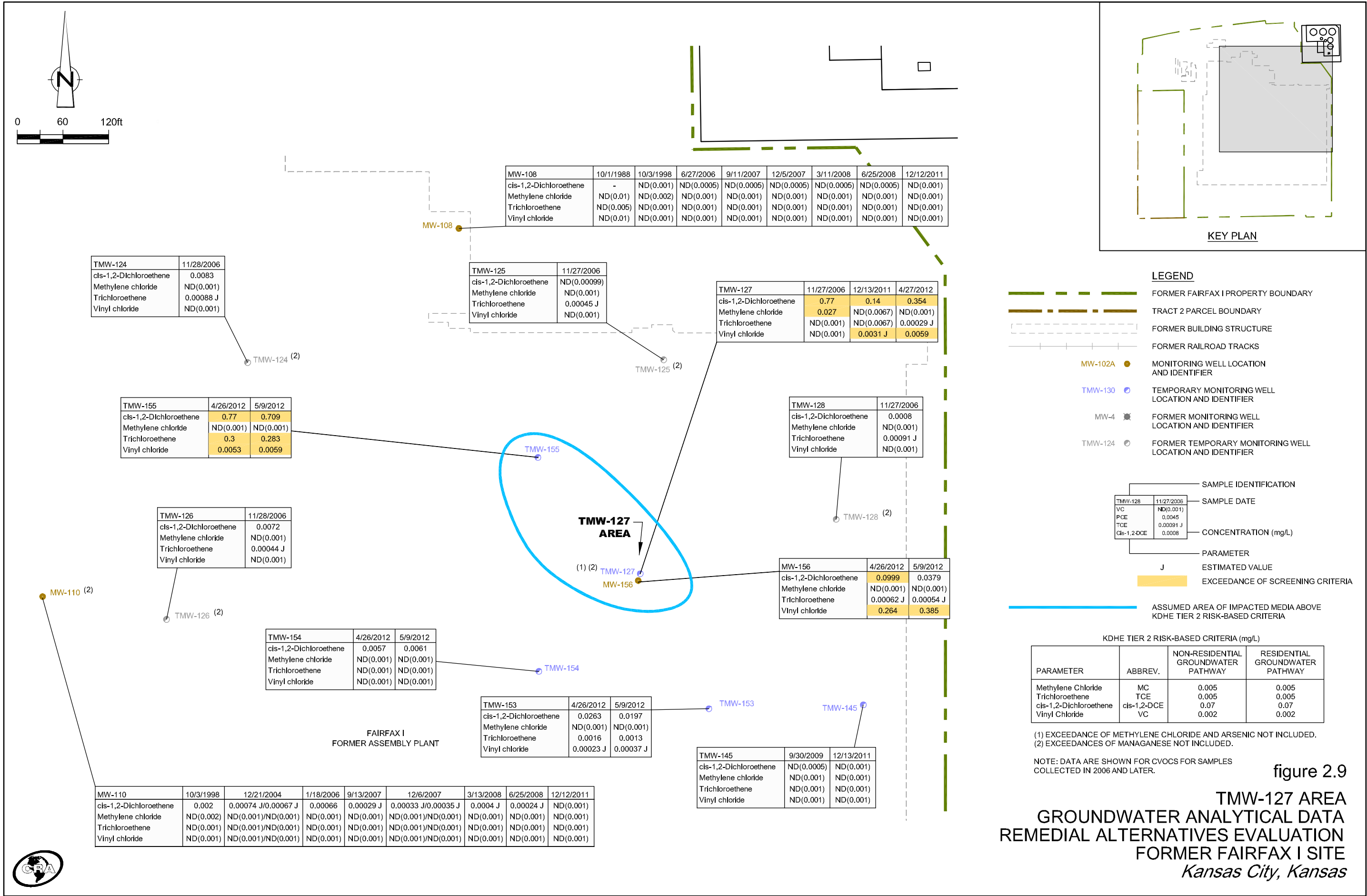
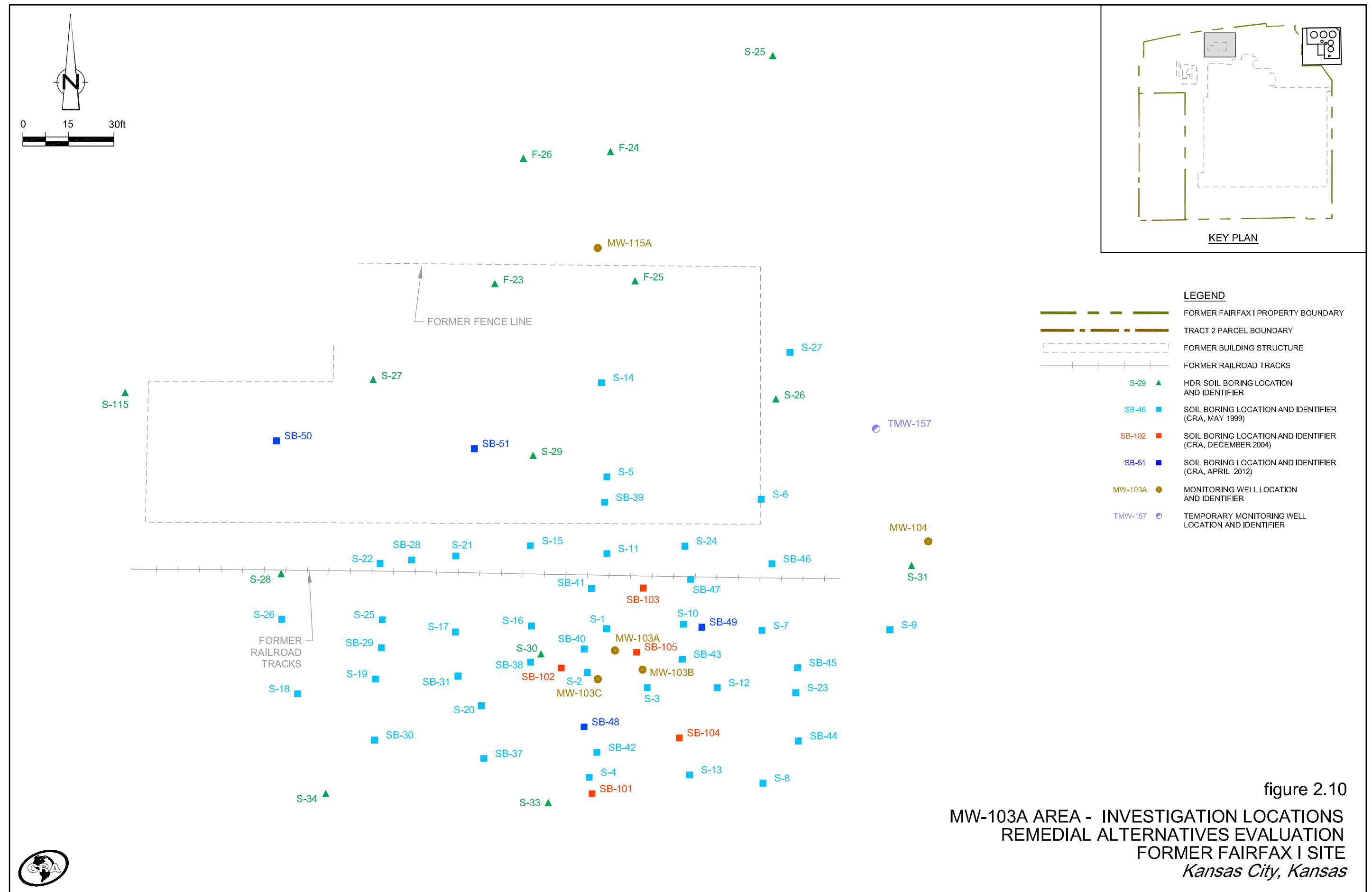
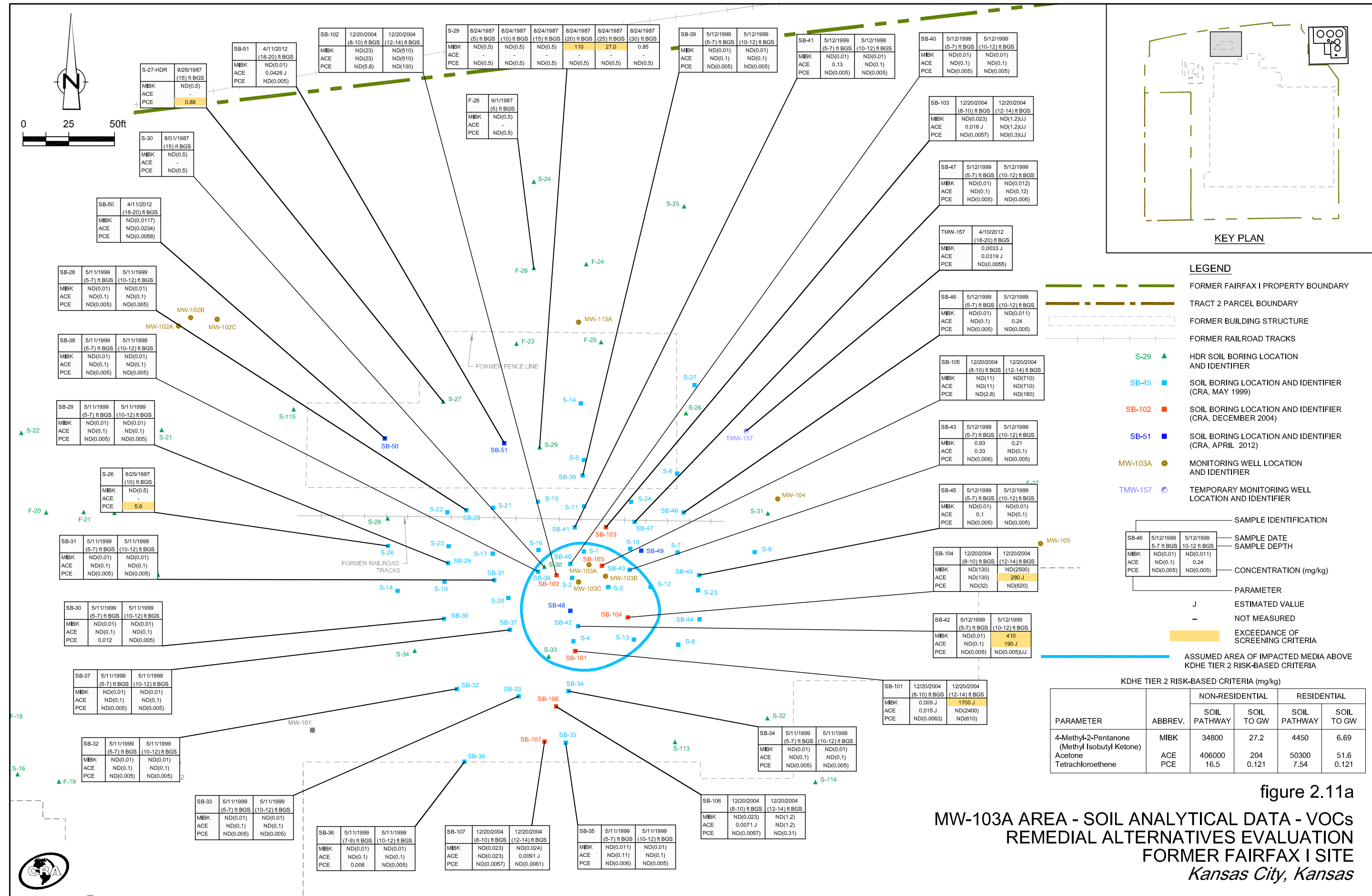


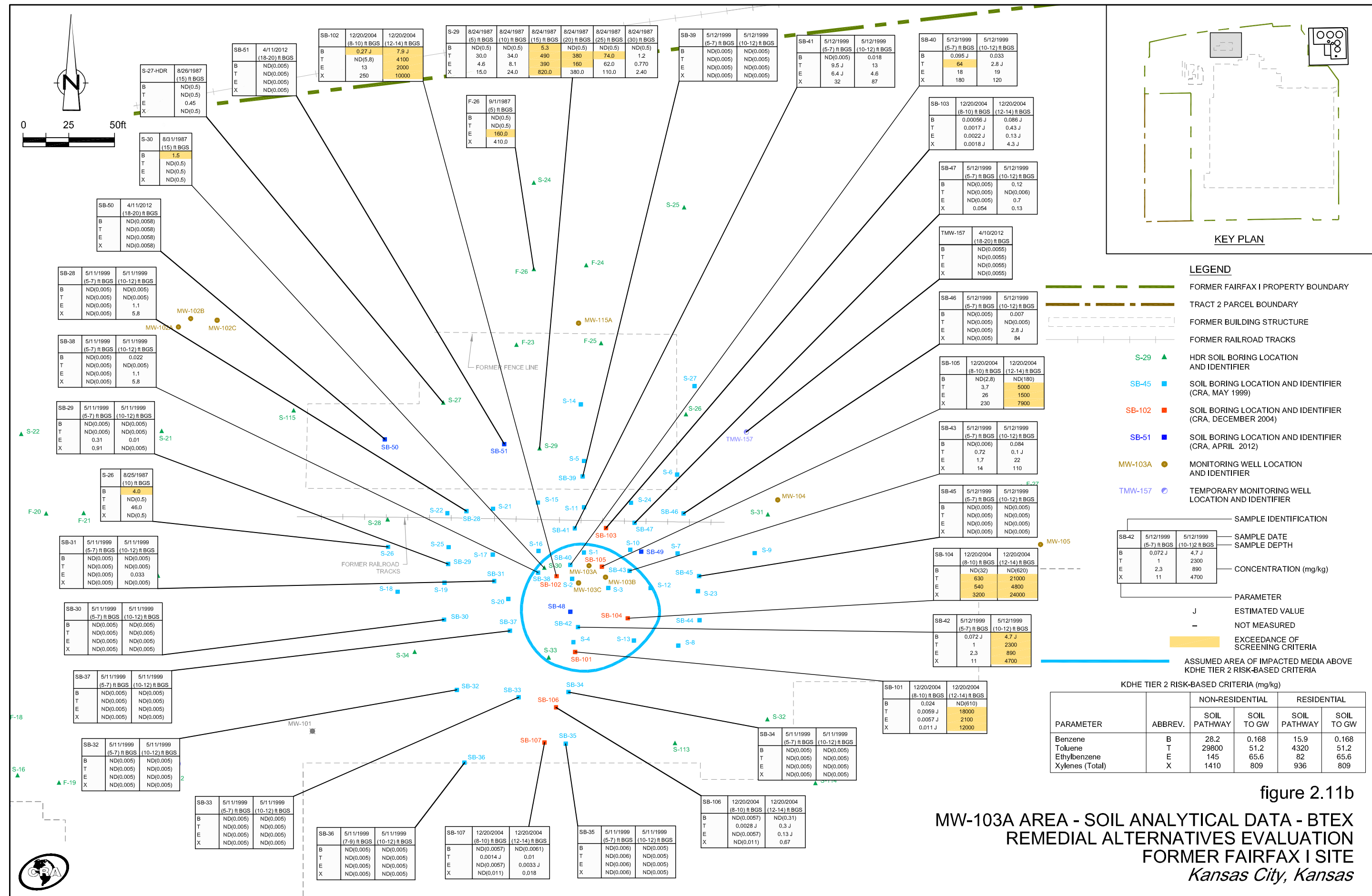
figure 2.8
TMW-127 AREA - INVESTIGATION LOCATIONS
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
Kansas City, Kansas

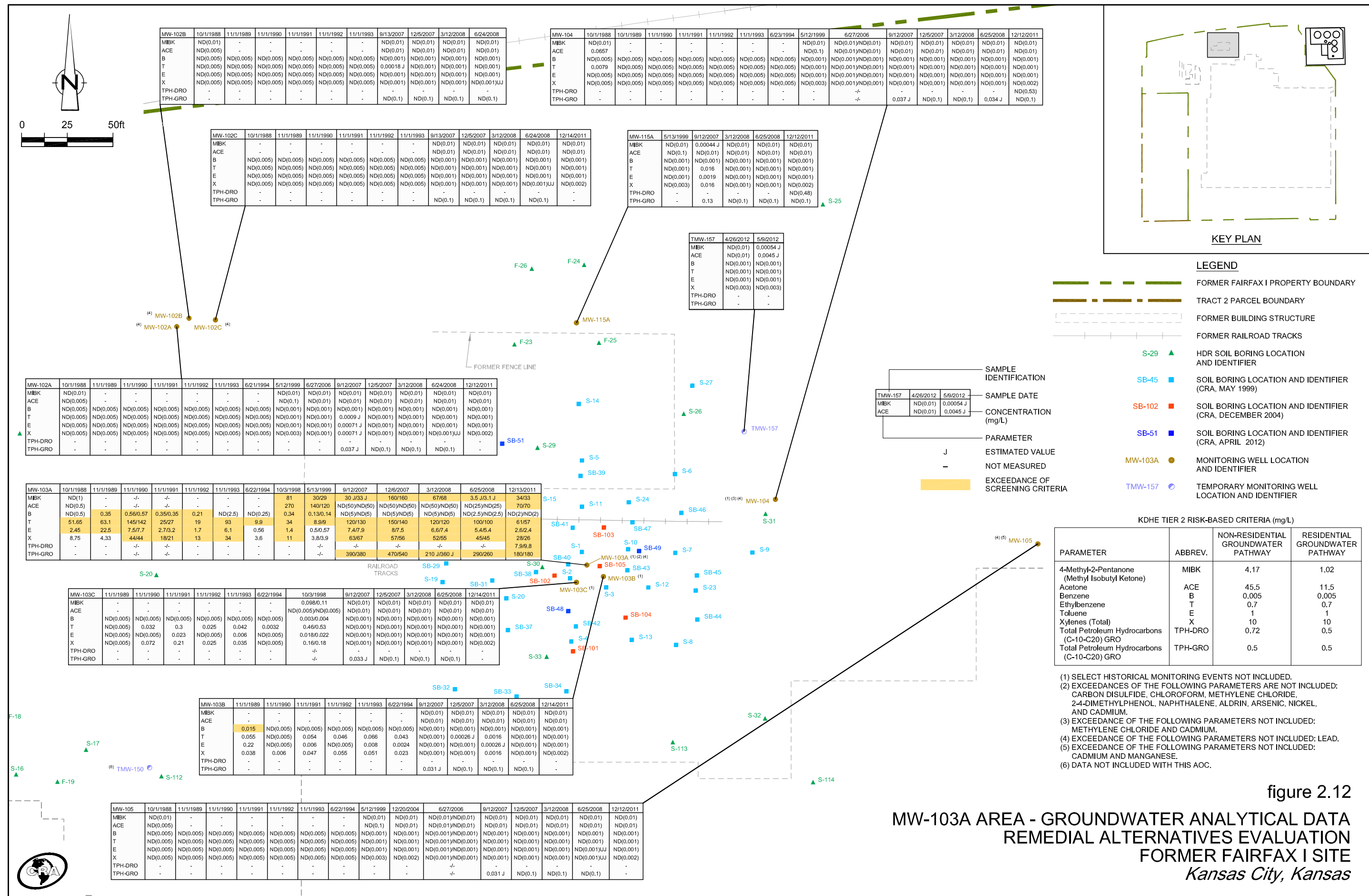


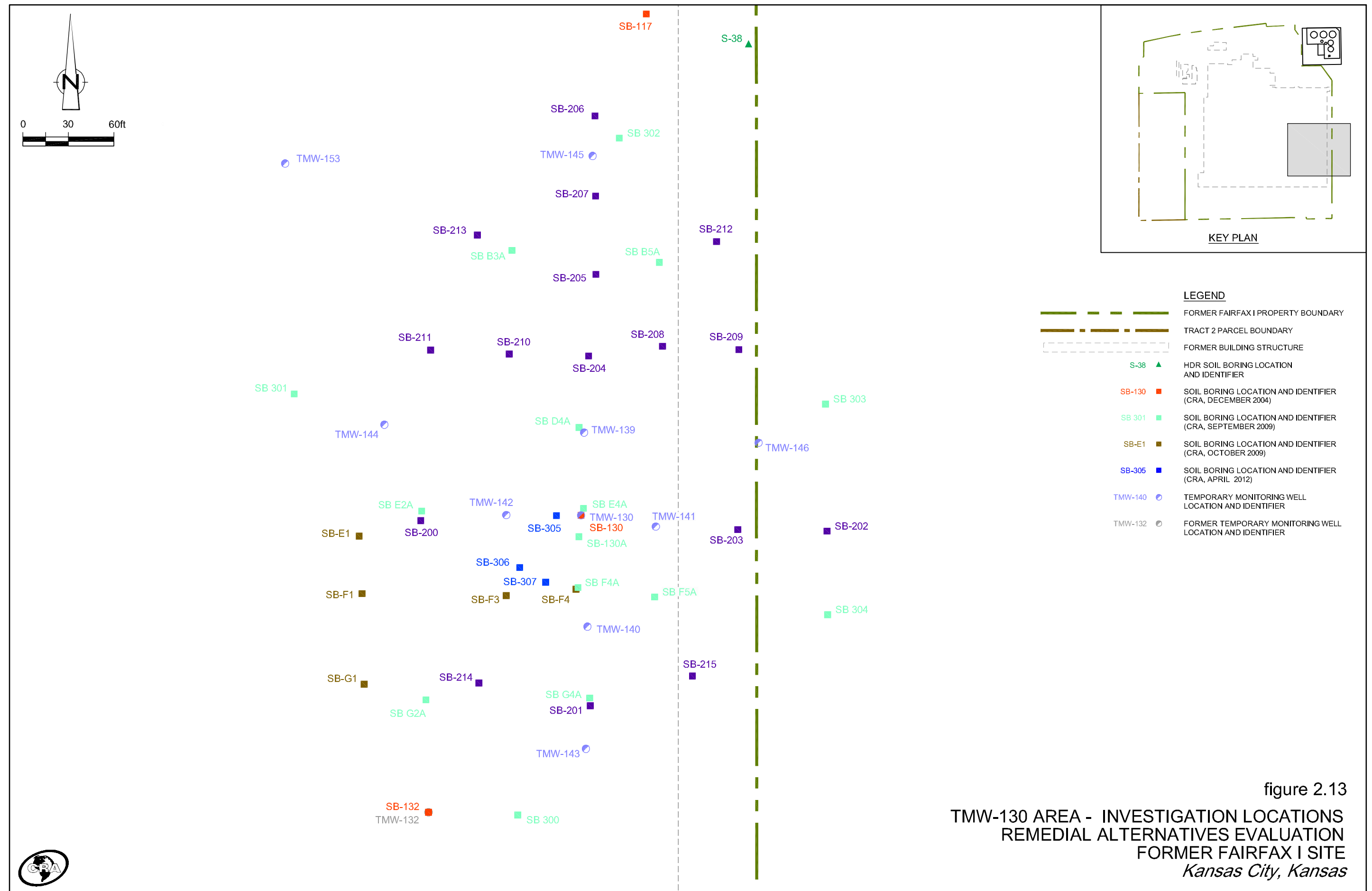


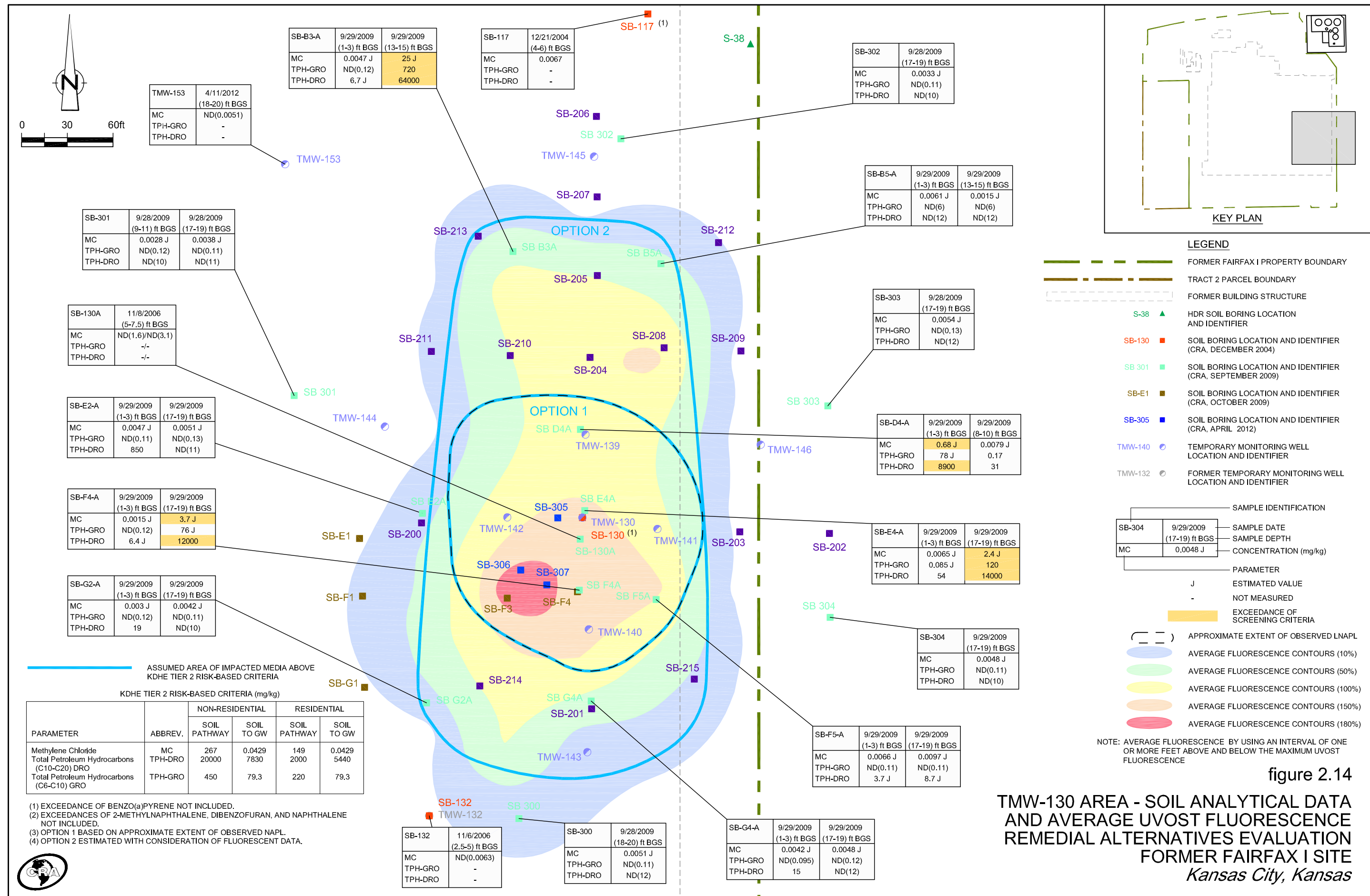












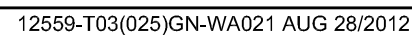


TABLE 4.1
INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

Response Actions	Remedial Technology	Process Options	Description	Effectiveness	Implementability	Cost	Screening Comments
No Action	Not applicable (NA)	NA	No actions are taken				Required for consideration by KDHE
Institutional Actions	Access restriction	Deed restrictions	Deeds for property in the area of influence would include restrictions on property use.	Moderate	Moderate	Low	Potentially applicable
In-Situ Treatment	Biological Treatment	Bioventing	Oxygen is delivered to contaminated unsaturated soils by forced air movement (either extraction or injection of air) to increase oxygen concentrations and stimulate biodegradation.	Moderate	Moderate	Moderate	Bioventing is a medium to long-term technology. Cleanup ranges from a few months to several years.
		Enhanced Bioremediation	Enhanced bioremediation is a process in which indigenous or inoculated micro-organisms (e.g., fungi, bacteria, and other microbes) degrade (metabolize) organic contaminants found in soil and/or ground water, converting them to innocuous end products. Nutrients, oxygen, or other amendments may be used to enhance bioremediation and contaminant desorption from subsurface materials.	Moderate	Moderate-Difficult	Moderate-High	The main advantage of the in situ process is that it allows soil to be treated with minimal disturbance of site activities.
		Phytoremediation	Phytoremediation is a process that uses plants to remove, transfer, stabilize, and destroy contaminants in soil and sediment. The mechanisms of phytoremediation include enhanced rhizosphere biodegradation, phyto-extraction (also called phyto-accumulation), phyto-degradation, and phyto-stabilization.	Low	Difficult	Moderate	The depth of the treatment zone is determined by plants used in phytoremediation. In most cases, it is limited to shallow soils.
	Physical/Chemical Treatment	Chemical Oxidation	Oxidation chemically converts hazardous contaminants to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert. The oxidizing agents most commonly used are ozone, hydrogen peroxide, hypochlorites, chlorine, and chlorine dioxide.	Moderate	Moderate-Difficult	Moderate-High	Difficult to deliver chemical oxidization to treatment area and oxidant is consumed by natural organic material.
		Soil Vapor Extraction	Soil vapor extraction (SVE) is an in situ unsaturated (vadose) zone soil remediation technology in which a vacuum is applied to the soil to induce the controlled flow of air and remove volatile and some semivolatile contaminants from the soil. The gas leaving the soil may be treated to recover or destroy the contaminants, depending on local and state air discharge regulations. Vertical extraction vents are typically used at depths of 1.5 meters (5 feet) or greater and have been successfully applied as deep as 91 meters (300 feet). Horizontal extraction vents (installed in trenches or horizontal borings) can be used as warranted by contaminant zone geometry, drill rig access, or other site-specific factors.	Moderate-High	Moderate-Difficult	Moderate	Potentially applicable for soils containing VOCs
		Solidification/Stabilization	Contaminants are physically bound or enclosed within a stabilized mass (solidification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization).	Moderate-High	Moderate-Difficult	Moderate-High	Difficult to deliver stabilizing agents to treatment area and requires significant controls to prevent contaminant migration during treatment.
	Thermal Treatment	Electrical Resistance Heating	Electrodes are placed in boreholes in the contaminated zone and used to heat the subsurface. The vapors and liquids that are generated during heating are collected and treated above ground.	Moderate-High	Difficult	High	Potentially applicable but requires significant controls to prevent contaminant migration during treatment.
		Radio Frequency/Electromagnetic Heating	Radio frequency heating (RFH) is an in situ process that uses electromagnetic energy to heat soil and enhance soil vapor extraction (SVE).	Moderate-High	Difficult	High	Potentially applicable but requires significant controls to prevent contaminant migration during treatment.
		Hot Air/Steam Injection	Hot air or steam is injected below the contaminated zone to heat up contaminated soil. The heating enhances the release of contaminants from the soil matrix. Some VOCs and SVOCs are stripped from contaminated zone and brought to the surface through soil vapor extraction.	Moderate-High	Difficult	High	Potentially applicable but requires significant controls to prevent contaminant migration during treatment.

TABLE 4.1

INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

Response Actions	Remedial Technology	Process Options	Description	Effectiveness	Implementability	Cost	Screening Comments
Ex-Situ Treatment	Biological Treatment (assuming excavation)	Biopiles	Excavated soils are mixed with soil amendments and placed in aboveground enclosures. It is an aerated static pile composting process in which compost is formed into piles and aerated with blowers or vacuum pumps.	Moderate	Moderate	Moderate	Possible release of VOCs to atmosphere during soil handling and treatment.
		Landfarming	Contaminated soil, sediment, or sludge is excavated, applied into lined beds, and periodically turned over or tilled to aerate the waste.	Moderate	Moderate	Moderate	Possible release of VOCs to atmosphere during soil handling and treatment.
	Thermal Treatment (assuming excavation)	Hot Gas Decontamination	The process involves raising the temperature of the contaminated equipment or material for a specified period of time. The gas effluent from the material is treated in an afterburner system to destroy all volatilized contaminants.	Moderate-High	Moderate-Difficult	Moderate-High	Potentially applicable for large quantities of impacted material.
		Pyrolysis	Chemical decomposition is induced in organic materials by heat in the absence of oxygen. Organic materials are transformed into gaseous components and a solid residue (coke) containing fixed carbon and ash.	Moderate	Moderate	Moderate-High	Potentially applicable for large quantities of impacted material.
		Thermal Desorption	Wastes are heated to volatilize water and organic contaminants. A carrier gas or vacuum system transports volatilized water and organics to the gas treatment system.	Moderate	Moderate	Moderate-High	Potentially applicable for large quantities of impacted material.
Soil Removal	Excavation	Off-Site Disposal	Contaminated material is removed and transported to permitted off-site treatment and disposal facilities. Pretreatment may be required.	Moderate-High	Moderate-Difficult	Moderate	Excavation and off-site disposal is applicable to the complete range of contaminant groups with no particular target group.
		Ex-Situ Treatment	See above ex-situ options.	Moderate-High	Moderate-Difficult	Moderate-High	See above ex-situ options
Containment	Cap	Clay and soil	Compacted clay covered with soil over areas of contamination	Moderate-High	Moderate	Moderate-High	Potentially applicable
		Asphalt	Installation of a layer of asphalt over areas of contamination	Moderate	Moderate	Moderate	Potentially applicable
		Concrete	Installation of a concrete slab over areas of contamination	Moderate-High	Moderate	Moderate-High	Potentially applicable
		Multimedia cap	Clay and synthetic membrane covered by soil over areas of contamination	Moderate-High	Moderate	High	Potentially applicable

TABLE 4.1
INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

Response Actions	Remedial Technology	Process Options	Description	Effectiveness	Implementability	Cost	Screening Comments
Non-aqueous phase liquids (NAPL) remedial technologies	LNAPL Mass Recovery	Excavation	LNAPL body is physically removed and properly treated or disposed.	Moderate-High	Moderate	Moderate-High	Potentially applicable. Disadvantages are accessibility, depth limitations, cost, waste disposal.
		LNAPL skimming	LNAPL is hydraulically recovered from the top of the groundwater column within a well.	Low-Moderate	Moderate	Low-Moderate	Potentially applicable.
		LNAPL Pumping	LNAPL is removed using a pump which operates to extract accumulated LNAPL and water (depending on the LNAPL thickness).	Moderate-High	Moderate-Difficult	Moderate-High	Potentially applicable.
		Multiphase extraction (MPE)(dual pump)	LNAPL and groundwater are removed through the use of two dedicated pumps. Vacuum enhancement is typically added to increase LNAPL hydraulic recovery rates.	Moderate-High	Moderate	Moderate-High	Potentially applicable. Disadvantages -generated fluids treatment
		Multiphase extraction (MPE) (single pump)	LNAPL is recovered by applying a vacuum to simultaneously remove LNAPL, vapors, and groundwater.	Moderate-High	Moderate	Moderate-High	Potentially applicable. Disadvantages -generated fluids treatment
		Surfactant-enhanced subsurface remediation (SESR)	A surfactant is injected that increases LNAPL solubilization and LNAPL mobility. The dissolved phase and LNAPL are then recovered via hydraulic recovery (LNAPL phase-change remediation and LNAPL mass recovery).	Moderate-High	Moderate-Difficult	High	Disadvantages-hydraulic control required, by-products, cost, dissolved COCs treatment, required homogeneity, water treatment, access.
	LNAPL Mass Control	Physical or hydraulic containment (barrier wall, French drain, slurry wall, wells, trenches)	Subsurface barrier is constructed to prevent or impede LNAPL migration.	Moderate-High	Moderate-Difficult	High	Potentially applicable. Disadvantages -Hydraulic control required, site management, cost, depth and geologic limitations.
		LNAPL in-situ stabilization	Contaminants are physically bound or enclosed within a stabilized mass (solidification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization).	Moderate-High	Moderate	High	Potentially applicable.
		In situ soil mixing (stabilization)	LNAPL body is physically/chemically bound within a stabilized mass to reduce mobility.	Moderate-High	Moderate-Difficult	Moderate-High	Potentially applicable. Disadvantages-accessibility, required homogeneity, depth limitations, cost, long-term residual management
	LNAPL phase-change remediation	Natural source zone depletion (NSZD)	LNAPL constituents are naturally depleted from the LNAPL body over time by volatilization, dissolution, absorption and, degradation.	Moderate-High	Moderate	Moderate-High	Potentially applicable. Disadvantages-time frame, containment.
		Air sparging/soil vapor extraction (AS/SVE)	AS injects air into LNAPL body to volatilize LNAPL constituents, and vapors are vacuum extracted. AS or SVE can also be used individually if conditions are appropriate.	Moderate-High	Moderate	Moderate-High	Potentially applicable. Disadvantages - does not treat heavy-end LNAPLs/low-permeability soils, off-gas vapor management.
		Bioslurping/enhanced fluid recovery (EFR)	LNAPL is remediated via a combination of vacuum-enhanced recovery and bioventing processes.	Moderate-High	Moderate-Difficult	High	Potentially applicable. Disadvantages-time frame, limited to mobile LNAPL.
		in situ chemical oxidation (ISCO)	LNAPL is depleted by accelerating LNAPL solubilization by the addition of a chemical oxidant into the LNAPL zone.	Moderate-High	Moderate-Difficult	High	Disadvantages-Rate-limited hydraulic control required, by-products, cost, vapor generation, rebound, accessibility /spacing homogeneity, MNO2 crusting.

Notes:
Gray shading indicates a technology or process option that was incorporated in the development of alternatives. Effectiveness and cost scales defined as low, medium and, high.
Implementability scale defined as easy, moderate, and difficult.

TABLE 4.2
INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

Response Action	Remedial Technology	Process Option	Description	Effectiveness	Implementability	Cost	Screening Comments
No Action	Not applicable (NA)	NA	No actions are taken				Required for consideration by KDHE
Institutional Controls	Access Restrictions	Deed Restrictions	Deeds for property in the area of influence would include restrictions on property / groundwater use.	Moderate	Moderate	Low	Potentially applicable in conjunction with other response actions.
	Monitoring	Groundwater Monitoring	Ongoing monitoring of wells.	Moderate	Easy	Low	Potentially applicable
Monitored Natural Attenuation (MNA)	MNA	MNA	Monitor wells to track natural decreases in contaminant concentrations that occur with time. Organic contaminants are allowed to naturally attenuate via biodegradation, dispersion, dilution, or adsorption	Low	Easy	Low	Potentially applicable in conjunction with other response actions. Requires long-term monitoring to assess remedial progress.
In Situ Treatment	Biological Treatment	Enhanced Bioremediation	The activity of naturally occurring or augmented (bioaugmentation) microbes is stimulated (biostimulation) by circulating electron donors, electron acceptors, or nutrients, through contaminated groundwater to enhance in situ biological degradation of organic contaminants.	Moderate – High	Moderate -Difficult	Moderate – High	Potentially applicable. May be difficult to implement in situ; nutrients are difficult to deliver.
		Phytoremediation	Plants are used to remove, transfer, stabilize, and destroy contaminants in groundwater	Low	Difficult	Moderate	Not effective for deeper groundwater.
	Physical/Chemical Treatment	Air Sparging/Soil Vapor Extraction	Inject air into the saturated subsurface to volatilize organic contaminants in groundwater. May be used in conjunction with soil vapor extraction, where a vacuum is applied to soil to induce controlled air flow and remove volatile and semivolatile contaminants from the unsaturated zone.	Moderate – High	Moderate - Difficult	Moderate – High	Potentially applicable. Design and effectiveness of system depends on geology and depth of contaminants; operations and maintenance (O&M) intensive. Air stream may require treatment.
		In Situ Thermal Treatment	The subsurface is heated to vaporize VOCs; vaporized contaminants can then be removed from the unsaturated zone by vacuum extraction and treated.	Moderate – High	Difficult	High	Success and required treatment time depend heavily on site-specific characteristics such as soil type, contaminant characteristics and concentrations, geology, and hydrogeology; volatilized VOCs are difficult to capture and may accumulate in buildings or follow preferential pathways; may require a large number of wells. Effective for VOCs; depends on the ability to capture vaporized contaminants.
	Chemical Treatment	In Situ Chemical Oxidation	Chemicals (such as ozone, potassium permanganate, sodium persulfate, or Fenton’s reagent) are injected into the contaminated groundwater to oxidize the contaminants	Moderate – High	Moderate – Difficult	Moderate – High	Potentially applicable. Depends on site geology, which may inhibit adequate dispersion of injected chemicals; multiple injections may be necessary to achieve remediation goals. Could add total dissolved solids (TDS) within the aquifer.
		In Situ Chemical Reduction	Chemicals (such as zero valent iron) are injected into the contaminated groundwater to chemically reduce the contaminants	Moderate – High	Moderate – Difficult	Moderate – High	Potentially applicable. Depends on site geology, which may inhibit adequate dispersion of injected chemicals; multiple injections may be necessary to achieve remediation goals.
		Permeable Reactive Barriers	A permeable wall is created (often zero valent iron) to treat contaminated groundwater while groundwater passively flows through.	High	Moderate – Difficult	High	Limited to subsurface lithology that has a continuous aquitard; can be difficult to install at depths greater than conventional trenching equipment. Possibility of precipitate formation due to site geochemistry.

TABLE 4.2
INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

Response Action	Remedial Technology	Process Option	Description	Effectiveness	Implementability	Cost	Screening Comments
Collection/ Discharge	Ex Situ Physical/Chemical Treatment	Extraction and Treatment	Contaminated groundwater is removed by pumping, and contaminants are removed ex situ through treatment such as advanced oxidation processes, air stripping, GAC adsorption, ion exchange, or separation	Moderate – High	Moderate	High	Potentially applicable. Effective for organic compounds; often generates a secondary waste stream; may leave significant concentrations of COCs behind as the aquifer is dewatered. Remedial time frame may be long.
		Dual-Phase Extraction	A high vacuum system is used to extract liquid and vapor from the subsurface; liquid and vapor are then separated and treated.	Moderate – High	Moderate – Difficult	High	Requires both water treatment and vapor treatment; more applicable to light non-aqueous phase liquids (petroleum releases) than to chlorinated solvent releases
		Precipitation	Alteration of chemical equilibria to reduce solubility of the contaminants	Moderate – High	Moderate – Difficult	High	Applicable for removal of inorganics.
		Air Stripping	Application of a counter-current air stream with impacted water in a packed column or other device (e.g., stacked tray system) to promote transfer of VOCs to air	Moderate – High	Moderate – Difficult	High	Potentially applicable. Air stream may require monitoring / controls. Air stripper operation may be affected by presence of inorganics in groundwater.
		Carbon absorption	Adsorption of contaminants onto activated carbon by passing water through carbon column	Moderate – High	Moderate – Difficult	High	Potentially applicable. Carbon usage is dependent on types and concentrations of organic compounds in groundwater.
		Reverse osmosis	Use of high pressure to force water through a membrane leaving contaminants behind	Moderate – High	Moderate – Difficult	High	Generally applied to constituents not amenable to other forms of physical / chemical treatment.
		Ion exchange	Contaminated water is passed through a resin bed where ions are exchanged between resin and water	Moderate – High	Moderate – Difficult	High	Applicable for removal of inorganics.
	Off-Site Treatment/ Discharge	POTW	Extracted groundwater discharged to local POTW for treatment	Moderate	Easy	Low – Moderate	Generally only suitable for low volume discharges.
		RCRA facility	Extracted groundwater discharged to licensed RCRA facility for treatment and/or disposal	Moderate	Easy	Low – Moderate	Generally only suitable for low volume discharges.
		Surface water	Extracted groundwater discharged to off-site surface water body after treatment.	Moderate	Easy	Low – Moderate	Potentially applicable. Discharge permit is required.
Containment	Capping	Asphalt	Pave with asphalt over areas of contamination. Can be used to minimize vapor intrusion and infiltration.	Moderate	Easy	Low – Moderate	Potentially applicable
		Concrete	Place concrete over areas of contamination. Can be used to minimize vapor intrusion and infiltration	Moderate	Easy	Low – Moderate	Potentially applicable
		Compacted Clay & Soil	Place compacted clay and soil over areas of contamination. Can be used to minimize vapor intrusion and infiltration.	Moderate	Moderate	Moderate	Potentially applicable
	Vertical Barriers	Grout Curtain	Pressure injection of grout in a regular pattern of drilled holes to form a low permeability barrier	Moderate	Difficult	High	Generally applicable for isolation of areas with continuing sources of groundwater contamination such as landfills.
		Slurry Wall.	Trench around area of contamination filled with bentonite slurry material to form a low permeability barrier	Moderate	Difficult	High	Generally applicable for isolation of areas with continuing sources of groundwater contamination such as landfills.

Notes:
Gray shading indicates a technology or process option that was incorporated in the development of alternatives. Effectiveness and cost scales defined as low, medium and, high.
Implementability scale defined as easy, moderate, and difficult.

TABLE 6.1a
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
S-8 AREA – SOIL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
1	No Action	Potential receptor contact with impacted media and potential impacts to groundwater (via infiltration and leaching) are not addressed. Currently there is no human exposure to impacted soil. Soil that is impacted above Tier 2 standards would remain in place.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	No short-term risks exist. Long-term risks are associated with potential receptor contact with impacted media and potential impacts to groundwater.	Not applicable since no action is undertaken.	
2	Engineering Controls/ Containment (with property use controls)	Potential receptor contact with impacted media is addressed by provision of surface cap and implementation of institutional controls on property use. Potential impacts to groundwater from unsaturated zone soil are mitigated by the surface cap which reduces infiltration and leaching. Media that are impacted above Tier 2 standards would remain in place.	Construction of the surface cap (e.g., soil, asphalt, concrete) and other types of controls are readily implementable using conventional materials and methods. Property use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for construction of the surface cap is dependent on the type of material used and the size of the area requiring capping. Drainage system improvements may also be needed to prevent accumulation of surface water runoff. Operating costs would be incurred related to ongoing maintenance of the surface cap and drainage system improvements.	Cap systems and associated controls are demonstrated to be highly reliable for preventing exposure and reducing infiltration when maintained properly.	Short-term risks during construction are very limited since there would be minimal disruption of the existing soil. Long-term risks associated with potential receptor contact with impacted media are managed but not eliminated. Potential risks associated with the presence of VOCs and effects on groundwater quality continue to exist. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	The construction of the surface cap could be implemented in a relatively short amount of time but ongoing maintenance would be needed. This alternative does not actively reduce the amount of the impacted media over the long term.	

TABLE 6.1a
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
S-8 AREA – SOIL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
3	Soil Vapor Extraction (SVE)	SVE is effective for removing VOCs from unsaturated (vadose) zone soils through use of vertical wells and/or trenches in which a vacuum is applied to withdraw volatile chemicals. The effectiveness of SVE systems is related to the ability to transfer the chemical mass that is sorbed to the soil to the soil vapor phase, for withdrawal via the vacuum piping for subsequent ex situ treatment. SVE is most effective for coarse-grained soil but can also be used for fine-grained soil. The presence of stratified soils may lead to preferential air/vapor flow through layers of coarse-grained soil and impair the overall treatment effectiveness. The presence of buried structures and utilities may also limit effectiveness due to preferential air/vapor flow. Monitoring during implementation is required, and post-treatment testing is needed to confirm effectiveness for removal of chemicals of concern.	SVE systems are readily implementable using conventional drilling and construction methods. The aboveground vacuum and treatment components are available as prefabricated systems from various vendors on either a purchase or rental basis.	Capital cost for SVE treatment is dependent on the size and depth of the area to be treated. This affects the spacing/quantity and design of the SVE wells, the flow rate and sizing of the vacuum and treatment components, and the number and location of gas probes used for monitoring. Operating costs would be incurred related to the operation of the SVE vacuum system, the off-gas treatment system, disposal, and monitoring/testing/reporting.	The reliability of SVE treatment depends on the ability to maintain appropriate air/vapor flow conditions throughout the horizontal and vertical limits of soil to be treated, until remedial goals have been attained. This may be affected by the presence of preferential flow paths.	Short-term risks are associated with installation of extraction wells. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained.	SVE systems can be constructed and implemented quickly but operation and monitoring may continue for many months or years to demonstrate attainment of remedial goals. The length of time required is primarily a function of the soil type and contaminant distribution.	The environmental footprint in terms of energy usage for this alternative may be significant if the operation period is lengthy.

TABLE 6.1a
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
S-8 AREA – SOIL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
4	Soil Excavation	Excavation would result in removal of impacted soil required for attaining Tier 2 standards. Post-excavation testing is needed to confirm effectiveness for removal of chemicals of concern.	Excavation is readily implementable for impacted unsaturated soil to depths of around 20 feet below ground surface using conventional construction methods. The soil type and depth of the excavation will determine requirements for sheeting and shoring during excavation. In addition, dewatering may be required depending on the water table conditions encountered during excavation.	The cost for excavation is dependent on the dimensions of the area and the excavation quantity; and other factors such as the type of material being excavated, the need for sheeting/shoring, the presence of buried structures, methods for managing water from dewatering, and the availability of temporary stockpile facilities. The cost for disposal of the excavated material is dependent on the method(s) to be employed, such as on-site ex situ treatment or off-site transportation and disposal. The cost for restoration is dependent on the type and quantity of backfill material and the requirements for compaction and surface restoration.	Excavation and ex `situ treatment or off-site disposal is commonly used as a remedial approach at numerous sites and accepted as highly reliable.	Short-term risks exist during excavation and on-site treatment activities due to the intrusive nature of the work and potential health and safety impacts to workers and the public. In addition risks exist related to increased vehicle activity beyond the site boundaries if off-site transportation and disposal is conducted. The excavation of VOC-impacted soil could result in VOC loss to the atmosphere during excavation activities which may require monitoring and controls. No long-term risk would remain after completion of the excavation and disposal activities.	The excavation activities can be implemented in a relatively short amount of time. The time required for the management of the excavated material is dependent on the methods used for on-site treatment or off-site disposal. These activities could probably be accomplished in a short term scenario.	The environmental footprint in terms of energy and resource usage (e.g., associated with equipment and vehicle activity) and the use of waste disposal resources for this alternative may be significant.
Overall Comparison of Alternatives		Alternatives 3 and 4 provide the highest degree of effectiveness by providing treatment or removal of soil impacted above Tier 2 standards. Alternative 2 provides a moderate degree of effectiveness by preventing exposure to impacted media. Alternative 1 is not effective since potential exposure to impacted media is not addressed. Currently there is no human exposure to impacted media. Soil that is impacted above Tier 2 standards would remain in place for Alternatives 1 and 2.	Alternatives 2, 3, and 4 involve the use of commonly available technologies and are readily implementable.	Alternative 2 is the lowest cost alternative. Alternative 4 is the next highest cost alternative and has no associated ongoing costs. Alternative 3 is the highest cost alternative. The cost is dependent on the time required for treatment and monitoring.	Alternatives 2 and 4 are the most reliable alternatives since they involve proven methods and clear implementation processes. Alternative 3 is less reliable than Alternatives 2 and 4 since it uses in situ treatment methods which are not as readily controlled.	Alternatives 3 and 4 pose the lowest long-term risk by being the most effective alternatives for addressing impacted media, but pose the highest short-term risk due to potential exposure of impacted media to workers and the environment. Alternative 2 does not pose any significant short-term exposure risk. This alternative poses long-term risks associated with the continued presence of impacted media however this risk is managed by the use of institutional controls.	Alternatives 2 and 4 require the least amount of time. Alternative 3 requires more time compared to Alternatives 2 and 4 due to the need for ongoing operation and monitoring.	Alternative 3 may have a significant environmental footprint due to energy usage. Alternative 4 may have a significant environmental footprint in terms of energy and resource usage.

TABLE 6.1b

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
S-8 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
1	No Action	Potential receptor contact with impacted media and potential impacts to groundwater are not addressed. Currently there is no human exposure to impacted groundwater. Groundwater that is impacted above Tier 2 standards would remain in place.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	No short-term risks exist. Long-term risks are associated with potential receptor contact with impacted media and potential impacts to groundwater.	Not applicable since no action is undertaken.	
2	Monitored Natural Attenuation (MNA) (with groundwater use controls)	Potential receptor contact with impacted media is addressed by implementation of institutional controls on property and groundwater use, and groundwater monitoring. MNA relies on natural subsurface mechanisms that are classified as either destructive or nondestructive. Biodegradation is the most important in situ destructive mechanism, while non-destructive mechanisms include sorption, dispersion, dilution, and volatilization. The effectiveness of MNA depends on natural conditions within the soil/ groundwater system and is demonstrated through observed changes in groundwater chemistry, reductions in concentrations of chemicals of concern, and plume stabilization. MNA remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Costs are dependent on the number of monitoring wells, the frequency and duration of monitoring, and the list of site-specific chemicals of concern.	Groundwater monitoring systems are demonstrated to be reliable for detecting changes in groundwater conditions over time. Groundwater use controls are demonstrated to be reliable for restricting use and preventing potential exposure.	Short-term risks are very limited since there would be no disruption to the site other than that associated with installation and sampling of monitoring wells. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when cleanup levels are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	MNA programs can be implemented quickly but often continue for many years to demonstrate attainment of remedial goals.	

TABLE 6.1b

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
S-8 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
3	Enhanced In situ Biological Treatment	Potential receptor contact with impacted media is addressed by implementation of institutional controls, same as Alternative 2. Enhanced in situ biological treatment utilizes the same natural processes as MNA but with augmentation to increase nutrient levels and stimulate biological activity. The treatment may be conducted under either aerobic or anaerobic conditions whereby contaminants in the source areas are metabolized into less toxic or nontoxic compounds by naturally occurring microorganisms. The microorganisms utilize the contaminants as a source of carbon and energy. In situ treatment remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Bench-scale and/or pilot scale treatability studies are required to determine the optimal types and methods for introduction of nutrients and additives. The use of injection wells or direct push technology for applying the material into the aquifer is readily implementable using commonly available equipment and materials. Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for in situ treatment is dependent on the size and depth of the area to be treated. This affects the spacing/quantity and design of the injection wells, and the number and location of monitoring wells. Operating costs would be incurred related to the supply and application of materials to be injected into the aquifer. Typically, multiple applications are required over time to maintain the proper conditions within the aquifer. Operating costs would also include groundwater monitoring and reporting.	The reliability of in situ biological treatment depends on the ability to maintain appropriate groundwater conditions and nutrient levels within the aquifer until remedial goals have been attained. Groundwater monitoring systems and groundwater use controls are demonstrated to be reliable as noted above.	Short-term risks are associated with installation of injection and monitoring wells and handling of materials used for injection. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	In situ biological treatment programs can be implemented quickly but multiple treatment applications may be needed and monitoring may continue for many years to demonstrate attainment of remedial goals.	

TABLE 6.1b

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
S-8 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
4	In situ Chemical Oxidation (ISCO)	Potential receptor contact with impacted media is addressed by implementation of institutional controls, same as Alternative 2. ISCO is effective for using chemical oxidants which are introduced into the aquifer to address areas of localized high concentrations of organic compounds. In an oxidation reaction, the oxidizing agent breaks the chemical bonds to produce less innocuous by-products, including carbon dioxide and water. The effectiveness of ISCO is potentially affected by the ability to deliver the oxidizing agent throughout the area to be treated and the presence of natural organic material which may consume large quantities of the oxidizing agent. In situ treatment remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Bench-scale and/or pilot scale treatability studies are required to determine the optimal methods for types and introduction of oxidizing agents. The use of injection wells or direct push technology for applying the material into the aquifer is readily implementable using commonly available equipment and materials. Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for in situ treatment is dependent on the size and depth of the area to be treated. This affects the spacing/quantity and design of the injection wells, and the number and location of monitoring wells. Operating costs would be incurred related to the supply and application of materials to be injected into the aquifer. Typically, multiple applications are required over time to maintain the supply of the oxidizing agent within the aquifer. Operating costs would also include groundwater monitoring and reporting.	The reliability of ISCO depends on the ability to deliver and maintain the required dosage of the oxidizing agent throughout the treatment area within the aquifer until remedial goals have been attained. A critical factor in the evaluation of ISCO treatment is determining the dosages required to effectively oxidize the chemicals of concern (referred to as stoichiometric demand) as well as competing reactions. The competing reactions are typically caused by the presence of natural organic materials such as humates and fulvates, as well as metals. Groundwater monitoring systems and groundwater use controls are demonstrated to be reliable as noted above.	Short-term risks are associated with installation of injection and monitoring wells and handling of materials used for injection. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	ISCO treatment programs can be implemented quickly but multiple treatment applications may be needed and monitoring may continue for months or years to demonstrate attainment of remedial goals.	The environmental footprint in terms of chemical usage and handling for this alternative is significant.

TABLE 6.1b

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
S-8 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
Overall Comparison of Alternatives		Alternatives 3 and 4 provide the highest degree of effectiveness by providing direct treatment of groundwater impacted above Tier 2 standards. Alternative 2 provides a moderate degree of effectiveness by preventing exposure to impacted media. Alternative 1 is not effective since potential exposure to impacted media is not addressed. Currently there is no human exposure to impacted groundwater.	Alternatives 2, 3, and 4 involve the use of commonly available technologies and are readily implementable.	Alternative 2 is the lowest cost alternative and has ongoing costs associated with monitoring. Alternatives 3 and 4 are the highest cost alternatives by a significant margin but have no associated ongoing costs.	Alternative 2 is the most reliable alternative since it involves proven methods and clear implementation processes. Alternatives 3 and 4 are less reliable than Alternative 2 since they use in situ treatment methods which are not as readily controlled.	Alternatives 3 and 4 pose the lowest long-term risk by being the most effective alternatives for addressing impacted media, but pose the highest short-term risk due to potential exposure of impacted media to workers and the environment. Alternative 2 does not pose any significant short-term exposure risk. This alternative poses long-term risks associated with the continued presence of impacted media however this risk is managed by the use of institutional controls.	Alternative 2 requires more time compared to the other alternatives due to the need for ongoing monitoring. Alternatives 3 and 4 do not involve ongoing operation and maintenance and hence requires less time than Alternative 2.	Alternative 4 has a significant environmental footprint due to chemical usage/handling.

TABLE 6.2a
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
SB-110 AREA - SOIL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
1	No Action	Potential receptor contact with impacted media and potential impacts to groundwater (via infiltration and leaching) are not addressed. Currently there is no human exposure to impacted soil. Soil that is impacted above Tier 2 standards would remain in place.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	No short-term risks exist. Long-term risks are associated with potential receptor contact with impacted media and potential impacts to groundwater.	Not applicable since no action is undertaken.	
2	Engineering Controls/ Containment (with property use controls)	Potential receptor contact with impacted media is addressed by provision of surface cap and implementation of institutional controls on property use. Potential impacts to groundwater from unsaturated zone soil are mitigated by the surface cap which reduces infiltration and leaching. Media that are impacted above Tier 2 standards would remain in place.	Construction of the surface cap (e.g., soil, asphalt, concrete) and other types of controls are readily implementable using conventional materials and methods. Property use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for construction of the surface cap is dependent on the type of material used and the size of the area requiring capping. Drainage system improvements may also be needed to prevent accumulation of surface water runoff. Operating costs would be incurred related to ongoing maintenance of the surface cap and drainage system improvements.	Cap systems and associated controls are demonstrated to be highly reliable for preventing exposure and reducing infiltration when maintained properly.	Short-term risks during construction are very limited since there would be minimal disruption of the existing soil. Long-term risks associated with potential receptor contact with impacted media are managed but not eliminated. Potential risks associated with the presence of VOCs and effects on groundwater quality continue to exist. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	The construction of the surface cap could be implemented in a relatively short amount of time but ongoing maintenance would be needed. This alternative does not actively reduce the amount of the impacted media over the long term.	

TABLE 6.2a

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
SB-110 AREA - SOIL
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<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
3	Soil Vapor Extraction (SVE)	SVE is effective for removing VOCs from unsaturated (vadose) zone soils through use of vertical wells and/or trenches in which a vacuum is applied to withdraw volatile chemicals. The effectiveness of SVE systems is related to the ability to transfer the chemical mass that is sorbed to the soil to the soil vapor phase, for withdrawal via the vacuum piping for subsequent ex situ treatment. SVE is most effective for coarse-grained soil but can also be used for fine-grained soil. The presence of stratified soils may lead to preferential air/vapor flow through layers of coarse-grained soil and impair the overall treatment effectiveness. The presence of buried structures and utilities may also limit effectiveness due to preferential air/vapor flow. Monitoring during implementation is required, and post-treatment testing is needed to confirm effectiveness for removal of chemicals of concern.	SVE systems are readily implementable using conventional drilling and construction methods. The aboveground vacuum and treatment components are available as prefabricated systems from various vendors on either a purchase or rental basis.	Capital cost for SVE treatment is dependent on the size and depth of the area to be treated. This affects the spacing/quantity and design of the SVE wells, the flow rate and sizing of the vacuum and treatment components, and the number and location of gas probes used for monitoring. Operating costs would be incurred related to the operation of the SVE vacuum system, the off-gas treatment system, disposal, and monitoring/testing/reporting.	The reliability of SVE treatment depends on the ability to maintain appropriate air/vapor flow conditions throughout the horizontal and vertical limits of soil to be treated, until remedial goals have been attained. This may be affected by the presence of preferential flow paths.	Short-term risks are associated with installation of extraction wells. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained.	SVE systems can be constructed and implemented quickly but operation and monitoring may continue for many months or years to demonstrate attainment of remedial goals. The length of time required is primarily a function of the soil type and contaminant distribution.	The environmental footprint in terms of energy usage for this alternative may be significant if the operation period is lengthy.

TABLE 6.2a
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
SB-110 AREA - SOIL
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Alternative	Name/ Description	Effectiveness	Implementability	Costs (See Table 6.6 for Cost Estimate Summary)	Reliability	Risks	Timeliness	Other considerations
4	Soil Excavation	Excavation would result in removal of impacted soil required for attaining Tier 2 standards. Post-excavation testing is needed to confirm effectiveness for removal of chemicals of concern.	Excavation is readily implementable for impacted unsaturated soil to depths of around 20 feet below ground surface using conventional construction methods. The soil type and depth of the excavation will determine requirements for sheeting and shoring during excavation. In addition, dewatering may be required depending on the water table conditions encountered during excavation.	The cost for excavation is dependent on the dimensions of the area and the excavation quantity; and other factors such as the type of material being excavated, the need for sheeting/shoring, the presence of buried structures, methods for managing water from dewatering, and the availability of temporary stockpile facilities. The cost for disposal of the excavated material is dependent on the method(s) to be employed, such as on-site ex situ treatment or off-site transportation and disposal. The cost for restoration is dependent on the type and quantity of backfill material and the requirements for compaction and surface restoration.	Excavation and ex situ treatment or off-site disposal is commonly used as a remedial approach at numerous sites and accepted as highly reliable.	Short-term risks exist during excavation and on-site treatment activities due to the intrusive nature of the work and potential health and safety impacts to workers and the public. In addition risks exist related to increased vehicle activity beyond the site boundaries if off-site transportation and disposal is conducted. The excavation of VOC-impacted soil could result in VOC loss to the atmosphere during excavation activities which may require monitoring and controls. No long-term risk would remain after completion of the excavation and disposal activities.	The excavation activities can be implemented in a relatively short amount of time. The time required for the management of the excavated material is dependent on the methods used for on-site treatment or off-site disposal. These activities could probably be accomplished in a short term scenario.	The environmental footprint in terms of energy and resource usage (e.g., associated with equipment and vehicle activity) and the use of waste disposal resources for this alternative may be significant.
Overall Comparison of Alternatives		Alternatives 3 and 4 provide the highest degree of effectiveness by providing treatment or removal of soil impacted above Tier 2 standards. Alternative 2 provides a moderate degree of effectiveness by preventing exposure to impacted media. Alternative 1 is not effective since potential exposure to impacted media is not addressed. Currently there is no human exposure to impacted media. Soil that is impacted above Tier 2 standards would remain in place for Alternatives 1 and 2.	Alternatives 2, 3, and 4 involve the use of commonly available technologies and are readily implementable.	Alternative 2 is the lowest cost alternative. Alternative 3 is the next highest cost alternative. The cost is dependent on the time required for treatment and monitoring. Alternative 4 is the highest cost alternatives but has no associated ongoing costs.	Alternatives 2 and 4 are the most reliable alternatives since they involve proven methods and clear implementation processes. Alternative 3 is less reliable than Alternatives 2 and 4 since it uses in situ treatment methods which are not as readily controlled.	Alternatives 3 and 4 pose the lowest long-term risk by being the most effective alternatives for addressing impacted media, but pose the highest short-term risk due to potential exposure of impacted media to workers and the environment. Alternative 2 does not pose any significant short-term exposure risk. This alternative poses long-term risks associated with the continued presence of impacted media however this risk is managed by the use of institutional controls.	Alternatives 2 and 4 require the least amount of time. Alternative 3 requires more time compared to Alternatives 2 and 4 due to the need for ongoing operation and monitoring.	Alternative 3 may have a significant environmental footprint due to energy usage. Alternative 4 may have a significant environmental footprint in terms of energy and resource usage.

TABLE 6.2b
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
SB-110 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
1	No Action	Potential receptor contact with impacted media and potential impacts to groundwater are not addressed. Currently there is no human exposure to impacted groundwater. Groundwater that is impacted above Tier 2 standards would remain in place.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	No short-term risks exist. Long-term risks are associated with potential receptor contact with impacted media and potential impacts to groundwater.	Not applicable since no action is undertaken.	
2	Monitored Natural Attenuation (MNA) (with groundwater use controls)	Potential receptor contact with impacted media is addressed by implementation of institutional controls on property and groundwater use, and groundwater monitoring. MNA relies on natural subsurface mechanisms that are classified as either destructive or nondestructive. Biodegradation is the most important in situ destructive mechanism, while non-destructive mechanisms include sorption, dispersion, dilution, and volatilization. The effectiveness of MNA depends on natural conditions within the soil/ groundwater system and is demonstrated through observed changes in groundwater chemistry, reductions in concentrations of chemicals of concern, and plume stabilization. MNA remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Costs are dependent on the number of monitoring wells, the frequency and duration of monitoring, and the list of site-specific chemicals of concern.	Groundwater monitoring systems are demonstrated to be reliable for detecting changes in groundwater conditions over time. Groundwater use controls are demonstrated to be reliable for restricting use and preventing potential exposure.	Short-term risks are very limited since there would be no disruption to the site other than that associated with installation and sampling of monitoring wells. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when cleanup levels are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	MNA programs can be implemented quickly but often continue for many years to demonstrate attainment of remedial goals.	

TABLE 6.2b
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
SB-110 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
3	Enhanced In Situ Biological Treatment	Potential receptor contact with impacted media is addressed by implementation of institutional controls, same as Alternative 2. Enhanced in situ biological treatment utilizes the same natural processes as MNA but with augmentation to increase nutrient levels and stimulate biological activity. The treatment may be conducted under either aerobic or anaerobic conditions whereby contaminants in the source areas are metabolized into less toxic or nontoxic compounds by naturally occurring microorganisms. The microorganisms utilize the contaminants as a source of carbon and energy. In situ treatment remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Bench-scale and/or pilot scale treatability studies are required to determine the optimal types and methods for introduction of nutrients and additives. The use of injection wells or direct push technology for applying the material into the aquifer is readily implementable using commonly available equipment and materials. Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for in situ treatment is dependent on the size and depth of the area to be treated. This affects the spacing/quantity and design of the injection wells, and the number and location of monitoring wells. Operating costs would be incurred related to the supply and application of materials to be injected into the aquifer. Typically, multiple applications are required over time to maintain the proper conditions within the aquifer. Operating costs would also include groundwater monitoring and reporting.	The reliability of in situ biological treatment depends on the ability to maintain appropriate groundwater conditions and nutrient levels within the aquifer until remedial goals have been attained. Groundwater monitoring systems and groundwater use controls are demonstrated to be reliable as noted above.	Short-term risks are associated with installation of injection and monitoring wells and handling of materials used for injection. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	In situ biological treatment programs can be implemented quickly but multiple treatment applications may be needed and monitoring may continue for many years to demonstrate attainment of remedial goals.	

TABLE 6.2b

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
SB-110 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
4	In Situ Chemical Oxidation (ISCO)	Potential receptor contact with impacted media is addressed by implementation of institutional controls, same as Alternative 2. ISCO is effective for using chemical oxidants which are introduced into the aquifer to address areas of localized high concentrations of organic compounds. In an oxidation reaction, the oxidizing agent breaks the chemical bonds to produce less innocuous by-products, including carbon dioxide and water. The effectiveness of ISCO is potentially affected by the ability to deliver the oxidizing agent throughout the area to be treated and the presence of natural organic material which may consume large quantities of the oxidizing agent. In situ treatment remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Bench-scale and/or pilot scale treatability studies are required to determine the optimal methods for types and introduction of oxidizing agents. The use of injection wells or direct push technology for applying the material into the aquifer is readily implementable using commonly available equipment and materials. Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for in situ treatment is dependent on the size and depth of the area to be treated. This affects the spacing/ quantity and design of the injection wells, and the number and location of monitoring wells. Operating costs would be incurred related to the supply and application of materials to be injected into the aquifer. Typically, multiple applications are required over time to maintain the supply of the oxidizing agent within the aquifer. Operating costs would also include groundwater monitoring and reporting.	The reliability of ISCO depends on the ability to deliver and maintain the required dosage of the oxidizing agent throughout the treatment area within the aquifer until remedial goals have been attained. A critical factor in the evaluation of ISCO treatment is determining the dosages required to effectively oxidize the chemicals of concern (referred to as stoichiometric demand) as well as competing reactions. The competing reactions are typically caused by the presence of natural organic materials such as humates and fulvates, as well as metals. Groundwater monitoring systems and groundwater use controls are demonstrated to be reliable as noted above.	Short-term risks are associated with installation of injection and monitoring wells and handling of materials used for injection. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	ISCO treatment programs can be implemented quickly but multiple treatment applications may be needed and monitoring may continue for months or years to demonstrate attainment of remedial goals.	The environmental footprint in terms of chemical usage and handling for this alternative is significant.

TABLE 6.2b

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
SB-110 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
Overall Comparison of Alternatives		Alternatives 3 and 4 provide the highest degree of effectiveness by providing direct treatment of groundwater impacted above Tier 2 standards. Alternative 2 provides a moderate degree of effectiveness by preventing exposure to impacted media. Alternative 1 is not effective since potential exposure to impacted media is not addressed. Currently there is no human exposure to impacted groundwater.	Alternatives 2, 3, and 4 involve the use of commonly available technologies and are readily implementable.	Alternative 2 is the lowest cost alternative and has ongoing costs associated with monitoring. Alternatives 3 and 4 are the highest cost alternatives by a significant margin but have no associated ongoing costs.	Alternative 2 is the most reliable alternative since it involves proven methods and clear implementation processes. Alternatives 3 and 4 are less reliable than Alternative 2 since they use in situ treatment methods which are not as readily controlled.	Alternatives 3 and 4 pose the lowest long-term risk by being the most effective alternatives for addressing impacted media, but pose the highest short-term risk due to potential exposure of impacted media to workers and the environment. Alternative 2 does not pose any significant short-term exposure risk. This alternative poses long-term risks associated with the continued presence of impacted media however this risk is managed by the use of institutional controls.	Alternative 2 requires more time compared to the other alternatives due to the need for ongoing monitoring. Alternatives 3 and 4 do not involve ongoing operation and maintenance and hence requires less time than Alternative 2.	Alternative 4 has a significant environmental footprint due to chemical usage/handling.

TABLE 6.3

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-127 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
1	No Action	Potential receptor contact with impacted media and potential impacts to groundwater are not addressed. Currently there is no human exposure to impacted groundwater. Groundwater that is impacted above Tier 2 standards would remain in place.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	No short-term risks exist. Long-term risks are associated with potential receptor contact with impacted media and potential impacts to groundwater.	Not applicable since no action is undertaken.	
2	Monitored Natural Attenuation (MNA) (with groundwater use controls)	Potential receptor contact with impacted media is addressed by implementation of institutional controls on property and groundwater use, and groundwater monitoring. MNA relies on natural subsurface mechanisms that are classified as either destructive or nondestructive. Biodegradation is the most important in situ destructive mechanism, while non-destructive mechanisms include sorption, dispersion, dilution, and volatilization. The effectiveness of MNA depends on natural conditions within the soil/groundwater system and is demonstrated through observed changes in groundwater chemistry, reductions in concentrations of chemicals of concern, and plume stabilization. MNA remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Costs are dependent on the number of monitoring wells, the frequency and duration of monitoring, and the list of site-specific chemicals of concern.	Groundwater monitoring systems are demonstrated to be reliable for detecting changes in groundwater conditions over time. Groundwater use controls are demonstrated to be reliable for restricting use and preventing potential exposure.	Short-term risks are very limited since there would be no disruption to the site other than that associated with installation and sampling of monitoring wells. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when cleanup levels are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	MNA programs can be implemented quickly but often continue for many years to demonstrate attainment of remedial goals.	

TABLE 6.3

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-127 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
3	Enhanced In Situ Biological Treatment	Potential receptor contact with impacted media is addressed by implementation of institutional controls, same as Alternative 2. Enhanced in situ biological treatment utilizes the same natural processes as MNA but with augmentation to increase nutrient levels and stimulate biological activity. The treatment may be conducted under either aerobic or anaerobic conditions whereby contaminants in the source areas are metabolized into less toxic or nontoxic compounds by naturally occurring microorganisms. The microorganisms utilize the contaminants as a source of carbon and energy. In situ treatment remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Bench-scale and/or pilot scale treatability studies are required to determine the optimal types and methods for introduction of nutrients and additives. The use of injection wells or direct push technology for applying the material into the aquifer is readily implementable using commonly available equipment and materials. Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for in situ treatment is dependent on the size and depth of the area to be treated. This affects the spacing/quantity and design of the injection wells, and the number and location of monitoring wells. Operating costs would be incurred related to the supply and application of materials to be injected into the aquifer. Typically, multiple applications are required over time to maintain the proper conditions within the aquifer. Operating costs would also include groundwater monitoring and reporting.	The reliability of in situ biological treatment depends on the ability to maintain appropriate groundwater conditions and nutrient levels within the aquifer until remedial goals have been attained. Groundwater monitoring systems and groundwater use controls are demonstrated to be reliable as noted above.	Short-term risks are associated with installation of injection and monitoring wells and handling of materials used for injection. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	In situ biological treatment programs can be implemented quickly but multiple treatment applications may be needed and monitoring may continue for many years to demonstrate attainment of remedial goals.	

TABLE 6.3

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-127 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
4	In Situ Chemical Oxidation (ISCO)	Potential receptor contact with impacted media is addressed by implementation of institutional controls, same as Alternative 2. ISCO is effective for using chemical oxidants which are introduced into the aquifer to address areas of localized high concentrations of organic compounds. In an oxidation reaction, the oxidizing agent breaks the chemical bonds to produce less innocuous by-products, including carbon dioxide and water. The effectiveness of ISCO is potentially affected by the ability to deliver the oxidizing agent throughout the area to be treated and the presence of natural organic material which may consume large quantities of the oxidizing agent. In situ treatment remedies typically include contingency plans to respond to adverse changes in groundwater conditions, as necessary.	Bench-scale and/or pilot scale treatability studies are required to determine the optimal methods for types and introduction of oxidizing agents. The use of injection wells or direct push technology for applying the material into the aquifer is readily implementable using commonly available equipment and materials. Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for in situ treatment is dependent on the size and depth of the area to be treated. This affects the spacing/quantity and design of the injection wells, and the number and location of monitoring wells. Operating costs would be incurred related to the supply and application of materials to be injected into the aquifer. Typically, multiple applications are required over time to maintain the supply of the oxidizing agent within the aquifer. Operating costs would also include groundwater monitoring and reporting.	The reliability of ISCO depends on the ability to deliver and maintain the required dosage of the oxidizing agent throughout the treatment area within the aquifer until remedial goals have been attained. A critical factor in the evaluation of ISCO treatment is determining the dosages required to effectively oxidize the chemicals of concern (referred to as stoichiometric demand) as well as competing reactions. The competing reactions are typically caused by the presence of natural organic materials such as humates and fulvates, as well as metals. Groundwater monitoring systems and groundwater use controls are demonstrated to be reliable as noted above.	Short-term risks are associated with installation of injection and monitoring wells and handling of materials used for injection. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained. Ongoing monitoring is needed to assess potential risks associated with plume migration and changes in chemical concentrations. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	ISCO treatment programs can be implemented quickly but multiple treatment applications may be needed and monitoring may continue for months or years to demonstrate attainment of remedial goals.	The environmental footprint in terms of chemical usage and handling for this alternative is significant.

TABLE 6.3

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-127 AREA - GROUNDWATER
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

Alternative	Name/ Description	Effectiveness	Implementability	Costs (See Table 6.6 for Cost Estimate Summary)	Reliability	Risks	Timeliness	Other considerations
5	Pump and Treat (for intermediate groundwater)	Potential receptor contact with impacted media is addressed by implementation of institutional controls, same as Alternative 2. Groundwater extraction is an effective method for hydraulic control and mass removal of dissolved chemicals in groundwater. The placement of extraction wells is critical for establishing effectiveness, and may involve use of wells for downgradient capture and/or wells within source areas or zones of higher concentrations. For source area wells, it is typical to see chemical concentrations decrease rapidly initially then more slowly in the longer term, and possibly rebound after pumping ceases. This is a function of the ability of the aquifer matrix to hold and release dissolved chemicals. A variety of effective treatment and discharge options are available for managing the extracted groundwater. VOCs are often treated by air stripping and/or carbon adsorption prior to discharge to the environment. Depending on groundwater conditions, pre-treatment may be needed to remove inorganics and solids that may impair the operation of the primary treatment equipment.	Groundwater pump and treat systems are readily implementable. Pumping tests are typically required to determine aquifer characteristics in order to design the optimal extraction well layout and to estimate flow rates required for the treatment and discharge system. In addition, groundwater treatability testing may be required to aid in the design of the treatment system components. Groundwater monitoring systems are readily implementable. Groundwater use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for pump and treat is dependent on the size and depth of the area to be treated. This affects the spacing/quantity and design of the extraction wells, and the number and location of monitoring wells. Capital costs also include construction of the treatment plant and piping system required to convey untreated and treated water. Operating costs would be incurred related to the ongoing operation of the extraction wells and the treatment plant. Operating costs would also include groundwater monitoring and reporting.	Pump and treat systems are demonstrated to be reliable for containing areas of impacted groundwater and reducing the mass of groundwater contamination. Groundwater monitoring systems and groundwater use controls are demonstrated to be reliable as noted above.	Short-term risks are associated with installation of extraction and monitoring wells. Long-term risks associated with potential receptor contact with impacted media are managed and ultimately eliminated when remedial goals are attained. Potential vapor intrusion into future buildings and structures may need to be assessed and mitigated as necessary.	Pump and treat systems require substantial time for the design, construction, start-up, and commissioning phases. Operational activities and monitoring may continue for many years.	The environmental footprint in terms of energy and resource usage for this alternative is significant.

TABLE 6.3

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-127 AREA - GROUNDWATER
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<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
Overall Comparison of Alternatives		Alternatives 3 and 4 provide the highest degree of effectiveness by providing direct treatment of groundwater impacted above Tier 2 standards. Alternative 5 provides a moderate to high degree of effectiveness through containment and capture of impacted groundwater. Alternative 2 provides a moderate degree of effectiveness by preventing exposure to impacted media. Alternative 1 is not effective since potential exposure to impacted media is not addressed. Currently there is no human exposure to impacted groundwater.	Alternatives 2, 3, 4, and 5 involve the use of commonly available technologies and are readily implementable.	Alternative 2 is the lowest cost alternative for both shallow and intermediate groundwater. Alternative 5 (for intermediate groundwater) is the next highest cost alternative. Each of these alternatives has ongoing costs associated with operation and/or monitoring. Alternatives 3 and 4 are the highest cost alternatives by a significant margin but have no associated ongoing costs.	Alternatives 2 and 5 are the most reliable alternatives since they involve proven methods and clear implementation processes. Alternatives 3 and 4 are less reliable than Alternatives 2 and 5 since they use in situ treatment methods which are not as readily controlled.	Alternatives 3, 4, and 5 pose the lowest long-term risk by being the most effective alternatives for addressing impacted media, but pose the highest short-term risk due to potential exposure of impacted media to workers and the environment. Alternative 2 does not pose any significant short-term exposure risk. This alternative poses long-term risks associated with the continued presence of impacted media however this risk is managed by the use of institutional controls.	Alternatives 2 and 5 require more time compared to the other alternatives due to the need for ongoing operation and/or monitoring. Alternatives 3 and 4 do not involve ongoing operation and maintenance and hence requires less time than Alternatives 2 and 5.	Alternatives 4 and 5 both have a significant environmental footprint due to chemical usage/handling and energy/resource usage respectively.

TABLE 6.4

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
MW-103A AREA - SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
1	No Action	Potential receptor contact with impacted media and potential impacts to groundwater are not addressed. Currently there is no human exposure to impacted media and dissolved phase groundwater impacts are not significant. Media that are impacted above Tier 2 standards and LNAPL would remain in place.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	No short-term risks exist. Long-term risks are associated with potential receptor contact with impacted media and potential impacts to groundwater.	Not applicable since no action is undertaken.	
2	Engineering controls/ capping and monitoring (with property use controls)	Potential receptor contact with impacted media is addressed by provision of surface cap and access controls. Potential impact to groundwater from unsaturated zone soil is mitigated by surface cap which reduces infiltration and leaching. Potential impact to groundwater from impacted media and LNAPL in saturated zone is not addressed directly but would be subject to monitoring. This may require contingency measures in the event that significant groundwater impacts are detected. Media that are impacted above Tier 2 standards and LNAPL would remain in place.	Construction of surface cap (e.g., soil, asphalt, concrete) and other types of controls are readily implementable using conventional materials and methods. Groundwater monitoring is readily implementable. Property use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for construction of the surface cap is dependent on the type of material used and the size of the area requiring capping. Drainage system improvements may also be needed to prevent accumulation of surface water runoff. Operating costs would be incurred related to ongoing maintenance of the surface cap and drainage system improvements.	Cap systems and associated controls are demonstrated to be highly reliable for preventing exposure and reducing infiltration when maintained properly. Monitoring is reliable for detecting potential changes in groundwater conditions that may trigger additional action.	Short-term risks during construction are very limited since there would be minimal disruption of the existing soil. Long-term risks associated with potential receptor contact with impacted media are managed but not eliminated. Potential risks associated with presence of LNAPL and effects on groundwater quality continue to exist.	The construction of the cap system and installation of the monitoring system could be implemented in a relatively short amount of time but monitoring would continue indefinitely. This alternative does not reduce the amount of the impacted media over the long term.	

TABLE 6.4

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
MW-103A AREA - SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
3	Engineering controls/ capping and LNAPL recovery (with property use controls)	Potential receptor contact with impacted media is addressed and potential impact to groundwater from unsaturated zone is mitigated in the same manner as Alternative 2. Potential impact to groundwater from impacted media and LNAPL in saturated zone is mitigated by removal of recoverable LNAPL but unrecoverable LNAPL would remain. Monitoring would be required consistent with Alternative 2. Media that are impacted above Tier 2 standards and LNAPL residual would remain in place.	Construction of surface cap and other types of controls are readily implementable. Construction and implementation of LNAPL recovery systems (e.g., skimming or pumping using conventional wells) and groundwater monitoring is readily implementable. Additional field investigations would be needed to confirm the LNAPL distribution (e.g., LIF/UVOST) in order to design the LNAPL recovery system layout. Property use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for construction of surface cap is dependent on the type of material used as described above. Capital cost for LNAPL recovery system is dependent on the type and number of wells. The use of wells with skimmers is assumed for this assessment. Operating costs would be incurred related to maintenance of the cap and groundwater monitoring. Operating costs for LNAPL recovery are dependent on the system type, amount of recovered fluid and the duration of operations. Additional capital and operating cost would be incurred for a more aggressive total fluids pumping system.	Cap systems and associated controls and groundwater monitoring systems are reliable as noted above. LNAPL recovery systems are limited in their reliability and effectiveness as a function of the site-specific LNAPL distribution and characteristics and the layout and design of the recovery wells.	Short-term risks during construction of the surface cap are very limited as noted above. Intrusive work related to installation of recovery wells poses some risks to workers and the environment due to disturbance and handling of impacted soils and fluids. Long-term risks associated with potential receptor contact with impacted media are managed but not eliminated. Potential risks associated with presence of LNAPL and effects on groundwater quality are reduced as LNAPL is removed but are not eliminated as long as LNAPL remains.	The construction of the cap system and LNAPL recovery system, and installation of the monitoring system could be implemented in a relatively short amount of time. The recovery rate of LNAPL is likely to be relatively slow (depending on the LNAPL distribution/ characteristics, and the design of the LNAPL recovery system). This alternative will result in some reduction in the amount of impacted media over the long term.	

TABLE 6.4

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
MW-103A AREA - SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
4	Engineering controls/ capping and LNAPL stabilization (with property use controls)	Potential receptor contact with impacted media is addressed and potential impact to groundwater from unsaturated zone is mitigated in the same manner as Alternatives 2 and 3. Potential impact to groundwater from impacted media and LNAPL is mitigated by stabilization. Monitoring would be required consistent with Alternatives 2 and 3. Media that are impacted above Tier 2 standards and stabilized LNAPL would remain in place.	Construction of surface cap and other types of controls are readily implementable. The use of in situ stabilization techniques is relatively new and practiced by a limited number of vendors, which may affect the ability to implement this component. Additional field investigations would be needed to confirm the LNAPL distribution during the design stage. Groundwater monitoring is readily implementable. Property use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for construction of surface cap is dependent on type of materials used as described above. Capital cost for LNAPL stabilization is dependent on the dimensions and volume of the area to be treated. Operating costs would be incurred related to maintenance of the soil cap and groundwater monitoring.	Cap systems and associated controls and groundwater monitoring systems are reliable as noted above. LNAPL stabilization is relatively new and reliability for long-term applications is uncertain.	Short-term risks during construction of the surface cap are very limited as noted above. Intrusive work related to installation of injection wells poses some risks to workers and the environment due to disturbance and handling of impacted soils and fluids. Long-term risks associated with potential receptor contact with impacted media are managed but not eliminated. Potential risks associated with presence of LNAPL and effects on groundwater quality are reduced as long as LNAPL remains stabilized.	The construction of the cap system and installation of the monitoring system could be implemented in a relatively short amount of time. Stabilization of LNAPL is also expected to be implemented relatively quickly but depends on the duration and timing of the in situ treatment applications. This alternative does not reduce the amount of the impacted media over the long term.	

TABLE 6.4

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
MW-103A AREA - SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
5	Excavation (soil and LNAPL)	Excavation would result in removal of impacted media and LNAPL required for attaining Tier 2 standards.	Excavation is readily implementable for impacted unsaturated soil to depths of around 20 feet below ground surface. Excavation of impacted media below the water table is implementable in conjunction with temporary dewatering, if required based on site conditions. Additional field investigation would be needed to confirm the LNAPL distribution during the design stage.	The cost for excavation is dependent on the dimensions of the area and the excavation quantity; and other factors such as the type of material being excavated, the need for sheeting/shoring, the presence of buried structures, methods for managing LNAPL and water from dewatering, and the availability of temporary stockpile facilities. The cost for disposal of the excavated material is dependent on the method(s) to be employed, such as on-site ex situ treatment or off-site transportation and disposal. The cost for restoration is dependent on the type and quantity of backfill material and the requirements for compaction and surface restoration.	Excavation and ex situ treatment or off-site disposal is commonly used as a remedial approach at numerous sites and accepted as highly reliable.	Short-term risks exist during excavation and on-site treatment activities due to the intrusive nature of the work and potential health and safety impacts to workers and the public. In addition risks exist related to increased equipment and vehicle activity beyond the site boundaries if off-site transportation and disposal is conducted. No long-term risk would remain after completion of the excavation and disposal activities.	The excavation activities can be implemented in a relatively short amount of time. The time required for the management of the excavated material is dependent on the methods used for on-site treatment or off-site disposal. These activities could probably be accomplished in a short term scenario.	The environmental footprint in terms of energy and resource usage (e.g., associated with equipment and vehicle activity) and the use of waste disposal resources for this alternative is significant.
6	In situ treatment (soil and LNAPL)	In situ treatment would result in treatment of impacted media and LNAPL required for attaining Tier 2 standards.	The use of in situ treatment methods such as electrical resistance heating is relatively new and practiced by a limited number of vendors, which may affect the ability to implement this alternative. Additional field investigation would be needed to confirm the LNAPL distribution during the design stage.	The cost for in situ treatment is dependent on the technology used, the dimensions of the area to be treated, the soil and groundwater conditions, and the chemical composition of the impacted media.	In situ treatment is relatively new and reliability depends on the applicability of the technology to the site conditions. In situ treatment by electrical resistance heating has been successfully used at other sites under similar conditions.	Short-term risks exist during in situ treatment application due to the use of equipment and materials. In the case of electrical resistance heating there are potential concerns associated with exposure to electrical power and currents, heat generation, and handling of vapor and off-gases. No long-term risk would remain after completion of the excavation and disposal activities.	The time required for in situ treatment is dependent on the technology used. The time required for electrical resistance heating will be subject to considerations for site preparation, provision of electrical power supply, and vapor collection/control systems, and the duration of the actual treatment process.	The environmental footprint in terms of energy usage for this alternative is significant.

TABLE 6.4

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
MW-103A AREA - SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (See Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
Overall Comparison of Alternatives		Alternatives 5 and 6 provide the highest degree of effectiveness by removing or treating soil impacted above Tier 2 standards and LNAPL. Alternatives 3 and 4 provide a moderate degree of effectiveness by preventing exposure to impacted media and mitigating the presence of LNAPL. Alternative 2 provides a moderate degree of effectiveness by preventing exposure to impacted media. Alternative 1 is not effective since potential exposure to impacted media is not addressed. Currently there is no human exposure to impacted media and dissolved phase groundwater impacts are not significant. Media that are impacted above Tier 2 standards and LNAPL would remain in place for Alternatives 1, 2, 3, and 4.	Alternatives 2, 3, and 5 involve the use of commonly available technologies and are readily implementable. Alternatives 4 and 6 involve the use of newer technologies that are practiced by a limited number of vendors, which may affect implementability.	Alternatives 2 and 3 are the lowest cost alternatives. Alternative 4 is the next highest cost alternative. Each of these alternatives has ongoing costs associated with operation and/or monitoring. Alternatives 5 and 6 are the highest cost alternatives but have no associated ongoing costs.	Alternatives 2, 3, and 5 are the most reliable alternatives since they involve proven methods and clear implementation processes. Alternatives 4 and 6 are less reliable than Alternatives 2, 3, and 5 since they use in situ treatment methods which are not as readily controlled.	Alternatives 5 and 6 pose the lowest long-term risk by being the most effective alternatives for addressing impacted media, but pose the highest short-term risk due to potential exposure of impacted media to workers and the environment. Alternatives 2, 3, and 4 do not pose any significant short-term exposure risk. These alternatives pose long-term risks associated with the continued presence of impacted media however this risk is managed by the use of engineering and access controls.	Alternatives 2 and 3 can be implemented relatively quickly compared to the other alternatives. Alternatives 4 and 6 will require more time for implementation compared to Alternatives 2 and 3 and may be affected by the choice of treatment technology and the availability of suitable contractors. Alternative 5 will also require more time for implementation compared to Alternatives 2 and 3 but should not be affected by contractor availability. Alternatives 2, 3, and 4 require ongoing operation and/or monitoring, whereas Alternatives 5 and 6 do not.	Alternatives 5 and 6 both have a significant environmental footprint due to usage of energy and resources.

TABLE 6.5

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-130 AREA - SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (see Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
1	No Action	Potential receptor contact with impacted media and potential impacts to groundwater are not addressed. Currently there is no human exposure to impacted media and dissolved phase groundwater impacts are not significant. Media that are impacted above Tier 2 standards and LNAPL would remain in place.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	Not applicable since no action is undertaken.	No short-term risks exist. Long-term risks are associated with potential receptor contact with impacted media and potential impacts to groundwater.	Not applicable since no action is undertaken.	
2	Engineering controls/ capping and monitoring (with property use controls)	Potential receptor contact with impacted media is addressed by provision of surface cap and access controls. Potential impact to groundwater from unsaturated zone soil is mitigated by surface cap which reduces infiltration and leaching. Potential impact to groundwater from impacted media and LNAPL in saturated zone is not addressed directly but would be subject to monitoring. This may require contingency measures in the event that significant groundwater impacts are detected. Media that are impacted above Tier 2 standards and LNAPL would remain in place.	Construction of surface cap (e.g., soil, asphalt, concrete) and other types of controls are readily implementable using conventional materials and methods. Groundwater monitoring is readily implementable. Property use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for construction of the surface cap is dependent on the type of material used and the size of the area requiring capping. Drainage system improvements may also be needed to prevent accumulation of surface water runoff. Operating costs would be incurred related to ongoing maintenance of the surface cap and drainage system improvements.	Cap systems and associated controls are demonstrated to be highly reliable for preventing exposure and reducing infiltration when maintained properly. Monitoring is reliable for detecting potential changes in groundwater conditions that may trigger additional action.	Short-term risks during construction are very limited since there would be minimal disruption of the existing soil. Long-term risks associated with potential receptor contact with impacted media are managed but not eliminated. Potential risks associated with presence of LNAPL and effects on groundwater quality continue to exist.	The construction of the cap system and installation of the monitoring system could be implemented in a relatively short amount of time but monitoring would continue indefinitely. This alternative does not reduce the amount of the impacted media over the long term.	

TABLE 6.5
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-130 AREA – SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (see Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
3	Engineering controls/ capping and LNAPL recovery (with property use controls)	Potential receptor contact with impacted media is addressed and potential impact to groundwater from unsaturated zone is mitigated in the same manner as Alternative 2. Potential impact to groundwater from impacted media and LNAPL in saturated zone is mitigated by removal of recoverable LNAPL but unrecoverable LNAPL would remain. Monitoring would be required consistent with Alternative 2. Media that are impacted above Tier 2 standards and LNAPL residual would remain in place.	Construction of surface cap and other types of controls are readily implementable. Construction and implementation of LNAPL recovery systems (e.g., skimming or pumping using conventional wells) and groundwater monitoring is readily implementable. Additional field investigations would be needed to confirm the LNAPL distribution (e.g., LIF/UVOST) in order to design the LNAPL recovery system layout. Property use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for construction of surface cap is dependent on the type of material used as described above. Capital cost for LNAPL recovery system is dependent on the type and number of wells. The use of wells with skimmers is assumed for this assessment. Operating costs would be incurred related to maintenance of the cap and groundwater monitoring. Operating costs for LNAPL recovery are dependent on the system type, amount of recovered fluid and the duration of operations. Additional capital and operating cost would be incurred for a more aggressive total fluids pumping system.	Cap systems and associated controls and groundwater monitoring systems are reliable as noted above. LNAPL recovery systems are limited in their reliability and effectiveness as a function of the site-specific LNAPL distribution and characteristics and the layout and design of the recovery wells.	Short-term risks during construction of the surface cap are very limited as noted above. Intrusive work related to installation of recovery wells poses some risks to workers and the environment due to disturbance and handling of impacted soils and fluids. Long-term risks associated with potential receptor contact with impacted media are managed but not eliminated. Potential risks associated with presence of LNAPL and effects on groundwater quality are reduced as LNAPL is removed but are not eliminated as long as LNAPL remains.	The construction of the cap system and LNAPL recovery system, and installation of the monitoring system could be implemented in a relatively short amount of time. The recovery rate of LNAPL is likely to be relatively slow (depending on the LNAPL distribution/ characteristics, and the design of the LNAPL recovery system). This alternative will result in some reduction in the amount of impacted media over the long term.	

TABLE 6.5

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-130 AREA – SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (see Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
4	Engineering controls/ capping and LNAPL stabilization (with property use controls)	Potential receptor contact with impacted media is addressed and potential impact to groundwater from unsaturated zone is mitigated in the same manner as Alternatives 2 and 3. Potential impact to groundwater from impacted media and LNAPL is mitigated by stabilization. Monitoring would be required consistent with Alternatives 2 and 3. Media that are impacted above Tier 2 standards and stabilized LNAPL would remain in place.	Construction of surface cap and other types of controls are readily implementable. The use of in situ stabilization techniques is relatively new and practiced by a limited number of vendors, which may affect the ability to implement this component. Additional field investigations would be needed to confirm the LNAPL distribution during the design stage. Groundwater monitoring is readily implementable. Property use controls are implemented through the KDHE Environmental Use Control Program.	Capital cost for construction of surface cap is dependent on type of materials used as described above. Capital cost for LNAPL stabilization is dependent on the dimensions and volume of the area to be treated. Operating costs would be incurred related to maintenance of the soil cap and groundwater monitoring.	Cap systems and associated controls and groundwater monitoring systems are reliable as noted above. LNAPL stabilization is relatively new and reliability for long-term applications is uncertain.	Short-term risks during construction of the surface cap are very limited as noted above. Intrusive work related to installation of injection wells poses some risks to workers and the environment due to disturbance and handling of impacted soils and fluids. Long-term risks associated with potential receptor contact with impacted media are managed but not eliminated. Potential risks associated with presence of LNAPL and effects on groundwater quality are reduced as long as LNAPL remains stabilized.	The construction of the cap system and installation of the monitoring system could be implemented in a relatively short amount of time. Stabilization of LNAPL is also expected to be implemented relatively quickly but depends on the duration and timing of the in situ treatment applications. This alternative does not reduce the amount of the impacted media over the long term.	

TABLE 6.5
REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-130 AREA – SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (see Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
5	Excavation (soil and LNAPL)	Excavation would result in removal of impacted media and LNAPL required for attaining Tier 2 standards.	Excavation is readily implementable for impacted unsaturated soil to depths of around 20 feet below ground surface. Excavation of impacted media below the water table is implementable in conjunction with temporary dewatering, if required based on site conditions. Additional field investigation would be needed to confirm the LNAPL distribution during the design stage.	The cost for excavation is dependent on the dimensions of the area and the excavation quantity; and other factors such as the type of material being excavated, the need for sheeting/shoring, the presence of buried structures, methods for managing LNAPL and water from dewatering, and the availability of temporary stockpile facilities. The cost for disposal of the excavated material is dependent on the method(s) to be employed, such as on-site ex-situ treatment or off-site transportation and disposal. The cost for restoration is dependent on the type and quantity of backfill material and the requirements for compaction and surface restoration.	Excavation and ex-situ treatment or off-site disposal is commonly used as a remedial approach at numerous sites and accepted as highly reliable.	Short-term risks exist during excavation and on-site treatment activities due to the intrusive nature of the work and potential health and safety impacts to workers and the public. In addition risks exist related to increased equipment and vehicle activity beyond the site boundaries if off-site transportation and disposal is conducted. No long-term risk would remain after completion of the excavation and disposal activities.	The excavation activities can be implemented in a relatively short amount of time. The time required for the management of the excavated material is dependent on the methods used for on-site treatment or off-site disposal. These activities could probably be accomplished in a short term scenario.	The environmental footprint in terms of energy and resource usage (e.g., associated with equipment and vehicle activity) and the use of waste disposal resources for this alternative is significant.
6	In situ treatment (soil and LNAPL)	In situ treatment would result in treatment of impacted media and LNAPL required for attaining Tier 2 standards.	The use of in situ treatment methods such as electrical resistance heating is relatively new and practiced by a limited number of vendors, which may affect the ability to implement this alternative. Additional field investigation would be needed to confirm the LNAPL distribution during the design stage.	The cost for in situ treatment is dependent on the technology used, the dimensions of the area to be treated, the soil and groundwater conditions, and the chemical composition of the impacted media.	In situ treatment is relatively new and reliability depends on the applicability of the technology to the site conditions. In situ treatment by electrical resistance heating has been successfully used at other sites under similar conditions.	Short-term risks exist during in situ treatment application due to the use of equipment and materials. In the case of electrical resistance heating there are potential concerns associated with exposure to electrical power and currents, heat generation, and handling of vapor and off-gases. No long-term risk would remain after completion of the excavation and disposal activities.	The time required for in situ treatment is dependent on the technology used. The time required for electrical resistance heating will be subject to considerations for site preparation, provision of electrical power supply, and vapor collection/control systems, and the duration of the actual treatment process.	The environmental footprint in terms of energy usage for this alternative is significant.

TABLE 6.5

REMEDIAL ALTERNATIVES SCREENING/EVALUATION SUMMARY
TMW-130 AREA - SOIL AND LNAPL
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS

<i>Alternative</i>	<i>Name/ Description</i>	<i>Effectiveness</i>	<i>Implementability</i>	<i>Costs (see Table 6.6 for Cost Estimate Summary)</i>	<i>Reliability</i>	<i>Risks</i>	<i>Timeliness</i>	<i>Other considerations</i>
Overall Comparison of Alternatives		Alternatives 5 and 6 provide the highest degree of effectiveness by removing or treating soil impacted above Tier 2 standards and LNAPL. Alternatives 3 and 4 provide a moderate degree of effectiveness by preventing exposure to impacted media and mitigating the presence of LNAPL. Alternative 2 provides a moderate degree of effectiveness by preventing exposure to impacted media. Alternative 1 is not effective since potential exposure to impacted media is not addressed. Currently there is no human exposure to impacted media and dissolved phase groundwater impacts are not significant. Media that are impacted above Tier 2 standards and LNAPL would remain in place for Alternatives 1, 2, 3, and 4.	Alternatives 2, 3, and 5 involve the use of commonly available technologies and are readily implementable. Alternatives 4 and 6 involve the use of newer technologies that are practiced by a limited number of vendors, which may affect implementability.	Alternatives 2 and 3 are the lowest cost alternatives. Alternative 4 is the next highest cost alternative. Each of these alternatives has ongoing costs associated with operation and/or monitoring. Alternatives 5 and 6 are the highest cost alternatives by a significant margin but have no associated ongoing costs.	Alternatives 2, 3, and 5 are the most reliable alternatives since they involve proven methods and clear implementation processes. Alternatives 4 and 6 are less reliable than Alternatives 2, 3, and 5 since they use in situ treatment methods which are not as readily controlled.	Alternatives 5 and 6 pose the lowest long-term risk by being the most effective alternatives for addressing impacted media, but pose the highest short-term risk due to potential exposure of impacted media to workers and the environment. Alternatives 2, 3, and 4 do not pose any significant short-term exposure risk. These alternatives pose long-term risks associated with the continued presence of impacted media however this risk is managed by the use of engineering and access controls.	Alternatives 2 and 3 can be implemented relatively quickly compared to the other alternatives. Alternatives 4 and 6 will require more time for implementation compared to Alternatives 2 and 3 and may be affected by the choice of treatment technology and the availability of suitable contractors. Alternative 5 will also require more time for implementation compared to Alternatives 2 and 3 but should not be affected by contractor availability. Alternatives 2, 3, and 4 require ongoing operation and/or monitoring, whereas Alternatives 5 and 6 do not.	Alternatives 5 and 6 both have a significant environmental footprint due to usage of energy and resources.

TABLE 6.6

**REMEDIAL ALTERNATIVES COST ESTIMATE SUMMARY
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS**

<i>Area of Concern</i>	<i>Alternative #</i>	<i>Name</i>	<i>Components</i>	<i>Estimated Capital Cost (1)</i>	<i>Estimated Operation, Maintenance and Monitoring Cost (1)</i>	<i>Estimated Closeout Cost (1)</i>	<i>Estimated Total Cost (1)</i>
S-8 Soil	1	No Action	----	\$0	\$0	\$0	\$0
	2	Engineering Controls/ Containment (2)	Delineation (confirm S-8 data) Concrete cap installation (300 square feet) Implementation of ICs	\$31,000	\$0	\$5,000	\$36,000
	3	Soil Vapor Extraction	Delineation (confirm S-8 data) One vacuum well, gas probes and collection piping, vacuum system Two years of operation, maintenance and monitoring	\$51,000	\$187,000	\$25,200	\$263,000
	4	Excavation	Delineation (confirm S-8 data) Excavation and off-site disposal (350 tons) Confirmatory sampling, backfill, and restoration	\$105,000	\$0	\$25,000	\$130,000
S-8 Groundwater	1	No Action	----	\$0	\$0	\$0	\$0
	2	Monitored Natural Attenuation (3)	Delineation (TMW-147E area) Implementation of ICs Groundwater monitoring (10 years)	\$41,000	\$144,000	\$15,000	\$200,000
	3	In Situ Enhanced Bioremediation	Delineation (TMW-147E area) Installation of 36 fixed injection wells 4-year remedial program and well abandonment Groundwater monitoring (10 years)	\$452,000	\$144,000	\$15,000	\$611,000
	4	In Situ Chemical Oxidation	Delineation (TMW-147E area) Direct push technology, 36 injection points 1 year remedial program Groundwater monitoring (10 years)	\$509,000	\$144,000	\$15,000	\$668,000

TABLE 6.6

**REMEDIAL ALTERNATIVES COST ESTIMATE SUMMARY
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS**

<i>Area of Concern</i>	<i>Alternative #</i>	<i>Name</i>	<i>Components</i>	<i>Estimated Capital Cost (1)</i>	<i>Estimated Operation, Maintenance and Monitoring Cost (1)</i>	<i>Estimated Closeout Cost (1)</i>	<i>Estimated Total Cost (1)</i>
SB-110 Soil	1	No Action	----	\$0	\$0	\$0	\$0
	2	Engineering Controls/ Containment (2)	Concrete cap installation (2,000 square feet) Implementation of ICs	\$38,000	\$0	\$5,000	\$43,000
	3	Soil Vapor Extraction	Five vacuum wells, gas probes and collection piping, vacuum system Two years of operation, maintenance and monitoring	\$70,000	\$227,000	\$25,200	\$322,000
	4	Excavation	Excavation and off-site disposal (2,300 tons) Confirmatory sampling, backfill, and restoration	\$418,000	\$0	\$25,000	\$443,000
SB-110 Groundwater	1	No Action	----	\$0	\$0	\$0	\$0
	2	Monitored Natural Attenuation (3)	Delineation (TMW-150 and TMW-151 area) Implementation of ICs Groundwater monitoring (10 years)	\$41,000	\$144,000	\$15,000	\$200,000
	3	In Situ Enhanced Bioremediation	Delineation (TMW-150 and TMW-151 area) Installation of 35 fixed injection wells 4-year remedial program and well abandonment Groundwater monitoring (10 years)	\$444,000	\$144,000	\$15,000	\$603,000
	4	In Situ Chemical Oxidation	Delineation (TMW-150 and TMW-151 area) Direct push technology, 35 injection points 1-year remedial program Groundwater monitoring (10 years)	\$513,000	\$144,000	\$15,000	\$672,000

TABLE 6.6

**REMEDIAL ALTERNATIVES COST ESTIMATE SUMMARY
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS**

<i>Area of Concern</i>	<i>Alternative #</i>	<i>Name</i>	<i>Components</i>	<i>Estimated Capital Cost (1)</i>	<i>Estimated Operation, Maintenance and Monitoring Cost (1)</i>	<i>Estimated Closeout Cost (1)</i>	<i>Estimated Total Cost (1)</i>
TMW-127 Groundwater (shallow)	1	No Action	----	\$0	\$0	\$0	\$0
	2	Monitored Natural Attenuation (3)	Delineation (TMW-127 and TMW-155 area) Implementation of ICs Groundwater monitoring (10 years)	\$81,000	\$552,000	\$15,000	\$648,000
	3	In Situ Enhanced Bioremediation	Delineation (TMW-127 and TMW-155 area) Installation of 115 fixed injection wells 4-year remedial program and well abandonment Groundwater monitoring (10 years)	\$1,511,000	\$552,000	\$15,000	\$2,078,000
	4	In Situ Chemical Oxidation	Delineation (TMW-127 and TMW-155 area) Direct push technology, 115 injection points 1-year remedial program Groundwater monitoring (10 years)	\$2,081,000	\$552,000	\$15,000	\$2,648,000
TMW-127 Groundwater (intermediate)	1	No Action	----	\$0	\$0	\$0	\$0
	2	Monitored Natural Attenuation (3)	Delineation (MW-156 area) Implementation of ICs Groundwater monitoring (10 years)	\$81,000	\$552,000	\$15,000	\$648,000
	3	In Situ Enhanced Bioremediation	Delineation (MW-156 area) Installation of 115 fixed injection wells 4-year remedial program and well abandonment Groundwater monitoring (10 years)	\$1,544,000	\$552,000	\$15,000	\$2,111,000
	4	In Situ Chemical Oxidation	Delineation (MW-156 area) Direct push technology, 115 injection points 1-year remedial program Groundwater monitoring (10 years)	\$2,622,000	\$552,000	\$15,000	\$3,189,000
	5	Pump and Treat	Delineation (MW-156 area) Two extraction wells, piping, treatment system, discharge to surface water 10 years of operation and groundwater monitoring	\$1,125,000	\$1,248,000	\$49,000	\$2,422,000

TABLE 6.6

**REMEDIAL ALTERNATIVES COST ESTIMATE SUMMARY
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS**

<i>Area of Concern</i>	<i>Alternative #</i>	<i>Name</i>	<i>Components</i>	<i>Estimated Capital Cost (1)</i>	<i>Estimated Operation, Maintenance and Monitoring Cost (1)</i>	<i>Estimated Closeout Cost (1)</i>	<i>Estimated Total Cost (1)</i>
MW-103A Soil and LNAPL	1	No Action	----	\$0	\$0	\$0	\$0
	2	Engineering Controls/capping and monitoring (2)	Concrete cap installation (4,000 square feet) Implementation of ICs Groundwater monitoring (10 years)	\$74,000	\$144,000	\$15,000	\$233,000
	3	Engineering Controls/capping and LNAPL recovery (skimming/pumping) (2)	Concrete cap installation (4,000 square feet) Implementation of ICs Installation and operation of two recovery wells with skimmers for 10 years Groundwater monitoring (10 years)	\$128,000	\$204,000	\$15,000	\$347,000
	4	Engineering Controls/capping and LNAPL stabilization (2)	Concrete cap installation (4,000 square feet) Implementation of ICs Direct push technology, 25 injection points, 1 injection event Groundwater monitoring (10 years)	\$252,000	\$144,000	\$15,000	\$411,000
	5	Excavation (soil and LNAPL)	Excavation and material handling (5,600 tons) Off-site disposal (2,800 tons) of non-hazardous waste Confirmatory sampling, backfilling and restoration	\$875,000	\$63,000	\$15,000	\$953,000
	6	In Situ treatment (soil and LNAPL)	Treatment using electrical resistance heating of soil from 15 to 30 feet deep (2,200 cubic yards)	\$816,000	\$178,000	\$25,000	\$1,019,000

TABLE 6.6

**REMEDIAL ALTERNATIVES COST ESTIMATE SUMMARY
FORMER FAIRFAX I SITE, KANSAS CITY, KANSAS**

<i>Area of Concern</i>	<i>Alternative #</i>	<i>Name</i>	<i>Components</i>	<i>Estimated Capital Cost (1)</i>	<i>Estimated Operation, Maintenance and Monitoring Cost (1)</i>	<i>Estimated Closeout Cost (1)</i>	<i>Estimated Total Cost (1)</i>
TMW-130 Soil and LNAPL	1	No Action	----	\$0	\$0	\$0	\$0
	2	Engineering Controls/capping and monitoring (2)	Concrete cap installation (25,000 square feet) Implementation of ICs Groundwater monitoring (10 years)	\$344,000	\$178,000	\$15,000	\$537,000
	3	Engineering Controls/capping and LNAPL recovery (skimming/pumping) (2)	Concrete cap installation (25,000 square feet) Implementation of ICs Installation and operation of five recovery wells with skimmers for 10 years Groundwater monitoring (10 years)	\$466,000	\$314,000	\$15,000	\$795,000
	4	Engineering Controls/ capping and LNAPL stabilization (2)	Concrete cap installation (25,000 square feet) Implementation of ICs Direct push technology, 137 injection points, 1 injection event Groundwater monitoring (10 years)	\$1,080,000	\$178,000	\$15,000	\$1,273,000
	5	Excavation (soil and LNAPL) option 1	Excavation and material handling (42,000 tons) Off-site disposal (12,600 tons) of non-hazardous waste Confirmatory sampling, backfilling and restoration	\$4,867,000	\$195,000	\$25,000	\$5,087,000
		Excavation (soil and LNAPL) option 2	Excavation and material handling (102,000 tons) Off-site disposal (15,300 tons) of non-hazardous waste Confirmatory sampling, backfilling and restoration	\$9,376,000	\$297,000	\$25,000	\$9,698,000
	6	In Situ treatment (soil and LNAPL)	Treatment using electrical resistance heating of soil from 15 to 30 feet deep (13,900 cubic yards).	\$4,282,000	\$178,000	\$25,000	\$4,485,000

Notes:

- (1) Estimated costs are shown as 2012 dollars.
- (2) Alternatives that involve capping could be integrated with plans for property development/building construction to improve cost-effectiveness.
- (3) The costs for MNA alternatives are specific to individual AOCs. If a Site-wide MNA approach was implemented then the efficiency of the overall monitoring and reporting could be improved.

APPENDIX A

SUMMARY OF SOIL AND GROUNDWATER INVESTIGATION RESULTS

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1.0 INVESTIGATION RESULTS

This appendix provides a summary of the investigation results for each Area of Concern (AOC) based on the investigations completed to date.

The AOCs presented below include:

- S-8 Area
- SB-110 Area
- TMW-127 Area
- MW-103A Area
- TMW-130 Area

The Site investigation locations are presented in Figure 2.1.

1.1 S-8 AREA

One of the areas investigated during the HDR Engineering, Inc. (HDR) Environmental Site Assessment (ESA) was the baler room and Underground Storage Tank (UST) 10 Area (referred to in this report as the S-8 Area, as shown on Figure 1.2). The baler room was formerly located approximately 200 ft north of the southwest corner of the assembly building. The baler room was used to collect general plant refuse and contained a large trash compactor/baler. UST 10, which contained unleaded gasoline and was removed in August 1987, was located adjacent to the northern exterior wall of the baler room. Soil boring and groundwater monitoring locations are presented on Figure 2.2. Detected analytical data for soil and groundwater samples are presented in Table A-1 and Table A-2, respectively. Concentrations of parameters detected greater than the Tier 2 standards are shown on Figures 2.3 and 2.4 for soil and groundwater, respectively.

Investigation Results

Soil boring S-8, installed by HDR in 1987, contained tetrachloroethene (PCE) at 10 ft bgs and 15 ft bgs at concentrations above the Tier 2 standard. No Volatile Organic Compounds (VOCs) were detected in the soil samples collected from other intervals (5, 20, 25, and 30 ft bgs). Groundwater samples collected from S-8 contained 1,2-dichloroethylene (1,2-DCE), PCE, and trichloroethene (TCE) at concentrations above the Tier 2 standards. Soil boring S-9 did not contain VOCs. Groundwater from S-9

contained benzene above the Tier 2 standard. Soil borings S-107 and S-108, installed in January 1988, contained no VOCs. 1,2-DCE was detected above the Tier 2 standard in groundwater from S-107. TCE was detected above the Tier 2 standard in groundwater from S-109, and S-110 and PCE was detected above the standard in groundwater from S-110 in 1988.

Conestoga-Rovers & Associates (CRA) collected a soil sample from soil boring SB-113 in December 2004 in the vicinity of UST 10 and the baler room at a depth of 10 to 12 ft bgs to verify that soil at the approximate depth of the base of the tank is not impacted at levels above the Tier 2 standards. No VOCs were detected at concentrations above the Tier 2 standards at SB-113.

CRA also collected a soil sample from soil boring SB-112 in December 2004 in the southwest corner the former building structure in the vicinity of UST 10 and the baler room at a depth of 10 to 12 ft bgs. No VOCs were detected at concentrations above the Tier 2 standards at SB-112.

In April 2012, CRA collected soil samples from four boreholes located around the assumed S-8 location. The boreholes are identified as SB-147N, SB-147S, SB-147W, and SB-147E as shown on Figure 2.3. One soil sample was collected at each borehole (from 18 to 20 ft bgs) and analyzed for VOCs. No VOCs were detected at concentrations above the Tier 2 standards.

Monitoring well MW-109 is located east of the S-8 Area and groundwater samples have been collected for VOCs analysis since 1989. As shown on Figure 2.4, no VOCs were detected at concentrations above the Tier 2 standards, with the exception of cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride (VC) in a sample collected in June 2008. These two compounds (cis-1,2-DCE and VC) were detected in the groundwater sample collected from MW-109 in 2011, but at concentrations less than the Tier 2 standards.

Three temporary monitoring wells, identified as TMW-147E, TMW-148, and TMW-149, shown on Figure 2.1, were installed in April 2012. TMW-147E was installed in one of the soil borings in the area around S-8 and TMW-148 was installed to delineate impacts approximately 420 ft southeast of the S-8 Area, as shown on Figures 2.1 and 2.2. TMW-149 was installed further southeast of TMW-148 (approximately 370 ft) as shown of Figure 2.1, to determine potential VOC migration from off Site. The screen interval for each well is from 17 to 27 ft bgs. Two sets of groundwater samples were collected from each location, in April and May 2012. As shown on Figure 2.4, the VOCs that were detected above the Tier 2 standards at TMW-147E include: cis-1,2-DCE; PCE; and TCE.

None of the detected VOC concentrations at TMW-148 and TMW-149 are above the Tier 2 standards.

1.2 SB-110 AREA

One of the areas investigated during the HDR ESA was the powerhouse area (referred to in this report as the SB-110 Area, as shown on Figure 1.2). The powerhouse/SB-110 Area is located northwest of the former main plant building. Eight USTs, which were removed in August 1987, were located in the powerhouse area in three clusters. The USTs contained diesel fuel, waste fuel oil, and gasoline. Soil boring and groundwater monitoring locations are presented on Figure 2.5. Detected analytical data for soil and groundwater samples are presented in Tables A-3 and A-4, respectively. Concentrations of parameters detected greater than the Tier 2 standards are shown on Figures 2.6 and 2.7 for soil and groundwater, respectively.

Investigation Results

Soil samples were collected by HDR beneath and in the vicinity of USTs 3 and 4, formerly located in the SB-110 Area. No VOCs were detected above the Tier 2 standards in August 1987 soil samples 87-209, 87-211, and S-15 or in January 1988 soil sample S-111. No VOCs were detected above the Tier 2 standards in January 1988 groundwater samples collected at S-111.

Soil samples were collected by HDR beneath and in the vicinity of USTs 5, 6, and 11, located north of USTs 3 and 4. No VOCs were detected in two of the August 1987 soil samples while PCE (626 micrograms per kilogram [$\mu\text{g}/\text{kg}$]) and xylenes (1,100 $\mu\text{g}/\text{kg}$) were detected in 87-206. No VOCs were detected in soil collected in August 1987 at S-16, S-17, and S-18 or in soil collected in January 1988 at S-112. No VOCs were detected in groundwater at S-16 and S-18. 1,2-DCE was detected in groundwater at S-17 (16 micrograms per liter [$\mu\text{g}/\text{L}$]) and S-112 (133 $\mu\text{g}/\text{L}$). PCE was detected in groundwater at S-17 (16 $\mu\text{g}/\text{L}$).

No VOCs were detected in soil samples S-19 through S-22 collected in August 1987 in the vicinity of USTs 7, 8, and 9, located north of USTs 5, 6, and 11).

CRA collected three soil samples in December 2004 at sample locations SB-108, SB-109, and SB-110, at depths of 10 to 12 ft bgs to verify that soil at the approximate depth of the base of the tanks is not impacted at levels above the Tier 2 standards. Soil sample SB-110 was collected in the vicinity of USTs 3 and 4, soil sample SB-109 was collected in the

vicinity of USTs 5, 6, and 11, and soil sample SB-108 was collected in the vicinity of USTs 7, 8, and 9. No VOCs were detected at concentrations above Tier 2 standards at SB-108 or SB-109. PCE was detected at SB-110 above the Tier 2 standards for soil based on groundwater protection of 0.121 mg/kg at a concentration of 0.19 mg/kg.

In December 2005, CRA installed and sampled five additional borings to verify the PCE concentration detected at SB-110 and to delineate PCE surrounding SB-110. SB-118 through SB-121 were advanced approximately 20 ft bgs from SB-110 in each cardinal direction. SB-122 was advanced adjacent to SB-110, as shown on Figure 2.5. The PCE concentration was below the Tier 2 standards in soil sample SB-120 (10 to 12 ft bgs). The PCE concentrations in soil samples SB-119 (10 to 12 ft bgs) and SB-121 (9 to 10 ft bgs) were above the Tier 2 standards. The PCE laboratory detection limit was above the Tier 2 standards in soil samples SB-118 (9 to 10 ft bgs) and SB-122 (9 to 10 ft bgs).

In November 2006, one soil boring (SB-137) was advanced to approximately 15 ft bgs to delineate PCE contamination in the soil east of soil boring SB-110. PCE was detected in soil sample SB-137 at a concentration below the Tier 2 standards.

In April 2012, CRA collected soil samples from six boreholes located in the area around SB-110. The boreholes are identified as SB-118A, SB-118B, SB-119A, SB-119B, SB-119C, and SB-120A as shown on Figure 2.6. One soil sample was collected at each borehole (various depths up to 20 ft bgs) and analyzed for VOCs. As shown on Figure 2.6, none of the detected concentrations are above the Tier 2 standards. The results for detected VOCs are shown in Table A-3.

A groundwater sample was collected from monitoring well MW-101 in October 1988. Concentrations of methylene chloride and lead were greater than the Tier 2 standard.

Temporary monitoring well TMW-138 was installed in November 2006 (screened from approximately 25 to 35 ft bgs) to determine if PCE was present in the shallow groundwater above the Tier 2 standard downgradient¹ of soil boring SB-110. PCE was detected in the groundwater sample at an estimated concentration well below the Tier 2 standard. Temporary monitoring well TMW-138 was abandoned in March 2007.

Monitoring well MW-125 was installed in October 2007 in the SB-110 Area near former temporary monitoring well TMW-138 to monitor PCE previously detected in soil in that area of the Site. TCE was not detected in the groundwater samples collected at MW-125

¹ Based on groundwater flow towards the Missouri River.

in November 2007, March 2008, June 2008, and December 2011, but was detected at low estimated concentrations less than the Tier 2 standard in December 2007 and April 2012.

Three temporary monitoring wells, identified as TMW-150, TMW-151, and TMW-152, shown on Figure 2.7, were installed in April 2012. The screen interval for each well is from 17 to 27 ft bgs. Two sets of groundwater samples were collected from each location, in April and May 2012. The results for detected VOCs are shown in Table A-4. TMW-152 is located in the immediate vicinity of SB-110 and the other soil borings discussed above and no VOCs were detected above Tier 2 standards. The other two wells, TMW-150 and TMW-151, are located in the area northeast of MW-125 and TMW-152, and were installed to determine potential VOC migration. TCE was detected at concentrations above the Tier 2 standard (0.005 mg/L) at TMW-150 (up to 0.0205 mg/L) and TMW-151 (up to 0.0099 mg/L).

1.3 TMW-127 AREA

The TMW-127 Area is located in the northeast quadrant of the footprint of the former Fairfax I Plant building (as shown on Figure 1.2). Soil boring and groundwater monitoring locations are presented on Figure 2.8. Detected analytical data for soil and groundwater samples are presented in Tables A-5 and A-6, respectively. There were no detections above Tier 2 standards in soil samples collected from this area. The analytical results for parameters that were detected above Tier 2 standards in groundwater samples are shown on Figure 2.9.

Investigation Results

Historical soil analytical data in the general area of TMW-127 included sample locations: S-37 (collected in 1987); SB-116 (collected in 2004); and SB-124, SB-124A, SB-125, SB-126, SB-126A, SB-127A, SB-128, and SB-128A (collected in 2006). None of the detected concentrations were above the Tier 2 standards.

Soil boring SB-127/temporary monitoring well TMW-127 was installed and sampled in November 2006 in response to an August 2006 request from the KDHE to perform investigative work in areas where little to no investigative work had occurred. There were no exceedances of the Tier 2 standards in the soil sample collected at SB-127 (27.5 to 30 ft bgs). Total arsenic, manganese, cis-1,2-DCE, and methylene chloride were detected in the groundwater sample at TMW-127 at concentrations above the Tier 2 standards.

Temporary monitoring well TMW-127 was redeveloped and sampled for total and dissolved (filtered) arsenic in September 2007 in response to the March 12, 2007 letter from the KDHE. Total arsenic was detected above the Tier 2 standard and dissolved arsenic was not detected in the groundwater sample from TMW-127.

In December 2011, CRA collected groundwater samples from TMW-127, MW-108, and MW-110. The sample collected from TMW-127 contained cis-1,2-DCE at 0.14 mg/L and VC at an estimated concentration of 0.0031 mg/L. The samples collected from MW-108 and MW-110 did not have any detected VOCs above the Tier 2 standards.

In April 2012, CRA collected soil samples from three boreholes located in the area near TMW-127. Each borehole was completed as a temporary monitoring well, identified as TMW-153, TMW-154, and TMW-155 as shown on Figure 2.8. One soil sample was collected at each borehole (various depths up to 20 ft bgs) and analyzed for VOCs. None of the detected concentrations were above the Tier 2 standards.

The screen interval for MW-156 is from 49 to 59 ft bgs. This well is located adjacent to TMW-127, which has a screen interval from 25 to 35 ft bgs. The screen intervals for TMW-153, TMW-154 and TMW-155 are from 17 to 27 ft bgs. Two sets of groundwater samples were collected from each location, in April and May 2012. TMW-127 was also sampled in April 2012. As shown on Figure 2.9, the VOCs that were detected at concentrations above Tier 2 standards include: cis-1,2-DCE; TCE; and VC. In April 2012, the sample collected from TMW-127 contained cis-1,2-DCE at 0.354 mg/L and VC at 0.0059 mg/L. The samples collected from MW-156 (located adjacent to TMW-127 but screened at a deeper interval) contained cis-1,2-DCE (up to 0.0999 mg/L) and VC (up to 0.385 mg/L) at concentrations above the Tier 2 standards. The samples collected from TMW-155 contained cis-1,2-DCE (up to 0.77 mg/L), TCE (up to 0.3 mg/L), and VC (up to 0.0059 mg/L) at concentrations above the Tier 2 standards. The samples collected from TMW-153 and TMW-154 did not have any detected VOCs above the Tier 2 standards.

Other groundwater analytical data in the general area of TMW-127, as shown on Figure 2.9, include groundwater samples collected from MW-108, MW-110, TMW-124, TMW-125, TMW-126, and TMW-128. None of the detected concentrations were above the Tier 2 standards with the exception of lead in one sample collected from MW-108 in 1998 and manganese in samples collected from MW-110 (2004 and 2006) and TMW-124, TMW-125, TMW-126, and TMW-128 (2006).

1.4 MW-103A AREA

The MW-103A Area is located at the north-central portion of the Fairfax I property (as shown on Figure 1.2). This area is near the former rail spur, the aboveground tank farm, and the location of the remediation system that operated from 1991 to 1994. Soil boring and groundwater monitoring locations are presented on Figure 2.10. Detected analytical data for soil and groundwater samples are presented in Tables A-7 and A-8, respectively. The analytical results for parameters that were detected above Tier 2 standards in soil samples are shown on Figures 2.11a and 2.11b and in groundwater samples are shown on Figure 2.12.

Investigation Results

Soil and groundwater contamination were discovered at the Site in 1987 during the HDR ESA. PCE, methyl isobutyl ketone (MIBK), and benzene, toluene, ethylbenzene, and xylenes (BTEX), were detected in soil at concentrations above the Tier 2 standards at sample locations S-26, S-27, S-29, S-30, and F-26. The primary sources of contamination were determined to be gasoline and paint thinner from a tank farm along with suspect historical releases of PCE from prior to GM operations. GM initiated its own cleanup program in 1988, which included semiannual groundwater monitoring, groundwater contaminant plume definition, and remedial design and construction. The remedial system was designed to address the presence of VOCs in soils and groundwater and the intermittent presence of light non-aqueous phase liquid (LNAPL). The remediation system for the small tank farm area comprised groundwater extraction and treatment by air stripping along with soil vapor extraction and treatment by thermal oxidation. The remedial action was initiated in 1991 and shut down in 1994. Semiannual groundwater monitoring was discontinued in 1994.

A comprehensive groundwater sampling event was completed in October 1998. Concentrations of VOCs were detected above Tier 2 standards at MW-103A and were similar to levels detected during the 1991 to 1994 remediation program. Concentrations of VOCs in groundwater samples collected from MW-103A indicated levels of BTEX, acetone, and MIBK greater than the Tier 2 standards. These parameters were also detected in soil samples collected in the area near MW-103A prior to plant demolition. Therefore, the continuous detection of these VOCs at MW-103A and the historical documentation of contaminated soils suggest that a local source of residual soil or LNAPL contamination may be affecting groundwater quality. The source of the VOC contamination in the soils and groundwater in the vicinity of MW-103A is likely the historical releases from the tanks, rail line, or building structures during historical operations.

Subsequent studies in 1999 and 2000 delineated the area of soil impacts that are the source of a localized area of groundwater contamination and intermittent LNAPL. Studies in this area have also included the collection of information to support in situ biological remedial technologies. The following activities were completed in the MW-103A Area in May 1999.

- Performed a soil screening survey in order to identify areas of soil contamination; 27 soil screening (headspace) samples (S-1 to S-27) collected from 5 to 7 ft bgs were analyzed by an on-Site laboratory for BTEX, 2-butanone (MEK), and 4-methyl-2-pentanone (MIBK).
- Completed 20 soil borings (SB-28 to SB-47) and collected two samples per boring at shallow depths (5 to 7 ft bgs) and at depths near the water table (10 to 12 ft bgs) and submitted the samples for laboratory analysis of VOCs in order to delineate the extent of residual contamination. The soil samples collected from SB-28 to SB-47 indicated the presence of various VOCs with the highest concentrations identified at SB-42 from 10 to 12 ft bgs. At this sample location, the VOCs that were detected at concentrations above Tier 2 standards included MIBK, acetone, and BTEX. Toluene was detected above Tier 2 standards at SB-40 from 5 to 7 ft bgs. VOCs were not detected above Tier 2 standards at any other locations.
- Collected groundwater samples from five monitoring wells (MW-102A, MW-103A, MW-104, MW-105, and MW-115A) for analysis of VOCs. The groundwater sample collected in May 1999 from MW-103A identified the presence of VOCs including MIBK, acetone, benzene and toluene at concentrations above Tier 2 standards. At the remaining wells that were sampled in May 1999, VOCs were either not detected or were detected at concentrations below Tier 2 standards.

In 2004, soil investigation activities were completed, including the advancement of seven boreholes (SB-101 through SB-107). Two samples were collected from each borehole at the sample intervals of 8 to 10 ft bgs and 12 to 14 ft bgs. In the following sample locations and intervals, MIBK, acetone, and BTEX were detected at concentrations greater than the Tier 2 standards: SB-101 (12 to 14 ft bgs), SB-102 (8 to 10 and 12 to 14 ft bgs), SB-104 (8 to 10 and 12 to 14 ft bgs), and SB-105 (12 to 14 ft bgs). Also one groundwater sample was collected from MW-105 for analysis of VOCs, SVOCs, metals and selected general chemistry parameters. None of the detected concentrations exceeded Tier 2 standards, except for manganese at 1.5 mg/L exceeding Tier 2 standard of 0.05 mg/L.

Subsequent groundwater sampling and analysis conducted from 2006 through 2008 has shown generally consistent results as shown on Figure 2.12 and Table A-8 from the following monitoring wells in the MW103-A area: MW-102A, MW-102B, MW-102C, MW-103A, MW-103B, MW103C, MW-104, MW-105, and MW-115A.

The intermittent presence of LNAPL in MW-103A has been identified during monitoring conducted in recent years. On January 17, 2006 the presence of LNAPL was recorded as 30.48 ft below top of casing (btoc), and the water level was 31.82 ft btoc. The water level condition at that time was relatively low since water levels are generally around 22 ft btoc.

In December 2011, groundwater samples were collected from MW-102A, MW-102C, MW-103A, MW-103B, MW-103C, MW-104, MW-105, and MW-115A. The sample collected from MW-103A contained various VOCs (MIBK, acetone, ethylbenzene, toluene, xylenes), SVOCs (2,4-dimethylphenol and naphthalene) and TPH, both Diesel Range Organics (DRO) and Gasoline Range Organics (GRO) at concentrations above Tier 2 standards. At the remaining locations noted above, none of the detected concentrations exceed Tier 2 standards.

In April 2012, CRA collected soil samples from three boreholes located near the former tank area, north of MW-103A. The boreholes are identified as SB-50, SB-51, and TMW-157 (completed as a temporary monitoring well). One soil sample was collected at each borehole (from 18 to 20 ft bgs) and analyzed for VOCs. As shown on Figures 2.11a and 2.11b and Table A-7, none of the detected concentrations are above the Tier 2 standards. In addition, soil samples were collected from two boreholes located in close proximity to MW-103A for waste characterization purposes and the data is provided in Table B-1. These boreholes are identified as SB-48 and SB-49 shown on Figure 2.10.

One temporary monitoring well (TMW-157), shown on Figure 2.12, was installed in April 2012 to determine potential VOC migration toward the northeast from MW-103A. The screen interval for TMW-157 is from 17 to 27 ft bgs. Two sets of groundwater samples were collected from TMW-157, in April and May 2012. As shown on Figure 2.12 and Table A-8, none of the detected VOC concentrations at TMW-157 are above the Tier 2 standards.

1.5 TMW-130 AREA

The TMW-130 Area is located in the southeast quadrant of the footprint of the former Fairfax I Plant building (as shown on Figure 1.2). Soil boring and groundwater monitoring locations are presented on Figure 2.13. Detected analytical data for soil and groundwater samples are presented in Tables A-9 and A-10, respectively. The analytical results for parameters that were detected above Tier 2 standards in soil and groundwater samples are shown on Figures 2.14 and 2.15, respectively.

Investigation Results

In November 2006, soil boring SB-130 and temporary monitoring well TMW-130 were installed in response to an August 2006 request from KDHE to perform investigative work in areas where little to no investigative work had occurred. The results indicated exceedances of the Tier 2 standards for 2-methylnaphthalene, dibenzofuran, and naphthalene in the soil sample collected at SB-130 (5 to 7.5 ft bgs). A 0.99-foot layer of LNAPL was observed in temporary well TMW-130 while collecting groundwater elevation measurements prior to groundwater sampling. Therefore, no groundwater sample was collected at TMW-130. SB-130A, SB-132, and TMW-132 were also advanced in the general area of SB-130 and there were no detected concentrations in soil and groundwater greater than the Tier 2 standards, except for manganese at concentration of 2.51 mg/L in groundwater sample collected from TMW-132 that exceeded Tier 2 standard of 0.05 mg/L.

In September 2007, a groundwater sample was collected from TMW-130 for VOCs and TPH (GRO) analysis. None of the detected concentrations exceeded Tier 2 standards, except for TPH (GRO).

In October 2007, 16 soil borings (SB-200 to SB-215) were advanced to 25 ft bgs, and the soil was screened using a photoionization detector (PID) for the presence of petroleum hydrocarbons to determine the extent of LNAPL impact. Soil samples were not submitted for laboratory analysis. In addition, eight temporary monitoring wells (TMW-139 to TMW-146) were installed. Fluid levels were monitored weekly for 6 weeks and intermittently through March 2008 at TMW-130 and the eight surrounding temporary wells. Wells with LNAPL present were bailed until the standing product within each well was removed. LNAPL was present in TMW-130 and TMW-139 to TMW-142 with thicknesses varying from a trace to 3 ft. No LNAPL was detected at TMW-143 to TMW-146.

In February 2008, a Laser-Induced Fluorescence (LIF) investigation using an ultraviolet optical screening tool (UVOST) was conducted at 24 locations to delineate the LNAPL horizontally and vertically and to approximate the LNAPL saturation profile and type. The results were used to map the magnitude of the response within the UVOST grid area, as shown on Figures 2.14 and 2.15.

In September 2008, a 2-day multi-phase extraction (MPE) pilot study was conducted at the LNAPL plume area. In addition, five soil borings (SB-E1, SB-F1, SB-F3, SB-F4, and SB-G1) were advanced within the UVOST grid. Borings SB-E1, SB-F1, and SB-G1 were soil screening borings installed at the request of the KDHE to complete soil delineation of the impacted area. Soil samples were not submitted for laboratory analysis. Borings SB-F3 and SB-F4 were installed to collect waste characterization samples from the impacted area.

In September 2009, nine soil sampling borings (SB-B3-A, SB-B5-A, SB-D4-A, SB-E4-A, SB-E2-A, SB-F4-A, SB-F5-A, SB-G2-A, and SB-G4-A) were advanced at UVOST grid locations. Soil samples for laboratory analysis were collected from 1 to 3 ft bgs and from the interval above the water table that exhibited the highest UVOST result. Five delineation borings (SB-300, SB-301, SB-302, SB-303, and SB-304) were also advanced outside the LNAPL-impacted area. Soil samples for laboratory analysis were collected from the interval above the water table. Methylene chloride was detected in all samples collected, but was greater than the Tier 2 standard in the following samples: SB-B3-A (13 to 15 ft bgs), SB-D4-A (1 to 3 ft bgs), SB-E4-A (17 to 19 ft bgs), and SB-F4-A (17 to 19 ft bgs). TPH - DRO was detected at concentrations greater than the Tier 2 standards in the shallow (1 to 3 ft bgs) samples from SB-D4-A, and in the deeper samples from SB-B3-A (13 to 15 ft bgs) and from SB-E4-A and SB-F4-A (17 to 19 ft bgs). TPH - GRO was detected at concentrations greater than the Tier 2 standards in the deeper (17 to 19 ft bgs) samples from SB-B3-A and SB-E4-A.

Groundwater samples were collected from the four temporary wells in 2009 that did not contain LNAPL (TMW-143, TMW-144, TMW-145, and TMW-146) and submitted for laboratory analysis. The sample collected from TMW-144 had a detected concentration of TCE greater than the Tier 2 standard.

Groundwater samples were also collected from these four temporary wells (TMW-143, TMW-144, TMW-145, and TMW-146) and TMW-139 in December 2011 and submitted for VOCs, SVOCs (2-methylnaphthalene) and TPH (DRO and GRO) laboratory analysis. The sample collected from TMW-139 had a detected concentration of benzene greater than the Tier 2 standard.

The LNAPL has been characterized as a degraded diesel/fuel oil distillate material based on the results of laboratory analysis of the material and is situated approximately 22 to 32 ft bgs. It was concluded that the historical source of the LNAPL may be located between TMW-130 and TMW-140, where the highest average fluorescence and the greatest observed LNAPL thickness were observed.

In April 2012, CRA collected soil samples from one borehole (identified as SB-305 on Figure 2.13) located in close proximity to TMW-130 for waste characterization purposes. In addition, CRA collected soil samples for geotechnical testing parameters from two boreholes.

TABLE A-1

S-8 AREA - SOIL ANALYTICAL DATA SUMMARY REMEDIAL ALTERNATIVES EVALUATION FORMER FAIRFAX I SITE KANSAS CITY, KANSAS													
Location Name:					S-8-HDR	S-8-HDR	SB-112	SB-113	SB-147N	SB-147S	SB-147W	TMW-147E	
Sample Name:					S-8-1046	S-8-1047	S-122104-DS-119	S-122104-DS-120	TMW 147N 18-20	TMW 147S 18-20	TMW 147W 18-20	TMW 147E 18-20	
Sample Date:					8/19/1987	8/19/1987	12/21/2004	12/21/2004	4/9/2012	4/9/2012	4/9/2012	4/9/2012	
Sample Type:													
Depth:	KDHE Tier 2 Risk-Based Criteria				(10) ft BGS	(15) ft BGS	(10-12) ft BGS	(10-12) ft BGS	(18-20) ft BGS	(18-20) ft BGS	(18-20) ft BGS	(18-20) ft BGS	
Area of Concern:	Non-Residential				S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	
Property:	Soil Pathway				Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	
Sampling Company:	Units	a	b	c	d	HDR	HDR	CRA	CRA	CRA	CRA	CRA	
<u>Volatile Organic Compounds</u>													
1,2-Dichloroethene (total)	mg/kg	NC	NC	NC	NC	-	-	-	-	0.121	ND(0.0048)	ND(0.0053)	0.201
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	101000	57.8	26000	24.2	-	-	ND(0.025)	ND(0.023)	0.0055 J	ND(0.0096)	ND(0.0106)	0.0111 J
Acetone	mg/kg	406000	204	50300	51.6	-	-	0.0039 J	0.0033 J	0.011 J	ND(0.0192)	ND(0.0211)	0.0381
cis-1,2-Dichloroethene	mg/kg	194	0.855	115	0.855	-	-	ND(0.0061)	ND(0.0057)	0.101	ND(0.0024)	ND(0.0026)	0.163
Ethylbenzene	mg/kg	145	65.6	82	65.6	ND(0.5)	ND(0.5)	0.0011 J	ND(0.0057)	ND(0.0056)	ND(0.0048)	ND(0.0053)	ND(0.0056)
Methylene chloride	mg/kg	267	0.0429	149	0.0429	-	-	0.011	0.0083	ND(0.0056)	ND(0.0048)	ND(0.0053)	ND(0.0056)
Tetrachloroethene	mg/kg	16.5	0.121	7.54	0.121	2.5 ^{uu}	0.76 ^{uu}	0.0039 J	0.0026 J	ND(0.0056)	0.0035 J	0.0043 J	ND(0.0056)
Toluene	mg/kg	29800	51.2	4320	51.2	ND(0.5)	ND(0.5)	0.0011 J	0.00061 J	ND(0.0056)	ND(0.0048)	ND(0.0053)	ND(0.0056)
trans-1,2-Dichloroethene	mg/kg	333	1.22	202	1.22	-	-	ND(0.0061)	ND(0.0057)	0.0195	ND(0.0024)	ND(0.0026)	0.0372
Trichloroethene	mg/kg	69.8	0.0842	41	0.0842	-	-	0.0005 J	ND(0.0057)	0.0015 J	ND(0.0048)	ND(0.0053)	0.0064
Xylenes (total)	mg/kg	1410	809	936	809	ND(0.5)	ND(0.5)	0.00094 J	ND(0.011)	ND(0.0056)	ND(0.0048)	ND(0.0053)	ND(0.0056)
<u>Metals</u>													
Aluminum	mg/kg	NC	NC	NC	NC	-	-	3760	1520	-	-	-	-
Arsenic	mg/kg	38	NC	11.3	NC	-	-	5.6	2.3	-	-	-	-
Barium	mg/kg	277000	NC	15300	NC	-	-	136	50.1	-	-	-	-
Beryllium	mg/kg	3650	NC	155	NC	-	-	0.093 J	ND(0.52)	-	-	-	-
Calcium	mg/kg	NC	NC	NC	NC	-	-	14500 J	4250 J	-	-	-	-
Chromium	mg/kg	111	NC	33.6	NC	-	-	7.5 J	3.4 J	-	-	-	-
Cobalt	mg/kg	579	NC	23.4	NC	-	-	5.2 J	2.6 J	-	-	-	-
Copper	mg/kg	81700	NC	3130	NC	-	-	5.8	1.6 J	-	-	-	-
Iron	mg/kg	NC	NC	NC	NC	-	-	10000	4400	-	-	-	-
Lead	mg/kg	1000	NC	400	NC	-	-	6.7	2.9	-	-	-	-
Magnesium	mg/kg	NC	NC	NC	NC	-	-	5550	1850	-	-	-	-
Manganese	mg/kg	66200	NC	9300	NC	-	-	229	81.6	-	-	-	-
Nickel	mg/kg	32400	NC	1540	NC	-	-	12.8 J	6.7 J	-	-	-	-
Potassium	mg/kg	NC	NC	NC	NC	-	-	902 J	329 J	-	-	-	-
Vanadium	mg/kg	NC	NC	NC	NC	-	-	13.1	6.1	-	-	-	-
Zinc	mg/kg	613000	NC	23500	NC	-	-	31.7	13.3	-	-	-	-
<u>General Chemistry</u>													
Percent moisture	%	NC	NC	NC	NC	-	-	-	-	19.9	4.2	3.9	25.1
Total solids	%	NC	NC	NC	NC	-	-	81.5	95.6	-	-	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
--: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-2

S-8 AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-109	MW-109	MW-109	MW-109	TMW-147E	TMW-147E	TMW-148	TMW-148	TMW-149	TMW-149	TMW-149
Sample Name:				GW-120607-JH-033	GW-031308-JH-029	GW-062508-JH-025	WG-121311-KH-012	GW-042712-JH-20	GW-051012-NL-09	GW-042612-JH-09	GW-051012-NL-08	GW-042612-JH-01	GW-051012-NL-FD	GW-051012-NL-07
Sample Date:				12/6/2007	3/13/2008	6/25/2008	12/13/2011	4/27/2012	5/10/2012	4/26/2012	5/10/2012	4/26/2012	5/10/2012	5/10/2012
Sample Type:		KDHE Tier 2 Risk-Based Criteria											Duplicate	
Area of Concern:		Non-Residential	Residential										S-8	S-8
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>														
1,1-Dichloroethene	mg/L	0.007	0.007	ND(0.001)	ND(0.001)	ND(0.0033)	ND(0.001)	0.00041 J	0.00013 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,2,4-Trimethylbenzene	mg/L	0.0174	0.00844	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)	0.00026 J	ND(0.001)	ND(0.001)	ND(0.001)
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	0.177	0.209	0.0028	0.0007 J	0.001	0.001	0.00094 J
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	ND(0.01)	ND(0.033)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.0027 J	ND(0.01)	ND(0.01)	ND(0.01)
Acetone	mg/L	45.5	11.5	ND(0.01)	ND(0.01)	ND(0.033)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.0067 J	ND(0.01)	ND(0.01)	ND(0.01)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	0.02	0.02	0.082 ^{ab}	0.0057	0.168 ^{ab}	0.197 ^{ab}	0.0027	0.0007 J	0.001	0.001	0.00094 J
Dichloroethene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.0033)UJ	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.00016 J	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.0033)UJ	0.0003 J	0.0527 ^{ab}	0.034 ^{ab}	0.00089 J	0.0008 J	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.0033)	ND(0.001)	ND(0.001)	ND(0.001)	0.00016 J	0.00015 J	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	0.0015	0.0017	0.0056	0.00073 J	0.009	0.0121	0.00013 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	0.00029 J	ND(0.0033)	ND(0.001)	0.0347 ^{ab}	0.0275 ^{ab}	0.0035	0.0025	0.00029 J	0.00014 J	0.00024 J
Vinyl chloride	mg/L	0.002	0.002	0.00029 J	ND(0.001)	0.0079 ^{ab}	ND(0.001)	0.00046 J	0.00084 J	ND(0.001)	ND(0.001)	ND(0.001)	0.00011 J	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.0033)UJ	ND(0.002)	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)
<u>Semivolatile Organic Compounds</u>														
Caprolactam	mg/L	50.6	7.77	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>														
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	ND(0.1)	ND(0.1)	0.078 J	-	-	-	-	-	-	-	-
<u>Metals</u>														
Aluminum	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
<u>General Chemistry</u>														
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-

Notes:
TMW-149 - Location and results not shown on databox figure.
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
-- : Not Analyzed
Boxed values exceed criteria.
mg/L - milligrams per liter
cfu/mL - colony forming units per milliliters
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appen

TABLE A-3

SB-110 AREA - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Cautation Name:						SB-108	SB-109	SB-110	SB-118	SB-119	SB-120	SB-121	SB-122	SB-122	SB-137	SB-118A	SB-118B	SB-119A	SB-119B	SB-119C	SB-120A		
Sample Name:						S-122004-DS-115	S-122004-DS-116	S-122004-DS-117	S-012559-122005-SC-006	S-012559-121505-SC-001	S-012559-121505-SC-002	S-012559-122005-SC-003	S-012559-122005-SC-004	S-012559-122005-SC-005	SB137 14-15	SB 118A 6-8	SB 118B 8-10	SB 119A 18-20	SB 119B 18-20	SB 119C 18-20	SB 120A 18-20		
Sample Date:						12/20/2004	12/20/2004	12/20/2004	12/20/2005	12/15/2005	12/15/2005	12/20/2005	12/20/2005	12/20/2005	11/6/2006	4/10/2012	4/1/2012	4/16/2012	4/17/2012	4/10/2012	4/9/2012		
Sample Type:																							
Depth:						KDHE Tier 2 Risk-Based Criteria																	
Area of Concern:						Non-Residential		Residential		SB-110		SB-110		SB-110		SB-110		SB-110		SB-110			
Property:						Soil Pathway		Soil to GW		Soil Pathway		Soil to GW		Fairfax I		Fairfax I		Fairfax I		Fairfax I			
Sampling Company:						Units		a		b		c		d		CRA		CRA		CRA			
Volatile Organic Compounds																							
1,2,4-Trimethylbenzene	mg/kg	126	2.21	54	1.07	-	-	-	-	-	-	-	-	-	-	ND(0.0048)	0.0224	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
1,2-Dichloroethene (total)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	ND(0.0048)	0.0024 J	ND(0.0048)	0.0278	ND(0.0083)	ND(0.0061)		
1,3,5-Trimethylbenzene	mg/kg	530	11.1	243	5.51	-	-	-	-	-	-	-	-	-	-	ND(0.0048)	0.003 J	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	101000	57.8	26000	24.2	ND(0.018)	ND(0.026)	ND(0.025)	-	-	-	-	-	-	-	0.0073 J	ND(0.0113)	ND(0.0097)	0.0049 J	0.0107 J	0.015		
2-Phenylbutane (sec-Butylbenzene)	mg/kg	654	20.2	276	8.27	-	-	-	-	-	-	-	-	-	-	0.0026 J	0.0059	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
Acetone	mg/kg	406000	204	50300	51.6	ND(0.018)	0.0092 J	ND(0.025)	-	-	-	-	-	-	-	0.0225 J	ND(0.0225)	ND(0.0193)	0.0054 J	0.0274 J	0.0576		
Chloroform (Trichloromethane)	mg/kg	7.14	0.85	4.22	0.85	ND(0.0046)	ND(0.0065)	ND(0.0063)	-	-	-	-	-	-	-	ND(0.0048)	ND(0.0056)	0.0011 J	0.0015 J	ND(0.0083)	ND(0.0061)		
cis-1,2-Dichloroethene	mg/kg	194	0.855	115	0.855	ND(0.0046)	ND(0.0065)	ND(0.0063)	-	-	-	-	-	-	-	ND(0.0024)	0.0024 J	ND(0.0024)	0.0278	ND(0.0042)	ND(0.0031)		
Cymene (p-Isopropyltoluene)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	ND(0.0048)	0.0027 J	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
Isopropyl benzene	mg/kg	5680	140	2540	65.1	-	-	-	-	-	-	-	-	-	-	0.00099 J	ND(0.0056)	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
Naphthalene	mg/kg	64.7	0.659	30.5	0.349	-	-	-	-	-	-	-	-	-	-	0.0026 J	0.0027 J	ND(0.0097)	ND(0.0132)	ND(0.0166)	ND(0.0123)		
N-Butylbenzene	mg/kg	687	23.6	285	10.2	-	-	-	-	-	-	-	-	-	-	0.0017 J	0.0076	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
N-Propylbenzene	mg/kg	14300	320	4070	110	-	-	-	-	-	-	-	-	-	-	ND(0.0048)	0.0033 J	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
Tetrachloroethene	mg/kg	16.5	0.121	7.54	0.121	ND(0.0046)	ND(0.0065)	0.19 nd	ND(0.29)	0.45 nd	0.034	0.15 nd	ND(0.27)	ND(0.27)	0.024	ND(0.0048)	0.0998	0.0013 J	ND(0.0066)	ND(0.0083)	0.0075		
Toluene	mg/kg	29800	51.2	4320	51.2	0.0025 J	ND(0.0065)	0.00091 J	-	-	-	-	-	-	-	ND(0.0048)	ND(0.0056)	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
Trichloroethene	mg/kg	69.8	0.0842	41	0.0842	ND(0.0046)	ND(0.0065)	0.001 J	-	-	-	-	-	-	-	ND(0.0048)	0.0044 J	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
Xylenes (total)	mg/kg	1410	809	936	809	0.0081 J	ND(0.013)	ND(0.013)	-	-	-	-	-	-	-	ND(0.0048)	ND(0.0056)	ND(0.0048)	ND(0.0066)	ND(0.0083)	ND(0.0061)		
Semi-Volatile Organic Compounds																							
2,4-Dimethylphenol	mg/kg	17600	190	1220	29.9	ND(0.39)	ND(0.45)	0.048 J	-	-	-	-	-	-	-	-	-	-	-	-	-		
Metals																							
Aluminum	mg/kg	NC	NC	NC	NC	5660	5690	7340	-	-	-	-	-	-	-	-	-	-	-	-	-		
Arsenic	mg/kg	38	NC	NC	NC	5.3	3.9	4.6	-	-	-	-	-	-	-	-	-	-	-	-	-		
Barium	mg/kg	277000	NC	15300	NC	183	205	208	-	-	-	-	-	-	-	-	-	-	-	-	-		
Beryllium	mg/kg	3650	NC	155	NC	0.17 J	0.14 J	0.21 J	-	-	-	-	-	-	-	-	-	-	-	-	-		
Calcium	mg/kg	NC	NC	NC	NC	13000	21200	20200	-	-	-	-	-	-	-	-	-	-	-	-	-		
Chromium	mg/kg	111	NC	33.6	NC	10.3	10.7	12.3	-	-	-	-	-	-	-	-	-	-	-	-	-		
Cobalt	mg/kg	579	NC	23.4	NC	4.8 J	6.7 J	6.8 J	-	-	-	-	-	-	-	-	-	-	-	-	-		
Copper	mg/kg	81700	NC	3130	NC	11.8	12.3	18.2	-	-	-	-	-	-	-	-	-	-	-	-	-		
Iron	mg/kg	NC	NC	NC	NC	9460 J	12900 J	12200 J	-	-	-	-	-	-	-	-	-	-	-	-	-		
Lead	mg/kg	1000	NC	400	NC	9.0	9.3	10.5	-	-	-	-	-	-	-	-	-	-	-	-	-		
Magnesium	mg/kg	NC	NC	NC	NC	3810	8270	7500	-	-	-	-	-	-	-	-	-	-	-	-	-		
Manganese	mg/kg	66200	NC	9300	NC	247	274	277	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mercury	mg/kg	20	NC	2	NC	0.013 J	0.0099 J	0.016 J	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nickel	mg/kg	32400	NC	1540	NC	12.4	16.9	17.0	-	-	-	-	-	-	-	-	-	-	-	-	-		
Potassium	mg/kg	NC	NC	NC	NC	1160	1530	2110	-	-	-	-	-	-	-	-	-	-	-	-	-		
Selenium	mg/kg	10200	NC	391	NC	0.43 J	ND(0.68)	ND(0.69)	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sodium	mg/kg	NC	NC	NC	NC	267 J	121 J	176 J	-	-	-	-	-	-	-	-	-	-	-	-	-		
Vanadium	mg/kg	NC	NC	NC	NC	16.6	18.8	19.6	-	-	-	-	-	-	-	-	-	-	-	-	-		
Zinc	mg/kg	613000	NC	23500	NC	38.5	47.7	51.5	-	-	-	-	-	-	-	-	-	-	-	-	-		
General Chemistry																							
Percent moisture	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	15.2	19.7	14.4	29.8		
Total solids	%	NC	NC	NC	NC	85.4	73.4	72.6	80.5	78.5	72.8	79.5	76.9	79.1	75.6	-	-	-	-	-	-		

Notes:

ND () - Not present at or above the associated value

J - Estimated concentration

UJ - Estimated reporting limit

NC - No Criteria

--: Not Analyzed

Boxed values exceed criteria

mg/kg - milligrams per kilograms

Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-4

SB-110 AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-101	TMW-138	MW-125	MW-125	MW-125	MW-125	MW-125	MW-125	TMW-150	TMW-150	
Sample Name:				MW-101	GW112806GC010	WG-110107-JH-001	GW-120607-JH-032	GW-031208-JH-015	GW-062508-JH-014	WG-121211-DF-009	WG-121211-DF-010	GW-042712-JH-19	GW-042712-JH-13	GW-042712-JH-15
Sample Date:				10/1/1988	11/28/2006	11/1/2007	12/6/2007	3/12/2008	6/25/2008	12/12/2011	12/12/2011	4/27/2012	4/27/2012	4/27/2012
Sample Type:	KDHE Tier 2 Risk-Based Criteria										Duplicate			Duplicate
Area of Concern:	Non-Residential		Residential	SB-110	SB-110	SB-110	SB-110	SB-110	SB-110	SB-110	SB-110	SB-110	SB-110	SB-110
Property:	Groundwater Pathway	Groundwater Pathway		Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	LANGSTON	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>														
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	0.00059 J	0.0114	0.0119
Benzene	mg/L	0.005	0.005	ND(0.005)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.00012 J	0.00012 J
Bromodichloromethane	mg/L	0.08	0.08	ND(0.005)	-	0.00017 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	0.0247	-	0.00033 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	-	ND(0.0005)	0.00048 J	ND(0.0005)	ND(0.0005)	0.00031 J	0.0003 J	ND(0.001)	0.0097	0.0102
Dichloroethene	mg/L	NC	NC	0.036	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	0.0324 ^{ab}	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.005)	0.00032 J	ND(0.001)	0.00047 J	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.001)	0.00043 J	0.00049 J	0.00047 J
Toluene	mg/L	1	1	0.0112	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	-	-	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.001)	ND(0.001)	ND(0.001)	0.0017	0.0017
Trichloroethene	mg/L	0.005	0.005	ND(0.005)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.00021 J	0.0002 J	0.00032 J	0.0201 ^{ab}	0.0205 ^{ab}
Trichlorofluoromethane (CFC-11)	mg/L	1.9	1.09	ND(0.02)	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Vinyl chloride	mg/L	0.002	0.002	ND(0.01)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.00027 J	0.00027 J
<u>Metals</u>														
Arsenic	mg/L	0.01	0.01	0.007	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	0.293	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	0.004	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	0.012	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	0.013	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	0.035 ^{ab}	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	0.0005	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	0.043	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	0.003	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	0.024	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	0.028	-	-	-	-	-	-	-	-	-	-

Notes:
TMW-138 - Location and results not shown on databox figure.
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
-- : Not Analyzed
Boxed values exceed criteria.
mg/L - milligrams per liter
cfu/mL - colony forming units per milliliters
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TABLE A-4

SB-110 AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:			TMW-150	TMW-151	TMW-151	TMW-152	TMW-152	
Sample Name:			GW-050912-NL-06	GW-042712-JH-17	GW-051012-NL-10	GW-042612-JH-07	GW-051012-NL-11	
Sample Date:			5/9/2012	4/27/2012	5/10/2012	4/26/2012	5/10/2012	
Sample Type:	KDHE Tier 2 Risk-Based Criteria							
Area of Concern:			Non-Residential	Residential	SB-110	SB-110	SB-110	
Property:			Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	
<u>Volatile Organic Compounds</u>								
1,2-Dichloroethene (total)	mg/L	NC	NC	0.0105	0.0374	0.0333	0.00036 J	0.00055 J
Benzene	mg/L	0.005	0.005	0.00012 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Bromodichloromethane	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	0.0089	0.0343	0.0305	ND(0.001)	0.00055 J
Dichloroethene	mg/L	NC	NC	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	0.0013	0.0011	0.0013	0.0049	0.0048
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	0.0016	0.0031	0.0028	ND(0.001)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	0.0203 ^{ab}	0.0099 ^{ab}	0.0089 ^{ab}	0.0013	0.0011
Trichlorofluoromethane (CFC-11)	mg/L	1.9	1.09	ND(0.001)	ND(0.001)	ND(0.001)	0.0014	0.0018
Vinyl chloride	mg/L	0.002	0.002	0.00032 J	0.00013 J	ND(0.001)	ND(0.001)	ND(0.001)
<u>Metals</u>								
Arsenic	mg/L	0.01	0.01	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-

Notes:
TMW-138 - Location and results not shown on databox figure.
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
-- : Not Analyzed
Boxed values exceed criteria.
mg/L - milligrams per liter
cfu/mL - colony forming units per milliliters
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

[illegible]

Notes:

ND () - Not present at or above the associated value

J - Estimated concentration

UJ - Estimated reporting limit

NC - No Criteria

--: Not Analyzed

Boxed values exceed criteria

mg/kg - milligrams per kilograms

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TABLE A-6

**TMW-127 AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS**

<i>Location Name:</i>				TMW-127	TMW-127	TMW-127	MW-108	MW-110
<i>Sample Name:</i>				GW112706GC003	GW-091407-NT-002	WG-121311-DF-018	WG-121211-DF-007	WG-121211-KH-008
<i>Sample Date:</i>				11/27/2006	9/14/2007	12/13/2011	12/12/2011	12/12/2011
<i>Sample Type:</i>				KDHE Tier 2 Risk-Based Criteria				
<i>Area of Concern:</i>				Non-Residential	Residential			
<i>Property:</i>				Groundwater Pathway	Groundwater Pathway			
<i>Sampling Company:</i>	Units			Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
		a	b	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>								
1,1-Dichloroethane	mg/L	0.0461	0.025	ND(0.001)	-	ND(0.0067)	ND(0.001)	ND(0.001)
1,1-Dichloroethene	mg/L	0.007	0.007	ND(0.001)	-	ND(0.0067)	ND(0.001)	ND(0.001)
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	-	ND(0.067)	ND(0.01)	ND(0.01)
Acetone	mg/L	45.5	11.5	ND(0.01)	-	ND(0.067)	ND(0.01)	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.001)	-	ND(0.0067)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	-	ND(0.0067)	ND(0.001)	ND(0.001)
Chloromethane (Methyl chloride)	mg/L	0.238	0.127	0.0044	-	ND(0.0067)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	0.77 ²⁰	-	0.14 ²⁰	ND(0.001)	ND(0.001)
Cymene (p-Isopropyltoluene)	mg/L	NC	NC	-	-	-	-	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	-	0.0032 J	ND(0.001)	ND(0.001)
Methyl tert butyl ether (MTBE)	mg/L	0.262	0.133	-	-	ND(0.033)	ND(0.005)	ND(0.005)
Methylene chloride	mg/L	0.005	0.005	0.027 ²⁰	-	ND(0.0067)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	-	ND(0.0067)	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	-	0.039	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	0.0057	-	0.0029 J	ND(0.001)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	-	ND(0.0067)	ND(0.001)	ND(0.001)
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	-	0.0031 J ²⁰	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	-	0.033	ND(0.002)	ND(0.002)
<u>Semivolatile Organic Compounds</u>								
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	ND(0.01)	-	-	-	-
Caprolactam	mg/L	50.6	7.77	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>								
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-	-
<u>Metals</u>								
Aluminum	mg/L	NC	NC	5.46	-	-	-	-
Arsenic	mg/L	0.01	0.01	0.0278 ²⁰	0.0484 ²⁰	-	-	-
Barium	mg/L	2	2	0.302	-	-	-	-
Cadmium	mg/L	0.005	0.005	ND(0.005)	-	-	-	-
Calcium	mg/L	NC	NC	142	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-
Chromium	mg/L	0.1	0.1	0.0094 J	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	0.0037 J	-	-	-	-
Copper	mg/L	1.3	1.3	0.0087 J	-	-	-	-
Iron	mg/L	NC	NC	23	-	-	-	-
Lead	mg/L	0.015	0.015	0.007	-	-	-	-

TABLE A-6

**TMW-127 AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS**

<i>Location Name:</i>				TMW-127	TMW-127	TMW-127	MW-108	MW-110
<i>Sample Name:</i>				GW112706GC003	GW-091407-NT-002	WG-121311-DF-018	WG-121211-DF-007	WG-121211-KH-008
<i>Sample Date:</i>				11/27/2006	9/14/2007	12/13/2011	12/12/2011	12/12/2011
<i>Sample Type:</i>		KDHE Tier 2 Risk-Based Criteria						
<i>Area of Concern:</i>		<i>Non-Residential</i>	<i>Residential</i>	TMW-127	TMW-127	TMW-127	TMW-127	TMW-127
<i>Property:</i>		<i>Groundwater Pathway</i>	<i>Groundwater Pathway</i>	<i>Fairfax I</i>	<i>Fairfax I</i>	<i>Fairfax I</i>	<i>Fairfax I</i>	<i>Fairfax I</i>
<i>Sampling Company:</i>	<i>Units</i>	<i>a</i>	<i>b</i>	<i>CRA</i>	<i>CRA</i>	<i>CRA</i>	<i>CRA</i>	<i>CRA</i>
Magnesium	mg/L	NC	NC	38.1	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-
Manganese	mg/L	0.05	0.05	1.5 ^{WB}	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-
Mercury	mg/L	0.002	0.002	ND(0.0002)	-	-	-	-
Nickel	mg/L	2.04	0.312	ND(0.04)	-	-	-	-
Potassium	mg/L	NC	NC	8.98	-	-	-	-
Selenium	mg/L	0.05	0.05	ND(0.005)	-	-	-	-
Silver	mg/L	0.508	0.0779	ND(0.01)	-	-	-	-
Sodium	mg/L	NC	NC	45.8	-	-	-	-
Thallium	mg/L	NC	NC	ND(0.01)	-	-	-	-
Vanadium	mg/L	NC	NC	0.0159 J	-	-	-	-
Zinc	mg/L	30.5	4.67	ND(0.0314)	-	-	-	-
<u>General Chemistry</u>								
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-
Total kjeldahl nitrogen (TKN)	mg/L	NC	NC	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-

Notes:

ND () - Not present at or above the associated value

J - Estimated concentration

UJ - Estimated reporting limit

NC - No Criteria

GRO - Gasoline range

-- : Not Analyzed

Boxed values exceed criteria.

mg/L - milligrams per liter

cfu/mL - colony forming units per milliliters

Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-7

MW-103A - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:					S-26	S-27-HDR	S-29	S-29	S-29	S-29	S-29	S-29	S-29	S-29	S-30	F-26	SB-28	SB-28	SB-29	SB-29
Sample Name:					S-26-1154	S-27-1161	S-29-1172	S-29-1173	S-29-1174	S-29-1175	S-29-1176	S-29-1177	S-30-1180	F-26-1262			S-051199-PK-001	S-051199-PK-002	S-051199-PK-003	S-051199-PK-004
Sample Date:					8/25/1987	8/26/1987	8/24/1987	8/24/1987	8/24/1987	8/24/1987	8/24/1987	8/24/1987	8/31/1987	9/1/1987			5/11/1999	5/11/1999	5/11/1999	5/11/1999
Sample Type:																				
Depth:	KDHE Tier 2 Risk-Based Criteria				(10) ft BGS	(15) ft BGS	(5) ft BGS	(10) ft BGS	(15) ft BGS	(20) ft BGS	(25) ft BGS	(30) ft BGS	(15) ft BGS	(5) ft BGS			(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS
Area of Concern:	Non-ResidentialResidential				MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A			MW-103A	MW-103A	MW-103A	MW-103A
Property:	Soil PathwaySoil to GWSoil PathwaySoil to GW				Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	c	d	HDR	HDR	HDR	HDR	HDR	HDR	HDR	HDR	HDR	HDR	HDR	CRA	CRA	CRA	CRA
Volatile Organic Compounds																				
1,2-Dichloroethene (total)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	101000	57.8	26000	24.2	-	-	-	-	-	-	-	-	-	-	-	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	34800	27.2	4450	6.69	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	110 ^{bd}	27.0 ^d	0.85	ND(0.5)	ND(0.5)		ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Acetone	mg/kg	406000	204	50300	51.6		-	-	-	-	-	-	-	-	-	-	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)
Benzene	mg/kg	28.2	0.168	15.9	0.168	4.0 ^{bd}	ND(0.5)	ND(0.5)	ND(0.5)	5.3 ^{bd}	ND(0.5)	ND(0.5)	ND(0.5)	1.5 ^{bd}	ND(0.5)		ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Carbon disulfide	mg/kg	1680	15.6	1020	6.71	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
cis-1,2-Dichloroethene	mg/kg	194	0.855	115	0.855	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Ethylbenzene	mg/kg	145	65.6	82	65.6	46.0	0.45	4.6	8.1	390 ^{abcd}	160 ^{abcd}	62.0	0.770	ND(0.5)	160.0 ^{abcd}		ND(0.005)	1.1	0.31	0.01
Tetrachloroethene	mg/kg	16.5	0.121	7.54	0.121	5.6 ^{bd}	0.88 ^{bd}	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)		ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Toluene	mg/kg	29800	51.2	4320	51.2	ND(0.5)	ND(0.5)	30.0	34.0	490 ^{bd}	380 ^{bd}	74.0 ^{bd}	1.2	ND(0.5)	ND(0.5)		ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Xylenes (total)	mg/kg	1410	809	936	809	ND(0.5)	ND(0.5)	15.0	24.0	820.0 ^{bd}	380.0	110.0	2.40	ND(0.5)	410.0		ND(0.005)	5.8	0.91	ND(0.005)
General Chemistry																				
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ash	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent moisture	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (solid)	none	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total kjeldahl nitrogen (TKN)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total solids	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
---: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

MW-103A - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:					SB-30	SB-30	SB-31	SB-31	SB-32	SB-32	SB-33	SB-33	SB-34	SB-34	SB-35	SB-35	SB-36	SB-36
Sample Name:					S-051199-PK-005	S-051199-PK-006	S-051199-PK-007	S-051199-PK-008	S-051199-PK-009	S-051199-PK-010	S-051199-PK-011	S-051199-PK-012	S-051199-PK-013	S-051199-PK-014	S-051199-PK-015	S-051199-PK-016	S-051199-PK-017	S-051199-PK-018
Sample Date:					5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/11/1999
Sample Type:																		
Depth:	KDHE Tier 2 Risk-Based Criteria				(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(7-9) ft BGS	(10-12) ft BGS
Area of Concern:	Non-Residential Residential				MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:	Soil Pathway Soil to GW Soil Pathway Soil to GW				Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	c	d	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>																		
1,2-Dichloroethene (total)	mg/ kg	NC	NC	NC	NC	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.005)	ND(0.005)
2-Butanone (Methyl ethyl ketone) (MEK)	mg/ kg	101000	57.8	26000	24.2	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.022)	ND(0.02)	ND(0.02)
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/ kg	34800	27.2	4450	6.69	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.011)	ND(0.01)	ND(0.01)
Acetone	mg/ kg	406000	204	50300	51.6	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.11)	ND(0.1)	ND(0.1)
Benzene	mg/ kg	28.2	0.168	15.9	0.168	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.005)	ND(0.005)
Carbon disulfide	mg/ kg	1680	15.6	1020	6.71	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.005)	ND(0.005)
cis-1,2-Dichloroethene	mg/ kg	194	0.855	115	0.855	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.005)	ND(0.005)
Ethylbenzene	mg/ kg	145	65.6	82	65.6	ND(0.005)	ND(0.005)	ND(0.005)	0.033	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.005)	ND(0.005)
Tetrachloroethene	mg/ kg	16.5	0.121	7.54	0.121	0.012	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.005)	0.006
Toluene	mg/ kg	29800	51.2	4320	51.2	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.005)	ND(0.005)
Xylenes (total)	mg/ kg	1410	809	936	809	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.005)	ND(0.005)
<u>General Chemistry</u>																		
Aerobic BTEX specific microbial population	cfu/ mL	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/ kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Ash	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/ kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent moisture	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (solid)	none	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/ mL	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total kjeldahl nitrogen (TKN)	mg/ kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total solids	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
--: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-7

MW-103A - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:					SB-37	SB-37	SB-38	SB-38	SB-39	SB-39	SB-40	SB-40	SB-41	SB-41	SB-42	SB-42	SB-43	SB-43	
Sample Name:					S-051199-PK-019	S-051199-PK-020	S-051199-PK-021	S-051199-PK-022	S-051299-PK-023	S-051299-PK-024	S-051299-PK-025	S-051299-PK-026	S-051299-PK-027	S-051299-PK-028	S-051299-PK-029	S-051299-PK-030	S-051299-PK-031	S-051299-PK-032	
Sample Date:					5/11/1999	5/11/1999	5/11/1999	5/11/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	
Sample Type:																			
Depth:	KDHE Tier 2 Risk-Based Criteria				(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	
Area of Concern:	Non-Residential Residential				MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	
Property:	Soil Pathway Soil to GW Soil Pathway Soil to GW				Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	
Sampling Company:	Units	a	b	c	d	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	
Volatile Organic Compounds																			
1,2-Dichloroethene (total)	mg/kg	NC	NC	NC	NC	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	0.008 J	ND(0.006)	ND(0.005)
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	101000	57.8	26000	24.2	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	22	ND(0.022)	ND(0.02)
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	34800	27.2	4450	6.69	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	410 ^{ba}	0.93	0.21
Acetone	mg/kg	406000	204	50300	51.6	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	0.13	ND(0.1)	ND(0.1)	190 J ^d	0.33	ND(0.1)
Benzene	mg/kg	28.2	0.168	15.9	0.168	ND(0.005)	ND(0.005)	ND(0.005)	0.022	ND(0.005)	ND(0.005)	0.095 J	0.033	ND(0.005)	0.018	0.072 J	4.7 J ^{ba}	ND(0.006)	0.084
Carbon disulfide	mg/kg	1680	15.6	1020	6.71	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)UJ	ND(0.006)	ND(0.005)
cis-1,2-Dichloroethene	mg/kg	194	0.855	115	0.855	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	0.007 J	ND(0.006)	ND(0.005)
Ethylbenzene	mg/kg	145	65.6	82	65.6	ND(0.005)	ND(0.005)	ND(0.005)	1.1	ND(0.005)	ND(0.005)	18	19	6.4 J	4.6	2.3	890 ^{abca}	1.7	22
Tetrachloroethene	mg/kg	16.5	0.121	7.54	0.121	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)UJ	ND(0.006)	ND(0.005)
Toluene	mg/kg	29800	51.2	4320	51.2	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	64 ^{bd}	2.8 J	9.5 J	13	1	2300 ^{bd}	0.72	0.1 J
Xylenes (total)	mg/kg	1410	809	936	809	ND(0.005)	ND(0.005)	ND(0.005)	5.8	ND(0.005)	ND(0.005)	180	120	32	87	11	4700 ^{abcd}	14	110
General Chemistry																			
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ash	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent moisture	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (solid)	none	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total kjeldahl nitrogen (TKN)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total solids	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
--: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-7

MW-103A - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:						SB-44	SB-44	SB-45	SB-45	SB-46	SB-46	SB-47	SB-47	SB-101	SB-101	SB-102	SB-102	SB-103	SB-103
Sample Name:						S-051299-PK-033	S-051299-PK-034	S-051299-PK-035	S-051299-PK-036	S-051299-PK-037	S-051299-PK-038	S-051299-PK-039	S-051299-PK-040	S-122004-DS-101	S-122004-DS-102	S-122004-DS-103	S-122004-DS-104	S-122004-DS-105	S-122004-DS-106
Sample Date:						5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	5/12/1999	12/20/2004	12/20/2004	12/20/2004	12/20/2004	12/20/2004	12/20/2004
Sample Type:																			
Depth:						KDHE Tier 2 Risk-Based Criteria				(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(5-7) ft BGS	(10-12) ft BGS	(8-10) ft BGS	(12-14) ft BGS
Area of Concern:						Non-Residential		Residential		MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:						Soil Pathway	Soil to GW	Soil Pathway	Soil to GW	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:						Units	a	b	c	d	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>																			
1,2-Dichloroethene (total)	mg/kg	NC	NC	NC	NC	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	101000	57.8	26000	24.2	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.024)	ND(0.025)	ND(2400)	ND(23)	ND(510)	0.0025 J	ND(1.2)UJ
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	34800	27.2	4450	6.69	ND(0.01)	0.039	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.011)	ND(0.012)	0.009 J	1700 J ^{bd}	ND(23)	ND(510)	ND(0.023)	ND(1.2)UJ
Acetone	mg/kg	406000	204	50300	51.6	ND(0.1)	ND(0.1)	0.1	ND(0.1)	ND(0.1)	0.24	ND(0.1)	ND(0.12)	0.015 J	ND(2400)	ND(23)	ND(510)	0.016 J	ND(1.2)UJ
Benzene	mg/kg	28.2	0.168	15.9	0.168	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	0.007	ND(0.005)	0.12	0.024	ND(610)	0.27 J ^{bd}	7.9 J ^{bd}	0.00056 J	0.086 J
Carbon disulfide	mg/kg	1680	15.6	1020	6.71	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	0.008	ND(0.005)	ND(0.006)	ND(0.0063)	ND(610)	ND(5.8)	ND(130)	ND(0.0057)	ND(0.3)UJ
cis-1,2-Dichloroethene	mg/kg	194	0.855	115	0.855	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.0063)	ND(610)	ND(5.8)	ND(130)	ND(0.0057)	ND(0.3)UJ
Ethylbenzene	mg/kg	145	65.6	82	65.6	ND(0.005)	0.007	ND(0.005)	ND(0.005)	ND(0.005)	2.8 J	ND(0.005)	0.7	0.0057 J	2100 ^{abcd}	13	2000 ^{abcd}	0.0022 J	0.13 J
Tetrachloroethene	mg/kg	16.5	0.121	7.54	0.121	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	ND(0.0063)	ND(610)	ND(5.8)	ND(130)	ND(0.0057)	ND(0.3)UJ
Toluene	mg/kg	29800	51.2	4320	51.2	ND(0.005)	0.038	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.006)	0.0059 J	18000 ^{bcd}	ND(5.8)	4100 ^{bd}	0.0017 J	0.43 J
Xylenes (total)	mg/kg	1410	809	936	809	ND(0.005)	0.042	ND(0.005)	ND(0.005)	ND(0.005)	84	0.054	0.13	0.011 J	12000 ^{abcd}	250	10000 ^{abcd}	0.0018 J	4.3 J
<u>General Chemistry</u>																			
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	NC	NC	-	-	-	-	-	-	-	-	ND(0)	-	ND(0)	86000	500	870000
Ammonia	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	5.5	13	14	3.1	2.9	14
Ash	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	ND(6.7)	ND(6.9)	ND(6.5)	ND(5.5)	ND(5.9)	0.22 J
Percent moisture	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (solid)	none	NC	NC	NC	NC	-	-	-	-	-	-	-	-	7.3	6.2	7.1	7.0	7.9	7.5
Total heterotropic bacteria	cfu/mL	NC	NC	NC	NC	-	-	-	-	-	-	-	-	5000	-	ND(0)	310000	15000	1100000
Total kjeldahl nitrogen (TKN)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	260 J	960 J	540 J	250 J	130 J	1200 J
Total solids	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	74.9	72.6	77.1	90.9	84.5	79.4

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
---: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-7

MW-103A - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:					SB-104	SB-104	SB-105	SB-105	SB-105	SB-106	SB-106	SB-107	SB-107	SB-50	SB-51	TMW-157
Sample Name:					S-122004-DS-107	S-122004-DS-108	S-122004-DS-109	S-122004-DS-102	S-122004-DS-110	S-122004-DS-111	S-122004-DS-112	S-122004-DS-113	S-122004-DS-114	SB 50 18-20	SB 51 18-20	TMW 157 18-20
Sample Date:					12/20/2004	12/20/2004	12/20/2004	12/20/2004	12/20/2004	12/20/2004	12/20/2004	12/20/2004	12/20/2004	4/11/2012	4/11/2012	4/10/2012
Sample Type:																
Depth:	KDHE Tier 2 Risk-Based Criteria				(8-10) ft BGS	(12-14) ft BGS	(8-10) ft BGS	(12-14) ft BGS	(12-14) ft BGS	(8-10) ft BGS	(12-14) ft BGS	(8-10) ft BGS	(12-14) ft BGS	(18-20) ft BGS	(18-20) ft BGS	(18-20) ft BGS
Area of Concern:	Non-Residential Residential				MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:	Soil Pathway Soil to GW Soil Pathway Soil to GW				Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	c	d	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>																
1,2-Dichloroethene (total)	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	ND(0.0058)	ND(0.005)	ND(0.0055)
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	101000	57.8	26000	24.2	ND(130)	ND(2500)	ND(11)	-	ND(710)	ND(0.023)	ND(1.2)	ND(0.023)	ND(0.024)	ND(0.0117)	0.0106 J
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	34800	27.2	4450	6.69	ND(130)	ND(2500)	ND(11)	-	ND(710)	ND(0.023)	ND(1.2)	ND(0.023)	ND(0.024)	ND(0.0117)	ND(0.01)
Acetone	mg/kg	406000	204	50300	51.6	ND(130)	280 J ^{bd}	ND(11)	-	ND(710)	0.0071 J	ND(1.2)	ND(0.023)	0.0091 J	ND(0.0234)	0.0426 J
Benzene	mg/kg	28.2	0.168	15.9	0.168	ND(32)	ND(620)	ND(2.8)	-	ND(180)	ND(0.0057)	ND(0.31)	ND(0.0057)	ND(0.0061)	ND(0.0058)	ND(0.005)
Carbon disulfide	mg/kg	1680	15.6	1020	6.71	ND(32)	ND(620)	ND(2.8)	-	ND(180)	ND(0.0057)	ND(0.31)	ND(0.0057)	ND(0.0061)	ND(0.0058)	ND(0.005)
cis-1,2-Dichloroethene	mg/kg	194	0.855	115	0.855	ND(32)	ND(620)	ND(2.8)	-	ND(180)	ND(0.0057)	ND(0.31)	ND(0.0057)	ND(0.0061)	ND(0.0029)	ND(0.0025)
Ethylbenzene	mg/kg	145	65.6	82	65.6	540 ^{abcd}	4800 ^{abcd}	26	-	1500 ^{abcd}	ND(0.0057)	0.13 J	ND(0.0057)	0.0033 J	ND(0.0058)	ND(0.005)
Tetrachloroethene	mg/kg	16.5	0.121	7.54	0.121	ND(32)	ND(620)	ND(2.8)	-	ND(180)	ND(0.0057)	ND(0.31)	ND(0.0057)	ND(0.0061)	ND(0.0058)	ND(0.005)
Toluene	mg/kg	29800	51.2	4320	51.2	630 ^{bd}	21000 ^{bcd}	3.7	-	5000 ^{bcd}	0.0028 J	0.3 J	0.0014 J	0.01	ND(0.0058)	ND(0.005)
Xylenes (total)	mg/kg	1410	809	936	809	3200 ^{abcd}	24000 ^{abcd}	230	-	7900 ^{abcd}	ND(0.011)	0.67	ND(0.011)	0.018	ND(0.0058)	ND(0.005)
<u>General Chemistry</u>																
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	NC	NC	570000	5600	-	5500	-	-	-	-	-	-	-
Ammonia	mg/kg	NC	NC	NC	NC	7.0	7.7	11	-	2.3	-	-	-	-	-	-
Ash	%	NC	NC	NC	NC	-	-	-	-	-	3.6	3.6	1.7	2.7	-	-
Nitrate (as N)	mg/kg	NC	NC	NC	NC	ND(6.9)	ND(6.7)	ND(6.2)	-	ND(5.9)	-	-	-	-	-	-
Percent moisture	%	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	25.5	19.3
pH (solid)	none	NC	NC	NC	NC	7.8	8.0	7.8	-	8.0	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	NC	NC	420000	5100	-	10000	-	-	-	-	-	-	-
Total kjeldahl nitrogen (TKN)	mg/kg	NC	NC	NC	NC	350 J	ND(200)UJ	450 J	-	98 J	-	-	-	-	-	-
Total solids	%	NC	NC	NC	NC	72.6	74.4	80.4	-	85.1	75.3	81.7	80.9	77.2	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
--: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A
Sample Name:				MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	MW-102A	GW-051299-JH-102	GW-062706-JH-014	GW-091207-NT-020	GW-120507-JH-014
Sample Date:				10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993	6/21/1994	5/12/1999	6/27/2006	9/12/2007	12/5/2007
Sample Type:		KDHE Tier 2 Risk-Based Criteria																		
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	LANGSTON	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>																				
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	ND(0.001)	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.02)	ND(0.01)	ND(0.01)	ND(0.01)
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Acetone	mg/L	45.5	11.5	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.1)	ND(0.01)	ND(0.01)	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)
Chlorobenzene	mg/L	0.1	0.1	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Cyclohexane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene	mg/L	NC	NC	ND(0.005)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-	-	-	-	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)	ND(0.001)	0.00071 J	ND(0.001)
Methyl cyclohexane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)	ND(0.001)	0.0009 J	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Vinyl chloride	mg/L	0.002	0.002	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.003)	ND(0.001)	0.00071 J	ND(0.001)
<u>Semivolatile Organic Compounds</u>																				
2,4-Dimethylphenol	mg/L	1.86	0.292	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	mg/L	0.1	0.0154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/L	4.78	0.744	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3&4-Methylphenol	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>																				
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.037 J	ND(0.1)
<u>Metals</u>																				
Arsenic	mg/L	0.01	0.01	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	0.185	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	0.016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:			MW-102A	MW-102A	MW-102A	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B
Sample Name:			GW-031208-JH-016	GW-062408-JH-010	WG-121211-DF-001	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	GW-091307-NT-021
Sample Date:			3/12/2008	6/24/2008	12/12/2011	10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993		9/13/2007
Sample Type:			KDHE Tier 2 Risk-Based Criteria																
Area of Concern:			Non-Residential	Residential		MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:			Groundwater Pathway	Groundwater Pathway		Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:			Units			CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
			a	b															
<u>Volatile Organic Compounds</u>																			
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)
Acetone	mg/L	45.5	11.5	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Chlorobenzene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0005)	ND(0.0005)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.0005)
Cyclohexane	mg/L	NC	NC	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene	mg/L	NC	NC	-	-	-	ND(0.005)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)
Methyl cyclohexane	mg/L	NC	NC	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	0.00018 J
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)UJ	ND(0.002)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)
<u>Semivolatile Organic Compounds</u>																			
2,4-Dimethylphenol	mg/L	1.86	0.292	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	mg/L	0.1	0.0154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/L	4.78	0.744	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3&4-Methylphenol	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>																			
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	ND(0.1)	ND(0.1)	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.1)
<u>Metals</u>																			
Arsenic	mg/L	0.01	0.01	-	-	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	0.011	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-102A	MW-102A	MW-102A	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B
Sample Name:				GW-031208-JH-016	GW-062408-JH-010	WG-121211-DF-001	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	MW-102B	GW-091307-NT-021
Sample Date:				3/12/2008	6/24/2008	12/12/2011	10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993	9/13/2007
Sample Type:		KDHE Tier 2 Risk-Based Criteria																	
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	LANGSTON	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	CRA
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	0.019 ⁹⁰	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	0.038	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	0.017	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides																			
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																			
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:			MW-102B	MW-102B	MW-102B	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C
Sample Name:			GW-120507-JH-015	GW-031208-JH-017	GW-062408-JH-009	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	GW-091307-NT-022
Sample Date:			12/5/2007	3/12/2008	6/24/2008	10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993		9/13/2007
Sample Type:			KDHE Tier 2 Risk-Based Criteria																
Area of Concern:			Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:			Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units		a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>																			
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)
Acetone	mg/L	45.5	11.5	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Chlorobenzene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0005)	ND(0.0005)	ND(0.0005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.0005)
Cyclohexane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene	mg/L	NC	NC	-	-	-	ND(0.005)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)
Methyl cyclohexane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)UJ	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)
<u>Semivolatile Organic Compounds</u>																			
2,4-Dimethylphenol	mg/L	1.86	0.292	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	mg/L	0.1	0.0154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/L	4.78	0.744	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3&4-Methylphenol	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>																			
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.1)
<u>Metals</u>																			
Arsenic	mg/L	0.01	0.01	-	-	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	0.321	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-102B	MW-102B	MW-102B	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C
Sample Name:				GW-120507-JH-015	GW-031208-JH-017	GW-062408-JH-009	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	MW-102C	GW-091307-NT-022
Sample Date:				12/5/2007	3/12/2008	6/24/2008	10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993	9/13/2007
Sample Type:		KDHE Tier 2 Risk-Based Criteria																	
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	LANGSTON	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	CRA
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	0.02 ²⁰	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	0.033	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	0.018	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	0.038	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides																			
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																			
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-102C	MW-102C	MW-102C	MW-102C	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Sample Name:				GW-120507-JH-016	GW-031208-JH-018	GW-062408-JH-008	WG-121411-KH-026	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Sample Date:				12/5/2007	3/12/2008	6/24/2008	12/14/2011	10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	11/1/1990	5/1/1991	5/1/1991	11/1/1991	11/1/1991	5/1/1992	5/1/1992
Sample Type:		KDHE Tier 2 Risk-Based Criteria											Duplicate		Duplicate		Duplicate		Duplicate	
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	LANGSTON	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE
Volatile Organic Compounds																				
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(1)	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(1)	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/L	45.5	11.5	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.5)	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.5)	ND(0.005)	ND(0.005)	0.35 ^{uv}	ND(2.5)	0.57 ^{uv}	0.56 ^{uv}	0.13 ^{uv}	0.14 ^{uv}	0.35 ^{uv}	0.35 ^{uv}	ND(0.25)	ND(0.25)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.5)	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	1.5 ^{uv}	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyclohexane	mg/L	NC	NC	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene	mg/L	NC	NC	-	-	-	-	ND(0.5)	-	ND(0.005)	ND(0.005)	ND(2.5)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.25)	ND(0.25)	ND(0.25)
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	2.45 ^{uv}	0.018	0.018	22.5 ^{uv}	7 ^{uv}	7.7 ^{uv}	7.5 ^{uv}	0.57	0.56	3.2 ^{uv}	2.7 ^{uv}	1.3 ^{uv}	1.3 ^{uv}
Methyl cyclohexane	mg/L	NC	NC	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	2 ^{uv}	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.5)	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	51.65 ^{uv}	0.071	0.071	63.1 ^{uv}	150 ^{uv}	142 ^{uv}	145 ^{uv}	0.29	0.35	27 ^{uv}	25 ^{uv}	5.3 ^{uv}	4.8 ^{uv}
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.5)	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(1)	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.002)	8.75	ND(0.005)	0.005	4.33	49 ^{uv}	44 ^{uv}	44 ^{uv}	1.2	2.3	21 ^{uv}	18 ^{uv}	10	9.9
Semivolatile Organic Compounds																				
2,4-Dimethylphenol	mg/L	1.86	0.292	-	-	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	mg/L	0.1	0.0154	-	-	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/L	4.78	0.744	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3&4-Methylphenol	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons																				
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																				
Arsenic	mg/L	0.01	0.01	-	-	-	-	0.279 ^{uv}	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	0.254	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	0.0083 ^{uv}	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	0.061	-	-	-	-	-	-	-	-	-	-	-	-

TABLE A-8

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-102C	MW-102C	MW-102C	MW-102C	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Sample Name:				GW-120507-JH-016	GW-031208-JH-018	GW-062408-JH-008	WG-121411-KH-026	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Sample Date:				12/5/2007	3/12/2008	6/24/2008	12/14/2011	10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	11/1/1990	5/1/1991	5/1/1991	11/1/1991	11/1/1991	5/1/1992	5/1/1992
Sample Type:		KDHE Tier 2 Risk-Based Criteria											Duplicate	Duplicate	Duplicate	Duplicate	Duplicate	Duplicate	Duplicate	Duplicate
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	LANGSTON	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	0.041	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	0.34 ^{ab}	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	0.8 ^c	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	0.023	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	0.232	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	0.46	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides																				
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	0.00007 ^{ac}	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																				
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	
Sample Name:				MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	GW-100398-JM-003	GW-051399-JH-106	GW-051399-JH-105	GW-091207-NT-018	GW-091207-NT-017	GW-120607-JH-031	GW-120607-JH-030	GW-031208-JH-021	
Sample Date:				11/1/1992	6/1/1993	6/1/1993	11/1/1993	6/1/1994	6/22/1994	10/3/1998	5/13/1999	5/13/1999	9/12/2007	9/12/2007	12/6/2007	12/6/2007	3/12/2008	
Sample Type:		KDHE Tier 2 Risk-Based Criteria			Duplicate			Duplicate			Duplicate			Duplicate			Duplicate	
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	
Sampling Company:	Units	a	b	PACE	PACE	PACE	PACE	PACE	PACE	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<u>Pesticides</u>																		
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<u>General Chemistry</u>																		
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B
Sample Name:				GW-031208-JH-020	GW-062508-JH-019	GW-062508-JH-018	WG-121311-DF-013	WG-121311-DF-014	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B
Sample Date:				3/12/2008	6/25/2008	6/25/2008	12/13/2011	12/13/2011	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993	6/1/1994
Sample Type:		KDHE Tier 2 Risk-Based Criteria			Duplicate			Duplicate												
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Pesticides</u>																				
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>General Chemistry</u>																				
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C
Sample Name:				MW-103B	GW-091207-NT-015	GW-120507-JH-021	GW-031208-JH-022	GW-062508-JH-017	WG-121411-KH-029	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C
Sample Date:				6/22/1994	9/12/2007	12/5/2007	3/12/2008	6/25/2008	12/14/2011	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993
Sample Type:		KDHE Tier 2 Risk-Based Criteria																		
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	PACE	CRA	CRA	CRA	CRA	CRA	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE
<u>Volatile Organic Compounds</u>																				
1,2-Dichloroethene (total)	mg/L	NC	NC	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	-	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	-	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/L	45.5	11.5	-	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/L	0.005	0.005	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Carbon disulfide	mg/L	1.66	0.716	-	0.00091 J	ND(0.001)	0.00073 J	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/L	0.1	0.1	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Chloroform (Trichloromethane)	mg/L	0.08	0.08	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	0.0034	0.0064	0.0038	0.00094	0.0044	-	-	-	-	-	-	-	-	-	-	-
Cyclohexane	mg/L	NC	NC	-	-	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene	mg/L	NC	NC	-	-	-	-	-	-	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Ethylbenzene	mg/L	0.7	0.7	0.0024	ND(0.001)	ND(0.001)	0.00026 J	ND(0.001)	ND(0.001)	0.099	0.099	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	0.023	ND(0.005)	ND(0.005)	ND(0.005)	0.006
Methyl cyclohexane	mg/L	NC	NC	-	-	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/L	0.005	0.005	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	1	1	0.043	ND(0.001)	0.00026 J	0.0016	ND(0.001)	ND(0.001)	0.098	0.098	ND(0.005)	ND(0.005)	0.032	ND(0.005)	0.3	0.04	0.025	0.005	0.042
Trichloroethene	mg/L	0.005	0.005	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/L	0.002	0.002	-	ND(0.001)	0.001	0.00057 J	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Xylenes (total)	mg/L	10	10	0.023	ND(0.001)	ND(0.001)	0.0016	ND(0.001)	ND(0.002)	0.025	0.025	ND(0.005)	ND(0.005)	0.072	ND(0.005)	0.21	0.034	0.025	0.008	0.035
<u>Semivolatile Organic Compounds</u>																				
2,4-Dimethylphenol	mg/L	1.86	0.292	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	mg/L	0.1	0.0154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/L	4.78	0.744	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3&4-Methylphenol	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>																				
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	0.031 J	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	-	-	-	-	-	-	-	-	-
<u>Metals</u>																				
Arsenic	mg/L	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103B	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C
Sample Name:				MW-103B	GW-091207-NT-015	GW-120507-JH-021	GW-031208-JH-022	GW-062508-JH-017	WG-121411-KH-029	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C
Sample Date:				6/22/1994	9/12/2007	12/5/2007	3/12/2008	6/25/2008	12/14/2011	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993
Sample Type:		KDHE Tier 2 Risk-Based Criteria																	
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	PACE	CRA	CRA	CRA	CRA	CRA	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Pesticides</u>																			
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>General Chemistry</u>																			
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104
Sample Name:				MW-103C	MW-103C	GW-100398-JM-007	GW-100398-JM-005	GW-091207-NT-016	GW-120507-JH-020	GW-031208-JH-024	GW-062508-JH-016	WG-121411-KH-030	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104
Sample Date:				6/1/1994	6/22/1994	10/3/1998	10/3/1998	9/12/2007	12/5/2007	3/12/2008	6/25/2008	12/14/2011	10/1/1988	6/1/1989	7/1/1989	10/1/1989	5/1/1990	11/1/1990
Sample Type:		KDHE Tier 2 Risk-Based Criteria				Duplicate												
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	PACE	PACE	CRA	CRA	CRA	CRA	CRA	CRA	CRA	LANGSTON	PACE	PACE	PACE	PACE	PACE
<u>Volatile Organic Compounds</u>																		
1,2-Dichloroethene (total)	mg/L	NC	NC	-	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	-	-	ND(0.005)	ND(0.005)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	-	-	0.098	0.11	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-
Acetone	mg/L	45.5	11.5	-	-	ND(0.005)	ND(0.005)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.0657	-	-	-	-	-
Benzene	mg/L	0.005	0.005	ND(0.005)	ND(0.005)	0.003	0.004	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Carbon disulfide	mg/L	1.66	0.716	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-	-	-
Chlorobenzene	mg/L	0.1	0.1	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	-	-	-	-	-
Chloroform (Trichloromethane)	mg/L	0.08	0.08	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.0072	-	-	-	-	-
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	-	ND(0.001)	ND(0.001)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.001)	-	-	-	-	-	-
Cyclohexane	mg/L	NC	NC	-	-	-	-	-	-	-	-	ND(0.001)	-	-	-	-	-	-
Dichloroethene	mg/L	NC	NC	ND(0.005)	-	-	-	-	-	-	-	-	ND(0.005)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Ethylbenzene	mg/L	0.7	0.7	ND(0.005)	ND(0.005)	0.018	0.022	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Methyl cyclohexane	mg/L	NC	NC	-	-	-	-	-	-	-	-	ND(0.001)	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	-	-	ND(0.002)	ND(0.002)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.0429 ^{ab}	-	-	-	-	-
Tetrachloroethene	mg/L	0.005	0.005	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.005)	-	-	-	-	-
Toluene	mg/L	1	1	0.003	0.0032	0.46	0.53	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.0079	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Trichloroethene	mg/L	0.005	0.005	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	-	-	-	-	-
Vinyl chloride	mg/L	0.002	0.002	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.01)	-	-	-	-	-
Xylenes (total)	mg/L	10	10	ND(0.005)	ND(0.005)	0.16	0.18	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.002)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
<u>Semivolatile Organic Compounds</u>																		
2,4-Dimethylphenol	mg/L	1.86	0.292	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	mg/L	0.1	0.0154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/L	4.78	0.744	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3&4-Methylphenol	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>																		
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-	0.033 J	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	-	-	-	-
<u>Metals</u>																		
Arsenic	mg/L	0.01	0.01	-	-	-	-	-	-	-	-	-	0.009	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-	-	-	-	-	0.422	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-	-	-	-	-	0.006 ^{ab}	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-103C	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104
Sample Name:				MW-103C	MW-103C	GW-100398-JM-007	GW-100398-JM-005	GW-091207-NT-016	GW-120507-JH-020	GW-031208-JH-024	GW-062508-JH-016	WG-121411-KH-030	MW-104	MW-104	MW-104	MW-104	MW-104
Sample Date:				6/1/1994	6/22/1994	10/3/1998	10/3/1998	9/12/2007	12/5/2007	3/12/2008	6/25/2008	12/14/2011	10/1/1988	6/1/1989	7/1/1989	10/1/1989	5/1/1990
Sample Type:		KDHE Tier 2 Risk-Based Criteria				Duplicate											
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	PACE	PACE	CRA	CRA	CRA	CRA	CRA	CRA	CRA	LANGSTON	PACE	PACE	PACE	PACE
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	0.017	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	0.05 ¹⁰	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	0.0005	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	0.055	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	ND(0.001)	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	0.003	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	0.032	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-
Pesticides																	
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																	
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104
Sample Name:				MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	MW-104	GW-051299-JH-101	GW-062706-JH-013	GW-062706-JH-012	GW-091207-NT-014	GW-120507-JH-019	GW-031208-JH-025	GW-062508-JH-021	WG-121211-DF-003
Sample Date:				5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993	6/23/1994	5/12/1999	6/27/2006	6/27/2006	9/12/2007	12/5/2007	3/12/2008	6/25/2008	12/12/2011
Sample Type:		KDHE Tier 2 Risk-Based Criteria																
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	PACE	PACE	PACE	PACE	PACE	PACE	PACE	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Pesticides</u>																		
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>General Chemistry</u>																		
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:			MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
Sample Name:			MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
Sample Date:			10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993	6/22/1994	5/12/1999	12/20/2004	6/27/2006	6/27/2006
Sample Type:	KDHE Tier 2 Risk-Based Criteria																		
Area of Concern:	Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:	Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	LANGSTON	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>																			
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	0.015	ND(0.001)	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.02)	ND(0.01)	ND(0.01)
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
Acetone	mg/L	45.5	11.5	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.1)	ND(0.01)	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	ND(0.001)	ND(0.001)
Chlorobenzene	mg/L	0.1	0.1	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	0.0063	0.0049
Cyclohexane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene	mg/L	NC	NC	0.019	-	ND(0.005)	0.015	0.026	0.012	0.011	ND(0.005)	0.018	0.009	0.009	ND(0.005)	-	-	-	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)
Methyl cyclohexane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	0.001	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	0.00043 J
Vinyl chloride	mg/L	0.002	0.002	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.003)	ND(0.002)	ND(0.001)
<u>Semivolatile Organic Compounds</u>																			
2,4-Dimethylphenol	mg/L	1.86	0.292	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00055 J	-
2,6-Dinitrotoluene	mg/L	0.1	0.0154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001 J	-
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	-
2-Methylphenol	mg/L	4.78	0.744	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	-
3&4-Methylphenol	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00053 J	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0023 J	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	-
<u>Total Petroleum Hydrocarbons</u>																			
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Metals</u>																			
Arsenic	mg/L	0.01	0.01	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0062 J	-
Barium	mg/L	2	2	0.235	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	-
Beryllium	mg/L	0.004	0.004	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.0050)	-
Cadmium	mg/L	0.005	0.005	0.006 ²⁰	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.0050)	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	172	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	169	-
Chromium	mg/L	0.1	0.1	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.010)	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	
Sample Name:				MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	GW-051299-JH-100	GW-122004-DS-003	GW-062706-JH-010	GW-062706-JH-009	
Sample Date:				10/1/1988	6/1/1989	7/1/1989	11/1/1989	5/1/1990	11/1/1990	5/1/1991	11/1/1991	5/1/1992	11/1/1992	6/1/1993	11/1/1993	6/22/1994	5/12/1999	12/20/2004	6/27/2006	6/27/2006	
Sample Type:		KDHE Tier 2 Risk-Based Criteria																Duplicate			
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	
Sampling Company:	Units	a	b	LANGSTON	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	PACE	CRA	CRA	CRA	CRA	
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0034 J	-	-	
Copper	mg/L	1.3	1.3	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.025)	-	-	
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.4	-	-	
Lead	mg/L	0.015	0.015	0.024 ²⁰	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.0030)	-	-	
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.1	-	-	
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42.3	-	-	
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5 ²⁰	-	-	
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5 ²⁰	-	-	
Mercury	mg/L	0.002	0.002	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.00020)	-	-	
Nickel	mg/L	2.04	0.312	0.044	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0052 J	-	-	
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.2 J	-	-	
Selenium	mg/L	0.05	0.05	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0076	-	-	
Silver	mg/L	0.508	0.0779	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.010)	-	-	
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71.8	-	-	
Thallium	mg/L	NC	NC	0.025	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.010)	-	-	
Zinc	mg/L	30.5	4.67	0.019	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.020)	-	-	
<u>Pesticides</u>																					
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<u>General Chemistry</u>																					
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65000	-	-	
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.032 J	-	-	
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110000	-	-	
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-105	MW-105	MW-105	MW-105	MW-105	MW-115A	MW-115A	MW-115A	MW-115A	MW-115A	TMW-157	TMW-157
Sample Name:				GW-091207-NT-013	GW-120507-JH-018	GW-031208-JH-026	GW-062508-JH-022	WG-121211-DF-005	GW-051399-JH-104	GW-091207-NT-019	GW-031208-JH-019	GW-062508-JH-015	WG-121211-KH-002	GW-042612-JH-05	GW-050912-NL-05
Sample Date:				9/12/2007	12/5/2007	3/12/2008	6/25/2008	12/12/2011	5/13/1999	9/12/2007	3/12/2008	6/25/2008	12/12/2011	4/26/2012	5/9/2012
Sample Type:	KDHE Tier 2 Risk-Based Criteria														
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
Volatile Organic Compounds															
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	ND(0.001)	-	-	-	-	0.00014 J	0.00028 J
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.02)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.00044 J	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.00054 J
Acetone	mg/L	45.5	11.5	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.1)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.0045 J
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)
Chlorobenzene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	0.0031	0.0037	0.0038	0.0012	0.00043 J	ND(0.001)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.001)	ND(0.001)	0.00028 J
Cyclohexane	mg/L	NC	NC	-	-	-	-	ND(0.001)	-	-	-	-	ND(0.001)	-	-
Dichloroethene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.001)	0.0019	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Methyl cyclohexane	mg/L	NC	NC	-	-	-	-	ND(0.001)	-	-	-	-	ND(0.001)	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	0.00063 J	0.00035 J	0.00032 J	0.0013 J	0.00034 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.016	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	0.0013	0.00075 J	0.0007 J	0.00053 J	0.0009 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.002)	ND(0.003)	0.016	ND(0.001)	ND(0.001)	ND(0.002)	ND(0.003)	ND(0.003)
Semivolatile Organic Compounds															
2,4-Dimethylphenol	mg/L	1.86	0.292	-	-	-	-	-	-	-	-	-	ND(0.0019)	-	-
2,6-Dinitrotoluene	mg/L	0.1	0.0154	-	-	-	-	-	-	-	-	-	ND(0.0048)	-	-
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	-	-	-	-	-	-	-	-	ND(0.00019)	-	-
2-Methylphenol	mg/L	4.78	0.744	-	-	-	-	-	-	-	-	-	ND(0.00095)	-	-
3&4-Methylphenol	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	ND(0.0019)	-	-
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	ND(0.00095)	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	ND(0.0019)	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	ND(0.00019)	-	-
Total Petroleum Hydrocarbons															
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	ND(0.48)	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	0.031 J	ND(0.1)	ND(0.1)	ND(0.1)	-	-	0.13	ND(0.1)	ND(0.1)	ND(0.1)	-	-
Metals															
Arsenic	mg/L	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-

MW-103A AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-105	MW-105	MW-105	MW-105	MW-105	MW-115A	MW-115A	MW-115A	MW-115A	MW-115A	TMW-157	TMW-157
Sample Name:				GW-091207-NT-013	GW-120507-JH-018	GW-031208-JH-026	GW-062508-JH-022	WG-121211-DF-005	GW-051399-JH-104	GW-091207-NT-019	GW-031208-JH-019	GW-062508-JH-015	WG-121211-KH-002	GW-042612-JH-05	GW-050912-NL-05
Sample Date:				9/12/2007	12/5/2007	3/12/2008	6/25/2008	12/12/2011	5/13/1999	9/12/2007	3/12/2008	6/25/2008	12/12/2011	4/26/2012	5/9/2012
Sample Type:		KDHE Tier 2 Risk-Based Criteria													
Area of Concern:		Non-Residential	Residential	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A	MW-103A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides															
Aldrin	mg/L	0.000166	0.0000495	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry															
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
GRO/DRO - gasoline range/diesel range
-- : Not Analyzed
Boxed values exceed criteria.
mg/L - milligrams per liter
cfu/mL - colony forming units per milliliters
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-9

TMW-130 AREA - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:					SB-130	SB-130A	SB-130A	SB-132	SB-B3-A	SB-B3-A	SB-B5-A	SB-B5-A	SB-D4-A	SB-D4-A	SB-E2-A	SB-E2-A	SB-E4-A	SB-E4-A		
Sample Name:					SB-130 5-7.5'	S11806KGSB130A5-7.5	DUP-2	SB132 2.5-5	S-092909-JH-021	S-092909-JH-022	S-092909-JH-023	S-092909-JH-024	S-092909-JH-017	S-092909-JH-018	S-092909-JH-019	S-092909-JH-020	S-092909-JH-015	S-092909-JH-016		
Sample Date:					11/3/2006	11/8/2006	11/8/2006	11/6/2006	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009		
Sample Type:					Duplicate															
Depth:	KDHE Tier 2 Risk-Based Criteria				(5-7.5) ft BGS	(5-7.5) ft BGS	(5-7.5) ft BGS	(2.5-5) ft BGS	(1-3) ft BGS	(13-15) ft BGS	(1-3) ft BGS	(13-15) ft BGS	(1-3) ft BGS	(8-10) ft BGS	(1-3) ft BGS	(17-19) ft BGS	(1-3) ft BGS	(17-19) ft BGS		
Area of Concern:	Non-Residential				TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130		
Property:	Soil Pathway	Soil to GW	Soil Pathway	Soil to GW	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I		
Sampling Company:	Units	a	b	c	d	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA		
Volatile Organic Compounds																				
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	101000	57.8	26000	24.2	-	ND(6.5)	ND(13)	ND(0.023)	0.0037 J	ND(32)	ND(0.012)	ND(0.011)	ND(1.1)	0.0065 J	ND(0.011)	ND(0.013)	0.007 J		
Acetone	mg/kg	406000	204	50300	51.6	-	ND(6.5)	ND(13)	0.0037 J	0.015	ND(32)	ND(0.012)	ND(0.011)	ND(1.1)	0.036	ND(0.011)	ND(0.013)	0.035		
Benzene	mg/kg	28.2	0.168	15.9	0.168	-	ND(1.6)	ND(3.1)	ND(0.0058)	ND(0.011)	ND(32)	ND(0.012)	ND(0.011)	ND(1.1)	0.0031 J	ND(0.011)	ND(0.013)	0.0082 J		
Ethylbenzene	mg/kg	145	65.6	82	65.6	-	ND(1.6)	0.26 J	ND(0.0058)	ND(0.011)	5.5 J	ND(0.012)	ND(0.011)	0.31 J	0.0022 J	ND(0.011)	ND(0.013)	0.0051 J		
Methylene chloride	mg/kg	267	0.0429	149	0.0429	-	ND(1.6)	ND(3.1)	ND(0.0063)	0.0047 J	25 J ^{est}	0.0061 J	0.0015 J	0.68 J ^{est}	0.0079 J	0.0047 J	0.0051 J	0.0065 J		
Toluene	mg/kg	29800	51.2	4320	51.2	-	ND(1.6)	ND(3.1)	ND(0.0058)	ND(0.011)	ND(32)	0.00039 J	ND(0.011)	ND(1.1)	ND(0.013)	0.00032 J	ND(0.013)	ND(0.013)		
Xylenes (total)	mg/kg	1410	809	936	809	-	0.11 J	1.1 J	ND(0.012)	ND(0.011)	43	ND(0.012)	ND(0.011)	0.15 J	ND(0.013)	ND(0.011)	ND(0.013)	0.0037 J		
Semi-Volatile Organic Compounds																				
2-Methylnaphthalene	mg/kg	1280	17.3	209	8.34	270 ^{RCR}	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Anthracene	mg/kg	221000	8180	18000	3770	5.3 J	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Benzo(a)anthracene	mg/kg	33.8	26.5	10.9	7.89	ND(110)	-	-	0.023 J	-	-	-	-	-	-	-	-	-		
Benzo(a)pyrene	mg/kg	3.38	23.5	1.09	23.5	ND(110)	-	-	0.018 J	-	-	-	-	-	-	-	-	-		
Benzo(b)fluoranthene	mg/kg	33.8	64.4	10.9	19.2	ND(110)	-	-	0.036 J	-	-	-	-	-	-	-	-	-		
Benzo(g,h,i)perylene	mg/kg	NC	NC	NC	NC	ND(110)	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Benzo(k)fluoranthene	mg/kg	338	638	109	190	ND(110)	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Butyl benzylphthalate (BBP)	mg/kg	13000	1610	4190	478	ND(110)	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Chrysene	mg/kg	3380	2710	1090	805	ND(110)	-	-	0.021 J	-	-	-	-	-	-	-	-	-		
Dibenz(a,h)anthracene	mg/kg	3.38	10.3	1.09	3.08	ND(110)	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Dibenzofuran	mg/kg	579	15.8	58.2	7.8 J ²	-	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Fluoranthene	mg/kg	35200	15200	2440	2830	ND(110)	-	-	0.048 J	-	-	-	-	-	-	-	-	-		
Fluorene	mg/kg	25900	626	2360	297	12 J	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Indeno(1,2,3-cd)pyrene	mg/kg	33.8	153	10.9	45.5	ND(110)	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Naphthalene	mg/kg	64.7	0.659	30.5	0.349	39 J ^{RCR}	-	-	ND(0.38)	-	-	-	-	-	-	-	-	-		
Phenanthrene	mg/kg	NC	NC	NC	NC	41 J	-	-	0.029 J	-	-	-	-	-	-	-	-	-		
Pyrene	mg/kg	26400	11900	1830	2190	7.2 J	-	-	0.04 J	-	-	-	-	-	-	-	-	-		
Total Petroleum Hydrocarbons																				
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/kg	20000	7830	2000	5440	-	-	-	-	6.7 J	64000 ^{RCR}	ND(12)	ND(12)	8900 ^{RCR}	31	850	ND(11)	54		
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/kg	450	79.3	220	79.3	-	-	-	-	ND(0.12)	720 ^{RCR}	ND(6)	ND(6)	78 J	0.17	ND(0.11)	ND(0.13)	0.085 J		
Metals																				
Aluminum	mg/kg	NC	NC	NC	NC	6680	-	-	4200	-	-	-	-	-	-	-	-	-		
Arsenic	mg/kg	38	NC	11.3	NC	5.2 J	-	-	5.5 J	-	-	-	-	-	-	-	-	-		
Barium	mg/kg	277000	NC	15300	NC	216	-	-	128	-	-	-	-	-	-	-	-	-		
Beryllium	mg/kg	3650	NC	155	NC	0.35 J	-	-	0.19 J	-	-	-	-	-	-	-	-	-		
Cadmium	mg/kg	965	NC	39	NC	0.31 J	-	-	0.40 J	-	-	-	-	-	-	-	-	-		
Calcium	mg/kg	NC	NC	NC	NC	15200	-	-	76900	-	-	-	-	-	-	-	-	-		
Chromium	mg/kg	111	NC	33.6	NC	10.6	-	-	7.3	-	-	-	-	-	-	-	-	-		
Cobalt	mg/kg	579	NC	23.4	NC	6.1 J	-	-	4.2 J	-	-	-	-	-	-	-	-	-		
Copper	mg/kg	81700	NC	3130	NC	16.0	-	-	11.2	-	-	-	-	-	-	-	-	-		
Iron	mg/kg	NC	NC	NC	NC	12400	-	-	9350	-	-	-	-	-	-	-	-	-		
Lead	mg/kg	1000	NC	400	NC	9.6 J	-	-	12.9	-	-	-	-	-	-	-	-	-		
Magnesium	mg/kg	NC	NC	NC	NC	5960	-	-	5370	-	-	-	-	-	-	-	-	-		
Manganese	mg/kg	66200	NC	9300	NC	258	-	-	279	-	-	-	-	-	-	-	-	-		
Mercury	mg/kg	20	NC	2	NC	0.027 J	-	-	0.024 J	-	-	-	-	-	-	-	-	-		
Nickel	mg/kg	32400	NC	1540	NC	16.4	-	-	11.2	-	-	-	-	-	-	-	-	-		
Potassium	mg/kg	NC	NC	NC	NC	1490	-	-	1110	-	-	-	-	-	-	-	-	-		
Sodium	mg/kg	NC	NC	NC	NC	ND(652)	-	-	158 J	-	-	-	-	-	-	-	-	-		
Thallium	mg/kg	NC	NC	NC	NC	ND(261)	-	-	0.63 J	-	-	-	-	-	-	-	-	-		
Vanadium	mg/kg	NC	NC	NC	NC	17.8	-	-	12.6	-	-	-	-	-	-	-	-	-		
Zinc	mg/kg	613000	NC	23500	NC	48.9	-	-	44.0	-	-	-	-	-	-	-	-	-		
General Chemistry																				
Total solids	%	NC	NC	NC	NC	76.7	76.6	78.5	85.8	83.0	78.1	83.2	84.0	83.7	79.4	84.3	87.7	80.5		

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
GRO/DRO - gasoline range/diesel range
--: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-9

TMW-130 AREA - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:		SB-F4-A				SB-F4-A	SB-F4-A	SB-F5-A	SB-F5-A	SB-G2-A	SB-G2-A	SB-G4-A	SB-G4-A	SB-300	SB-301	SB-301	SB-302	SB-303	SB-304	SB-117
Sample Name:		S-092909-JH-011				S-092909-JH-011	S-092909-JH-012	S-092909-JH-013	S-092909-JH-014	S-092909-JH-009	S-092909-JH-010	S-092909-JH-007	S-092909-JH-008	S-092809-JH-001	S-092809-JH-002	S-092809-JH-003	S-092809-JH-004	S-092809-JH-005	S-092909-JH-006	S-122104-DS-124
Sample Date:		9/29/2009				9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/29/2009	9/28/2009	9/28/2009	9/28/2009	9/28/2009	9/28/2009	9/29/2009	12/21/2004
Sample Type:																				
Depth:		KDHE Tier 2 Risk-Based Criteria				(1-3) ft BGS	(17-19) ft BGS	(1-3) ft BGS	(17-19) ft BGS	(1-3) ft BGS	(17-19) ft BGS	(1-3) ft BGS	(17-19) ft BGS	(18-20) ft BGS	(9-11) ft BGS	(17-19) ft BGS	(17-19) ft BGS	(17-19) ft BGS	(17-19) ft BGS	(4-6) ft BGS
Area of Concern:		Non-Residential				TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130
Property:		Soil Pathway				Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	off-site	off-site	Fairfax I
Sampling Company:		Units	a	b	c	d	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
Volatile Organic Compounds																				
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	101000	57.8	26000	24.2	ND(0.011)	ND(5.5)	ND(0.011)	0.0024 J	ND(0.012)	ND(0.011)	ND(0.0097)	ND(0.012)	ND(0.011)	ND(0.012)	ND(0.01)	ND(0.011)	ND(0.013)	ND(0.011)	ND(0.019)
Acetone	mg/kg	406000	204	50300	51.6	ND(0.011)	ND(5.5)	ND(0.011)	0.016	ND(0.012)	ND(0.011)	ND(0.0097)	ND(0.012)	ND(0.011)	ND(0.012)	ND(0.01)	ND(0.011)	ND(0.013)	ND(0.011)	0.0033 J
Benzene	mg/kg	28.2	0.168	15.9	0.168	ND(0.011)	0.12 J	ND(0.011)	ND(0.012)	ND(0.012)	ND(0.011)	ND(0.0097)	ND(0.012)	ND(0.011)	ND(0.012)	ND(0.01)	ND(0.011)	ND(0.013)	ND(0.011)	ND(0.0048)
Ethylbenzene	mg/kg	145	65.6	82	65.6	ND(0.011)	1.3 J	ND(0.011)	ND(0.012)	ND(0.012)	ND(0.011)	ND(0.0097)	ND(0.012)	ND(0.011)	ND(0.012)	ND(0.01)	ND(0.011)	ND(0.013)	ND(0.011)	ND(0.0048)
Methylene chloride	mg/kg	267	0.0429	149	0.0429	0.0015 J	3.7 J ^{est}	0.0066 J	0.0097 J	0.003 J	0.0042 J	0.0042 J	0.0048 J	0.0051 J	0.0028 J	0.0038 J	0.0033 J	0.0054 J	0.0048 J	0.0067
Toluene	mg/kg	29800	51.2	4320	51.2	ND(0.011)	ND(5.5)	ND(0.011)	ND(0.012)	ND(0.012)	ND(0.011)	ND(0.0097)	ND(0.012)	ND(0.011)	ND(0.012)	ND(0.01)	ND(0.011)	ND(0.013)	ND(0.011)	0.00045 J
Xylenes (total)	mg/kg	1410	809	936	809	ND(0.011)	0.38 J	ND(0.011)	ND(0.012)	ND(0.012)	ND(0.011)	ND(0.0097)	ND(0.012)	ND(0.011)	ND(0.012)	ND(0.01)	ND(0.011)	ND(0.013)	ND(0.011)	ND(0.0096)
Semi-Volatile Organic Compounds																				
2-Methylnaphthalene	mg/kg	1280	17.3	209	8.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(4.2)
Anthracene	mg/kg	221000	8180	18000	3770	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.53 J
Benzo(a)anthracene	mg/kg	33.8	26.5	10.9	7.89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5 J
Benzo(a)pyrene	mg/kg	3.38	23.5	1.09	23.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3 J ^{est}
Benzo(b)fluoranthene	mg/kg	33.8	64.4	10.9	19.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8 J
Benzo(g,h,i)perylene	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.84 J
Benzo(k)fluoranthene	mg/kg	338	638	109	190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.79 J
Butyl benzylphthalate (BBP)	mg/kg	13000	1610	4190	478	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18
Chrysene	mg/kg	3380	2710	1090	805	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5 J
Dibenz(a,h)anthracene	mg/kg	3.38	10.3	1.09	3.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2 J
Dibenzofuran	mg/kg	579	15.8	58.2	7.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(4.2)
Fluoranthene	mg/kg	35200	15200	2440	2830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7 J
Fluorene	mg/kg	25900	626	2360	297	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(4.2)
Indeno(1,2,3-cd)pyrene	mg/kg	33.8	153	10.9	45.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.92 J
Naphthalene	mg/kg	64.7	0.659	30.5	0.349	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(4.2)
Phenanthrene	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9 J
Pyrene	mg/kg	26400	11900	1830	2190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8 J
Total Petroleum Hydrocarbons																				
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/kg	20000	7830	2000	5440	6.4 J	12000 ^{est}	3.7 J	8.7 J	19	ND(10)	15	ND(12)	ND(12)	ND(10)	ND(11)	ND(10)	ND(12)	ND(10)	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/kg	450	79.3	220	79.3	ND(0.12)	76 J	ND(0.11)	ND(0.11)	ND(0.12)	ND(0.11)	ND(0.095)	ND(0.12)	ND(0.11)	ND(0.12)	ND(0.11)	ND(0.11)	ND(0.13)	ND(0.11)	-
Metals																				
Aluminum	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	339
Arsenic	mg/kg	38	NC	11.3	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
Barium	mg/kg	277000	NC	15300	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.9 J
Beryllium	mg/kg	3650	NC	155	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.51)
Cadmium	mg/kg	965	NC	39	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.51)
Calcium	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	305 J
Chromium	mg/kg	111	NC	33.6	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1 J
Cobalt	mg/kg	579	NC	23.4	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.76 J
Copper	mg/kg	81700	NC	3130	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2 J
Iron	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1870
Lead	mg/kg	1000	NC	400	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4
Magnesium	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	112 J
Manganese	mg/kg	66200	NC	9300	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.4
Mercury	mg/kg	20	NC	2	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.10)
Nickel	mg/kg	32400	NC	1540	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(1.2)
Potassium	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	124 J
Sodium	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(514)
Thallium	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(1.0)
Vanadium	mg/kg	NC	NC	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.2 J
Zinc	mg/kg	613000	NC	23500	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.2
General Chemistry																				
Total solids	%	NC	NC	NC	NC	81.1	96.8	84.0	90.3	80.8	95.7	95.6	86.7	85.7	96.5	94.9	96.0	83.0	96.8	97.3
Notes:																				
ND () - Not present at or above the associated value																				
J - Estimated concentration																				
UJ - Estimated reporting limit																				
NC - No Criteria																				
GRO/DRO - gasoline range/diesel range																				
--: Not Analyzed																				
Boxed values exceed criteria																				
mg/kg - milligrams per kilograms																				
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A																				

TMW-130 AREA - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				TMW-130	TMW-132	TMW-139	TMW-143	TMW-143	TMW-143	TMW-144	TMW-144	TMW-145	TMW-145	TMW-146	TMW-146
Sample Name:				GW-091307-NT-026	GW112706GC005	WG-121411-DF-027	GW-093009-JH-029	GW-093009-JH-028	WG-121411-DF-028	GW-093009-JH-025	WG-121411-DF-025	GW-093009-JH-026	WG-121311-DF-020	GW-093009-JH-027	WG-121411-DF-023
Sample Date:				9/13/2007	11/27/2006	12/14/2011	9/30/2009	9/30/2009	12/14/2011	9/30/2009	12/14/2011	9/30/2009	12/13/2011	9/30/2009	12/14/2011
Sample Type:		KDHE Tier 2 Risk-Based Criteria					Duplicate								
Area of Concern:		Non-Residential	Residential	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130	TMW-130
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>															
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.14)	ND(0.01)	0.11	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Benzene	mg/L	0.005	0.005	0.0049 J	ND(0.001)	0.045 ^{ab}	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.00015 J
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0071)	0.0044	ND(0.01)	ND(0.0005)	ND(0.0005)	ND(0.001)	0.024	0.0071	ND(0.0005)	ND(0.001)	ND(0.0005)	ND(0.001)
Cyclohexane	mg/L	NC	NC	-	-	0.0015 J	-	-	ND(0.001)	-	ND(0.001)	-	ND(0.001)	-	ND(0.001)
Ethylbenzene	mg/L	0.7	0.7	ND(0.014)	ND(0.001)	0.0081 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.014)	ND(0.001)	ND(0.01)	0.0016	0.0016	0.0011	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0071)	0.00022 J	ND(0.01)	ND(0.0005)	ND(0.0005)	ND(0.001)	0.0013	0.00031 J	ND(0.0005)	ND(0.001)	ND(0.0005)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.014)	ND(0.001)	ND(0.01)	ND(0.001)	ND(0.001)	ND(0.001)	0.0051 ^{ab}	0.0005 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
<u>Semivolatile Organic Compounds</u>															
2-Methylnaphthalene	mg/L	0.0346	0.0167	-	0.0011 J	-	-	-	ND(0.0002)	-	ND(0.00021)	-	ND(0.0002)	-	ND(0.00021)
<u>Total Petroleum Hydrocarbons</u>															
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	ND(0.1)	ND(0.1)	ND(0.51)	ND(0.1)	ND(0.53)	ND(0.1)	ND(0.51)	ND(0.1)	0.33
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	0.65 ^{ab}	-	-	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.12)
<u>Metals</u>															
Aluminum	mg/L	NC	NC	-	1.75	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	-	0.0093 J	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	0.473	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	182	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	0.0213	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	0.0042 J	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	0.0034 J	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	22.3	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	0.0024 J	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	44.6	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	2.51 ^{ab}	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	0.018 J	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	11.1	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	37.1	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	0.0057 J	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	NC	NC	-	0.0052 J	-	-	-	-	-	-	-	-	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
-- : Not Analyzed
Boxed values exceed criteria.
mg/L - milligrams per liter
cfu/mL - colony forming units per milliliters
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

TABLE A-11

SITE-WIDE/NON-AOC - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:					SB-111	SB-123	SB-123B	SB-123C	SB-124	SB-124A	SB-125	SB-125	SB-126	SB-126A	SB-129	SB-129A	SB-129A	SB-131	SB-131A
Sample Name:					S-122104-DS-118	MW-123 10-12.5	S112006KGSB123B22.5-25	SB-123-22.5-25	SB-124	S11806KGSB124A22.5-25	SB-125-7.5-10	S11806KGSB125A7.5-10	SB-126-27.5-30	S11806KGSB126A27.5-30	SB-129	DUP-1	S11806KGSB129A5-7.5	SB-131	S11806KGSB131A12.5-15
Sample Date:					12/21/2004	10/31/2006	11/20/2006	11/2/2006	11/1/2006	11/8/2006	11/2/2006	11/8/2006	11/2/2006	11/8/2006	11/1/2006	11/8/2006	11/8/2006	11/1/2006	11/8/2006
Sample Type:																Duplicate			
Depth:	KDHE Tier 2 Risk-Based Criteria				(10-12) ft BGS	(10-12.5) ft BGS	(22.5-25) ft BGS	(22.5-25) ft BGS	(22.5-25) ft BGS	(22.5-25) ft BGS	(7.5-10) ft BGS	(7.5-10) ft BGS	(27.5-30) ft BGS	(27.5-30) ft BGS	(5-7.5) ft BGS	(5-7.5) ft BGS	(5-7.5) ft BGS	(12.5-15) ft BGS	(12.5-15) ft BGS
Area of Concern:	Non-Residential				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Property:	Soil Pathway	Soil to GW	Soil Pathway	Soil to GW	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	c	d	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>																			
Methylene chloride	mg/kg	267	0.0429	149	0.0429	0.0041 J	-	ND(0.0053)	-	-	ND(0.0056)	-	ND(0.0068)	-	ND(0.0063)	-	ND(0.0059)UJ	ND(0.0064)	-
Toluene	mg/kg	29800	51.2	4320	51.2	0.0005 J	-	ND(0.0053)	-	-	ND(0.0056)	-	ND(0.0068)	-	ND(0.0063)	-	ND(0.0059)UJ	ND(0.0064)	-
<u>Semi-Volatile Organic Compounds</u>																			
Benzo(a)anthracene	mg/kg	33.8	26.5	10.9	7.89	ND(0.44)	ND(0.37)	-	ND(0.34)	ND(0.34)	-	ND(0.39)	-	ND(0.39)	-	0.032 J	-	-	ND(0.34)
Benzo(a)pyrene	mg/kg	3.38	23.5	1.09	23.5	ND(0.44)	ND(0.37)	-	ND(0.34)	ND(0.34)	-	ND(0.39)	-	ND(0.39)	-	0.027 J	-	-	ND(0.34)
Benzo(b)fluoranthene	mg/kg	33.8	64.4	10.9	19.2	ND(0.44)	ND(0.37)	-	ND(0.34)	ND(0.34)	-	ND(0.39)	-	ND(0.39)	-	0.031 J	-	-	ND(0.34)
Benzo(k)fluoranthene	mg/kg	338	638	109	190	ND(0.44)	ND(0.37)	-	ND(0.34)	ND(0.34)	-	ND(0.39)	-	ND(0.39)	-	0.017 J	-	-	ND(0.34)
Caprolactam	mg/kg	440000	451	30600	69.2	0.041 J	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	3380	2710	1090	805	ND(0.44)	ND(0.37)	-	ND(0.34)	ND(0.34)	-	ND(0.39)	-	ND(0.39)	-	0.027 J	-	-	ND(0.34)
Fluoranthene	mg/kg	35200	15200	2440	2830	ND(0.44)	ND(0.37)	-	ND(0.34)	ND(0.34)	-	ND(0.39)	-	ND(0.39)	-	0.058 J	-	-	ND(0.34)
Phenanthrene	mg/kg	NC	NC	NC	NC	ND(0.44)	ND(0.37)	-	ND(0.34)	ND(0.34)	-	ND(0.39)	-	ND(0.39)	-	0.037 J	-	-	ND(0.34)
Pyrene	mg/kg	26400	11900	1830	2190	ND(0.44)	ND(0.37)	-	ND(0.34)	ND(0.34)	-	ND(0.39)	-	ND(0.39)	-	0.047 J	-	-	ND(0.34)
<u>Metals</u>																			
Aluminum	mg/kg	NC	NC	NC	NC	7320	4520	-	674	1690	-	4290	-	889	-	4950	-	-	2500
Antimony	mg/kg	817	NC	31.3	NC	ND(8.1)UJ	ND(6.8)UJ	-	ND(6.1)	ND(6.3)	-	ND(7.1)	-	ND(7.0)	-	0.46 J	-	-	ND(6.2)
Arsenic	mg/kg	38	NC	11.3	NC	8.5	5.3	-	1.7 J	3.5 J	-	5.4 J	-	1.2 J	-	4.6 J	-	-	2.9 J
Barium	mg/kg	277000	NC	15300	NC	239	172	-	18.3 J	48.3	-	189	-	21.9 J	-	170	-	-	93.0
Beryllium	mg/kg	3650	NC	155	NC	0.27 J	0.35 J	-	ND(0.51)	ND(0.52)	-	0.12 J	-	ND(0.59)	-	0.19 J	-	-	ND(0.52)
Cadmium	mg/kg	965	NC	39	NC	0.11 J	0.14 J	-	0.056 J	0.10 J	-	0.13 J	-	0.072 J	-	0.29 J	-	-	0.12 J
Calcium	mg/kg	NC	NC	NC	NC	19400 J	12900	-	2940	3740	-	16800	-	3270	-	10800	-	-	7290
Chromium	mg/kg	111	NC	33.6	NC	12.3 J	8.6	-	1.9	3.4	-	7.9	-	2.2	-	7.5	-	-	5.0
Cobalt	mg/kg	579	NC	23.4	NC	8.4	5.1 J	-	1.6 J	2.8 J	-	4.9 J	-	1.8 J	-	4.4 J	-	-	3.1 J
Copper	mg/kg	81700	NC	3130	NC	15.6	4.0	-	0.69 J	15.6	ND(2.6)	-	7.8	-	0.83 J	-	9.8	-	4.0
Iron	mg/kg	NC	NC	NC	NC	15000	10400	-	2510	5510	-	10100	-	2710	-	9450	-	-	6040
Lead	mg/kg	1000	NC	400	NC	10.4	6.2	-	1.6 J	3.4 J	-	6.7 J	-	2.0 J	-	7.1 J	-	-	3.8 J
Magnesium	mg/kg	NC	NC	NC	NC	7480	5340	-	922	1460	-	6850	-	1070	-	4800	-	-	2920
Manganese	mg/kg	66200	NC	9300	NC	465	215	-	45.4	85.8	-	253	-	47.2	-	238	-	-	131
Mercury	mg/kg	20	NC	2	NC	0.012 J	ND(0.037)	-	ND(0.10)	ND(0.10)	-	0.016 J	-	ND(0.12)	-	0.015 J	-	-	ND(0.10)
Nickel	mg/kg	32400	NC	1540	NC	21.4 J	12.4	-	3.6 J	7.2	-	12.0	-	4.2 J	-	11.5	-	-	8.0
Potassium	mg/kg	NC	NC	NC	NC	1830 J	923	-	161 J	362 J	-	1120	-	222 J	-	1170	-	-	596
Selenium	mg/kg	10200	NC	391	NC	ND(0.67)	ND(1.7)	-	ND(25.5)	ND(26.1)	-	ND(29.7)	-	ND(29.4)	-	ND(27.3)	-	-	ND(26.0)
Sodium	mg/kg	NC	NC	NC	NC	ND(189)	ND(567)	-	ND(510)	57.0 J	-	ND(594)	-	ND(587)	-	96.7 J	-	-	64.8 J
Thallium	mg/kg	NC	NC	NC	NC	ND(1.3)	ND(4.0)	-	ND(204)	ND(209)	-	0.86 J	-	ND(235)	-	ND(218)	-	-	ND(208)
Vanadium	mg/kg	NC	NC	NC	NC	21.6	16.2 J	-	2.8 J	14.2	-	14.2	-	3.7 J	-	13.3	-	-	8.9
Zinc	mg/kg	613000	NC	23500	NC	52.6	32.6	-	7.0	17.0	-	35.8	-	9.5	-	37.2	-	-	20.5
<u>General Chemistry</u>																			
Percent moisture	%	NC	NC	NC	NC	-	11.8	-	-	-	-	-	-	-	-	-	-	-	-
Total solids	%	NC	NC	NC	NC	74.2	-	95.1	98.0	95.7	89.6	84.2	73.6	85.1	79.3	91.7	84.2	78.2	96.3

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
--: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

SITE-WIDE/NON-AOC - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-117A	MW-117A	MW-117A	MW-117A	MW-117A	MW-117A	MW-117B	MW-117B	MW-117B	MW-117B	MW-117B	MW-117B	MW-117B	MW-117B	MW-117B	MW-117B
Sample Name:				GW-091107-NT-004	GW-091107-NT-003	GW-120407-JH-003	GW-031108-JH-004	GW-062408-JH-003	WG-121311-KH-015	GW-011706-JH-004	GW-062706-JH-003	GW-091107-NT-005	GW-120407-JH-004	GW-031108-JH-005	GW-062408-JH-004	WG-121511-KH-033	GW-011706-JH-006	GW-062706-JH-006	GW-091107-NT-008
Sample Date:				9/11/2007	9/11/2007	12/4/2007	3/11/2008	6/24/2008	12/13/2011	1/17/2006	6/27/2006	9/11/2007	12/4/2007	3/11/2008	6/24/2008	12/15/2011	1/17/2006	6/27/2006	9/11/2007
Sample Type:				Duplicate															
Area of Concern:				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Property:				Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units			CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
		Non-Residential	Residential																
		Groundwater Pathway	Groundwater Pathway																
		a	b																
Volatile Organic Compounds																			
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Acetone	mg/L	45.5	11.5	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chlorobenzene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chloromethane (Methyl chloride)	mg/L	0.238	0.127	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.00019 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	0.00027 J	ND(0.001)	0.0013	0.0011	0.0013	0.0013	0.0011	0.00083	0.0013	0.0029	0.0035	0.0045
Dichloroethene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.001)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.001)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.0016	0.0013	0.00063 J
Trichlorofluoromethane (CFC-11)	mg/L	1.9	1.09	-	-	-	-	-	ND(0.001)	-	-	-	-	-	-	ND(0.001)	-	-	-
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.002)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.002)	ND(0.001)	ND(0.001)	ND(0.001)
Semivolatile Organic Compounds																			
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caprolactam	mg/L	50.6	7.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/L	29.5	4.56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons																			
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	0.045 J	0.028 J	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	0.12	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	0.032 J
Metals																			
Aluminum	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																			
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SITE-WIDE/NON-AOC - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-118A	MW-118A	MW-118A	MW-118A	MW-118B	MW-118B	MW-118B	MW-118B	MW-118B	MW-118B	MW-118B	MW-118B	MW-124A	MW-124A	MW-124A	MW-124A
Sample Name:				GW-120407-JH-006	GW-031108-JH-008	GW-062408-JH-013	WG-121311-KH-017	GW-011706-JH-005	GW-062706-JH-005	GW-091107-NT-007	GW-120407-JH-007	GW-031108-JH-009	GW-062408-JH-012	WG-121511-KH-034	GW112806GC005	GW-091207-NT-011	GW-091207-NT-010	GW-120507-JH-011	GW-031108-JH-011
Sample Date:				12/4/2007	3/11/2008	6/24/2008	12/13/2011	1/17/2006	6/27/2006	9/11/2007	12/4/2007	3/11/2008	6/24/2008	12/15/2011	11/28/2006	9/12/2007	9/12/2007	12/5/2007	3/11/2008
Sample Type:		KDHE Tier 2 Risk-Based Criteria														Duplicate			
Area of Concern:		Non-Residential	Residential	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
Volatile Organic Compounds																			
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Acetone	mg/L	45.5	11.5	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chlorobenzene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chloromethane (Methyl chloride)	mg/L	0.238	0.127	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.0016	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	0.0031	0.0039	0.0055	0.004	0.0049	0.0027	0.0029	0.0028	0.0034	0.0024	0.025	0.00026 J	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Dichloroethene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0005)	ND(0.0005)	0.00024 J	ND(0.001)	0.00027 J	0.0002 J	ND(0.0005)	ND(0.0005)	0.00022 J	ND(0.0005)	0.00089 J	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Trichloroethene	mg/L	0.005	0.005	0.00064 J	0.00068 J	0.00062 J	0.00024 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichlorofluoromethane (CFC-11)	mg/L	1.9	1.09	-	-	-	ND(0.001)	-	-	-	-	-	-	ND(0.001)	-	-	-	-	-
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.0011	0.00038 J	0.00031 J	0.00036 J	0.00045 J	0.00044 J	0.0038 ²⁶	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.002)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.002)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Semivolatile Organic Compounds																			
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caprolactam	mg/L	50.6	7.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	-	-	-	-
Phenol	mg/L	29.5	4.56	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	-	-	-	-
Total Petroleum Hydrocarbons																			
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	0.032 J	ND(0.1)	ND(0.1)	ND(0.1)	-	-	0.033 J	0.037 J	ND(0.1)	ND(0.1)
Metals																			
Aluminum	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	1.57 J	-	-	-	-
Arsenic	mg/L	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	0.0089 J	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-	-	-	-	-	-	-	0.526	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	108	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	0.008 J	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	ND(0.05)	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	0.0023 J	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	29.1	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	-	-	0.0036 J	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	37.5	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	2.34 ²⁶	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	ND(0.0002)	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	ND(0.04)	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	12.8	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	ND(0.005)	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	35.5	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	-	-	-	-
Vanadium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	0.0047 J	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	0.0194 J	-	-	-	-
General Chemistry																			
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE A-12
SITE-WIDE/NON-AOC - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-124A	MW-124A	MW-124B	MW-124B	MW-124B	MW-124B	MW-124B	MW-124B	MW-150C
Sample Name:				GW-062408-JH-007	WG-121311-DF-011	GW112806GC006	GW-091207-NT-012	GW-120507-JH-012	GW-031108-JH-012	GW-062408-JH-006	WG-121411-KH-024	GW-100398-JM-033
Sample Date:				6/24/2008	12/13/2011	11/28/2006	9/12/2007	12/5/2007	3/11/2008	6/24/2008	12/14/2011	10/4/1998
Sample Type:												
Area of Concern:				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Property:				Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	Fairfax I	N/A
Sampling Company:	Units	Non-Residential Groundwater Pathway a	Residential Groundwater Pathway b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	
KDHE Tier 2 Risk-Based Criteria												
Volatile Organic Compounds												
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	11.8	4.92	ND(0.01)	ND(0.01)	0.0029 J	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.005)
Acetone	mg/L	45.5	11.5	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.005)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.00054 J	ND(0.001)	ND(0.001)	ND(0.001)
Chlorobenzene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	0.0003 J	0.00023 J	0.00027 J	0.00027 J	0.00016 J	ND(0.001)
Chloromethane (Methyl chloride)	mg/L	0.238	0.127	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0005)	ND(0.001)	0.00026 J	ND(0.0005)	0.00022 J	ND(0.0005)	ND(0.0005)	ND(0.001)	ND(0.001)
Dichloroethene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.002)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)UJ	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0005)	ND(0.001)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.001)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichlorofluoromethane (CFC-11)	mg/L	1.9	1.09	-	ND(0.001)	-	-	-	-	-	ND(0.001)	-
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)UJ	ND(0.002)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.002)	ND(0.001)
Semivolatile Organic Compounds												
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-
Caprolactam	mg/L	50.6	7.77	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	-	-	ND(0.01)	-	-	-	-	-	-
Phenol	mg/L	29.5	4.56	-	-	ND(0.01)	-	-	-	-	-	-
Total Petroleum Hydrocarbons												
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	ND(0.1)	-	-	0.042 J	ND(0.1)	ND(0.1)	ND(0.1)	-	-
Metals												
Aluminum	mg/L	NC	NC	-	-	0.261 J	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	-	-	ND(0.01)	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	0.769	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	ND(0.005)	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	125	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	ND(0.01)	-	-	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	-	ND(0.05)	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	ND(0.025)	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	11.6	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	ND(0.005)	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	37.1	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	2.32 ^{2B}	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	ND(0.0002)	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	ND(0.04)	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	14.6	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	ND(0.005)	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	ND(0.01)	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	115	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	0.0059 J	-	-	-	-	-	-
Vanadium	mg/L	NC	NC	-	-	ND(0.05)	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	ND(0.02)	-	-	-	-	-	-
General Chemistry												
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-

TABLE A-13

OFF-SITE - SOIL ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:					SB-114	SB-115	SB-122A	SB-122B	SB-123A	SB-133	SB-133A	SB-134	SB-134A	SB-135	SB-135A	SB-136	SB-136A	
Sample Name:					S-122104-DS-121	S-122104-DS-122	MW 122A 0-2.5	MW-122 0-2.5	MW 123A 10-12.5	SB-133 7.5-10	SB 133A 7.5-10	SB-134 10-12.5	SB 134A 10-12.5	SB-135 12.5-15	SB 135A 12.5-15	SB-136 12.5-15	SB 136A 12.5-15	
Sample Date:					12/21/2004	12/21/2004	11/7/2006	10/31/2006	11/7/2006	10/31/2006	11/7/2006	10/31/2006	11/7/2006	10/31/2006	11/7/2006	10/31/2006	11/7/2006	
Sample Type:																		
Depth:	KDHE Tier 2 Risk-Based Criteria				(10-12) ft BGS	(10-12) ft BGS	(0-2.5) ft BGS	(0-2.5) ft BGS	(10-12.5) ft BGS	(7.5-10) ft BGS	(7.5-10) ft BGS	(10-12.5) ft BGS	(10-12.5) ft BGS	(12.5-15) ft BGS	(12.5-15) ft BGS	(12.5-15) ft BGS	(12.5-15) ft BGS	
Area of Concern:	Non-Residential				off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	
Property:	Residential				off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	
Sampling Company:	Units	a	b	c	d	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	
<u>Volatile Organic Compounds</u>																		
1,2-Dichloroethane	mg/kg	10.9	0.06	6.27	0.06	ND(0.006)	0.0019 J	ND(0.0059)	-	ND(0.0058)	-	ND(0.0064)	-	ND(0.0059)	-	ND(0.0058)	ND(0.0064)	
Methylene chloride	mg/kg	267	0.0429	149	0.0429	0.0083	0.012	ND(0.0059)	-	ND(0.0058)	-	ND(0.0064)	-	ND(0.0059)	-	ND(0.0058)	ND(0.0064)	
Toluene	mg/kg	29800	51.2	4320	51.2	0.00087 J	0.00051 J	ND(0.0059)	-	ND(0.0058)	-	ND(0.0064)	-	ND(0.0059)	-	ND(0.0058)	ND(0.0064)	
<u>Semi-Volatile Organic Compounds</u>																		
Benzo(b)fluoranthene	mg/kg	33.8	64.4	10.9	19.2	ND(0.46)	ND(0.41)	-	0.09 J	-	ND(0.45)	-	ND(0.34)	-	ND(0.35)	-	ND(0.35)	
<u>Metals</u>																		
Aluminum	mg/kg	NC	NC	NC	NC	7130	5790	-	8030	-	10600	-	1700	-	2450	-	3040	
Arsenic	mg/kg	38	NC	11.3	NC	6.7	6.6	-	6.2	-	10	-	3.4	-	3.7	-	3.7	
Barium	mg/kg	277000	NC	15300	NC	201	189	-	193	-	288	-	27.8	-	65.8	-	174	
Beryllium	mg/kg	3650	NC	155	NC	0.26 J	0.16 J	-	0.53 J	-	0.72 J	-	ND(1.0)	-	0.20 J	-	0.23 J	
Cadmium	mg/kg	965	NC	39	NC	ND(0.70)	ND(0.62)	-	0.32 J	-	0.34 J	-	0.12 J	-	ND(0.53)	-	0.10 J	
Calcium	mg/kg	NC	NC	NC	NC	19000 J	18700 J	-	33500	-	25500	-	4120	-	5590	-	10200	
Chromium	mg/kg	111	NC	33.6	NC	12.7 J	9.8 J	-	11.9	-	16.9	-	3.5	-	5.0	-	6.3	
Cobalt	mg/kg	579	NC	23.4	NC	5.9 J	6.3	-	5.5 J	-	8.2	-	3.0 J	-	3.9 J	-	3.3 J	
Copper	mg/kg	81700	NC	3130	NC	19.5	9.8	-	12.6	-	17.7	-	1.4 J	-	1.8 J	-	2.3 J	
Iron	mg/kg	NC	NC	NC	NC	14200	12700	-	12800	-	18800	-	4890	-	6610	-	7170	
Lead	mg/kg	1000	NC	400	NC	10.5	8.6	-	10	-	12.8	-	3.6	-	4.2	-	4.4	
Magnesium	mg/kg	NC	NC	NC	NC	7090	7060	-	6370	-	9840	-	1300	-	2020	-	4060	
Manganese	mg/kg	66200	NC	9300	NC	270	298	-	284	-	398	-	102	-	125	-	132	
Mercury	mg/kg	20	NC	2	NC	0.035 J	0.0077 J	-	ND(0.038)	-	0.014 J	-	ND(0.034)	-	ND(0.035)	-	ND(0.035)	
Nickel	mg/kg	32400	NC	1540	NC	17.3 J	15.6 J	-	15.1	-	20.9	-	7.2	-	9.6	-	7.8	
Potassium	mg/kg	NC	NC	NC	NC	1630 J	1480 J	-	1690	-	2130	-	299 J	-	454 J	-	601	
Vanadium	mg/kg	NC	NC	NC	NC	19.9	17.1	-	22.0 J	-	30.4 J	-	6.9 J	-	9.3 J	-	12.7 J	
Zinc	mg/kg	613000	NC	23500	NC	50.1	42.9	-	47.3	-	66.1	-	13.4	-	20.7	-	21.0	
<u>General Chemistry</u>																		
Percent moisture	%	NC	NC	NC	NC	-	-	15.7	12.0	13.2	26.0	21.4	2.8	15.0	4.9	13.8	6.3	
Total solids	%	NC	NC	NC	NC	71.8	80.1	-	-	-	-	-	-	-	-	-	-	

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
--: Not Analyzed
Boxed values exceed criteria
mg/kg - milligrams per kilograms
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1B	MW-1B
Sample Name:				MW-1A	Well 1A	Well 1A	GW-100398-JM-011	GW-122104-DS-013	GW-091307-NT-029	GW-120607-JH-029	GW-031308-JH-035	GW-062608-JH-033	GW-062608-JH-032	WG-121311-KH-021	Well 1B	GW-091307-NT-028
Sample Date:				3/28/1985	3/28/1985	12/17/1986	10/3/1998	12/21/2004	9/13/2007	12/6/2007	3/13/2008	6/26/2008	6/26/2008	12/13/2011	12/17/1986	9/13/2007
Sample Type:		KDHE Tier 2 Risk-Based Criteria														
Area of Concern:		Non-Residential	Residential	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Property:		Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Sampling Company:	Units	a	b	LANGSTON			CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA		CRA
Sodium	mg/L	NC	NC	-	-	-	-	43.5	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	0.048	-	ND(0.02)	-	ND(0.010)	-	-	-	-	-	-	ND(0.02)	-
Zinc	mg/L	30.5	4.67	0.36	-	0.064	-	ND(0.020)	-	-	-	-	-	-	0.042	-
General Chemistry																
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand (COD)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-1B	MW-1B	MW-1B	MW-1B	MW-1B	MW-1B	MW-1B	MW-1C	MW-1C	MW-1C	MW-1C	MW-1C
Sample Name:				GW-120607-JH-028	GW-120607-JH-027	GW-031308-JH-038	GW-031308-JH-037	GW-062608-JH-031	GW-062608-JH-030	WG-121411-KH-031	Well 1C	GW-100398-JM-009	GW-091307-NT-027	GW-120507-JH-024	GW-031308-JH-039
Sample Date:				12/6/2007	12/6/2007	3/13/2008	3/13/2008	6/26/2008	6/26/2008	12/14/2011	12/17/1986	10/3/1998	9/13/2007	12/5/2007	3/13/2008
Sample Type:		KDHE Tier 2 Risk-Based Criteria		Duplicate		Duplicate		Duplicate							
Area of Concern:		Non-Residential	Residential	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Property:		Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA		CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>															
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	0.041	ND(0.01)	ND(0.01)	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.0004)	0.001	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0005)	ND(0.0005)	0.00028 J	0.00026 J	ND(0.0005)	ND(0.0005)	ND(0.001)	-	ND(0.001)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)	ND(0.0007)	0.01	ND(0.001)	ND(0.001)	ND(0.001)
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	ND(0.002)	ND(0.001)	ND(0.001)	ND(0.001)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)UJ	ND(0.001)	ND(0.0011)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.0004)	0.21	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.001)	-	ND(0.001)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.002)	-	0.11	ND(0.001)	ND(0.001)	ND(0.001)
<u>Semivolatile Organic Compounds</u>															
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/L	0.000537	0.00016	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/L	0.00543	0.00162	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-
Caprolactam	mg/L	50.6	7.77	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene	mg/L	0.000027	0.00000805	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-octyl phthalate (DnOP)	mg/L	0.0894	0.0184	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/L	0.000392	0.000117	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/L	29.5	4.56	-	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>															
Oil and grease	mg/L	NC	NC	-	-	-	-	-	-	-	ND(0.5)	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	ND(0.1)	ND(0.1)	ND(0.1)
<u>Metals</u>															
Aluminum	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-	-	-	0.31	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	-	-	-	ND(0.01)	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	ND(0.01)	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	ND(0.01)	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-1B	MW-1B	MW-1B	MW-1B	MW-1B	MW-1B	MW-1B	MW-1C	MW-1C	MW-1C	MW-1C	MW-1C
Sample Name:				GW-120607-JH-028	GW-120607-JH-027	GW-031308-JH-038	GW-031308-JH-037	GW-062608-JH-031	GW-062608-JH-030	WG-121411-KH-031	Well 1C	GW-100398-JM-009	GW-091307-NT-027	GW-120507-JH-024	GW-031308-JH-039
Sample Date:				12/6/2007	12/6/2007	3/13/2008	3/13/2008	6/26/2008	6/26/2008	12/14/2011	12/17/1986	10/3/1998	9/13/2007	12/5/2007	3/13/2008
Sample Type:		KDHE Tier 2 Risk-Based Criteria		Duplicate		Duplicate		Duplicate							
Area of Concern:		Non-Residential	Residential	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Property:		Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA		CRA	CRA	CRA	CRA
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	ND(0.02)	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	0.033	-	-	-	-
General Chemistry															
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand (COD)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:			MW-1C	MW-1C	MW-3	MW-3	MW-3	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A
Sample Name:			GW-062608-JH-029	WG-121511-KH-035	MW-3	MW-3	MW-3	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	GW-100398-JM-017
Sample Date:			6/26/2008	12/15/2011	10/1/1988	6/1/1989	7/1/1989	6/30/1987	10/29/1987	6/27/1988	9/16/1988	12/19/1988	3/21/1989	6/21/1989	9/18/1989	10/3/1998
Sample Type:	KDHE Tier 2 Risk-Based Criteria															
Area of Concern:	Non-Residential	Residential	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Property:	Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Sampling Company:	Units		CRA	CRA	LANGSTON	PACE	PACE									CRA
<u>Volatile Organic Compounds</u>																
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-	-	-	-	-	-	ND(0.005)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	0.04 ND	ND(0.0004)	ND(0.0004)	ND(0.0004)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.005)	-	-	-	-	-	-	-	-	-	0.002
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0005)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	0.002
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)UJ	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	0.009	ND(0.0007)	ND(0.0007)	0.001
Methylene chloride	mg/L	0.005	0.005	0.0014	ND(0.001)	ND(0.01)	-	-	-	-	-	-	-	-	-	ND(0.002)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)UJ	ND(0.001)	ND(0.005)	-	-	-	-	-	-	-	-	-	0.029 ND
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	0.044	ND(0.0004)	ND(0.0004)	0.023
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0005)	ND(0.001)	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.005)	-	-	-	-	-	-	-	-	-	0.001
Xylenes (total)	mg/L	10	10	ND(0.001)UJ	ND(0.002)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.0012)	ND(0.0012)	ND(0.0012)	-	0.041	ND(0.0012)	ND(0.0012)	0.013
<u>Semivolatile Organic Compounds</u>																
Acetophenone	mg/L	0.926	0.494	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/L	0.000537	0.00016	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/L	NC	NC	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/L	0.00543	0.00162	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
Caprolactam	mg/L	50.6	7.77	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene	mg/L	0.000027	0.0000805	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
Di-n-octyl phthalate (DnOP)	mg/L	0.0894	0.0184	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/L	0.000392	0.000117	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
Phenol	mg/L	29.5	4.56	-	-	ND(0.004)	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>																
Oil and grease	mg/L	NC	NC	-	-	-	-	-	ND(0.5)	ND(0.5)	1.0	0.6	1.0	ND(0.5)	ND(0.5)	ND(0.5)
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	ND(0.1)	-	-	-	-	-	-	-	-	-	-	-	-
<u>Metals</u>																
Aluminum	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	0.006	0.006	-	-	ND(0.01)	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	-	-	0.0005	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	0.12	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	0.004	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	0.011	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	0.005	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	0.021 ND	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	0.0005	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	0.021	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.05	0.05	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	0.002	-	-	-	-	-	-	-	-	-	-

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-1C	MW-1C	MW-3	MW-3	MW-3	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A
Sample Name:				GW-062608-JH-029	WG-121511-KH-035	MW-3	MW-3	MW-3	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	Well 11A/110A	GW-100398-JM-017
Sample Date:				6/26/2008	12/15/2011	10/1/1988	6/1/1989	7/1/1989	6/30/1987	10/29/1987	6/27/1988	9/16/1988	12/19/1988	3/21/1989	6/21/1989	9/18/1989
Sample Type:		KDHE Tier 2 Risk-Based Criteria														
Area of Concern:		Non-Residential	Residential	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Property:		Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Sampling Company:	Units	a	b	CRA	CRA	LANGSTON	PACE	PACE								CRA
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	0.024	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	0.017	-	-	-	-	-	-	-	-	-	-
General Chemistry																
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand (COD)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:			MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A
Sample Name:			GW-122104-DS-008	GW-091407-NT-034	GW-091407-NT-033	GW-120507-JH-023	GW-031308-JH-034	GW-031308-JH-033	GW-062608-JH-028	GW-062608-JH-027	WG-121311-KH-019	DUP-1	W112106KGMW122	W112106KGMW123
Sample Date:			12/21/2004	9/14/2007	9/14/2007	12/5/2007	3/13/2008	3/13/2008	6/26/2008	6/26/2008	12/13/2011	11/21/2006	11/21/2006	11/21/2006
Sample Type:		KDHE Tier 2 Risk-Based Criteria		Duplicate			Duplicate		Duplicate			Duplicate		
Area of Concern:		Non-Residential	Residential	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Property:		Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
<u>Volatile Organic Compounds</u>														
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.005)	ND(0.005)	ND(0.005)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.00017 J
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	0.004	0.0027	0.0026	0.0019	0.0058	0.0057	0.0046	0.0046	0.0016	0.00027 J	0.00028 J
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)UJ	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.002)	ND(0.002)	ND(0.002)
Tetrachloroethene	mg/L	0.005	0.005	0.0048	0.0073 ^{ab}	0.007 ^{ab}	0.0096 ^{ab}	0.0035	0.0035	0.002 J	0.0021 J	0.0062 ^{ab}	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	0.00021 J	ND(0.0005)	ND(0.0005)	ND(0.0005)	0.00019 J	0.00021 J	0.0002 J	0.00019 J	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	0.0019	0.0014	0.0015	0.0014	0.00087 J	0.00075 J	0.00052 J	0.00055 J	0.00058 J	0.0002 J	0.0002 J
Xylenes (total)	mg/L	10	10	ND(0.002)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)UJ	ND(0.002)	ND(0.001)	ND(0.001)
<u>Semivolatile Organic Compounds</u>														
Acetophenone	mg/L	0.926	0.494	ND(0.01)	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/L	0.000537	0.00016	ND(0.01)	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
Benzo(g,h,i)perylene	mg/L	NC	NC	ND(0.01)	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	0.0011 J
Benzo(k)fluoranthene	mg/L	0.00543	0.00162	ND(0.01)	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	ND(0.01)	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
Caprolactam	mg/L	50.6	7.77	ND(0.01)	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene	mg/L	0.000027	0.00000805	ND(0.01)	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	ND(0.01)	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
Di-n-octyl phthalate (DnOP)	mg/L	0.0894	0.0184	ND(0.01)	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
Indeno(1,2,3-cd)pyrene	mg/L	0.000392	0.000117	ND(0.01)	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	0.00088 J ^{ab}
Phenol	mg/L	29.5	4.56	0.0045 J	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
<u>Total Petroleum Hydrocarbons</u>														
Oil and grease	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	0.17 J	ND(0.1)UJ	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-
<u>Metals</u>														
Aluminum	mg/L	NC	NC	ND(0.053)	-	-	-	-	-	-	-	1.38	1.05	1.03
Antimony	mg/L	0.006	0.006	ND(0.060)	-	-	-	-	-	-	-	ND(0.06)	ND(0.06)	ND(0.06)
Arsenic	mg/L	0.01	0.01	ND(0.010)	-	-	-	-	-	-	-	0.0064 J	ND(0.02)	0.0141 J ^{ab}
Barium	mg/L	2	2	0.19 J	-	-	-	-	-	-	-	0.239	0.238	0.426
Beryllium	mg/L	0.004	0.004	0.00078 J	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)
Cadmium	mg/L	0.005	0.005	ND(0.00061)	-	-	-	-	-	-	-	ND(0.005)	ND(0.005)	ND(0.005)
Calcium	mg/L	NC	NC	159	-	-	-	-	-	-	-	208	207	212
Calcium (dissolved)	mg/L	NC	NC	155	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	ND(0.010)	-	-	-	-	-	-	-	ND(0.015)	ND(0.015)	0.0069 J
Cobalt	mg/L	0.0306	0.00468	0.0035 J	-	-	-	-	-	-	-	0.0041 J	0.0037 J	ND(0.05)
Copper	mg/L	1.3	1.3	ND(0.025)	-	-	-	-	-	-	-	ND(0.025)	ND(0.025)	ND(0.025)
Iron	mg/L	NC	NC	0.57	-	-	-	-	-	-	-	3.8	3.58	12.3
Lead	mg/L	0.015	0.015	ND(0.0030)	-	-	-	-	-	-	-	ND(0.015)	ND(0.015)	ND(0.015)
Magnesium	mg/L	NC	NC	48.3 J	-	-	-	-	-	-	-	48.5	48.2	55.7
Magnesium (dissolved)	mg/L	NC	NC	47.1 J	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	1.5 J ^{ab}	-	-	-	-	-	-	-	1.29 ^{ab}	1.29 ^{ab}	1.52 ^{ab}
Manganese (dissolved)	mg/L	0.05	0.05	1.2 ^{ab}	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	ND(0.00020)	-	-	-	-	-	-	-	ND(0.0002)	ND(0.0002)	ND(0.0002)
Nickel	mg/L	2.04	0.312	0.0090 J	-	-	-	-	-	-	-	0.0125 J	0.0118 J	0.0064 J
Potassium	mg/L	NC	NC	9.5 J	-	-	-	-	-	-	-	6.13	6.05	7.96
Selenium	mg/L	0.05	0.05	0.026	-	-	-	-	-	-	-	0.0083 J	0.0095 J	0.0088 J
Silver	mg/L	0.508	0.0779	ND(0.010)	-	-	-	-	-	-	-	ND(0.03)	ND(0.03)	ND(0.03)

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-110A	MW-122	MW-122	MW-123	
Sample Name:				GW-122104-DS-008	GW-091407-NT-034	GW-091407-NT-033	GW-120507-JH-023	GW-031308-JH-034	GW-031308-JH-033	GW-062608-JH-028	GW-062608-JH-027	WG-121311-KH-019	DUP-1	W112106KGMW122	W112106KGMW123	
Sample Date:				12/21/2004	9/14/2007	9/14/2007	12/5/2007	3/13/2008	3/13/2008	6/26/2008	6/26/2008	12/13/2011	11/21/2006	11/21/2006	11/21/2006	
Sample Type:		KDHE Tier 2 Risk-Based Criteria			Duplicate			Duplicate			Duplicate			Duplicate		
Area of Concern:		Non-Residential	Residential	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	
Property:		Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	off-site	
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	
Sodium	mg/L	NC	NC	84.7	-	-	-	-	-	-	-	-	19.4	19.5	17.3	
Thallium	mg/L	NC	NC	ND(0.010)	-	-	-	-	-	-	-	-	ND(0.035)	ND(0.035)	ND(0.035)	
Zinc	mg/L	30.5	4.67	ND(0.020)	-	-	-	-	-	-	-	-	0.0069 J	0.006 J	0.0111 J	
General Chemistry																
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	50	-	-	-	-	-	-	-	-	-	-	-	
Ammonia	mg/L	NC	NC	0.1 J	-	-	-	-	-	-	-	-	-	-	-	
Chemical oxygen demand (COD)	mg/L	NC	NC	24.3	-	-	-	-	-	-	-	-	-	-	-	
Nitrate (as N)	mg/L	NC	NC	1.0	-	-	-	-	-	-	-	-	-	-	-	
Orthophosphate	mg/L	NC	NC	0.01 J	-	-	-	-	-	-	-	-	-	-	-	
Total heterotropic bacteria	cfu/mL	NC	NC	100	-	-	-	-	-	-	-	-	-	-	-	
Total organic carbon (TOC)	mg/L	NC	NC	4	-	-	-	-	-	-	-	-	-	-	-	

TABLE A-14

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:			TMW-133	TMW-134	TMW-135	TMW-136	
Sample Name:			W112106KGSB133	W112106KGSB134	W112106KGSB135	W112106KGSB136	
Sample Date:			11/21/2006	11/21/2006	11/21/2006	11/21/2006	
Sample Type:	KDHE Tier 2 Risk-Based Criteria						
Area of Concern:	Non-Residential	Residential	off-site	off-site	off-site	off-site	
Property:	Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site	
Sampling Company:	Units	a	b	CRA	CRA	CRA	
<u>Volatile Organic Compounds</u>							
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	0.00012 J	0.00021 J	ND(0.001)	0.0002 J
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	0.0002 J	0.00016 J	ND(0.001)	0.00018 J
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Methylene chloride	mg/L	0.005	0.005	ND(0.002)	ND(0.002)	ND(0.002)	ND(0.002)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
<u>Semivolatile Organic Compounds</u>							
Acetophenone	mg/L	0.926	0.494	-	-	-	-
Benzo(b)fluoranthene	mg/L	0.000537	0.00016	ND(0.01)	0.0036 J ND	ND(0.01)	ND(0.01)
Benzo(g,h,i)perylene	mg/L	NC	NC	ND(0.01)	0.0046 J	ND(0.01)	ND(0.01)
Benzo(k)fluoranthene	mg/L	0.00543	0.00162	ND(0.01)	0.0014 J	ND(0.01)	ND(0.01)
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	ND(0.01)	0.0016 J	ND(0.01)	0.0015 J
Caprolactam	mg/L	50.6	7.77	-	-	-	-
Dibenz(a,h)anthracene	mg/L	0.000027	0.00000805	ND(0.01)	0.0038 J ND	ND(0.01)	ND(0.01)
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Di-n-octyl phthalate (DnOP)	mg/L	0.0894	0.0184	ND(0.01)	0.0045 J	ND(0.01)	ND(0.01)
Indeno(1,2,3-cd)pyrene	mg/L	0.000392	0.000117	ND(0.01)	0.0039 J ND	ND(0.01)	ND(0.01)
Phenol	mg/L	29.5	4.56	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
<u>Total Petroleum Hydrocarbons</u>							
Oil and grease	mg/L	NC	NC	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-
<u>Metals</u>							
Aluminum	mg/L	NC	NC	0.709	0.616	0.285 J	0.328 J
Antimony	mg/L	0.006	0.006	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)
Arsenic	mg/L	0.01	0.01	0.0091 J	0.0087 J	ND(0.02)	0.0109 J ND
Barium	mg/L	2	2	0.321	0.196	0.251	0.326
Beryllium	mg/L	0.004	0.004	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Cadmium	mg/L	0.005	0.005	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Calcium	mg/L	NC	NC	190	195	171	211
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-
Chromium	mg/L	0.1	0.1	ND(0.015)	ND(0.015)	0.0142 J	ND(0.015)
Cobalt	mg/L	0.0306	0.00468	ND(0.05)	ND(0.05)	0.0032 J	0.0044 J
Copper	mg/L	1.3	1.3	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.025)
Iron	mg/L	NC	NC	7.46	8.5	6.04	8.01
Lead	mg/L	0.015	0.015	ND(0.015)	ND(0.015)	ND(0.015)	ND(0.015)
Magnesium	mg/L	NC	NC	39.1	41.4	27.4	48.2
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-
Manganese	mg/L	0.05	0.05	1.18 ND	1.31 ND	0.641 ND	1.69 ND
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-
Mercury	mg/L	0.002	0.002	ND(0.0002)	ND(0.0002)	ND(0.0002)	ND(0.0002)
Nickel	mg/L	2.04	0.312	0.0041 J	ND(0.04)	0.0188 J	0.0061 J
Potassium	mg/L	NC	NC	7.49	6.64	5.53	8.76
Selenium	mg/L	0.05	0.05	ND(0.015)	ND(0.015)	0.0161	0.0193
Silver	mg/L	0.508	0.0779	ND(0.03)	ND(0.03)	ND(0.03)	ND(0.03)

TABLE A-14

OFF-SITE - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				TMW-133	TMW-134	TMW-135	TMW-136
Sample Name:				W112106KGSB133	W112106KGSB134	W112106KGSB135	W112106KGSB136
Sample Date:				11/21/2006	11/21/2006	11/21/2006	11/21/2006
Sample Type:		KDHE Tier 2 Risk-Based Criteria					
Area of Concern:		Non-Residential	Residential	off-site	off-site	off-site	off-site
Property:		Groundwater Pathway	Groundwater Pathway	off-site	off-site	off-site	off-site
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA
Sodium	mg/L	NC	NC	15.9	18.9	12.7	43.8
Thallium	mg/L	NC	NC	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)
Zinc	mg/L	30.5	4.67	0.0088 J	ND(0.06)	0.0127 J	0.012 J
General Chemistry							
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-
Chemical oxygen demand (COD)	mg/L	NC	NC	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
GRO - gasoline range
-- : Not Analyzed
Boxed values exceed criteria.
mg/L - milligrams per liter
cfu/mL - colony forming units per milliliters
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-2A	MW-3A	MW-3A		MW-3A		MW-3B	MW-3B	MW-3C		MW-3C		MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A
Sample Name:				MW-2A	Well 3A	Well 3A		GW-100398-JM-029		Well 3B	Well 3B	Well 3C		GW-100398-JM-031		MW-4A	Well 4A	Well 4A	Well 4A	Well 4A	Well 4A	Well 4A	Well 4A	Well 4A	Well 4A	Well 4A	Well 4A	Well 4A
Sample Date:				4/5/1985	9/27/1985	12/18/1986		10/4/1998		9/27/1985	12/18/1986	12/18/1986		10/4/1998		6/20/1985	6/20/1985	8/15/1985	2/6/1986	8/9/1986	12/18/1986	1/26/1987	2/27/1987	3/25/1987	6/30/1987	10/29/1987	12/30/1987	
Sample Type:		KDHE Tier 2 Risk-Based Criteria																										
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II		Fairfax II		Fairfax II	Fairfax II	Fairfax II		Fairfax II		Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A		N/A		N/A	N/A	N/A		N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	LANGSTON	NONE	NONE				NONE	NONE	NONE				LANGSTON	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	LANGSTON
Magnesium (dissolved)	mg/L	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	ND(0.001)	-	-		-		-	-	-		-		ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	ND(0.01)	-	ND(0.01)		-		-	ND(0.01)	ND(0.01)		-		ND(0.01)	-	-	-	-	-	0.021	0.018	0.011	0.024	-	-	0.03
Potassium	mg/L	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	ND(0.001)	-	-		-		-	-	-		-		ND(0.01)	ND(0.001)	-	ND(0.001)	-	-	-	-	-	-	-	-	0.30 ^B
Sodium	mg/L	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	ND(0.01)	-	ND(0.02)		-		-	ND(0.02)	ND(0.02)		-		ND(0.1)	-	-	-	-	-	0.067	0.058	0.037	0.035	-	-	0.099
Zinc	mg/L	30.5	4.67	0.015	-	0.033		-		-	0.031	0.022		-		0.104	0.104	-	ND(0.01)	-	-	0.038	0.024	0.015	0.056	-	-	-
General Chemistry																												
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates	mg/L	NC	NC	-	-	-		-		-	-	-		-		-	ND(1)	-	20	-	-	-	-	-	-	-	-	-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-		-		-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	
Sample Name:				Well 4A	Well 4A	Well 4A	MW-4A	Well 4A	Well 4A	Well 4A	GW-100398-JH-016	GW-100398-JH-014	WG-12559-103008-TK-003	MW-4B	Well 4B	Well 4B	Well 4B	Well 4B	Well 4B	Well 4B	Well 4B	Well 4B	
Sample Date:				6/29/1988	8/12/1988	9/16/1988	12/30/1988	3/27/1989	10/2/1989	1/5/1990	10/3/1998	10/3/1998	10/30/2008	6/20/1985	6/20/1985	8/15/1985	3/12/1986	3/20/1986	8/9/1986	12/18/1986	1/26/1987	2/27/1987	3/25/1987
Sample Type:		KDHE Tier 2 Risk-Based Criteria										Duplicate											
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	NONE	NONE	NONE	LANGSTON	NONE	NONE	NONE	N/A	N/A	N/A	LANGSTON	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	ND(0.01)	-	-	0.043	-	-	0.043	-	-	-	ND(0.01)	-	-	-	-	-	ND(0.01)	ND(0.01)	ND(0.01)	0.012
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	0.003	-	-	0.004	-	-	0.003	-	-	-	ND(0.01)	ND(0.001)	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	ND(0.02)	-	-	0.047	-	-	0.039	-	-	-	ND(0.1)	-	-	-	-	-	0.032	0.032	ND(0.02)	ND(0.02)
Zinc	mg/L	30.5	4.67	0.034	-	-	ND(0.010)	-	-	0.028	-	-	-	0.099	0.019	-	-	-	-	0.018	0.019	0.010	0.025
General Chemistry																							
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	
Sample Name:				Well 4B	MW-4B	Well 4B	Well 4B	Well 4B	Well 4B	Well 4B	Well 4B	WG-12559-103008-TK-002	MW-4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	MW-4C	
Sample Date:				12/30/1987	12/30/1988	12/30/1988	3/27/1989	6/27/1989	10/2/1989	1/5/1990		10/30/2008	6/20/1985	6/20/1985	8/15/1985	3/12/1986	3/20/1986	8/9/1986	12/18/1986	1/26/1987	2/27/1987	3/25/1987	12/30/1987	12/30/1988
Sample Type:				KDHE Tier 2 Risk-Based Criteria																				
Area of Concern:				Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:				Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Company:				Units		NONE	LANGSTON	NONE	NONE	NONE	NONE	NONE	LANGSTON	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	LANGSTON
Volatile Organic Compounds																								
1,1,2,2-Tetrachloroethane	mg/L	0.00128	0.000694	-	ND(0.0006)	ND(0.0006)	-	ND(0.0006)	-	ND(0.0006)	-	-	ND(0.01)	-	-	-	-	ND(0.0006)	-	-	-	-	-	ND(0.0006)
1,1-Dichloroethane	mg/L	0.0461	0.025	-	0.00294	-	-	0.0022	-	0.00092	-	-	ND(0.01)	-	-	-	-	ND(0.0005)	-	-	-	-	-	ND(0.0005)
1,1-Dichloroethene	mg/L	0.007	0.007	-	ND(0.0006)	0.00294	-	-	-	ND(0.0006)	-	-	ND(0.01)	-	-	-	-	-	-	-	-	-	-	ND(0.0006)
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/L	0.005	0.005	-	0.000871	-	-	ND(0.0006)	-	0.0006	-	-	ND(0.01)	-	-	-	-	ND(0.0006)	ND(0.0006)	ND(0.0006)	ND(0.0006)	ND(0.0006)	-	ND(0.0006)
1,2-Dichloroethene (total)	mg/L	NC	NC	ND(0.0005)	-	0.000871	-	0.00844	-	0.0053	-	-	-	-	-	-	-	ND(0.0005)	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/L	0.005	0.005	ND(0.0004)	0.00562 ND	0.00562 ND	0.008 ND	0.00481	ND(0.0004)	ND(0.0004)	0.00098 J	-	ND(0.01)	ND(0.0004)	-	-	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	0.00201
Carbon disulfide	mg/L	1.66	0.716	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/L	0.1	0.1	-	ND(0.0004)	-	-	-	-	ND(0.0004)	-	-	ND(0.01)	-	-	-	-	-	-	-	-	-	-	ND(0.0004)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	-	ND(0.0005)	ND(0.0005)	-	ND(0.0005)	-	ND(0.0005)	-	-	ND(0.01)	-	-	-	-	ND(0.0005)	-	-	-	-	-	ND(0.0005)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.001)	-	ND(0.01)	-	-	-	-	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)
Methyl tert butyl ether (MTBE)	mg/L	0.262	0.133	-	-	-	-	-	-	-	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	-	ND(0.0009)	ND(0.0009)	-	0.00143	-	ND(0.005)	-	-	ND(0.01)	ND(0.005)	-	-	-	ND(0.005)	ND(0.0009)	ND(0.0009)	0.0014	-	-	ND(0.0009)
m-Xylene	mg/L	NC	NC	-	ND(0.0004)	ND(0.0004)	-	ND(0.0004)	-	ND(0.0004)	-	-	-	-	-	-	-	-	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	-	ND(0.0004)
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.01)	-	-	-	-	-	-
o-Xylene	mg/L	NC	NC	-	ND(0.0004)	ND(0.0004)	-	ND(0.0004)	-	ND(0.0004)	-	-	-	-	-	-	-	-	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	-	ND(0.0004)
Phenolics (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p-Xylene	mg/L	NC	NC	-	ND(0.0004)	ND(0.0004)	-	ND(0.0004)	-	ND(0.0004)	-	-	-	-	-	-	-	-	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	-	ND(0.0004)
Tetrachloroethene	mg/L	0.005	0.005	ND(0.0011)	ND(0.0011)	ND(0.0011)	-	ND(0.0011)	-	ND(0.0011)	-	-	ND(0.01)	-	-	-	-	-	ND(0.0011)	ND(0.0011)	ND(0.0011)	ND(0.0011)	ND(0.0011)	ND(0.0011)
Toluene	mg/L	1	1	ND(0.0004)	0.00888	0.00888	ND(0.0004)	0.00429	ND(0.0004)	ND(0.0004)	ND(0.001)	-	0.013	0.013	-	-	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	0.000418
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0005)	0.0113	0.0113	-	-	-	-	-	-	ND(0.01)	-	-	-	-	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	0.0021	ND(0.0005)	ND(0.0005)
Trichloroethene	mg/L	0.005	0.005	ND(0.0006)	ND(0.0006)	ND(0.0006)	-	ND(0.0006)	-	ND(0.0006)	-	-	ND(0.01)	-	-	-	-	ND(0.0006)	ND(0.0006)	ND(0.0006)	ND(0.0006)	ND(0.0006)	ND(0.0006)	ND(0.0006)
Vinyl chloride	mg/L	0.002	0.002	-	0.00311 ND	0.00311 ND	-	0.00356 ND	-	0.0013	-	-	ND(0.01)	ND(0.0008)	-	-	-	ND(0.0008)	-	-	-	-	-	ND(0.0008)
Xylenes (total)	mg/L	10	10	-	-	-	ND(0.0012)	-	ND(0.0012)	-	ND(0.002)	-	-	-	-	-	-	-	-	-	-	-	-	-
Semivolatile Organic Compounds																								
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	-	-	-	-	-	-	ND(0.05)	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	0.075	0.075	-	-	-	-	-	-	-	-	-	ND(0.05)	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	0.025 ND	25 ND	-	-	-	ND(10)	-	-	-	-	-	-
Diethyl phthalate	mg/L	79	12.2	-	-	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	-	-	-	ND(0.01)	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	-	-	-	-	-	-	-	-	-	ND(0.01)	ND(0.01)	-	-	-	ND(0.01)	-	-	-	-	-	-
Ethyl methyl benzene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimethylbenzene	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons																								
Oil and grease	mg/L			ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	-	-	4.2	0.10	ND(0.5)	ND(0.5)	ND(0.5)	2.0	ND(0.5)	-	ND(0.5)	0.6	6.3	ND(0.5)
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	0.079 BJ	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-	-	-	-	0.028 J	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
Aluminum	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	0.006	0.006	-	ND(0.010)	ND(0.001)	-	ND(0.001)	-	ND(0.001)	-	-	0.10 ND	-	-	-	-	-	-	-	-	-	-	ND(0.010)
Arsenic	mg/L	0.01	0.01	-	0.002	0.002	-	ND(0.001)	-	ND(0.001)	-	-	ND(0.01)	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Barium	mg/L	2	2	0.46	0.616	0.616	-	-	-	0.497	-	-	-	-	-	-	-	-	0.20	0.047	0.39	0.61	0.03	0.461
Beryllium	mg/L	0.004	0.004	-	-	-	-	ND(0.001)	-	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-																				

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C
Sample Name:				Well 4B	MW-4B	Well 4B	Well 4B	Well 4B	Well 4B	Well 4B	WG-12559-103008-TK-002	MW-4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	MW-4C	
Sample Date:				12/30/1987	12/30/1988	12/30/1988	3/27/1989	6/27/1989	10/2/1989	1/5/1990	10/30/2008	6/20/1985	6/20/1985	8/15/1985	3/12/1986	3/20/1986	8/9/1986	12/18/1986	1/26/1987	2/27/1987	3/25/1987	12/30/1987	12/30/1988
Sample Type:		KDHE Tier 2 Risk-Based Criteria																					
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	NONE	LANGSTON	NONE	NONE	NONE	NONE	NONE	N/A	LANGSTON	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	LANGSTON
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	ND(0.001)	ND(0.001)	-	ND(0.001)	-	ND(0.001)	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	ND(0.001)
Nickel	mg/L	2.04	0.312	0.03	0.022	0.022	-	ND(0.01)	-	0.005	-	ND(0.01)	-	-	-	-	-	ND(0.01)	0.011	ND(0.01)	ND(0.01)	0.01	0.014
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	0.002	0.002	-	0.002	-	0.002	-	ND(0.01)	ND(0.001)	-	-	-	-	-	-	-	-	-	0.002
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	0.26	0.030	0.030	-	ND(0.02)	-	0.017	-	ND(0.1)	-	-	-	-	-	ND(0.02)	0.107	-	0.037	0.078	0.024
Zinc	mg/L	30.5	4.67	0.076	ND(0.010)	ND(0.01)	-	0.017	-	0.013	-	0.068	0.068	-	-	-	-	0.025	-	-	0.023	0.01	ND(0.010)
General Chemistry																							
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY REMEDIAL ALTERNATIVES EVALUATION FORMER FAIRFAX I SITE KANSAS CITY, KANSAS																					
Location Name:				MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-5A	MW-5A	MW-5B	MW-5C	MW-5C	MW-6A	MW-6A	MW-6A	MW-6A	MW-6B	MW-6B
Sample Name:				Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	GW-100398-JH-012	WG-12559-103008-TK-001	Well 5A	GW-100398-JM-021	Well 5B	Well 5C	GW-100398-JM-019	Well 6A	Well 6A	Well 6A	GW-100598-JH-034	Well 6B	Well 6B
Sample Date:				12/30/1988	3/27/1989	6/27/1989	10/2/1989	1/5/1990	10/3/1998	10/30/2008	12/18/1986	10/3/1998	12/18/1986	12/18/1986	10/3/1998	5/21/1986	12/18/1986	12/30/1987	10/5/1998	5/21/1986	12/18/1986
Sample Type:				KDHE Tier 2 Risk-Based Criteria																	
Area of Concern:				Non-Residential	Residential																
Property:				Groundwater Pathway	Groundwater Pathway	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Sampling Company:	Units			a	b	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				NONE	NONE	NONE	NONE	NONE			NONE		NONE	NONE		NONE	NONE	NONE		NONE	NONE
<u>Volatile Organic Compounds</u>																					
1,1,2,2-Tetrachloroethane	mg/L	0.00128	0.000694	ND(0.0006)	-	ND(0.0006)	-	ND(0.0006)	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
1,1-Dichloroethane	mg/L	0.0461	0.025	-	-	ND(0.0005)	-	ND(0.0005)	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
1,1-Dichloroethene	mg/L	0.007	0.007	ND(0.0006)	-	-	-	-	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	-	-	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
1,2-Dichloroethane	mg/L	0.005	0.005	-	-	ND(0.0006)	-	ND(0.0006)	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	0.01 ²⁰	ND(0.001)	-	-
1,2-Dichloroethene (total)	mg/L	NC	NC	ND(0.0005)	-	ND(0.0005)	-	0.00056	-	-	ND(0.0005)	-	ND(0.0005)	ND(0.0005)	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	-	-	-	-	-	ND(0.005)	-	-	ND(0.005)	-	-	ND(0.005)			-	ND(0.005)	-	-
Benzene	mg/L	0.005	0.005	0.00201	ND(0.0004)	0.00153	ND(0.0004)	0.001	ND(0.001)	ND(0.001)	ND(0.0004)	ND(0.001)	ND(0.0004)	ND(0.0004)	ND(0.001)	0.0084 ²⁰	ND(0.0004)	ND(0.0004)	ND(0.001)	ND(0.0004)	ND(0.0004)
Carbon disulfide	mg/L	1.66	0.716	-	-	-	-	-	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
Chlorobenzene	mg/L	0.1	0.1	-	-	-	-	-	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.0005)	-	ND(0.0005)	-	ND(0.0005)	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	-	-	-	-	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	0.002	-	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.001)	ND(0.001)	ND(0.0007)	ND(0.001)	ND(0.0007)	ND(0.0007)	ND(0.001)	-	ND(0.0007)	ND(0.0007)	ND(0.001)	-	ND(0.0007)
Methyl tert butyl ether (MTBE)	mg/L	0.262	0.133	-	-	-	-	-	-	ND(0.005)	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.005)	-	ND(0.0009)	-	0.0021	ND(0.002)	-	-	ND(0.002)	-	-	ND(0.002)	-	-	-	ND(0.002)	-	-
m-Xylene	mg/L	NC	NC	ND(0.0004)	-	ND(0.0004)	-	ND(0.0004)	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	mg/L	NC	NC	ND(0.0004)	-	ND(0.0004)	-	ND(0.0004)	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenolics (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p-Xylene	mg/L	NC	NC	ND(0.0004)	-	ND(0.0004)	-	ND(0.0004)	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/L	0.005	0.005	ND(0.0011)	-	ND(0.0011)	-	ND(0.0011)	ND(0.001)	-	ND(0.0011)	ND(0.001)	ND(0.0011)	ND(0.0011)	ND(0.001)	-	ND(0.0011)	ND(0.0011)	ND(0.001)	-	ND(0.0011)
Toluene	mg/L	1	1	0.000418	ND(0.0004)	0.000644	ND(0.0004)	ND(0.0004)	ND(0.001)	ND(0.001)	ND(0.0004)	ND(0.001)	ND(0.0004)	ND(0.0004)	ND(0.001)	-	ND(0.0004)	ND(0.0004)	ND(0.001)	-	ND(0.0004)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0005)	-	-	-	-	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.0005)	ND(0.001)	-	-
Trichloroethene	mg/L	0.005	0.005	ND(0.0006)	-	ND(0.0006)	-	ND(0.0006)	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
Vinyl chloride	mg/L	0.002	0.002	ND(0.0008)	-	ND(0.0008)	-	ND(0.0008)	ND(0.001)	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
Xylenes (total)	mg/L	10	10	-	ND(0.0012)	-	ND(0.0012)	-	ND(0.001)	ND(0.002)	-	ND(0.001)	-	-	ND(0.001)	-	-	-	ND(0.001)	-	-
<u>Semivolatile Organic Compounds</u>																					
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	0.075	0.075	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	mg/L	79	12.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyl methyl benzene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimethylbenzene	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>																					
Oil and grease	mg/L			ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	-	-	ND(0.5)	-	ND(0.5)	ND(0.5)	-	-	1.2	2.9	-	-	ND(0.5)
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	0.062 BJ	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-	-	-	ND(0.1)	-	-	-	-	-	-	-	-	-	-	-
<u>Metals</u>																					
Aluminum	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	0.006	0.006	ND(0.001)	-	ND(0.001)	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	ND(0.001)	-	ND(0.001)	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	0.461	-	ND(0.01)	-	0.438	-	-	0.22	-	0.41	0.42	-	-	0.21	0.60	-	-	0.69
Beryllium	mg/L	0.004	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	0.002	-	ND(0.001)	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	ND(0.01)	-	ND(0.01)	-	0.010	-	-	0.01	-	ND(0.01)	ND(0.01)	-	-	0.010	0.02	-	-	ND(0.01)
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	ND(0.01)	-	ND(0.01)	-	ND(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	0.030 ²⁰	-	0.013	-	ND(0.01)	-	-	ND(0.01)	-	ND(0.01)	ND(0.01)	-	-	ND(0.01)	0.042 ²⁰	-	-	ND(0.01)
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-4C	MW-5A	MW-5A	MW-5B	MW-5C	MW-5C	MW-6A	MW-6A	MW-6A	MW-6A	MW-6B	MW-6B
Sample Name:				Well 4C	Well 4C	Well 4C	Well 4C	Well 4C	GW-100398-JH-012	WG-12559-103008-TK-001	Well 5A	GW-100398-JM-021	Well 5B	Well 5C	GW-100398-JM-019	Well 6A	Well 6A	Well 6A	GW-100398-JH-034	Well 6B	Well 6B	
Sample Date:				12/30/1988	3/27/1989	6/27/1989	10/2/1989	1/5/1990	10/3/1998	10/30/2008	12/18/1986	10/3/1998	12/18/1986	12/18/1986	10/3/1998	5/21/1986	12/18/1986	12/30/1987	10/5/1998	5/21/1986	12/18/1986	
Sample Type:		KDHE Tier 2 Risk-Based Criteria																				
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Sampling Company:	Units	a	b	NONE	NONE	NONE	NONE	NONE			NONE		NONE	NONE		NONE	NONE	NONE		NONE	NONE	
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mercury	mg/L	0.002	0.002	ND(0.001)	-	ND(0.001)	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel	mg/L	2.04	0.312	0.014	-	ND(0.01)	-	0.013	-	-	ND(0.01)	-	ND(0.01)	ND(0.01)	-	-	ND(0.01)	0.02	-	-	ND(0.01)	
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver	mg/L	0.508	0.0779	0.002	-	ND(0.001)	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium	mg/L	NC	NC	0.024	-	0.014	-	0.024	-	-	ND(0.02)	-	ND(0.02)	ND(0.02)	-	-	0.041	0.35	-	-	0.033	
Zinc	mg/L	30.5	4.67	ND(0.01)	-	ND(0.01)	-	0.039	-	-	0.022	-	0.022	0.025	-	-	0.032	0.057	-	-	0.021	
General Chemistry																						
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-6B	MW-6B	MW-6C	MW-6C	MW-6C	MW-100B	MW-100B	MW-119A	MW-119A	MW-119A	MW-119A	MW-119A	MW-119A	MW-119B	
Sample Name:				Well 6B	Well 6B	Well 6C	Well 6C	GW-100598-JH-032	Well 100B	Well 100B	GW-011806-JH-011	GW-011806-JH-010	GW-062706-JH-015	GW-091307-NT-030	GW-120607-JH-026	GW-031108-JH-013	GW-062608-JH-036	GW-011806-JH-009
Sample Date:				7/20/1989	9/19/1989	5/21/1986	12/18/1986	10/5/1998	7/21/1989	9/19/1989	1/18/2006	1/18/2006	6/27/2006	9/13/2007	12/6/2007	3/11/2008	6/26/2008	1/18/2006
Sample Type:		KDHE Tier 2 Risk-Based Criteria																
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site
Sampling Company:	Units	a	b	NONE	NONE	NONE	NONE	NONE	NONE	NONE	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA
Volatile Organic Compounds																		
1,1,2,2-Tetrachloroethane	mg/L	0.00128	0.000694	ND(0.0006)	-	-	-	ND(0.001)	ND(0.0006)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1-Dichloroethane	mg/L	0.0461	0.025	ND(0.0005)	-	-	-	ND(0.001)	ND(0.0005)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1-Dichloroethene	mg/L	0.007	0.007	-	-	-	-	ND(0.001)	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/L	0.005	0.005	ND(0.0006)	-	-	-	ND(0.001)	ND(0.0006)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,2-Dichloroethene (total)	mg/L	NC	NC	0.068	-	-	-	-	ND(0.0005)	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	-	-	-	-	ND(0.005)	-	-	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Benzene	mg/L	0.005	0.005	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.001)	ND(0.0004)	ND(0.0004)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.01)	-	-	-	ND(0.001)	ND(0.01)	-	0.00035 J	0.0003 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chlorobenzene	mg/L	0.1	0.1	-	-	-	-	ND(0.001)	-	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.0005)	-	-	-	ND(0.001)	ND(0.0005)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	-	-	-	0.001	-	-	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Ethylbenzene	mg/L	0.7	0.7	ND(0.0007)	ND(0.0007)	-	ND(0.0007)	ND(0.001)	ND(0.0007)	ND(0.0007)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)
Methyl tert butyl ether (MTBE)	mg/L	0.262	0.133	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.005)	-	-	-	ND(0.002)	ND(0.005)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
m-Xylene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	ND(0.01)	-	-	-	-	ND(0.01)	-	-	-	-	-	-	-	-	-
o-Xylene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenolics (total)	mg/L	NC	NC	ND(0.001)	-	-	-	-	ND(0.001)	-	-	-	-	-	-	-	-	-
p-Xylene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/L	0.005	0.005	ND(0.0011)	-	-	ND(0.0011)	ND(0.001)	ND(0.0011)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)
Toluene	mg/L	1	1	ND(0.0004)	ND(0.0004)	-	ND(0.0004)	ND(0.001)	ND(0.0004)	ND(0.0004)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	-	-	-	-	ND(0.001)	-	-	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Trichloroethene	mg/L	0.005	0.005	ND(0.0006)	-	-	-	ND(0.001)	ND(0.0006)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Vinyl chloride	mg/L	0.002	0.002	ND(0.0008)	-	-	-	ND(0.001)	ND(0.0008)	-	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Xylenes (total)	mg/L	10	10	ND(0.0012)	ND(0.0012)	-	-	ND(0.001)	ND(0.0012)	ND(0.0012)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	ND(0.001)
Semivolatile Organic Compounds																		
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	0.075	0.075	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	ND(10)	-	-	-	-	ND(10)	-	0.0022 J	ND(0.01)	-	-	-	-	-	-
Diethyl phthalate	mg/L	79	12.2	ND(0.01)	-	-	-	-	ND(0.01)	-	ND(0.01)	ND(0.01)	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	ND(0.01)	-	-	-	-	ND(0.01)	-	ND(0.01)	ND(0.01)	-	-	-	-	-	-
Ethyl methyl benzene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimethylbenzene	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons																		
Oil and grease	mg/L			ND(0.5)	ND(0.5)	-	ND(0.5)	-	ND(0.5)	ND(0.5)	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-	-	-	-	-	-	-	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	-
Metals																		
Aluminum	mg/L			-	-	-	-	-	-	-	0.126 J	0.149 J	-	-	-	-	-	-
Antimony	mg/L	0.006	0.006	ND(0.001)	-	-	-	-	ND(0.001)	-	ND(0.06)	ND(0.06)	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	0.007	-	-	-	-	ND(0.001)	-	0.0085 J	0.0096 J	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	0.58	-	-	-	0.631	0.66	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	ND(0.001)	-	-	-	-	ND(0.001)	-	ND(0.005)	ND(0.005)	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	0.003	-	-	-	-	0.002	-	ND(0.005)	ND(0.005)	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	198	205	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	204	194	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	0.017	-	-	0.011	-	0.013	-	0.0144	0.0149	-	-	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	ND(0.05)	ND(0.05)	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	0.010	-	-	-	-	ND(0.01)	-	ND(0.025)	0.0024 J	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	24.1	24.8	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	0.015	-	-	ND(0.01)	-	0.012	-	ND(0.005)	ND(0.005)	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	50.1	52	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-6B	MW-6B	MW-6C	MW-6C	MW-6C	MW-100B	MW-100B	MW-119A	MW-119A	MW-119A	MW-119A	MW-119A	MW-119A	MW-119A	MW-119B	
Sample Name:				Well 6B	Well 6B	Well 6C	Well 6C	GW-100598-JH-032	Well 100B	Well 100B	GW-011806-JH-011	GW-011806-JH-010	GW-062706-JH-015	GW-091307-NT-030	GW-120607-JH-026	GW-031108-JH-013	GW-062608-JH-036	GW-011806-JH-009	
Sample Date:				7/20/1989	9/19/1989	5/21/1986	12/18/1986	10/5/1998	7/21/1989	9/19/1989	1/18/2006	1/18/2006	6/27/2006	9/13/2007	12/6/2007	3/11/2008	6/26/2008	1/18/2006	
Sample Type:		KDHE Tier 2 Risk-Based Criteria										Duplicate							
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	
Sampling Company:	Units	a	b	NONE	NONE	NONE	NONE		NONE	NONE	CRA	CRA	CRA	CRA	CRA			CRA	
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	51.6	49	-	-	-	-	-	-	
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	4.07 ^{ab}	4.28 ^{ab}	-	-	-	-	-	-	
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	4.33 ^{ab}	4.11 ^{ab}	-	-	-	-	-	-	
Mercury	mg/L	0.002	0.002	ND(0.001)	-	-	-	-	ND(0.001)	-	ND(0.0002)	ND(0.0002)	-	-	-	-	-	-	
Nickel	mg/L	2.04	0.312	ND(0.01)	-	-	ND(0.01)	-	ND(0.01)	-	0.0095 J	0.0092 J	-	-	-	-	-	-	
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	8.59	8.96	-	-	-	-	-	-	
Silver	mg/L	0.508	0.0779	0.003	-	-	-	-	0.003	-	ND(0.01)	ND(0.01)	-	-	-	-	-	-	
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	44.1	45.7	-	-	-	-	-	-	
Thallium	mg/L	NC	NC	0.021	-	-	0.039	-	0.017	-	ND(0.01)	ND(0.01)	-	-	-	-	-	-	
Zinc	mg/L	30.5	4.67	0.014	-	-	0.067	-	0.016	-	ND(0.02)	ND(0.02)	-	-	-	-	-	-	
General Chemistry																			
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	10	30	-	-	-	-	-	-	
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	ND(0.3)	0.4	-	-	-	-	-	-	
Cyanide (total)	mg/L	0.2	0.2	ND(0.001)	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	0.21	0.16	-	-	-	-	-	-	
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	ND(0.1)	ND(0.1)	-	-	-	-	-	-	
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	170	140	-	-	-	-	-	-	
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	5	5	-	-	-	-	-	-	

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-119B	MW-119B	MW-119B	MW-119B	MW-119B	MW-120C	MW-120C	MW-120C	MW-120C	MW-120C	MW-120C	MW-120C	MW-120C	MW-120C	MW-120C
Sample Name:				GW-062706-JH-016	GW-091307-NT-031	GW-120607-JH-025	GW-031108-JH-014	GW-062608-JH-035	Well 12C/120C	Well 12C/120C	Well 12C/120C	Well 12C/120C	Well 12C/120C	Well 12C/120C	Well 12C/120C	Well 12C/120C	Well 12C/120C	GW-100498-JH-022
Sample Date:				6/27/2006	9/13/2007	12/6/2007	3/11/2008	6/26/2008	6/30/1987	10/29/1987	3/21/1989	6/21/1989	6/27/1989	9/16/1989	9/18/1989	12/19/1989	12/27/1989	10/4/1998
Sample Type:		KDHE Tier 2 Risk-Based Criteria																
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	On-Site	On-Site	On-Site	On-Site	On-Site	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	CRA	CRA	CRA			NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																		
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY REMEDIAL ALTERNATIVES EVALUATION FORMER FAIRFAX I SITE KANSAS CITY, KANSAS																		
Location Name:				MW-121A	MW-121A	MW-121A	MW-121A	MW-121A	MW-121B	MW-121B	MW-121B	MW-121B	MW-121B	MW-121B	MW-130A	MW-130A	MW-130A	MW-130A
Sample Name:				GW-011806-JH-013	GW-062606-JH-002	GW-091407-NT-035	GW-120407-JH-008	GW-031208-JH-027	GW-011806-JH-012	GW-062606-JH-001	GW-091407-NT-036	GW-120407-JH-009	GW-031208-JH-028	GW-062608-JH-038	Well 130A	Well 130A	Well 130A	Well 130A
Sample Date:				1/18/2006	6/26/2006	9/14/2007	12/4/2007	3/12/2008	1/18/2006	6/26/2006	9/14/2007	12/4/2007	3/12/2008	6/26/2008	6/30/1987	12/27/1987	3/21/1989	6/21/1989
Sample Type:	KDHE Tier 2 Risk-Based Criteria																	
Area of Concern:	Non-Residential	Residential		Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:	Groundwater Pathway	Groundwater Pathway		On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	NONE	NONE	NONE	NONE
<u>Volatile Organic Compounds</u>																		
1,1,2,2-Tetrachloroethane	mg/L	0.00128	0.000694	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-
1,1-Dichloroethane	mg/L	0.0461	0.025	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-
1,1-Dichloroethene	mg/L	0.007	0.007	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-
1,2-Dichloroethene (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	-	-	-	-
Benzene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	1.012 ²⁰	-	ND(0.0004)	6.33 ¹⁰
Carbon disulfide	mg/L	1.66	0.716	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.0015	ND(0.001)	-	-	-
Chlorobenzene	mg/L	0.1	0.1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-
cis-1,2-Dichloroethene	mg/L	0.07	0.07	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)UJ	-	-	-	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	0.225	-	ND(0.0007)	3.22 ²⁰
Methyl tert butyl ether (MTBE)	mg/L	0.262	0.133	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	-	-	-	-
m-Xylene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/L	0.00211	0.00111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenolics (total)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p-Xylene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	-	-	-	-
Toluene	mg/L	1	1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	1.588 ²⁰	-	0.005	8.37 ¹⁰
trans-1,2-Dichloroethene	mg/L	0.1	0.1	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	-	-	-	-
Trichloroethene	mg/L	0.005	0.005	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-
Vinyl chloride	mg/L	0.002	0.002	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	-	-	-	-
Xylenes (total)	mg/L	10	10	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)UJ	0.393	4.6	ND(0.0012)	98.8 ¹⁰
<u>Semivolatile Organic Compounds</u>																		
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	0.075	0.075	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	mg/L	79	12.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	mg/L	8.4	1.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyl methyl benzene	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indane	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimethylbenzene	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Total Petroleum Hydrocarbons</u>																		
Oil and grease	mg/L			-	-	-	-	-	-	-	-	-	-	-	ND(0.5)	1.2	ND(0.5)	ND(0.5)
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	ND(0.1)	ND(0.1)	ND(0.1)	-	-	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	-	-	-	-
<u>Metals</u>																		
Aluminum	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.004	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	0.0306	0.00468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.015	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-121A	MW-121A	MW-121A	MW-121A	MW-121A	MW-121B	MW-121B	MW-121B	MW-121B	MW-121B	MW-121B	MW-130A	MW-130A	MW-130A	MW-130A
Sample Name:				GW-011806-JH-013	GW-062606-JH-002	GW-091407-NT-035	GW-120407-JH-008	GW-031208-JH-027	GW-011806-JH-012	GW-062606-JH-001	GW-091407-NT-036	GW-120407-JH-009	GW-031208-JH-028	GW-062608-JH-038	Well 130A	Well 130A	Well 130A	Well 130A
Sample Date:				1/18/2006	6/26/2006	9/14/2007	12/4/2007	3/12/2008	1/18/2006	6/26/2006	9/14/2007	12/4/2007	3/12/2008	6/26/2008	6/30/1987	12/27/1987	3/21/1989	6/21/1989
Sample Type:		KDHE Tier 2 Risk-Based Criteria																
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	On-Site	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	CRA	NONE	NONE	NONE	NONE
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																		
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-130A	MW-130A	MW-130A	MW-130A	MW-130C	MW-130C	MW-130C	MW-130C	MW-130C	MW-130C	MW-130C	MW-150A	MW-160A	MW-160A	MW-160A	MW-160A	MW-160A	MW-160A
Sample Name:				Well 130A	Well 130A	GW-100398-JH-010	GW-100398-JH-008	Well 130C	Well 130C	Well 130C	Well 130C	Well 130C	Well 130C	Well 130C	GW-100398-JH-006	GW-100398-JM-035	Well 16C/160A	Well 16C/160A	Well 16C/160A	Well 16C/160A	Well 16C/160A
Sample Date:				9/18/1989	12/27/1989	10/3/1998	10/3/1998	6/30/1987	3/21/1989	6/21/1989	9/18/1989	12/27/1989	10/3/1998	10/4/1998	6/29/1987	10/29/1987	6/23/1988	9/16/1988	12/13/1988	6/19/1989	
Sample Type:		KDHE Tier 2 Risk-Based Criteria																			
Area of Concern:		Non-Residential	Residential																		
Property:		Groundwater Pathway	Groundwater Pathway	Fairfax II	Fairfax II	Duplicate	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Sampling Company:	Units	a	b	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				NONE	NONE			NONE	NONE	NONE	NONE	NONE			NONE	NONE	NONE	NONE	NONE	NONE	NONE
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	2.04	0.312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	30.5	4.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>General Chemistry</u>																					
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-160A	MW-160A	MW-160A	MW-160A	MW-160A	MW-160A	MW-160A	MW-160A	MW-200A	MW-200A	MW-200A	MW-200A	MW-200B	MW-200B	MW-200C	MW-200C	MW-200C
Sample Name:				Well 16C/160A	GW-100398-JM-015	GW-122104-DS-007	GW-091407-NT-037	GW-120407-JH-010	GW-031008-JH-003	GW-062608-JH-037	Well 200A	Well 200A	Well 200A	Well 200A	GW-100398-JH-020	Well 200B	Well 200B	Well 200C	Well 200C	GW-100398-JH-018
Sample Date:				9/12/1989	10/3/1998	12/21/2004	9/14/2007	12/4/2007	3/10/2008	6/26/2008	7/24/1989	10/3/1989	1/8/1990	10/3/1998	7/24/1989	10/3/1989	7/24/1989	10/3/1989	10/3/1989	10/3/1998
Sample Type:		KDHE Tier 2 Risk-Based Criteria																		
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	NONE			CRA	CRA			NONE	NONE	NONE		NONE	NONE	NONE	NONE		
Magnesium (dissolved)	mg/L	NC	NC	-	-	30.7 J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	2.4 J ¹⁰	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	2.3 ¹⁰	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	-	-	ND(0.00020)	-	-	-	-	ND(0.001)	-	-	-	-	ND(0.001)	-	ND(0.001)	-	-
Nickel	mg/L	2.04	0.312	-	-	ND(0.040)	-	-	-	-	0.02	-	-	-	-	ND(0.01)	-	ND(0.01)	-	-
Potassium	mg/L	NC	NC	-	-	7.5 J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	-	-	ND(0.010)	-	-	-	-	0.004	-	-	-	-	0.003	-	0.003	-	-
Sodium	mg/L	NC	NC	-	-	6.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	-	-	ND(0.010)	-	-	-	-	0.021	-	-	-	-	0.021	-	0.018	-	-
Zinc	mg/L	30.5	4.67	-	-	ND(0.020)	-	-	-	-	0.022	-	-	-	-	0.015	-	0.011	-	-
General Chemistry																				
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	ND(0)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	-	-	-	-	-	-	-	ND(0.001)	-	-	-	-	ND(0.001)	-	ND(0.001)	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	ND(0.10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	0.009 J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	ND(100)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	0.8 J	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-210A	MW-210A	MW-210A	MW-220A	MW-220A		MW-220A	MW-230A	MW-230A	MW-230A	MW-230A	MW-230B	MW-230B	MW-230C	MW-230C		MW-230C
Sample Name:				Well 210A	Well 210A	Well 210A	Well 220A	Well 220A		GW-100498-JH-026	Well 230A	Well 230A	Well 230A	GW-100398-JH-004	Well 230B	Well 230B	Well 230C	Well 230C		GW-100398-JH-002
Sample Date:				7/25/1989	10/4/1989	1/4/1990	7/26/1989	10/4/1989		10/4/1998	7/26/1989	10/4/1989	10/4/1989	10/3/1998	7/26/1989	10/4/1989	7/26/1989	10/4/1989		10/3/1998
Sample Type:		KDHE Tier 2 Risk-Based Criteria																		
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II		Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II		Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A
Sampling Company:	Units	a	b	NONE	NONE	NONE	NONE	NONE		NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE		NONE
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Manganese	mg/L	0.05	0.05	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Mercury	mg/L	0.002	0.002	ND(0.001)	-	-	ND(0.001)	-		-	ND(0.001)	-	-	-	ND(0.001)	-	ND(0.001)	-		-
Nickel	mg/L	2.04	0.312	0.019	-	-	ND(0.01)	-		-	0.018	-	-	-	ND(0.01)	-	0.014	-		-
Potassium	mg/L	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Silver	mg/L	0.508	0.0779	0.005	-	-	0.004	-		-	0.006	-	-	-	0.003	-	0.003	-		-
Sodium	mg/L	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Thallium	mg/L	NC	NC	0.029	-	-	0.024	-		-	0.03	-	-	-	0.01	-	0.014	-		-
Zinc	mg/L	30.5	4.67	0.036	-	-	0.014	-		-	0.037	-	-	-	0.012	-	0.017	-		-
General Chemistry																				
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Ammonia	mg/L	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Cyanide (total)	mg/L	0.2	0.2	0.003	-	-	ND(0.001)	-		-	ND(0.001)	-	-	-	0.08	-	ND(0.001)	-		-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Sulfates	mg/L	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Total heterotrophic bacteria	cfu/mL	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-

Location Name:				MW-240A	MW-240A	MW-240A	MW-240A	MW-240A	MW-240B	MW-240B	MW-240B	MW-240C	MW-240C	MW-240C	MW-240C	
Sample Name:				Well 240A	Well 240A	Well 240A	GW-100498-JH-030	WG-12559-103008-TK-005	Well 240B	Well 240B	Well 240B	Well 240C	Well 240C	Well 240C	WG-100498-JH-028	WG-12559-103008-TK-004
Sample Date:				7/27/1989	10/5/1989	1/9/1990	10/4/1998	10/30/2008	7/27/1989	10/5/1989	1/9/1990	7/27/1989	10/5/1989	1/9/1990	10/4/1998	10/30/2008
Sample Type:	KDHE Tier 2 Risk-Based Criteria															
Area of Concern:	Non-Residential		Residential		Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:	Groundwater Pathway		Groundwater Pathway		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	NONE	NONE	NONE			NONE	NONE	NONE	NONE	NONE	NONE		

1,1,2,2-Tetrachloroethane	mg/L	0.00128	0.000694	ND(0.0006)	-	ND(0.0006)	ND(0.001)	-	ND(0.0006)	-	ND(0.0006)	ND(0.0006)	-	ND(0.0006)	ND(0.001)	-
1,1-Dichloroethane	mg/L	0.0461	0.025	ND(0.0005)	-	ND(0.0005)	ND(0.001)	-	ND(0.0005)	-	ND(0.0005)	ND(0.0005)	-	ND(0.0005)	ND(0.001)	-
1,1-Dichloroethene	mg/L	0.007	0.007	-	-	ND(0.0006)	ND(0.001)	-	-	-	ND(0.0006)	-	-	ND(0.0006)	ND(0.001)	-
1,2-Dichlorobenzene	mg/L	0.6	0.6	-	-	-	0.001	-	-	-	-	-	-	-	ND(0.001)	-
1,2-Dichloroethane	mg/L	0.005	0.005	ND(0.0006)	-	ND(0.0006)	ND(0.001)	-	ND(0.0006)	-	ND(0.0006)	ND(0.0006)	-	ND(0.0006)	ND(0.001)	-
1,2-Dichloroethene (total)	mg/L	NC	NC	0.017	-	0.013	-	-	ND(0.0005)	-	ND(0.0005)	ND(0.0005)	-	ND(0.0005)	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	4.17	1.02	-	-	-	ND(0.005)	-	-	-	-	-	-	-	ND(0.005)	-
Benzene	mg/L	0.005	0.005	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.001)	ND(0.001)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.001)	ND(0.001)
Carbon disulfide	mg/L	1.66	0.716	ND(0.01)	-	-	ND(0.001)	-	ND(0.01)	-	-	ND(0.01)	-	-	ND(0.001)	-
Chlorobenzene	mg/L	0.1	0.1	-	-	0.0067	ND(0.001)	-	-	-	ND(0.0004)	-	-	ND(0.0004)	ND(0.001)	-
Chloroform (Trichloromethane)	mg/L	0.08	0.08	ND(0.0005)	-	ND(0.0005)	ND(0.001)	-	ND(0.0005)	-	ND(0.0005)	ND(0.0005)	-	0.00084	ND(0.001)	-
cis-1,2-Dichloroethene	mg/L	0.07	0.07	-	-	-	ND(0.001)	-	-	-	-	-	-	-	ND(0.001)	-
Ethylbenzene	mg/L	0.7	0.7	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.001)	ND(0.001)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.0007)	ND(0.001)	ND(0.001)
Methyl tert butyl ether (MTBE)	mg/L	0.262	0.133	-	-	-	-	ND(0.005)	-	-	-	-	-	-	-	0.00029 J
Methylene chloride	mg/L	0.005	0.005	ND(0.005)	-	ND(0.005)	ND(0.002)	-	ND(0.005)	-	ND(0.005)	ND(0.005)	-	ND(0.005)	ND(0.002)	-
m-Xylene	mg/L	NC	NC	-	-	ND(0.0004)	-	-	-	-	ND(0.0004)	-	-	ND(0.0004)	-	-
Naphthalene	mg/L	0.00211	0.00111	ND(0.01)	-	-	-	-	ND(0.01)	-	-	ND(0.01)	-	-	-	-
o-Xylene	mg/L	NC	NC	-	-	ND(0.0004)	-	-	-	-	ND(0.0004)	-	-	ND(0.0004)	-	-
Phenolics (total)	mg/L	NC	NC	ND(0.001)	-	-	-	-	ND(0.001)	-	-	ND(0.001)	-	-	-	-
p-Xylene	mg/L	NC	NC	-	-	ND(0.0004)	-	-	-	-	ND(0.0004)	-	-	ND(0.0004)	-	-
Tetrachloroethene	mg/L	0.005	0.005	ND(0.0011)	-	ND(0.0011)	ND(0.001)	-	ND(0.0011)	-	ND(0.0011)	ND(0.0011)	-	ND(0.0011)	ND(0.001)	-
Toluene	mg/L	1	1	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.001)	ND(0.001)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	ND(0.0004)	0.0004	ND(0.001)	ND(0.001)
trans-1,2-Dichloroethene	mg/L	0.1	0.1	-	-	-	ND(0.001)	-	-	-	-	-	-	-	ND(0.001)	-
Trichloroethene	mg/L	0.005	0.005	ND(0.0006)	-	0.00068	ND(0.001)	-	ND(0.0006)	-	ND(0.0006)	ND(0.0006)	-	ND(0.0006)	ND(0.001)	-
Vinyl chloride	mg/L	0.002	0.002	ND(0.0008)	-	ND(0.0008)	ND(0.001)	-	ND(0.0008)	-	0.0013	ND(0.0008)	-	ND(0.0008)	ND(0.001)	-
Xylenes (total)	mg/L	10	10	ND(0.0012)	ND(0.0012)	-	ND(0.001)	ND(0.002)	ND(0.0012)	ND(0.0012)	-	ND(0.0012)	ND(0.0012)	-	ND(0.001)	ND(0.002)

[illegible]

Oil and grease	mg/L			ND(0.5)	0.6	0.6	-	-	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.6	ND(0.5)	-	-
Total Petroleum Hydrocarbons (C10-C20) DRO	mg/L	0.72	0.5	-	-	-	-	0.13 B	-	-	-	-	-	-	-	0.057 B
Total Petroleum Hydrocarbons (C3)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C5) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6) Unsaturated	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C6-C10) GRO	mg/L	0.5	0.5	-	-	-	-	ND(0.1)	-	-	-	-	-	-	-	0.051 B

[illegible]

FAIRFAX II - GROUNDWATER ANALYTICAL DATA SUMMARY
REMEDIAL ALTERNATIVES EVALUATION
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS

Location Name:				MW-240A	MW-240A	MW-240A	MW-240A	MW-240A	MW-240B	MW-240B	MW-240B	MW-240C	MW-240C	MW-240C	MW-240C	MW-240C
Sample Name:				Well 240A	Well 240A	Well 240A	GW-100498-JH-030	WG-12559-103008-TK-005	Well 240B	Well 240B	Well 240B	Well 240C	Well 240C	Well 240C	GW-100498-JH-028	WG-12559-103008-TK-004
Sample Date:				7/27/1989	10/3/1989	1/9/1990	10/4/1998	10/30/2008	7/27/1989	10/5/1989	1/9/1990	7/27/1989	10/5/1989	1/9/1990	10/4/1998	10/30/2008
Sample Type:		KDHE Tier 2 Risk-Based Criteria														
Area of Concern:		Non-Residential	Residential	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II	Fairfax II
Property:		Groundwater Pathway	Groundwater Pathway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Company:	Units	a	b	NONE	NONE	NONE			NONE	NONE	NONE	NONE	NONE	NONE		
Magnesium (dissolved)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (dissolved)	mg/L	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.002	0.002	ND(0.001)	-	ND(0.001)	-	-	ND(0.001)	-	ND(0.001)	ND(0.001)	-	ND(0.001)	-	-
Nickel	mg/L	2.04	0.312	0.01	-	ND(0.01)	-	-	ND(0.01)	-	0.019	ND(0.01)	-	0.023	-	-
Potassium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.508	0.0779	0.004	-	0.003	-	-	0.003	-	ND(0.001)	0.002	-	ND(0.001)	-	-
Sodium	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	NC	NC	0.016	-	0.036	-	-	0.017	-	0.011	0.02	-	0.018	-	-
Zinc	mg/L	30.5	4.67	0.011	-	0.114	-	-	0.012	-	0.020	ND(0.01)	-	0.026	-	-
General Chemistry																
Aerobic BTEX specific microbial population	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	mg/L	0.2	0.2	ND(0.001)	-	-	-	-	0.011	-	-	0.005	-	-	-	-
Nitrate (as N)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total heterotropic bacteria	cfu/mL	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon (TOC)	mg/L	NC	NC	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
ND () - Not present at or above the associated value
J - Estimated concentration
UJ - Estimated reporting limit
NC - No Criteria
-- : Not Analyzed
GRO - gasoline range
Boxed values exceed criteria.
mg/L - milligrams per liter
cfu/mL - colony forming units per milliliters
Risk Based Standards for Kansas, RSK Manual- 5th Version, Kansas Department of Health and Environment, October 2010, Appendix A

APPENDIX B

COST ESTIMATE TABLES

TABLE B-1

**S-8 AREA SOIL - ALTERNATIVE 2
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ENGINEERING CONTROLS (CONCRETE CAP)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$5,000	\$5,000
Concrete Cap Installation	1	LS	\$10,000	\$10,000
Implementation of ICs	1	LS	\$10,000	\$10,000
			(Subtotal)	\$25,000
		Construction management	10%	\$2,500
		Administrative/Legal	5%	\$1,250
		Contingency	10%	\$2,500
		Total Capital Costs		\$31,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$5,000	\$5,000
			(Subtotal)	\$5,000
		Net Present Worth of Close-out Costs		\$5,000

Alternative 2 Total Cost	\$36,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-2

**S-8 AREA SOIL ALTERNATIVE 3
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
SOIL VAPOR EXTRACTION (SVE)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$5,000	\$5,000
Vacuum wells	1	each	\$1,000	\$1,000
Gas probes	4	each	\$500	\$2,000
Vacuum equipment	1	LS	\$10,000	\$10,000
Vapor phase carbon units (1,000 pounds each)	1	each	\$5,000	\$5,000
Transportation and Disposal	10	TONS	\$150	\$1,500
Implementation of ICs	1	LS	\$10,000	\$10,000
			Subtotal	\$35,000
		<i>Mobilization/ Demobilization/Well Abandonment</i>	10%	\$3,500
		<i>Design</i>	10%	\$3,500
		<i>Construction management</i>	10%	\$3,500
		<i>Administrative/Legal</i>	5%	\$1,750
		<i>Contingency</i>	10%	\$3,500
		Total Capital Costs		\$51,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Operator (provided by subcontractor)	12	month	\$2,400	\$28,800
CRA technician	120	hour	\$85	\$10,200
CRA travel expenses	1	LS	\$5,000	\$5,000
Utilities	1	LS	\$5,000	\$5,000
Carbon exchange	2	each	\$3,000	\$6,000
Operation and Maintenance	1	LS	\$2,000	\$2,000
Project Management	1	LS	\$10,000	\$10,000
Gas probes	4	each	\$100	\$400
Carbon system	12	each	\$100	\$1,200
Exhaust	12	each	\$100	\$1,200
Annual reporting and IC Implementation	1	annual	\$15,000	\$15,000
		Annual Cost (Subtotal)		\$85,000
		10% <i>Contingency</i>		\$8,500
		<i>Annual Cost + Contingency</i>		\$93,500
		<i>Years of monitoring</i>		2.00
		Operation, Maintenance and Monitoring Costs		\$187,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$15,000	\$15,000
Equipment Removal	1	LS	\$5,200	\$5,200
Site Restoration	1	LS	\$5,000	\$5,000
		(Subtotal)		\$25,200
		Close-out Costs		\$25,200
		Alternative 3 Total Cost		\$263,000

Notes:
All dollar amounts in Subtotals and Totals to nearest thousand dollars
All values are in 2012 Dollars
Net present worth discount rate is 5.0%
LS - lump sum
ICs - Institutional Controls

TABLE B-3

**S-8 AREA SOIL - ALTERNATIVE 4
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
EXCAVATION**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$5,000	\$5,000
Excavation and Disposal	350	TONS	\$85	\$30,000
Dewatering	1	LS	\$10,000	\$10,000
Confirmatory Sampling	10	Per Sample	\$400	\$4,000
Backfill	350	TONS	\$40	\$14,000
Area Restoration	1	LS	\$10,000	\$10,000
Monitoring Well Reinstallation	1	LS	\$5,000	\$5,000
(Subtotal)				\$78,000
<i>Mobilization/ Demobilization/ Well Abandonment</i> 10%				\$7,800
<i>Construction management</i> 10%				\$7,800
<i>Administrative/Legal</i> 5%				\$3,900
<i>Contingency</i> 10%				\$7,800
Total Capital Costs				\$105,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
Net Present Worth of Close-out Costs				\$25,000

Alternative 4 Total Cost	\$130,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

sq ft - square feet

TABLE B-4

**S-8 AREA GROUNDWATER - ALTERNATIVE 2
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
MONITORED NATURAL ATTENUATION (MNA)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$20,000	\$20,000
Implementation of ICs	1	LS	\$10,000	\$10,000
Subtotal				\$30,000
Mobilization/ Demobilization/ Well Abandonment 10%				\$3,000
Design 10%				\$3,000
Administrative/Legal 5%				\$1,500
Contingency 10%				\$3,000
Total Capital Costs				\$41,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly GW Monitoring (4 wells)	1	LS	\$12,000	\$12,000
Annual reporting and IC Implementation	1	annual	\$5,000	\$5,000
Annual Cost (Subtotal)				\$17,000
10% Contingency				\$1,700
Annual Cost + Contingency				\$18,700
10-Year Present Worth Factor at 5.0% discount factor				7.72
Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs				\$144,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
10-Year Present Worth Factor at 5.0% discount factor				0.61
Net Present Worth of Close-out Costs				\$15,000

Alternative 2 Total Cost	\$200,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-5
S-8 AREA GROUNDWATER - ALTERNATIVE 3
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
IN-SITU ENHANCED BIOREMEDIATION (4 YEAR TREATMENT)

<u>Capital Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$20,000	\$20,000
Fixed Injection Wells (wells installed to 27 ft bgs, screened from 17-27 ft bgs)	36	Well	\$1650	\$59,400
Oversight for Well Install	40	Hrs	\$100	\$4,000
Bench Scale Test	1	LS	\$7,000	\$7,000
Pilot Study	1	LS	\$25,000	\$25,000
Implementation of ICs	1	LS	\$10,000	\$10,000
EOS (Emulsified Soy Lactate)	41348	lbs	\$3.12	\$129,006
Nutrients (ammonium sulfate, sodium dihydrogen phosphate)	642	lbs	\$1.75	\$1,124
Reagent Injection Labor	342	hrs	\$50	\$17,115
Nutrient Injection Labor	687	hrs	\$50	\$34,335
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$5000	\$5,000
			Subtotal	\$312,000
		Mobilization/ Demobilization/ Well Abandonment	10%	\$31,200
		Design	10%	\$31,200
		Construction management	10%	\$31,200
		Administrative/Legal	5%	\$15,600
		Contingency	10%	\$31,200
		Total Capital Costs		\$452,000
<u>Operation, Maintenance, and Monitoring Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (using existing monitoring wells within the S-8 area; 4 wells)	1	LS	\$12,000	\$12,000
Annual reporting and ICs Implementation	1	LS	\$5,000	\$5,000
			Annual Cost (Subtotal)	\$17,000
			10% Contingency	\$1,700
			Annual Cost + Contingency	\$18,700
			10-Year Present Worth Factor at 5.0% discount factor	7.72
		Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs		\$144,000
<u>Closeout Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
			(Subtotal)	\$25,000
			10-Year Present Worth Factor at 5.0% discount factor	0.61
		Net Present Worth of Close-out Costs		\$15,000
		Alternative 3 Total Cost		\$611,000

Notes:
All dollar amounts in Subtotals and Totals to nearest thousand dollars
All values are in 2012 Dollars
Net present worth discount rate is 5.0%
LS - lump sum
ICs - Institutional Controls
ft bgs- feet below ground surface

TABLE B-6

**S-8 AREA GROUNDWATER - ALTERNATIVE 4
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
IN-SITU CHEMICAL OXIDATION**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$20,000	\$20,000
Direct Push Points (36 points @ 27' bgs)	2916	LF	\$40	\$116,640
Bench Scale Test	1	LS	\$7,000	\$7,000
Pilot Study	1	LS	\$25,000	\$25,000
Implementation of ICs	1	LS	\$10,000	\$10,000
Sodium Persulfate Oxidant (FMC Kloxur Persulfate)	86895	lbs	\$1.50	\$130,342
Sodium Hydroxide Activator	28792	lbs	\$0.38	\$10,941
Reagent Injection Labor	517	hour	\$50	\$25,830
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$5000	\$5,000
Subtotal				\$351,000
<i>Mobilization/ Demobilization/ Well Abandonment 10%</i>				\$35,100
<i>Design 10%</i>				\$35,100
<i>Construction management 10%</i>				\$35,100
<i>Administrative/Legal 5%</i>				\$17,550
<i>Contingency 10%</i>				\$35,100
Total Capital Costs				\$509,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (using existing MWs within the S-8 area; 4 wells)	1	LS	\$12,000	\$12,000
Annual reporting and IC Implementation	1	LS	\$5,000	\$5,000
Annual Cost (Subtotal)				\$17,000
<i>10% Contingency</i>				\$1,700
<i>Annual Cost + Contingency</i>				\$18,700
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				7.72
Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs				\$144,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				0.61
Net Present Worth of Close-out Costs				\$15,000

Alternative 4 Total Cost	\$668,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

LF - linear feet

lbs - pound

TABLE B-7

**SB-110 AREA SOIL - ALTERNATIVE 2
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ENGINEERING CONTROLS (CONCRETE CAP)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Concrete Cap Installation	1	LS	\$20,000	\$20,000
Implementation of ICs	1	LS	\$10,000	\$10,000
			(Subtotal)	\$30,000
		Construction management	10%	\$3,000
		Administrative/Legal	5%	\$1,500
		Contingency	10%	\$3,000
		Total Capital Costs		\$38,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$5,000	\$5,000
			(Subtotal)	\$5,000
		10-Year Present Worth Factor at 5.0% discount factor		
		Net Present Worth of Close-out Costs		
				\$5,000

Alternative 2 Total Cost	\$43,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-8

**SB-110 AREA SOIL ALTERNATIVE 3
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
SOIL VAPOR EXTRACTION (SVE)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Site Preparation	1	LS	\$5,000	\$5,000
Vacuum wells	5	each	\$1,000	\$5,000
Gas probes	10	each	\$500	\$5,000
Vacuum equipment	1	LS	\$10,000	\$10,000
Vapor phase carbon units (1,000 pounds each)	2	each	\$5,000	\$10,000
Transportation and Disposal	20	TONS	\$150	\$3,000
Implementation of ICs	1	LS	\$10,000	\$10,000
			Subtotal	\$48,000
		<i>Mobilization/ Demobilization/ Well Abandonment</i>	10%	\$4,800
		<i>Design</i>	10%	\$4,800
		<i>Construction management</i>	10%	\$4,800
		<i>Administrative/Legal</i>	5%	\$2,400
		<i>Contingency</i>	10%	\$4,800
		Total Capital Costs		\$70,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Operator (provided by subcontractor)	12	month	\$2,400	\$28,800
CRA technician	120	hour	\$85	\$10,200
CRA travel expenses	1	LS	\$5,000	\$5,000
Utilities	1	LS	\$5,000	\$5,000
Carbon exchange	8	each	\$3,000	\$24,000
Operation and Maintenance	1	LS	\$2,000	\$2,000
Project Management	1	LS	\$10,000	\$10,000
Gas probes	10	each	\$100	\$1,000
Carbon system	12	each	\$100	\$1,200
Exhaust	12	each	\$100	\$1,200
Annual reporting and ICs Implementation	1	annual	\$15,000	\$15,000
		Annual Cost (Subtotal)		\$103,000
		<i>10% Contingency</i>		\$10,300
		Annual Cost + Contingency		\$113,300
		Years of monitoring		2.00
		Maintenance and Monitoring Costs		\$227,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$15,000	\$15,000
Equipment Removal	1	LS	\$5,200	\$5,200
Site Restoration	1	LS	\$5,000	\$5,000
		(Subtotal)		\$25,200
		Net Present Worth of Close-out Costs		\$25,200

Alternative 3 Total Cost	\$322,000
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Assumptions:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

Notes:

LS - lump sum

ICs - Institutional Controls

TABLE B-9

**SB-110 AREA SOIL - ALTERNATIVE 4
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
EXCAVATION**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Site Prep for Equipment Laydown	1	LS	\$5,000	\$5,000
Excavation and disposal	2,300	TONS	\$85	\$196,000
Dewatering	1	LS	\$20,000	\$20,000
Confirmatory Sampling	15	Per Sample	\$400	\$6,000
Backfill	2,300	TONS	\$40	\$92,000
Area Restoration	1	LS	\$15,000	\$15,000
			(Subtotal)	\$334,000
		Construction management 10%		\$33,400
		Administrative/Legal 5%		\$16,700
		Contingency 10%		\$33,400
			Total Capital Costs	\$418,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
			(Subtotal)	\$25,000
			Net Present Worth of Close-out Costs	\$25,000

Alternative 4 Total Cost	\$443,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

sq ft - square feet

TABLE B-10

**SB-110 AREA GROUNDWATER - ALTERNATIVE 2
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
MONITORED NATURAL ATTENUATION (MNA)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$20,000	\$20,000
Implementation of ICs	1	LS	\$10,000	\$10,000
			<i>Subtotal</i>	\$30,000
		Mobilization/ Demobilization/ Well Abandonment	10%	\$3,000
		Design	10%	\$3,000
		Administrative/Legal	5%	\$1,500
		Contingency	10%	\$3,000
		<i>Total Capital Costs</i>		\$41,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly GW Monitoring (4 wells)	1	LS	\$12,000	\$12,000
Annual reporting and IC Implementation	1	annual	\$5,000	\$5,000
		<i>Annual Cost (Subtotal)</i>		\$17,000
		10% Contingency		\$1,700
		<i>Annual Cost + Contingency</i>		\$18,700
		10-Year Present Worth Factor at 5.0% discount factor		7.72
		<i>Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs</i>		\$144,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
		<i>(Subtotal)</i>		\$25,000
		10-Year Present Worth Factor at 5.0% discount factor		0.61
		<i>Net Present Worth of Close-out Costs</i>		\$15,000
		<i>Alternative 2 Total Cost</i>		\$200,000

Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-11
SB-110 AREA GROUNDWATER - ALTERNATIVE 3
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
IN-SITU ENHANCED BIOREMEDIATION (4 YEAR TREATMENT)

<u>Capital Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$20,000	\$20,000
Fixed Injection Wells (35 wells installed to 27' bgs, screened from 17'-27' bgs)	35	Well	\$1,650	\$57,750
Oversight for Well Install	40	hour	\$100	\$4,000
Bench Scale Test	1	LS	\$7,000	\$7,000
Pilot Study	1	LS	\$25,000	\$25,000
Implementation of ICs	1	LS	\$10,000	\$10,000
EOS (Emulsified Soy Lactate)	41020	lbs	\$3.12	\$127,982
Nutrients (ammonium sulfate, sodium dihydrogen phosphate)	637	lbs	\$1.75	\$1,115
Reagent Injection Labor	335	hour	\$50	\$16,750
Nutrient Injection Labor	675	hour	\$50	\$33,750
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$3000	\$3,000
Subtotal				\$306,000
Mobilization/Demobilization/Well Abandonment 10%				\$30,600
Design 10%				\$30,600
Construction management 10%				\$30,600
Administrative/Legal 5%				\$15,300
Contingency 10%				\$30,600
Total capital Costs				\$444,000
<u>Operation, Maintenance, and Monitoring Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (using existing monitoring wells within the SB-110 area; 4 wells)	1	Hrs	\$12,000	\$12,000
Annual reporting and IC Implementation	1	LS	\$5,000	\$5,000
Annual Cost (Subtotal)				\$17,000
10% Contingency				\$1,700
Annual Cost + Contingency				\$18,700
10-Year Present Worth Factor at 5.0% discount factor				7.72
Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs				\$144,000
<u>Closeout Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
10-Year Present Worth Factor at 5.0% discount factor				0.61
Net Present Worth of Close-out Costs				\$15,000
Alternative 3 Total Cost				\$603,000

Notes:
All dollar amounts in Subtotals and Totals to nearest thousand dollars
All values are in 2012 Dollars
Net present worth discount rate is 5.0%
LS - lump sum
ICs - Institutional Controls

TABLE B-12

SB-110 AREA GROUNDWATER - ALTERNATIVE 4
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
IN-SITU CHEMICAL OXIDATION

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$20,000	\$20,000
Site Prep for Equipment Laydown	1	LS	\$10,000	\$10,000
Direct Push Points (35 points @ 27 ft bgs)	2835	LF	\$40	\$113,400
Bench Scale Test	1	LS	\$7,000	\$7,000
Pilot Study	1	LS	\$25,000	\$25,000
Implementation of ICs	1	LS	\$10,000	\$10,000
Sodium Persulfate Oxidant (FMC Kloxur Persulfate)	86205	lbs	\$1.50	\$129,308
Sodium Hydroxide Activator	28980	lbs	\$0.38	\$11,012
Reagent Injection Labor	505	hour	\$50	\$25,250
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$3000	\$3,000
			Subtotal	\$354,000
		Mobilization/ Demobilization/Well Abandonment	10%	\$35,400
		Design	10%	\$35,400
		Construction management	10%	\$35,400
		Administrative/Legal	5%	\$17,700
		Contingency	10%	\$35,400
		Total Capital Costs		\$513,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (using existing monitoring wells within the SB-110 area; 4 wells)	1	LS	\$12,000	\$12,000
Annual reporting and IC Implementation	1	LS	\$5,000	\$5,000
			Annual Cost (Subtotal)	\$17,000
			10% Contingency	\$1,700
			Annual Cost + Contingency	\$18,700
			10-Year Present Worth Factor at 5.0% discount factor	7.72
		Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs		\$144,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
			(Subtotal)	\$25,000
			10-Year Present Worth Factor at 5.0% discount factor	0.61
		Net Present Worth of Close-out Costs		\$15,000
		Alternative 4 Total Cost		\$672,000

Notes:
All dollar amounts in Subtotals and Totals to nearest thousand dollars
All values are in 2012 Dollars
Net present worth discount rate is 5.0%
LS - lump sum
ICs - Institutional Controls
ft bgs - feet below ground surface
lbs - pound

TABLE B-13

**TMW-127 AREA SHALLOW GROUNDWATER ALTERNATIVE 2
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
MONITORED NATURAL ATTENUATION (MNA)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$50,000	\$50,000
Implementation of ICs	1	LS	\$10,000	\$10,000
<i>Subtotal</i>				\$60,000
<i>Mobilization/ Demobilization/ Well Abandonment</i> 10%				\$6,000
<i>Design</i> 10%				\$6,000
<i>Administrative/Legal</i> 5%				\$3,000
<i>Contingency</i> 10%				\$6,000
<i>Total capital Costs</i>				\$81,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly GW Monitoring (20 wells)	1	LS	\$60,000	\$60,000
Annual reporting and ICs Implementation	1	Annual	\$5,000	\$5,000
<i>Annual Cost (Subtotal)</i>				\$65,000
<i>10% Contingency</i>				\$6,500
<i>Annual Cost + Contingency</i>				\$71,500
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				7.72
<i>Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs</i>				\$552,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
<i>(Subtotal)</i>				\$25,000
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				0.61
<i>Net Present Worth of Close-out Costs</i>				\$15,000

<i>Alternative 2 Total Cost</i>	\$648,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-14
TMW-127 AREA SHALLOW GROUNDWATER - ALTERNATIVE 3
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
IN-SITU ENHANCED BIOREMEDIATION (4 YEAR TREATMENT)

Capital Costs				
Cost Item	Quantity	Unit	Cost/Unit	Item Cost
Delineation	1	LS		\$50,000
Fixed Injection Wells (screened from 17 ft-32 ft	115	Well		\$2,000
Oversight for Well Install	160	hour		\$100
Bench Scale Test	1	LS		\$7,000
Pilot Study	1	LS		\$25,000
Implementation of ICs	1	LS		\$10,000
EOS (Emulsified Soy Lactate)	197096	lbs		\$3.12
Nutrients (ammonium sulfate, sodium dihydrogen phosphate)	3059	lbs		\$1.75
Reagent Injection Labor	389	hour		\$75
Nutrient Injection Labor	389	hour		\$75
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS		\$25,000
				Subtotal
				\$1,042,000
				Mobilization/ Demobilization/Well Abandonment 10%
				\$104,200
				Design 10%
				\$104,200
				Construction management 10%
				\$104,200
				Administrative/Legal 5%
				\$52,100
				Contingency 10%
				\$104,200
				Total Capital Costs
				\$1,511,000
Operation, Maintenance, and Monitoring Costs				
Cost Item	Quantity	Unit	Cost/Unit	Item Cost
Quarterly Monitoring (using existing monitoring wells within the TMW-127 area; 20 wells)	1	LS		\$60,000
Annual reporting and IC Implementation	1	LS		\$5,000
				Annual Cost (Subtotal)
				\$65,000
				10% Contingency
				\$6,500
				Annual Cost + Contingency
				\$71,500
				10-Year Present Worth Factor at 5.0% discount factor
				7.72
				Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs
				\$552,000
Closeout Costs				
Cost Item	Quantity	Unit	Cost/Unit	Item Cost
Closeout Report	1	LS		\$25,000
				(Subtotal)
				\$25,000
				10-Year Present Worth Factor at 5.0% discount factor
				0.61
				Net Present Worth of Close-out Costs
				\$15,000
Alternative 3 Total Cost				\$2,078,000

Notes:
All dollar amounts in Subtotals and Totals to nearest thousand dollars
All values are in 2012 Dollars
Net present worth discount rate is 5.0%
LS - lump sum
ICs - Institutional Controls
ft - feet
lbs - pound

TABLE B-15

**TMW-127 AREA SHALLOW GROUNDWATER - ALTERNATIVE 4
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
IN-SITU CHEMICAL OXIDATION**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$50,000	\$50,000
Direct Push Points (115 points @ 32 ft bgs)	11040	LF	\$40	\$441,600
Bench Scale Test	1	LS	\$7,000	\$7,000
Pilot Study	1	LS	\$25,000	\$25,000
Implementation of ICs	1	LS	\$50,000	\$50,000
Sodium Persulfate Oxidant (FMC Kloxur Persulfate)	425558	lbs	\$1.50	\$638,336
Sodium Hydroxide Activator	143175	lbs	\$0.38	\$54,407
Reagent Injection Labor	2880	hour	\$50	\$144,000
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$25000	\$25,000
<i>Subtotal</i>				<i>\$1,435,000</i>
<i>Mobilization/Demobilization/Well Abandonment 10%</i>				<i>\$143,500</i>
<i>Design 10%</i>				<i>\$143,500</i>
<i>Construction management 10%</i>				<i>\$143,500</i>
<i>Administrative/Legal 5%</i>				<i>\$71,750</i>
<i>Contingency 10%</i>				<i>\$143,500</i>
<i>Total capital Costs</i>				<i>\$2,081,000</i>

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (using existing monitoring wells within the TMW-127 area; 20 wells)	1	LS	\$60,000	\$60,000
Annual reporting and IC Implementation	1	LS	\$5,000	\$5,000
<i>Annual Cost (Subtotal)</i>				<i>\$65,000</i>
<i>10% Contingency</i>				<i>\$6,500</i>
<i>Annual Cost + Contingency</i>				<i>\$71,500</i>
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				<i>7.72</i>
<i>Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs</i>				<i>\$552,000</i>

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
<i>(Subtotal)</i>				<i>\$25,000</i>
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				<i>0.61</i>
<i>Net Present Worth of Close-out Costs</i>				<i>\$15,000</i>

<i>Alternative 4 Total Cost</i>	<i>\$2,648,000</i>
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

ft bgs - feet below ground surface

lbs - pound

TABLE B-16

**TMW-127 AREA INTERMEDIATE GROUNDWATER ALTERNATIVE 2
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
MONITORED NATURAL ATTENUATION (MNA)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$50,000	\$50,000
Implementation of ICs	1	LS	\$10,000	\$10,000
Subtotal				\$60,000
Mobilization/ Demobilization/ Well Abandonment	10%			\$6,000
Design	10%			\$6,000
Administrative/Legal	5%			\$3,000
Contingency	10%			\$6,000
Total capital Costs				\$81,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly GW Monitoring (20 wells)	1	LS	\$60,000	\$60,000
Annual reporting and ICs Implementation	1	Annual	\$5,000	\$5,000
Annual Cost (Subtotal)				\$65,000
10% Contingency				\$6,500
Annual Cost + Contingency				\$71,500
10-Year Present Worth Factor at 5.0% discount factor				7.72
Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs				\$552,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
10-Year Present Worth Factor at 5.0% discount factor				0.61
Net Present Worth of Close-out Costs				\$15,000

Alternative 2 Total Cost	\$648,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-17

TMW-127 AREA INTERMEDIATE GROUNDWATER - ALTERNATIVE 3
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
IN-SITU ENHANCED BIOREMEDIATION (4 YEAR TREATMENT)

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$50,000	\$50,000
Fixed Injection Wells (screened from 34 ft-59 ft)	115	Well	\$2200	\$253,000
Oversight for Well Install	160	hour	\$100	\$16,000
Bench Scale Test	1	LS	\$7,000	\$7,000
Pilot Study	1	LS	\$25,000	\$25,000
Implementation of ICs	1	LS	\$10,000	\$10,000
EOS (Emulsified Soy Lactate)	197096	lbs	\$3.12	\$614,939
Nutrients (ammonium sulfate, sodium dihydrogen phosphate)	3059	lbs	\$1.75	\$5,353
Reagent Injection Labor	389	hour	\$75	\$29,160
Nutrient Injection Labor	389	hour	\$75	\$29,160
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$25000	\$25,000
			<i>Subtotal</i>	\$1,065,000
		Mobilization/ Demobilization/ Well Abandonment 10%		\$106,500
		Design 10%		\$106,500
		Construction management 10%		\$106,500
		Administrative/Legal 5%		\$53,250
		Contingency 10%		\$106,500
		<i>Total Capital Costs</i>		\$1,544,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (using existing monitoring wells within the TMW-127 area; 20 wells)	1	LS	\$60,000	\$60,000
Annual reporting and IC Implementation	1	LS	\$5,000	\$5,000
			<i>Annual Cost (Subtotal)</i>	\$65,000
			10% Contingency	\$6,500
			Annual Cost + Contingency	\$71,500
			10-Year Present Worth Factor at 5.0% discount factor	7.72
			<i>Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs</i>	\$552,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
			<i>(Subtotal)</i>	\$25,000
			10-Year Present Worth Factor at 5.0% discount factor	0.61
			<i>Net Present Worth of Close-out Costs</i>	\$15,000
			<i>Alternative 3 Total Cost</i>	\$2,111,000

Notes:
All dollar amounts in Subtotals and Totals to nearest thousand dollars
All values are in 2012 Dollars
Net present worth discount rate is 5.0%
LS - lump sum
ICs - Institutional Controls
ft - feet
lbs - pound

TABLE B-18

TMW-127 AREA INTERMEDIATE GROUNDWATER - ALTERNATIVE 4
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
IN-SITU CHEMICAL OXIDATION

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$50,000	\$50,000
Direct Push Points (115 points @ 59 ft bgs)	20355	LF	\$40	\$814,200
Bench Scale Test	1	LS	\$7,000	\$7,000
Pilot Study	1	LS	\$25,000	\$25,000
Implementation of ICs	1	LS	\$50,000	\$50,000
Sodium Persulfate Oxidant (FMC Kloxur Persulfate)	425558	lbs	\$1.50	\$638,336
Sodium Hydroxide Activator	143175	lbs	\$0.38	\$54,407
Reagent Injection Labor	2880	hour	\$50	\$144,000
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$25000	\$25,000
<i>Subtotal</i>				\$1,808,000
<i>Mobilization/ Demobilization/ Well Abandonment 10%</i>				\$180,800
<i>Design 10%</i>				\$180,800
<i>Construction management 10%</i>				\$180,800
<i>Administrative/Legal 5%</i>				\$90,400
<i>Contingency 10%</i>				\$180,800
<i>Total capital Costs</i>				\$2,622,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (using existing monitoring wells within the TMW-127 area; 20 wells)	1	LS	\$60,000	\$60,000
Annual reporting and IC Implementation	1	LS	\$5,000	\$5,000
<i>Annual Cost (Subtotal)</i>				\$65,000
<i>10% Contingency</i>				\$6,500
<i>Annual Cost + Contingency</i>				\$71,500
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				7.72
<i>Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs</i>				\$552,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
<i>(Subtotal)</i>				\$25,000
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				0.61
<i>Net Present Worth of Close-out Costs</i>				\$15,000

Alternative 4 Total Cost	\$3,189,000
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Notes:
All dollar amounts in Subtotals and Totals to nearest thousand dollars
All values are in 2012 Dollars
Net present worth discount rate is 5.0%
LS - lump sum
ICs - Institutional Controls

TABLE B-19

**TMW-127 AREA INTERMEDIATE GROUNDWATER ALTERNATIVE 5
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
PUMP AND TREAT**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$50,000	\$50,000
Site Preparation	1	LS	\$5,000	\$5,000
Air permitting	1	LS	\$10,000	\$10,000
New GW Extraction Wells (2 intermediate)	150	LF	\$200	\$30,000
Submersible Pumps	2	LS	\$5,000	\$10,000
Well Electrical Connections	2	LS	\$7,500	\$15,000
Pump Test	1	LS	\$25,000	\$25,000
Groundwater Treatment System and enclosure	1	LS	\$500,000	\$500,000
Discharge Permit	1	LS	\$15,000	\$15,000
Equipment Installation	1	LS	\$50,000	\$50,000
Site Electrical	1	LS	\$50,000	\$50,000
Implementation of ICs	1	LS	\$10,000	\$10,000
Transportation and Disposal	40	TONS	\$150	\$6,000
Subtotal				\$776,000
<i>Mobilization/ Demobilization/ Well Abandonment 10%</i>				<i>\$77,600</i>
<i>Design 10%</i>				<i>\$77,600</i>
<i>Construction management 10%</i>				<i>\$77,600</i>
<i>Administrative/Legal 5%</i>				<i>\$38,800</i>
<i>Contingency 10%</i>				<i>\$77,600</i>
Total Capital Costs				\$1,125,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Semi-annual GW Monitoring	2	each	\$10,000	\$20,000
GW Treatment System Operation	1.0	LS	\$75,000	\$75,000
Inspection of Operations	52	weeks	\$700	\$36,400
Electrical, well and pump O&M	1	LS	\$10,000	\$100
Annual reporting and ICs Implementation	1	annual	\$15,000	\$15,000
Annual Cost (Subtotal)				\$147,000
<i>10% Contingency</i>				<i>\$14,700</i>
<i>Annual Cost + Contingency</i>				<i>\$161,700</i>
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				<i>7.72</i>
Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs				\$1,248,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
Equipment Removal	1	LS	\$5,200	\$5,200
Site Restoration	1	LS	\$50,000	\$50,000
(Subtotal)				\$80,000
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				<i>0.61</i>
Net Present Worth of Close-out Costs				\$49,000
Alternative 4 Total Cost				\$2,422,000

Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-20

**MW-103A AREA SOIL - ALTERNATIVE 2
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ENGINEERING CONTROLS (CONCRETE CAP & MONITORING)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Implementation of ICs	1	LS	\$10,000	\$10,000
Site Prep for Equipment Laydown	1	LS	\$5,000	\$5,000
Concrete Cap (maintain three wells)	1	LS	\$40,000	\$40,000
			(Subtotal)	\$55,000
		Mobilization/ Demobilization/ Well Abandonment	10%	\$5,500
		Construction management	10%	\$5,500
		Administrative/Legal	5%	\$2,750
		Contingency	10%	\$5,500
		Total Capital Costs		\$74,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (four wells)	1	LS	\$12,000	\$12,000
Annual reporting and ICs Implementation	1	LS	\$5,000	\$5,000
			Annual Cost (Subtotal)	\$17,000
		10% Contingency		\$1,700
		Annual Cost + Contingency		\$18,700
		10-Year Present Worth Factor at 5.0% discount factor		7.72
		Net Present Worth of 10 Years of Monitoring Costs		\$144,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
			(Subtotal)	\$25,000
		10-Year Present Worth Factor at 5.0% discount factor		0.61
		Net Present Worth of Close-out Costs		\$15,000

Alternative 2 Total Cost	\$233,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-21

**MW-103A AREA SOIL - ALTERNATIVE 3
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ENGINEERING CONTROLS (CONCRETE CAP & LNAPL RECOVERY)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Implementation of ICs	1	LS	\$10,000	\$10,000
Site Prep for Equipment Laydown	1	LS	\$5,000	\$5,000
Concrete Cap (maintain MW-103A)	1	LS	\$40,000	\$40,000
Skimmer System (equipment and installation)	2	LS	\$20,000	\$40,000
(Subtotal)				\$95,000
Mobilization/ Demobilization/ Well Abandonment 10%				\$9,500
Construction management 10%				\$9,500
Administrative/Legal 5%				\$4,750
Contingency 10%				\$9,500
Total Capital Costs				\$128,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Semi-Annual O&M	2	each	\$2,500	\$5,000
Waste Removal (LNAPL)	2	each	\$1,000	\$2,000
Quarterly Monitoring (four wells)	1	LS	\$12,000	\$12,000
Annual reporting and IC Implementation	1	LS	\$5,000	\$5,000
Annual Cost (Subtotal)				\$24,000
10% Contingency				\$2,400
Annual Cost + Contingency				\$26,400
10-Year Present Worth Factor at 5.0% discount factor				7.72
Net Present Worth of 10 Years of Operation, Maintenance, and Monitoring Costs				\$204,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
10-Year Present Worth Factor at 5.0% discount factor				0.61
Net Present Worth of Close-out Costs				\$15,000

Alternative 3 Total Cost	\$347,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-22

**MWA-103A AREA SOIL - ALTERNATIVE 4
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ENGINEERING CONTROLS (CONCRETE CAP & LNAPL STABILIZATION)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Implementation of ICs	1	LS	\$10,000	\$10,000
Site Prep for Equipment Laydown	1	LS	\$5,000	\$5,000
Concrete Cap	1	LS	\$40,000	\$40,000
Pilot studies	1	LS	\$25,000	\$25,000
Direct Push Points (25 points @ 32 ft bgs)	800	LF	\$40	\$32,000
Reagent material (ISGS)	40000	lbs	\$1.00	\$40,000
Reagent Injection Labor	200	hour	\$50	\$10,000
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$25000	\$25,000
(Subtotal)				\$187,000
<i>Mobilization/ Demobilization/ Well Abandonment 10%</i>				<i>\$18,700</i>
<i>Construction management 10%</i>				<i>\$18,700</i>
<i>Administrative/Legal 5%</i>				<i>\$9,350</i>
<i>Contingency 10%</i>				<i>\$18,700</i>
Total capital Costs				\$252,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (four wells)	1	LS	\$12,000	\$12,000
Annual reporting and IC Implementation	1	LS	\$5,000	\$5,000
Annual Cost (Subtotal)				\$17,000
<i>10% Contingency</i>				<i>\$1,700</i>
<i>Annual Cost + Contingency</i>				<i>\$18,700</i>
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				<i>7.72</i>
Net Present Worth of 10 Years of Operation, Maintenance, and Monitoring Costs				\$144,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				<i>0.61</i>
Net Present Worth of Close-out Costs				\$15,000

Alternative 4 Total Cost	\$411,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

ft bgs - feet below ground surface

lbs - pound

TABLE B-23

**MW-103A AREA SOIL - ALTERNATIVE 5
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
EXCAVATION**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Site Prep for Equipment Laydown	1	LS	\$5,000	\$5,000
Excavation and Disposal	5,600	TONS	\$25	\$140,000
Dewatering	1	LS	\$50,000	\$50,000
Material handling	5,600	TONS	\$25	\$140,000
Disposal	2,800	TONS	\$60	\$168,000
Confirmatory Sampling	20	Per Sample	\$400	\$8,000
Backfill	2,800	TONS	\$40	\$112,000
Area Restoration	1	LS	\$20,000	\$20,000
Monitoring Well Re-installation	1	LS	\$5,000	\$5,000
(Subtotal)				\$648,000
Mobilization/ Demobilization/ Well Abandonment 10%				\$64,800
Construction management 10%				\$64,800
Administrative/Legal 5%				\$32,400
Contingency 10%				\$64,800
Total capital Costs				\$875,000

Operation, Maintenance, and Monitoring Costs [2-Years Semi-Annual Monitoring Costs (one well)]

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (one well)	32	Hrs	\$75	\$2,400
Annual reporting and IC	1	LS	\$5,000	\$5,000
Annual Cost (Subtotal)				\$7,400
10% Contingency				\$740
Annual Cost + Contingency				\$8,140
10-Year Present Worth Factor at 5.0% discount factor				7.72
Net Present Worth of 10 Years of Monitoring Costs				\$63,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
10-Year Present Worth Factor at 5.0% discount factor				0.61
Net Present Worth of Close-out Costs				\$15,000

Alternative 5 Total Cost	\$953,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-24

**MW103A AREA SOIL ALTERNATIVE 6
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ELECTRICAL RESISTANCE HEATING**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$18,000	\$18,000
Electrical Resistance Heating Treatment based on 4,000 sq ft; 15 to 30 ft deep treatment zone	2222	CY	\$200	\$445,000
Area Restoration	1	LS	\$75,000	\$75,000
Monitoring Well Re-installation	5	LS	\$5,000	\$25,000
			Subtotal	\$563,000
		<i>Mobilization/ Demobilization/ Well Abandonment</i>	10%	\$56,300
		<i>Design</i>	10%	\$56,300
		<i>Construction management</i>	10%	\$56,300
		<i>Administrative/Legal</i>	5%	\$28,150
		<i>Contingency</i>	10%	\$56,300
		Total Capital Costs		\$816,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly monitoring (five well)	1	LS	\$16,000	\$16,000
Annual reporting	1	annual	\$5,000	\$5,000
			Annual Cost (Subtotal)	\$21,000
		<i>10% Contingency</i>		\$2,100
		Annual Cost + Contingency		\$23,100
		10-Year Present Worth Factor at 5.0% discount factor		7.72
		Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs		\$178,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
			Net Present Worth of Close-out Costs	\$25,000

Alternative 6 Total Cost	\$1,019,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

CY - cubic yard

sq ft - square feet

TABLE B-25

**TMW-130 AREA SOIL - ALTERNATIVE 2
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ENGINEERING CONTROLS (CONCRETE CAP & MONITORING FOR SOIL OPTION #1)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Site Prep for Equipment Laydown	1	LS	\$5,000	\$5,000
Concrete Cap (maintain five wells)	1	LS	\$200,000	\$200,000
Implementation of ICs	1	LS	\$50,000	\$50,000
			(Subtotal)	\$255,000
Mobilization/ Demobilization/ Well Abandonment	10%			\$25,500
Construction management	10%			\$25,500
Administrative/Legal	5%			\$12,750
Contingency	10%			\$25,500
			Total capital Costs	\$344,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (five well)	1	LS	\$16,000	\$16,000
Annual reporting and ICs Implementation	1	LS	\$5,000	\$5,000
			Subtotal	\$21,000
	10%	Contingency		\$2,100
2-Years Semi-Annual GW Sampling Cost + Contingency				\$23,100
10-Year Present Worth Factor at 5.0% discount factor				7.72
			Net Present Worth of 10 Years of Monitoring Costs	\$178,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
			(Subtotal)	\$25,000
10-Year Present Worth Factor at 5.0% discount factor				0.61
			Net Present Worth of Close-out Costs	\$15,000

Alternative 2 Total Cost	\$537,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-26

**TMW-130 AREA SOIL - ALTERNATIVE 3
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ENGINEERING CONTROLS (CONCRETE CAP & LNAPL RECOVERY FOR OPTION #1)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Site Prep for Equipment Laydown	1	LS	\$20,000	\$20,000
Concrete Cap (maintain five wells)	1	LS	\$200,000	\$200,000
Skimmer System (equipment and installation)	1	LS	\$75,000	\$75,000
Implementation of ICs	1	LS	\$50,000	\$50,000
			(Subtotal)	\$345,000
		Mobilization/ Demobilization/ Well Abandonment	10%	\$34,500
		Construction management	10%	\$34,500
		Administrative/Legal	5%	\$17,250
Contingency (25%)		Contingency	10%	\$34,500
		Total capital Costs		\$466,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Semi-Annual O&M	2	each	\$5,000	\$10,000
Waste Removal (LNAPL)	2	each	\$3,000	\$6,000
Quarterly Monitoring (five well)	1	LS	\$16,000	\$16,000
Annual reporting and ICs Implementation	1	LS	\$5,000	\$5,000
			Annual Cost (Subtotal)	\$37,000
			10% Contingency	\$3,700
			Annual Cost + Contingency	\$40,700
		10-Year Present Worth Factor at 5.0% discount factor		7.72
		Net Present Worth of 10 Years of Operation, Maintenance, and Monitoring Costs		\$314,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
			(Subtotal)	\$25,000
		10-Year Present Worth Factor at 5.0% discount factor		0.61
		Net Present Worth of Close-out Costs		\$15,000

Alternative 3 Total Cost	\$795,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-27

**TMW-130 AREA SOIL - ALTERNATIVE 4
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ENGINEERING CONTROLS (CONCRETE CAP & LNAPL STABILIZATION FOR OPTION #1)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Implementation of ICs	1	LS	\$50,000	\$50,000
Site Prep for Equipment Laydown	1	LS	\$20,000	\$20,000
Concrete Cap (maintain five wells)	1	LS	\$200,000	\$200,000
Pilot studies	1	LS	\$25,000	\$25,000
Direct Push Points (137 points @ 32 ft bgs)	4384	LF	\$40	\$175,360
Reagent material (ISGS)	250000	lbs	\$1.00	\$250,000
Reagent Injection Labor	1096	hrs	\$50	\$54,800
Injection Equipment (poly tanks, hoses, pumps, mixers, etc)	1	LS	\$25000	\$25,000
(Subtotal)				\$800,000
<i>Mobilization/ Demobilization/ Well Abandonment</i> 10%				\$80,000
<i>Construction management</i> 10%				\$80,000
<i>Administrative/Legal</i> 5%				\$40,000
<i>Contingency</i> 10%				\$80,000
Total capital Costs				\$1,080,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (five well)	1	LS	\$16,000	\$16,000
Annual reporting and ICs Implementation	1	LS	\$5,000	\$5,000
Annual Cost (Subtotal)				\$21,000
10% Contingency				\$2,100
<i>Annual Cost + Contingency</i>				<i>\$23,100</i>
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				<i>7.72</i>
Net Present Worth of 10 Years of Operation, Maintenance, and Monitoring Costs				\$178,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
(Subtotal)				\$25,000
<i>10-Year Present Worth Factor at 5.0% discount factor</i>				<i>0.61</i>
Net Present Worth of Close-out Costs				\$15,000

Alternative 4 Total Cost	\$1,273,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

ft bgs - feet below ground surface

TABLE B-28

TMW-130 AREA SOIL - ALTERNATIVE 5
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
EXCAVATION OPTION #1

<u>Capital Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Site Prep for Equipment Laydown	1	LS	\$5,000	\$5,000
Excavation and Disposal	42,000	TONS	\$25	\$1,050,000
Dewatering	1	LS	\$100,000	\$100,000
Material handling	42,000	TONS	\$25	\$1,050,000
Disposal	12,600	TONS	\$60	\$756,000
Confirmatory Sampling	100	Per Sample	\$400	\$40,000
Backfill	12,600	TONS	\$40	\$504,000
Area Restoration	1	LS	\$75,000	\$75,000
Monitoring Well Re-installation	5	LS	\$5,000	\$25,000
			(Subtotal)	\$3,605,000
		Mobilization/ Demobilization/ Well Abandonment	10%	\$360,500
		Construction management	10%	\$360,500
		Administrative/Legal	5%	\$180,250
		Contingency	10%	\$360,500
		Total capital Costs		\$4,867,000
<u>Operation, Maintenance, and Monitoring Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (five well)	1	LS	\$16,000	\$16,000
Annual reporting and ICs Implementation	1	LS	\$5,000	\$5,000
		2-Years Semi-Annual GW Sampling Annual Cost (Subtotal)		\$21,000
		10% Contingency		\$4,200
		2-Years Semi-Annual GW Sampling Cost + Contingency		\$25,200
		10-Year Present Worth Factor at 5.0% discount factor		7.72
		Net Present Worth of 10 Years of Monitoring Costs		\$195,000
<u>Closeout Costs</u>				
<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
		Net Present Worth of Close-out Costs		\$25,000
		Alternative 5 Total Cost		\$5,087,000

Notes:
All dollar amounts in Subtotals and Totals to nearest thousand dollars
All values are in 2012 Dollars
Net present worth discount rate is 5.0%
LS - lump sum
ICs - Institutional Controls

TABLE B-29

**TMW-130 AREA SOIL - ALTERNATIVE 6
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
EXCAVATION OPTION #2**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Site Prep for Equipment Laydown	1	LS	\$5,000	\$5,000
Excavation	102,000	TONS	\$25	\$2,550,000
Dewatering	1	LS	\$100,000	\$100,000
Material handling	102,000	TONS	\$25	\$2,550,000
Disposal	15,300	TONS	\$60	\$918,000
Confirmatory Sampling	200	Per Sample	\$400	\$80,000
Backfill	15,300	TONS	\$40	\$612,000
Area Restoration	1	LS	\$100,000	\$100,000
Monitoring Well Re-installation	6	LS	\$5,000	\$30,000
(Subtotal)				\$6,945,000
Mobilization/ Demobilization/ Well Abandonment 10%				\$694,500
Construction management 10%				\$694,500
Administrative/Legal 5%				\$347,250
Contingency 10%				\$694,500
Total capital Costs				\$9,376,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (10 wells)	1	LS	\$30,000	\$30,000
Annual reporting and ICs Implementation	1	LS	\$5,000	\$5,000
2-Years Semi-Annual GW Sampling Annual Cost (Subtotal)				\$35,000
10% Contingency				\$3,500
2-Years Semi-Annual GW Sampling Cost + Contingency				\$38,500
10-Year Present Worth Factor at 5.0% discount factor				7.72
Net Present Worth of 10 Years of Monitoring Costs				\$297,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
Net Present Worth of Close-out Costs				\$25,000

Alternative 6 Total Cost	\$9,698,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

TABLE B-30

**TMW130 AREA SOIL ALTERNATIVE 6
FORMER FAIRFAX I SITE
KANSAS CITY, KANSAS
ELECTRICAL RESISTANCE HEATING (FOR OPTION #1)**

Capital Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Delineation	1	LS	\$75,000	\$75,000
Electrical Resistance Heating Treatment based on 25,000 sq ft; 15 to 30 feet deep treatment zone	13889	CY	\$200	\$2,777,778
Area Restoration	1	LS	\$75,000	\$75,000
Monitoring Well Re-installation	5	LS	\$5,000	\$25,000
			<i>Subtotal</i>	\$2,953,000
		<i>Mobilization/ Demobilization/ Well Abandonment</i>	10%	\$295,300
		<i>Design</i>	10%	\$295,300
		<i>Construction management</i>	10%	\$295,300
		<i>Administrative/Legal</i>	5%	\$147,650
		<i>Contingency</i>	10%	\$295,300
		Total Capital Costs		\$4,282,000

Operation, Maintenance, and Monitoring Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Quarterly Monitoring (five well)	1	LS	\$16,000	\$16,000
Annual reporting	1	annual	\$5,000	\$5,000
			<i>Annual Cost (Subtotal)</i>	\$21,000
		10%	<i>Contingency</i>	\$2,100
			<i>Annual Cost + Contingency</i>	\$23,100
		<i>10-Year Present Worth Factor at 5.0% discount factor</i>		7.72
		Net Present Worth of 10 Years of Operation, Maintenance and Monitoring Costs		\$178,000

Closeout Costs

<i>Cost Item</i>	<i>Quantity</i>	<i>Unit</i>	<i>Cost/Unit</i>	<i>Item Cost</i>
Closeout Report	1	LS	\$25,000	\$25,000
		Net Present Worth of Close-out Costs		\$25,000

Alternative 6 Total Cost	\$4,485,000
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Notes:

All dollar amounts in Subtotals and Totals to nearest thousand dollars

All values are in 2012 Dollars

Net present worth discount rate is 5.0%

LS - lump sum

ICs - Institutional Controls

CY - cubic yard

sq ft - square feet