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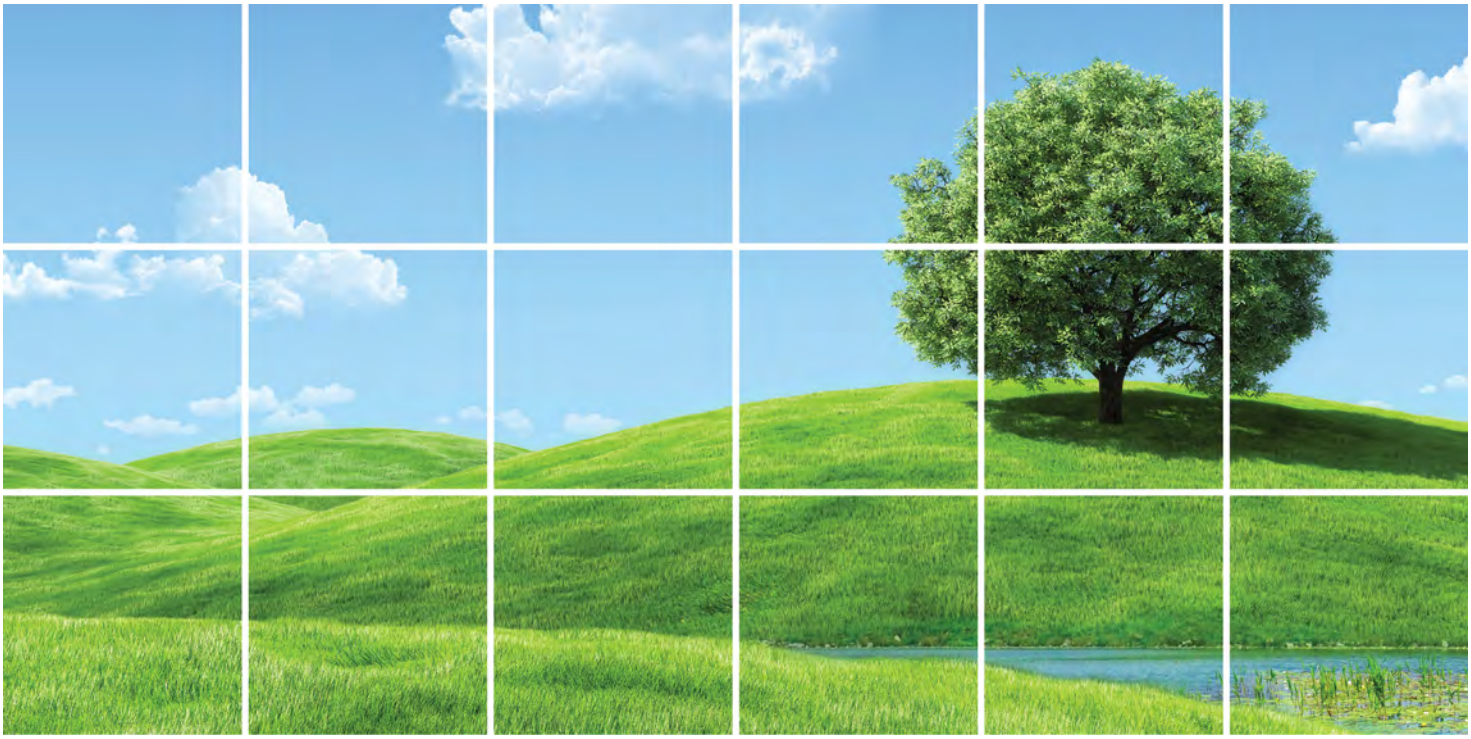

REPORT

HYDROGEOLOGIC STUDY (PRE-DREDGING REPORT)

PENNY'S CONCRETE AND SAND LLC - CONDITIONAL USE PERMIT, DOUGLAS COUNTY
1752 N. 1500 ROAD
LAWRENCE, KANSAS

Prepared for: DOUGLAS COUNTY PUBLIC WORKS DEPARTMENT

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1502 SW 41st St.
Topeka, Kansas 66609-1200

July 2013 • #080649

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1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

The purpose of this report is to provide a hydrogeologic assessment of the proposed open pit mining operation for Penny's Concrete and Sand LLC, (Penny's) Douglas County, Kansas, on behalf of Douglas County. A conditional use permit (CUP) would be required from Douglas County to allow the property to be used for mining purposes. The Site is located in the South 1/2 of Section 26, Range 20 E, Township 12 and in Section 35, Range 20 E, Township 12S. The Site location is presented on Figure 1.

1.2 BACKGROUND

1.2.1 HISTORY

Penny's has operated an on-river aggregate mining operation adjacent to the proposed open pit mining area since the 1970s. Due to concerns regarding changes in the Kansas River channel, the Corp of Engineers (Corp) decided to discontinue all on-river dredging operations on the Kansas River. Penny's was given a date of May 31, 2013 to cease mining operations, and they have complied. In response to the Corp's decision, Penny's has been evaluating open pit mining located immediately east-southeast of their existing river dredging operations (Site). Use of the property for mining operations requires approval of a Conditional Use Permit (CUP) by Douglas County. During review by the Douglas County Planning Commission, concerns were voiced by the City of Eudora with regards to their municipal wellfield located approximately 7,000 feet east of the proposed Site.

Dr. Carl Nuzman was contracted by Penny's to evaluate the proposed sand pit operation on ground water in the vicinity of the Site and potential impacts to the City of Eudura well field. Several concerned citizens also provided comments to the Douglas County Planning Commission including a report by Dr. McElwee, who lives directly west of the proposed Site. Dr. Nuzman and Dr. McElwee each reached differing conclusions regarding groundwater flow and the potential impact of the proposed sand pit mining operation. Douglas County subsequently requested the services of Conestoga-Rovers & Associates (CRA) to provide an independent third party evaluation of these two reports.

CRA completed its review and provided a letter report dated December 20, 2012 to Mr. Keith Browning, Douglas County Public Works Director. CRA's review concluded that the available information indicated there were no major problems or concerns with

regard to the proposed operation; however several recommendations for further assessment to confirm this position and implement precautionary measures and best management practices for the operation were proposed prior to approval of the CUP.

On April 10, 2013, the Douglas County Commissioners contracted with CRA to conduct a hydrogeologic study (Pre-Dredging Report) of Penny's proposed open pit mining operation as recommended in CRA's December review letter. Penny's supported the undertaking of this work by CRA and cooperated with the investigation. This report presents the findings of the hydrogeologic study.

1.3 REPORT ORGANIZATION

The report provides the recommended hydrogeologic assessment of the proposed open pit mining operation. The report is organized into the following sections:

Section 1.0 Introduction
Section 2.0 Hydrogeologic Setting
Section 3.0 Field Investigation
Section 4.0 Water Quality
Section 5.0 Site Evaluation
Section 6.0 Hydrogeologic Evaluation
Section 7.0 Conclusions
Section 8.0 References

2.0 HYDROGEOLOGIC SETTING

2.1 CLIMATE AND PHYSIOGRAPHY

The climate of Douglas County has a typical continental climate as can be expected of a location in the interior of a large landmass in the middle latitudes. It is characterized by large annual and daily variances in temperature (USDA 1973). The normal annual precipitation for Douglas County is 39.11 inches (KSU 2011).

Based on Site survey data, the elevation ranges from 800 to 815 feet above mean sea level (USGS 1963). Topographic relief within a quarter-mile radius of the Site is approximately 15 feet. The Site surface runoff is generally to the east to a drainage ditch that leads to the Kansas River.

The major topographic feature is the Kansas River, which is located directly north of the Site and provides drainage to the entire northern three-fourths of Douglas County. South of the Site are upland cuestas formed by differential erosion of the limestone, shale and sandstone beds.

2.2 OVERBURDEN GEOLOGY

Surficial geology at the Site consists of alluvium deposited by the Kansas River during the late Pleistocene time period and more specifically during Wisconsinan time. The alluvium is chiefly sand and silt similar to the sediments carried by the river at the present time. Sediments are typical of an alluvial valley with finer grained materials encountered below clay and silt overburden and coarsening with depth to sands and gravel deposits with cobbles and boulders at the bedrock contact. A generalized map of the surficial geology of the Site and surrounding area is provided as Figure 2.

2.3 BEDROCK GEOLOGY

The underlying bedrock is composed of Pennsylvanian, Virgilian Stage units of the Shawnee Group. The Shawnee group consists of alternating layers of limestone and shale. Stratigraphically, the first unit to be encountered would be the Topeka Limestone, which in turn is underlain by the Calhoun Shale (O'Conner 1960). The differing erosion and channeling of the bedrock surface over time by the Kansas River would account for possible variations in the depth that bedrock is encountered and shale versus limestone lithologic descriptions. Specifics regarding the bedrock geology below the Site are difficult to provide due to limited well logs. The alluvial sediments in the river valley provide abundant water supply; therefore, there has been no need to advance wells deeper into the underlying bedrock formations. A review of Kansas Geological Survey (KGS) Water Well Completion Records Database (WWC5) describes the bedrock as shale, rock, or limestone.

3.0 FIELD INVESTIGATION

In order to obtain site specific geologic and hydrogeologic information, a total of five monitoring wells (MW-1 through MW-5) were installed around the vicinity of the planned open pit mining area as shown on Figure 3. Field activities associated with this study began May 1 and concluded July 2, 2013. The following discussion details the results of the field investigation.

3.1 PREPARATION OF A SITE-SPECIFC HASP

Prior to initiation of monitoring well installation or other Site activities, a Site-specific Health and Safety Plan (HASP) was developed. The HASP addressed the tasks to be performed and established the methods and procedures to be implemented to safely conduct each task. A copy of the HASP is provided as appendix A.

3.2 UTILITY CLEARANCE

A thorough review and summary of utilities present in the vicinity of the Site was conducted prior to all field activities that penetrated the ground surface, such as monitoring well installations. CRA's drilling subcontractor, RAZEK Environmental, LLC (Razek) contacted Kansas One-Call (811) to clear public utilities to confirm specific monitoring well locations were clear of subsurface utilities.

3.3 MONITORING WELL INSTALLATION

Razek was contracted to complete installation of the five proposed monitoring wells from May 1 to 3, 2013. Soil samples were continuously collected, from the surface to the total depth of the well, using a Geoprobe® track mounted probe rig and macro core sampler. Soil samples were placed into sealable plastic bags for headspace analysis of potential volatile organic vapors using a photoionization detector (PID). Soils were described and logged according to the Unified Soil Classification System (USCS), for lithologic information. Based on field PID readings, no volatile organic compounds were present at any of the five boring locations.

After soil sampling was completed, the wells were then drilled with 8 ¾ inch, hollow-stem augers to allow for installation of the two-inch diameter, schedule 40 PVC well casing and screen. A total of 20 feet of 0.01-slot well screen threaded to PVC casing was installed in each location, the only exception was MW-3. A total of 30 feet of screen was installed in this well due to its total depth of 48 feet. Monitoring wells MW-1, MW-2 and MW-5 were each completed to a depth of 40 feet below ground surface (bgs) as shallow monitoring wells per the approved work plan. Groundwater monitoring well MW-3, located on the southeast corner of the Site, was initially planned for completion as the deep monitoring well with an estimated depth of approximately 70 ft bgs.

Per the work plan, installation of one deep (bedrock) monitoring well was planned to provide additional lithologic information and ensure the formation consisted of one hydrostratigraphic unit/aquifer. However, during installation of MW-3, hollow stem auger refusal was encountered at 48 feet bgs, which was less than the anticipated 70 feet. CRA was concerned this refusal might be due to a large boulder or other obstruction impeding the augers and not a true representation of bedrock. In order to evaluate this scenario, an off-set boring was conducted three feet north of MW-3. Steel probe rods were advanced using the Geoprobe rig, and these rods also could not be advanced beyond 48 feet. It should be noted that the WWC-5 water well record for Mr. Chris Paxson, located approximately ½ mile east of MW-3, reported a total depth of 51 feet and termination at bedrock. Based on the field investigation results and the nearby WWC-5 water well record for Mr. Paxson, it is possible that a bedrock high exists within this area.

Based on the shallow refusal of bedrock in MW-3, it was decided to attempt installation of MW-4, located in the southwest corner of the Site, as a deep monitoring well to better assess the deep portion of the aquifer observed in other area wells. Probe rods were initially advanced at this well location and refusal was found at a depth of 69 feet bgs, which corresponded to the anticipated depth of bedrock in the work plan. MW-4 was completed to a depth of 69 feet and serves as the deep monitoring well at the Site.

All monitoring wells were installed according to Kansas Article 30 Water Well Contractor's License, Water Well Construction and Abandonment and completed WWC-5 water well records are included in Appendix C.

3.4 LITHOLOGIC DESCRIPTION AND GRAIN SIZE ANALYSIS

Drilling logs were prepared for each monitoring well during drilling and Stratigraphic and Instrumentation Logs, including well construction details, are provided in Appendix D. Overall, the logs indicate lithology consistent with a river alluvial system with overburden consisting of brown to black silty clays and silts underlain by yellowish brown to blue gray, fine grained sands which coarsen with depth. Gravel was encountered below 50 feet in depth within MW-4 and cobbles up to 3.5 inch in size were observed at the total depth of this monitoring well. The thickness of overburden (clays and silts) encountered during drilling ranged from 5.5 feet bgs (MW-5) to 33 feet bgs (MW-3), with an average thickness of approximately 20 feet. It should be noted that two one foot thick sand lenses were observed within the clays and silts at monitoring well MW-1.

Grain size analysis was conducted by Inspecsol Engineering, Inc., a CRA affiliated company, on samples collected from all five monitoring wells, with the exception of MW-3. Samples were anticipated to be collected from the deep portion of the aquifer in MW-3; therefore, shallow samples were not collected from this well. Grain size samples were collected from below the overburden at: 35 feet bgs at MW-1, 25 feet bgs at MW-2, 50 and 55 feet bgs at MW-4 and 30 feet bgs at MW-5. Results were consist with observed lithologic descriptions during drilling with an average sand content of 97.7% and fine grained material (silts and clays) averaging less than 1.1% in samples from above 50 feet bgs. As discussed above, gravel content increased with depth and the samples collected from MW-4 at 50 and 55 feet contained 7.4% and 26.2% gravel, respectively. A summary of grain size analysis results are provided in Table 1 and copies of the analytical results are included in Appendix E.

3.5 SLUG TESTING

After completion of the five monitoring wells, each well was developed by pumping and surging the well to remove silts and fine particles. Approximately one week after well development activities, single well response testing or "Slug Tests" were conducted on each monitoring well. Electronic data loggers were placed in each well to record the well response. A slug (48 inches long x 1.5 inches diameter, solid PVC pipe) was dropped into each well to rapidly raise the water level and generate a "falling head test" as the water level recovered. The slug was then removed to generate a "rising head test". A total of three rising and falling head response tests were conducted at each monitoring well.

The computer software program Aqtesolve was used to evaluate the slug tests using several different analytical methods including Bouwer-Rice, Butler, and Springer-Gelhar. Results of the slug testing indicated the aquifer has a high hydraulic conductivity (*K*) with average values ranging from 0.032 to 0.0588 cm/sec, which translates to approximately 90 to 166 feet/day. Table 2 provides a summary of the single-well response testing results and graphs of the test data are provided in Appendix F.

3.6 RIVER GAUGE INSTALLATION, SURVEYING AND WATER LEVEL MEASUREMENTS

On May 9, 2013 river gauges were installed at the locations indicated on Figure M.1. No areas directly up-gradient (west) or down-gradient (east) of the Site could be located on the Kansas River that offered protection for the river gauges such as a dock or utility

crossing, etc. Therefore, the gauges were installed with metal T-posts driven approximately 3 feet into the bed of the river and these were covered by a 3-inch diameter PVC pipe that was cemented to the T-post. A four foot fiberglass river gauge gauge was then installed to the PVC casing.

Anderson Surveying Company (Anderson) of Lee's Summit, Missouri was contracted by CRA to conduct surveying of the five monitoring wells and two river gauges. On June 3, 2013, all five monitoring wells were surveyed; however, the two river gauges could not be located. It appears the significant rain events during the month of May, and particularly on May 30th, damaged the west river gauge and caused several feet of sand infilling of the channel on the east side, which buried the gauge at this location.

River gauges were re-installed on June 19 and 20, 2013. Gauges were installed using 8 foot landscape timbers bolted to t-posts driven into the river bed. These gauge locations were surveyed for elevation and location by Anderson on June 20, 2013. A permanent bench mark was established at MW-1, near the east river gauge, and at a concrete filled 2' diameter pipe near the west river gauges. These bench marks will allow future monitoring of the river levels (if necessary) even if the river gauges are damaged. Copies of the survey data are included in Appendix B.

Water levels in the monitoring wells were measured on May 16 and in conjunction with river gauge elevations on June 20 and July 2, 2013. Analysis of water level and river gauge measurements are discussed in Section 7.0.

4.0 WATER QUALITY

4.1 MONITORING WELL SAMPLING

In conjunction with slug testing activities, CRA collected groundwater samples from each of the monitoring wells using low flow pumps with dedicated tubing. Collected groundwater samples were placed in laboratory-supplied containers, placed on ice, and shipped under standard chain of custody (COC) protocol to TestAmerica Laboratories, a Kansas Certified Laboratory located in Pittsburg, Pennsylvania, for the following laboratory analyses:

- Metals including: lead, iron, arsenic, barium, cadmium by method SW6010, and mercury by SW7470
- Geochemical parameters including: sulfate by EPA Method 300.0, sulfide by SM 4500, nitrate/nitrite-N by EPA Method 353, ammonia-N by EPA Method E350.1,

total dissolved solids by SM 2540C, alkalinity by SM2320, and chloride by EPA Method 300.0

- Commons pesticides and herbicides likely associated with historical practices at the Site

The monitoring wells were later sampled on June 20, 2013 for the presence or absence of total coliform bacteria and Eschericha coli, commonly known as E. coli. Bacteria samples were sent to Continental Analytical Services, a Kansas Certified Laboratory located in Salina, Kansas.

4.2 MONITORING WELL ANALYTICAL RESULTS

The laboratory analytical results for groundwater samples collected on May 16 and June 20, 2013 are presented in Table 3 and copies of analytical results are included in Appendix G. For discussion, the groundwater monitoring well analytical results were compared to chemical-specific risk-based clean up levels published in Appendix A – KDHE Tier 2 Summary Table of the *Risk-based Standards for Kansas RSK Manual – 5th Version* (RSK) October 2010. Residential groundwater standards were used as the comparison criteria, since groundwater in the vicinity of the Site is used for domestic purposes.

4.2.1 PESTICIDES AND HERBICIDES RESULTS

Select pesticides and herbicides were not detected above laboratory detection limits in groundwater samples collected from the five monitoring wells, which suggests historic applications of these chemicals for agricultural purposes likely have been done in accordance with manufacturer's guidelines and are not causing impacts to underlying groundwater supplies.

4.2.2 METALS RESULTS

Groundwater samples for metals were field filtered to remove suspended solid particulates within the groundwater sample that often adhere to metals, which can result in "false positive" readings in total (unfiltered) metals samples. These dissolved concentrations are more representative of biologically available metals in the water.

Results of metals analysis were below laboratory detection limits for cadmium and lead. Concentrations of barium ranged from 0.360 mg/L (parts per million) (MW-1) to 0.840 mg/L (MW-5), and all concentrations were below the KDHE Tier 2 RSK value of 2 mg/L. Mercury concentrations were also below the KDHE Tier 2 RSK value of 2 µg/L (parts per billion), with concentrations ranging from 0.041 (µg/L) to 0.057 (µg/L).

Arsenic concentrations ranged from 6.9 µg/L (MW-1) to 23 µg/L (MW-2). The concentrations in MW-2 and MW-4 (12 µg/L) are above the KDHE Tier 2 RSK value of 10 µg/L. Arsenic is a naturally occurring metal and high concentrations are found in many locations across Kansas, and the concentrations detected in the samples from MW-2 and MW-4 should not be considered as representing a particular source of contamination.

A specific cleanup level has not been assigned for iron by KDHE, but the United States Environmental Protection Agency (EPA) has established a Secondary Maximum Contaminant level (SMCL) of 0.3 mg/L. Concentrations of iron ranged from 1.4 mg/L (MW-1) to 14 mg/L in MW-4. These results indicate the aquifer is high in iron concentrations, likely as a result of the natural dissolution of iron containing rocks.

4.2.3 GEOCHEMICAL ANALYSIS

Analysis of geochemical parameters was conducted to better characterize aquifer water quality parameters and establish baseline concentrations. Chloride concentrations ranged from 4.1 mg/L (MW-2) to 44 mg/L (MW-5), a SMCL of 250 mg/L has been established for chloride, and the results indicate chloride concentrations are expectedly low for the aquifer. Alkalinity (total as $CaCO_3$) is a concentrations ranged from 360 mg/L (MW-2) to 550 mg/L (MW-1). Alkalinity is a measure of the hardness based on the volume of calcium carbonate present in the water. Based on the concentrations detected, the water quality would be considered the hardest water (>250 mg/L) based on comparisons with water quality across the United States (Durfor and Becker 1964). The hardness of the aquifer water is consistent with most alluvial river valleys in Kansas, due to the significant deposits of limestone rock which is composed primarily of calcite ($CaCO_3$).

Total dissolved solids (TDS), which is a measurement of suspended particulates in the water, ranged from 390 mg/L (MW-2) to 680 mg/L (MW-1). The SMCL for TDS is 500 mg/L. Sulfate has an SMCL of 250 mg/L and concentrations were well below this threshold with a low concentration of 38 mg/L (MW-3) and a high of 110 mg/L (MW-1 and MW-5). Sulfide concentrations were below laboratory detection limits in MW-2,

MW-4, and MW-5 with an estimated low concentration of 0.72 mg/L in MW-1 and a high concentration of 4.6 mg/L in MW-3.

Nitrate/Nitrite measured as total N concentrations were below laboratory detection limits, with the exception of MW-1, which was 0.33 mg/L. This concentration is above the KDHE Tier 2 RSK value of 0.10 mg/L. Ammonia concentrations ranged from 0.25 mg/L (MW-2) to 0.71 mg/L (MW-3). A KDHE Tier 2 RSK value has not been determined for ammonia nor has an SMCL by the U.S. EPA.

4.2.4 BACTERIA ANALYSIS

Results of the bacteria analysis from all five monitoring wells tested **present** for total coliform bacteria, but were **absent** for Eschericha coli, commonly known as E. coli, the only exception was MW-1, which was also positive for E. coli.

Total coliforms include bacteria that are found in the soil, in water that has been influenced by surface water, and in human and animal waste. Fecal coliforms are the group of total coliforms that are considered to be present specifically in the gut and feces of warm-blooded animals. E. Coli is the major species in the fecal coliform group and is considered to be the best indicator of fecal pollution and the possible presence of pathogens.

Total coliforms and E. coli are typically found in surface water. Monitoring well MW-1 is located near the drainage ditch that runs along the east side of the Site. There is therefore increased potential for surface water influences in this area. The absence of E. coli in the remaining monitoring wells suggests the detection in MW-1 is not representative of Site conditions. Re-sampling in the future could be considered to confirm conditions at MW-1.

4.3 PRIVATE (DOMESTIC) WELL SAMPLING

In order to establish baseline water quality and quantity conditions within potential zones of influence of the mining operation, CRA proposed a private water well survey be conducted. A total of 12 wells registered as "Domestic" were identified during a review of the Kansas Geologic Survey's WWC-5 water well record database within ½ mile of the Site. An unregistered domestic water well is also present at the farm house located at the southwest corner of the Site. The locations of the identified domestic wells are shown on Figure 4. Seven of these twelve wells were selected based on their

locations both up-gradient and down-gradient of the Site for potential sampling to determine the baseline water quality. The following individuals were sent access agreements from Douglas County and correspond to the identified wells (labeled 1-7) on figure 3:

1. Jeff Wallace (Espinosa Properties, LLC) – PO Box 3722, Lawrence, KS 66046
2. Carl McElwee – 1564 E. 1850 Rd. Lawrence, KS 66046
3. Van, LLC - 3712 Quail Creek, Ct. Lawrence, KS 66047
4. Bruce Perkins – 1952 N. 1550 Rd, Eudora, KS 66025
5. Chris Paxson – 1922 N. 1550 Rd, Eudora, KS 66025 (Note: original access letter sent to Mr. Perkins)
6. Virginia Strong (Richard Strong) – 3712 Trail Rd., Lawrence, KS 66049
7. Norma Schmille C/O Deathe Albert – 1918 N. 1500 Road, Eudora, Kansas 66025

Access was obtained from six of the seven domestic wells. Mr. Albert Deathe was the only resident that did not grant access to the sampling of his well. However, Mr. Strong's residence is located directly south across N 1500 Road from Mr. Deathe's residence and serves as an adequate cross-gradient location.

Domestic well water samples were collected from the Paxson, Perkins and Strong wells on June 20 and from the McElwee, Espinosa and Van LLC wells on June 24, 2013. All samples were collected from an outside water faucet to avoid any influence of home water treatment systems. The samples were collected after running the water for approximately 10 minutes to allow for a representative sample. Collected water samples were placed in laboratory-supplied containers, placed on ice, and shipped under standard chain of custody (COC) protocol to TestAmerica Laboratories, a Kansas Certified Laboratory, for the following laboratory analyses:

- Metals including: lead, iron, arsenic, barium, cadmium by method SW6010, and mercury by SW7470
- Geochemical parameters including: sulfate by EPA Method 300.0, sulfide by SM 4500, nitrate/nitrite-N by EPA Method 353, ammonia-N by EPA Method E350.1, total dissolved solids by SM 2540C, alkalinity by SM2320, and chloride by EPA Method 300.0
- Presence/absence of bacteria
- Pesticides and Herbicides were not analyzed since detections were not reported in groundwater samples from the monitoring wells installed as part of this program.

4.4 PRIVATE (DOMESTIC) WELL ANALYTICAL RESULTS

The laboratory analytical results for groundwater samples collected on from the domestic wells are presented in Table 4 and copies of analytical results are included in Appendix H. For discussion, the domestic well analytical results were compared to chemical-specific risk-based clean up levels published in Appendix A – KDHE Tier 2 Summary Table of the *Risk-based Standards for Kansas RSK Manual – 5th Version* (RSK) October 2010. Residential groundwater standards were used as the comparison criteria.

4.4.1 METALS RESULTS

Domestic well samples for metals were not field filtered in order to be representative of concentrations seen at the tap prior to consumption or use for domestic purposes. Results were below laboratory detection limits for cadmium, with the exception of an estimated concentration of 0.32 and lead concentrations ranged from an estimated concentration of 1.6 µg/L (Perkins) to 4.9 µg/L (Van LLC). These concentrations of cadmium and lead are well below the KDHE RSK value of 5 and 15 µg/L, respectively.

Concentrations of barium ranged from an estimated 0.140 mg/L (Strong) to 0.850 m/L (Perkins), and all concentrations were below the KDHE Tier 2 RSK value of 2 mg/L. Mercury concentrations were below the laboratory detection limit (0.20 µg/L) in all six wells.

Arsenic concentrations ranged from an estimated 3.2 µg/L (McElwee) to 5.6 µg/L (Paxson), while the Perkins, Strong and Van LLC wells were below the laboratory detection limits of 10 µg/L. These concentrations are below the KDHE Tier 2 RSK value of 10 µg/L.

A specific cleanup level has not been assigned for iron by KDHE, but the United States Environmental Protection Agency (EPA) has established a Secondary Maximum Contaminant level (SMCL) of 0.3 mg/L. Concentrations of iron ranged from less than 0.1 mg/L (Van LLC) to 13 mg/L (Espinosa). With the exceptions of the Strong and Van LLC samples, these results indicate the aquifer is high in iron, similar to the results for the installed groundwater monitoring wells.

4.4.2 GEOCHEMICAL ANALYSIS

Analysis of geochemical parameters indicate chloride concentrations ranged from 5.8 mg/L (Paxson) to 15 mg/L (McElwee), a SMCL of 250 mg/L has been established for chloride, and the results indicate chloride concentrations are expectedly low for the aquifer. Alkalinity (total as $CaCO_3$) concentrations ranged from 330 mg/L (Paxson, Strong, Van LLC, and Espinosa) to 390 mg/L (Perkins). Alkalinity is a measure of the hardness based on the volume of calcium carbonate present in the water. Based on the concentrations detected, the water quality would be considered the hardest water (>250 mg/L) based on comparisons with water quality across the United States (Durfor and Becker 1964). The hardness of the aquifer water is consistent with most alluvial river valleys in Kansas, and is likely due to the significant deposits of limestone rock. Several of the domestic well residents reported having installed water softening systems to treat this condition.

Total dissolved solids (TDS), which is a measurement of suspended particulates in the water, ranged from 360 mg/L (Paxson) to 550 mg/L (McElwee). The SMCL for TDS is 500 mg/L, which the sample from the Strong (500 mg/L) and McElwee wells are equal to and exceed, respectively. Sulfate has an SMCL of 250 mg/L and concentrations were below this threshold with a low concentration of 9.3 mg/L (Perkins) and a high of 190 mg/L (McElwee). Sulfide concentrations were all below the laboratory detection limit of 3 mg/L; however, estimated concentrations of 0.72 mg/L and 0.38 mg/L were detected in the Van LLC and McElwee samples, respectively.

Nitrate/Nitrite concentrations ranged from 0.31 mg/L (Perkins) to 21 mg/L (Strong). The concentration in Mr. Strong's well is significantly above the KDHE Tier 2 RSK value of 10 mg/L. Ammonia concentrations ranged from 0.10 mg/L (Van LLC) to 0.34 mg/L (Paxson). A KDHE Tier 2 RSK value has not been determined for ammonia nor has an SMCL by the U.S. EPA.

4.4.3 BACTERIA ANALYSIS

Similar to the groundwater monitoring well results, bacteria analysis from the six domestic well also tested **present** for total coliform bacteria, but were **absent** for E. coli.

Based on the monitoring well detections, the total coliform presence is likely an existing (natural) groundwater condition; although, they may also relate to domestic well defects such as a defective well cap, possible hole or crack in the well casing or simply a pathway along the outside of the well. However, the absence of E. Coli suggests the

presence of total coliform is not the result of fecal coliform bacteria. All domestic well owners were provided copies of the bacteria results in letters dated July 3, 2013.

5.0 SITE EVALUATION

5.1 PHASE I ESA

A Site evaluation was conducted in order to document existing conditions at the existing Site area and operations, prior to beginning mining operations. The initial phase of this Site evaluation consisted of completing a Phase I ESA, which included a title search, review of historical information and search of applicable databases for evidence of historical land use and potential sources of contamination. A stand alone report documenting the findings of the Phase I ESA is included as Appendix I.

The results of the Phase I ESA did not indicate any evidence of recognized environmental conditions at the Site, but did acknowledge the possible impact of historical pesticides and herbicides in soils based on historical agricultural land use.

5.2 TEST PIT INSTALLATION

Based on Phase I ESA findings, a test pit program was completed in order to evaluate the potential impacts of agricultural use at the site, a backhoe was used to install five test pits to a depth of 2 feet, and the locations are shown on figure 5. Soils encountered during advancement of the test pits were fairly uniform with the following general description:

Depth (Feet)	*Description*
0 to 1	CLAY, silty, soft, slight plasticity, light to dark brown, with traces of organic material, damp (topsoil).
1 to 2	SILT, trace of clay, soft, light brown to tan, damp

Detailed Stratigraphic and Instrumentation logs with associated Photo-ionization detection (PID) readings are provided in Appendix J. PID readings did not indicate the presence of volatile organic vapors in any of the samples.

A photo log of the test pit installation activities is included as Appendix K. Since no anomalous soils or elevated PID readings were encountered during the test pit installation, a representative sample from the center most test pit (TP #3) was collected from a depth of 2 feet bgs. The soil sample was analyzed for the same constituents as

the on-site monitoring wells, with the exception of bacteria analysis. Detailed below is the full list of parameters with associated testing methods:

- Metals including: lead, iron, arsenic, barium, cadmium by method SW6010, and mercury by SW7470
- Geochemical parameters including: sulfate by EPA Method 300.0, sulfide by SM 4500, nitrate/nitrite-N by EPA Method 353, ammonia-N by EPA Method E350.1, total dissolved solids by SM 2540C, alkalinity by SM2320, and chloride by EPA Method 300.0
- Select pesticides and herbicides

5.3 SOIL ANALYITICAL RESULTS

Analytical results for the soil sample collected on June 20, 2013 are summarized in Table 5 and copies of analytical results are included in Appendix L. Analytical results were compared to chemical-specific risk-based clean up levels published in Appendix A – KDHE Tier 2 Summary Table of the *Risk-based Standards for Kansas RSK Manual – 5th Version* (RSK) October 2010. Residential soil standards were used as the comparison criteria as applicable.

Select pesticides and herbicides were not detected above laboratory detection limits in the soil sample collected from test pit 3. Similar to the groundwater results, the results suggest historic applications of these chemicals for agricultural purposes have likely been done in accordance with manufacturer's guidelines.

Results of metals analysis did not indicate any constituents were detected above established KDHE Tier 2 RSK values. Data also did not indicate any concentrations above applicable KDHE Tier 2 RSK values.

6.0 HYDROGEOLOGIC EVALUATION

As discussed in the report introduction, a critical component of this hydrogeologic study is the accurate determination of the groundwater flow direction, based on site-specific water elevations in lieu of regional groundwater flow directions as reported in various Kansas Geologic Survey publications. In addition, the effect the proposed open pit mining operation could have on water quantity is another important aspect of this study. The following provides a discussion of these subjects.

6.1 GROUNDWATER FLOW DIRECTION

Based on groundwater elevations collected from the monitoring wells on three separate occasions, the groundwater flow direction in spring of 2013 was towards the northeast and the Kansas River with a calculated flow gradient of approximately 1.12 feet/mile based on the July 2, 2013 elevation data. An average hydraulic conductivity of 140 feet/day, based on data obtained from single well response testing and groundwater model calibration, was used to calculate a groundwater flow velocity of 0.1 feet/day for the upper portion of the aquifer. Groundwater elevation contours for all three separate events are provided on Figure M.4.

The groundwater elevations collected on June 20, 2013 indicate higher elevations in MW-1 and MW-5. If the elevations in these two wells are discounted, the northeast flow direction remains consistent. The measurement of the elevated water levels in MW-1 and MW-5 is attributable to an important phenomenon commonly referred to as "bank storage" where the river will provide high transient recharge to the aquifer during periods of elevated water levels in the Kansas River. Since these periods of elevated water levels in the river are infrequent and short in duration, it is reasonable to discount the water elevations collected from MW-1 and MW-5 on June 20, 2013 when determining typical groundwater flow directions at the Site.

6.2 DEWATERING INFLUENCE

A three-dimensional (3D) numerical groundwater flow model was developed in order to estimate the potential dewatering influence from maximum rate sand mining extraction operation in which groundwater extraction and water loss through evaporation will occur. The analysis also helped evaluate/confirm the overall groundwater flow direction. The numerical modeling approach allows the various effects of pit development, municipal pumping, and the Kansas River to be readily represented. The results of this 3D model, including specifics regarding the model calibration and boundary conditions are included in a separate report provided in Appendix M.

The following scenarios were simulated to evaluate the potential dewatering effects. The scenarios are listed as follows:

- Scenario 1: Long Term Representative Conditions (Base Case)
- Scenario 2: Early Stage Extraction

- Scenario 3: Late Stage Extraction
- Scenario 4: Late Stage Extraction and Pond Backfilled in North
- Scenario 5: Rehabilitation Condition

Scenario 1 (Base Condition)

Figure M.6 shows the simulated groundwater elevation contours across the model boundary during Scenario 1. These contours were generated using a long term average, (from October 1 to September 30 of the following year) rather than the instantaneous elevations collected on July 2, 2013, for the Kansas River stage elevation. The results of the base line modeling indicate groundwater flow at the Site is consistent with the identified northeast groundwater flow direction using the spring 2013 monitoring well data and that there is an overall easterly flow of groundwater in the regional aquifer.

Scenario 2 (Early Stage Extraction)

Figure M.7 shows the simulated ground water elevation contours across the model boundary during the early stages of open pit extraction (Scenario 2). The following assumptions were made for this scenario and include discussions with Penny's regarding their planned mining operation:

- The open pit is represented by a high hydraulic conductivity zone which simulates an open body of water (lake).
- Recharge over the pit area was set to zero as the simulated dewatering rate includes the net precipitation and evaporation effects.
- Dewatering in the lake is represented by a well which has an extraction rate equivalent to the sand and gravel removal rate, combined with the net precipitation and evaporation effects.
- Maximum sand and gravel extraction rates are expected to be 5000 tons per day, but only the solids volume of sand and gravel contributes to a dewatering effect. The rate of 5,000 tons per day is a conservative estimate based on past extraction rates from the river dredging operation, which was allowed to operate 24 hours per day versus the 12 hour day for the pit mine. In addition, the model conservatively assumes production 365 days per year, which is unlikely.

- Dewatering rate due to extraction is a function of the volume of solids removed. Pore water drains back into the pit and most of any residual water mined with the sand and gravel will travel through a settling pond, and return to the pit on a continuous basis.
- Surface area of the pond during early stage extraction is approximately 2 X 10^6 ft^2.
- Evaporative losses are calculated using a standard water balance on the proposed pond area, and represent an annual average dewatering rate.

Modeling results for this scenario do not significantly change the groundwater elevation contours, with the exception of a slight shift to the west for elevation contour representing 787.00 feet. The combined dewatering effect of the active extraction and pond evaporation for scenario 2 is 338 US gallons per minute (gpm). Figure M.11 shows the simulated groundwater drawdown associated with scenario 2 with a maximum drawdown contour of approximately 1 foot around the immediate mining operation area. A simulated drawdown of 0.25 feet, which is not likely to be noticeable, extends approximately ¾ of a mile from the operation area.

Scenario 3 (Early Stage Extraction)

Figure M.8 shows the simulated groundwater contours associated with scenario 3, which is modeling of the effects of extraction of the entire planned mining operation (166 acres) and full evaporation from the same area. The increased pond area increases evaporative losses and the net dewatering rate and the surface of the pond has to be considered as one elevation, which has the effect of stretching the elevation contours in the area of the pond and generating a more easterly flow direction across the Site.

Figure M.12 shows the simulated drawdown contours for scenario 3. The combined dewatering effect of the active extraction and pond evaporation for scenario 3 is 397 gpm. The maximum drawdown contour is 1 foot in the vicinity of MW-4, which conversely had the highest observed groundwater elevations at the Site. A simulated drawdown of 0.25 feet, which is not likely to be noticeable, extends approximately one mile east, west and north of the Site.

Scenario 4 (Backfilling of northwest portion of pit)

Figure M.9 shows the simulated groundwater contours associated with Scenario 4, which is modeling the effects of filling of the northern portion of the mining pit with

lower permeability (2.8 x 10-1 ft/day) overburden material. It should be noted that backfilling activities may begin shortly after mining operations have ceased in the northwest corner and not excavation of the entire pit area as considered in the model. The dewatering rate applied was the same as Scenario 3 (397 gpm), and is a conservative rate based on the high groundwater withdrawal rate.

Figure M.13 shows the simulated groundwater drawdown contours associated with scenario 4. This figure is very similar to the one generated for scenario 3, which is logical since both are based on the same dewatering rates. The maximum drawdown contour is 0.75 foot in the vicinity of MW-4. A simulated drawdown of 0.25 feet, which is not likely to be noticeable, extends two miles south and one mile east, west and north of the Site.

Scenario 5 (Post Mining Operations)

Figure M.10 shows the simulated groundwater contours associated with Scenario 5, which is modeling the effects of long term dewatering and drawdown after mining operations have ceased and the northern portion of the pit has been backfilled. This figure is similar to M.9, in that the pond area becomes one static elevation, which has the effect of stretching the elevation contours in the area of the pond. The Site has a northeast flow direction upgradient of the pond and shifts to an easterly flow direction on the east side of the Site.

Figure M.14 shows the simulated groundwater drawdown contours associated with scenario 5. Under this scenario, groundwater withdrawal is only due to evaporation occurring over the full pit area (166 acres). The dewatering rate due to evaporation is the same as in Scenarios 3 and 4 (82 gpm). The maximum drawdown contour is 0.5 foot in the vicinity of MW-4. A simulated drawdown of 0.25 feet, which is not likely to be noticeable, extends within a one mile radius of MW-4 to the west, south and northwest. To the northeast there is a minor simulated increase in groundwater levels (less than 0.25 feet).

Based on the results of the groundwater modeling, the following conclusions are evident:

- Based on conservative estimates of tons mined per day, the extraction of aggregate will have a minimal influence on the aquifer.
- Aggregate extraction will cause an insignificant drawdown effect in the areas beyond the outer edges of the pond.

- The maximum predicted groundwater level decrease beyond the pond will occur during the early stages of extraction and will be on the order of 1 foot. However, the drawdown will diminish in the area beyond the pond under rehabilitation conditions.
- The maximum predicted groundwater level decrease in the pond will occur during early stages of extraction, and will be within 1 ft of all other stages of extraction.
- Sensitivity simulation results show that even under the assumption of a lower annual recharge rate, the predicted drawdown during early stage extraction will be insignificant.

7.0 SUMMARY AND CONCLUSIONS

The following provides a summary of the results of the hydrologic and hydrogeologic assessment of the proposed open pit mining operation for Penny's:

- An unconfined alluvial aquifer consisting of an average of 20 feet of overburden underlain by fine grained sands that coarsen with depth underlies the Site.
- Groundwater in the area of the Site flows to the northeast and the Kansas River at an average horizontal hydraulic gradient of approximately 1.12 feet/mile, and at an average groundwater velocity of about 0.1 feet/day in the upper portion of the aquifer.
- Analytical results of groundwater samples collected from the five newly installed monitoring wells did not indicate evidence of any constituents which would have any negative effect on the operation of an aggregate mining operation at the Site.
- Results of a Phase I ESA of the Site did not indicate any evidence of historical uses of the Site that would negatively impact the proposed mining operation and a representative soil sample collected from the surface soils did not have detectable levels of pesticides or herbicides.
- Operation of the proposed aggregate mining operation is not anticipated to have any appreciable or unacceptable effect on the City of Eudora municipal water supply wells, private water supply wells, or the Kansas River.

8.0 REFERENCES

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KDHE 2010. Kansas Department of Health and Environment, Division of Environment, Bureau of Environmental Remediation, *Risk-Based Standards for Kansas RSK Manual – 5th Version*, October 2010.

KSU 2011. Kansas State University Research and Extension, Weather Data Library, Website, http://www.ksre.ksu.edu/wdl/precipdata.htm

O'Conner, 1960, *Geology and Ground-water Resources of Douglas County, Kansas, Bulletin 148*.

USDA 1973. U.S. Department of Agriculture, *Soil Survey of Douglas County, Kansas,* July 1977.

USEPA 2013. Table 1 Secondary Maximum Contaminant Levels, Website, http://water.epa.gov/drink/contaminants/secondarystandards.cfm

USGS 1963. U.S. Geological Survey, Lawrence East, Kansas Quadrangle Topographic Map, 1963.

Yours truly,

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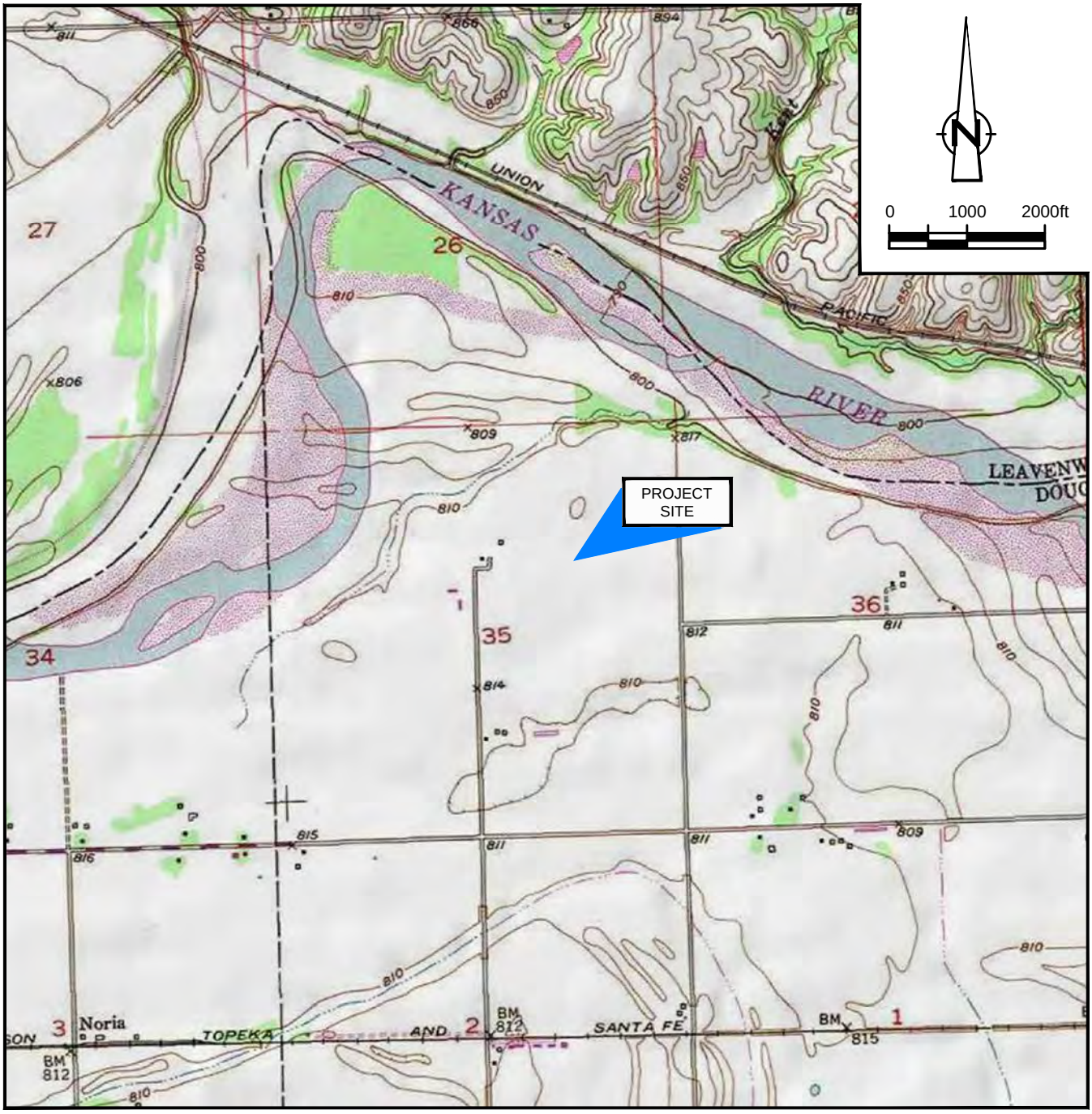


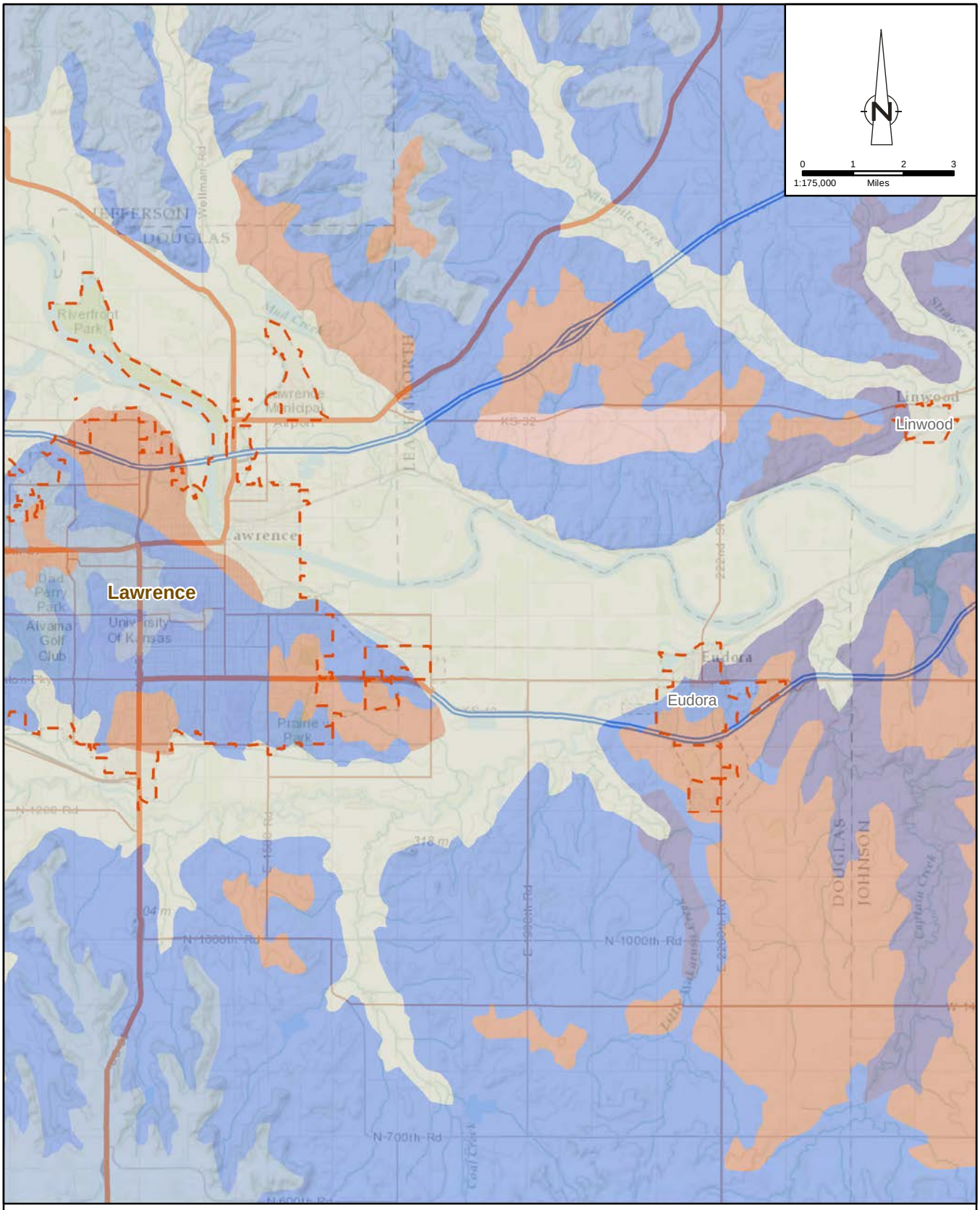
SOURCE: USGS 7.5 MINUTE QUAD
"LAWRENCE EAST, KANSAS"

LAT/LONG: 38.9666ÁNORTH, 95.1535ÁWEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ZONE - KANSAS NORTH

figure 1

SITE LOCATION MAP
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY, KANSAS
Douglas County Public Works

080649-00(000)GN-DL002 APR 25/2013



Source: ESRI 2013; ESRI Data & Maps 2008 Data Distribution Application; Surficial Geology of Kansas 2008

Legend

- Qal3;Alluvium (late Pleistocene and Holocene)
- Qgd;Glacial drift
- Ntd;Terrace deposits
- ¨s;Shawnee Group
- ¨d;Douglas Group
- ¨l;Lansing Group
- ¨kc;Kansas City Group

figure 2

Surficial Geology
Eudora, Kansas

080649(001)GIS-WA001 June 03, 2013

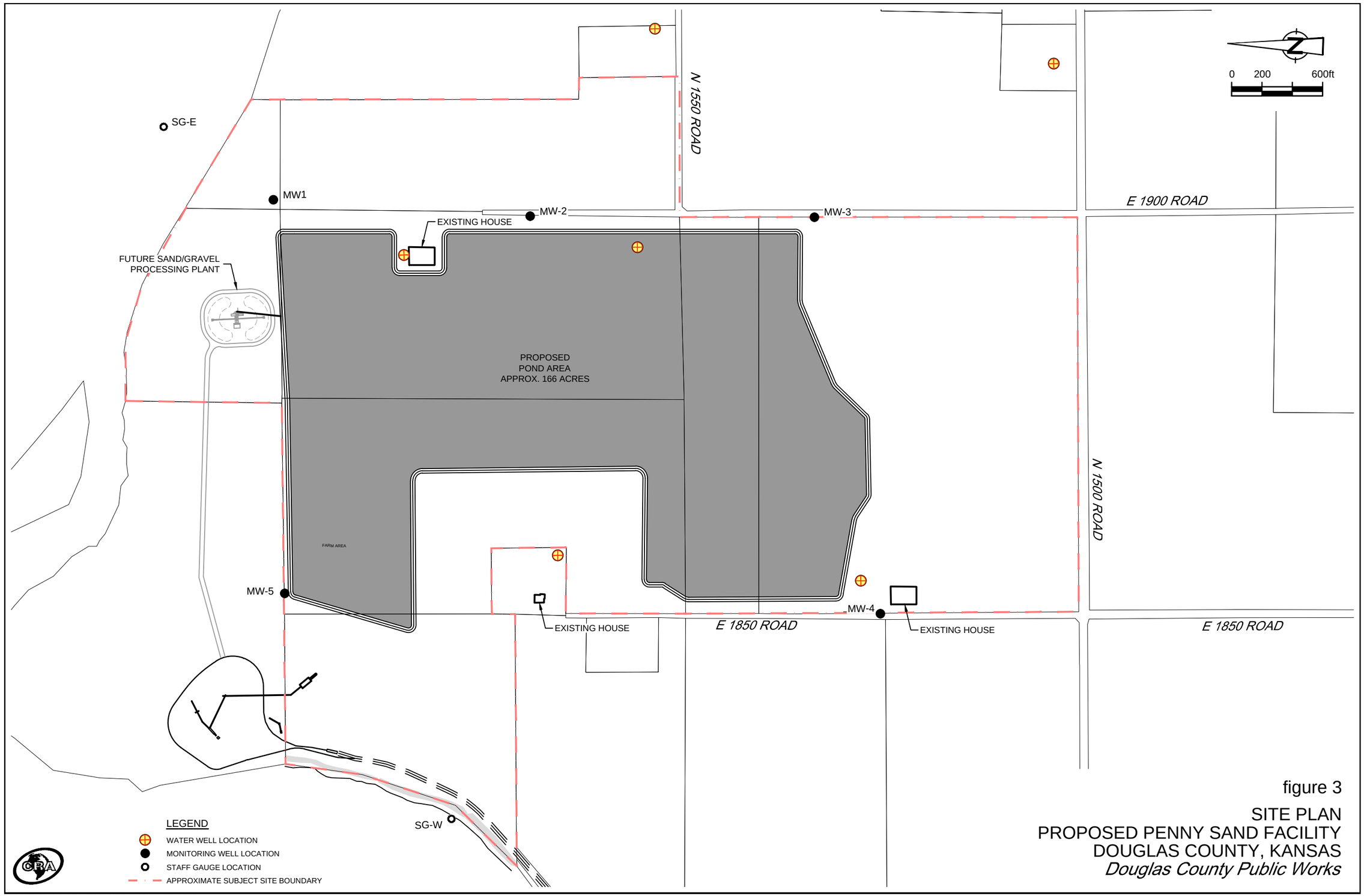
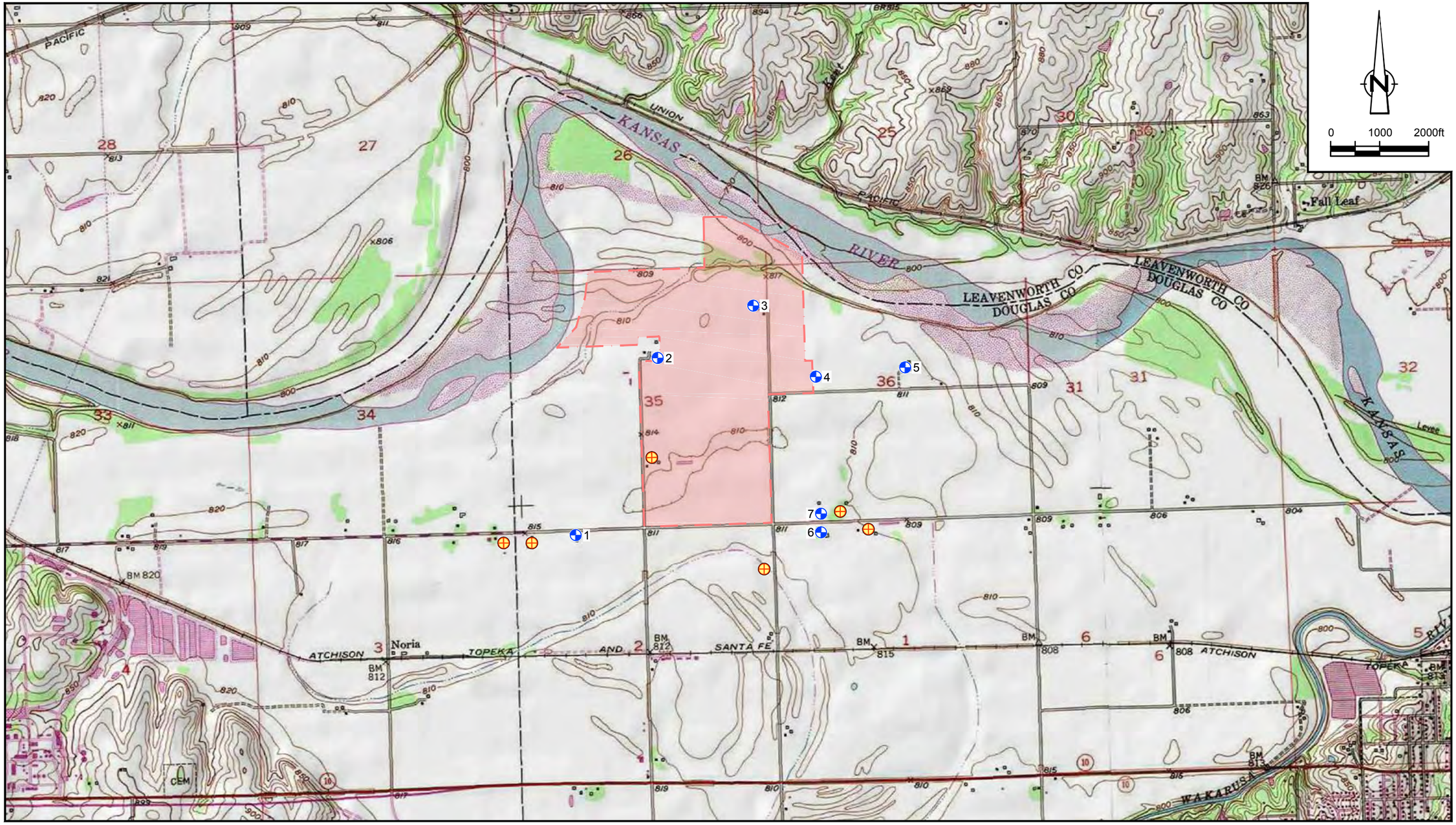


figure 3

SITE PLAN
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY, KANSAS
Douglas County Public Works

080649-02(003)GN-WA001 JUL 18/2013



LEGEND

- Domestic Wells Sampled
- Domestic Well Location
- Approximate Subject Site Boundary

figure 4

DOMESTIC WELL LOCATIONS
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY, KANSAS
Douglas County Public Works

080649-00(000)GN-DL001 JUL 16/2013

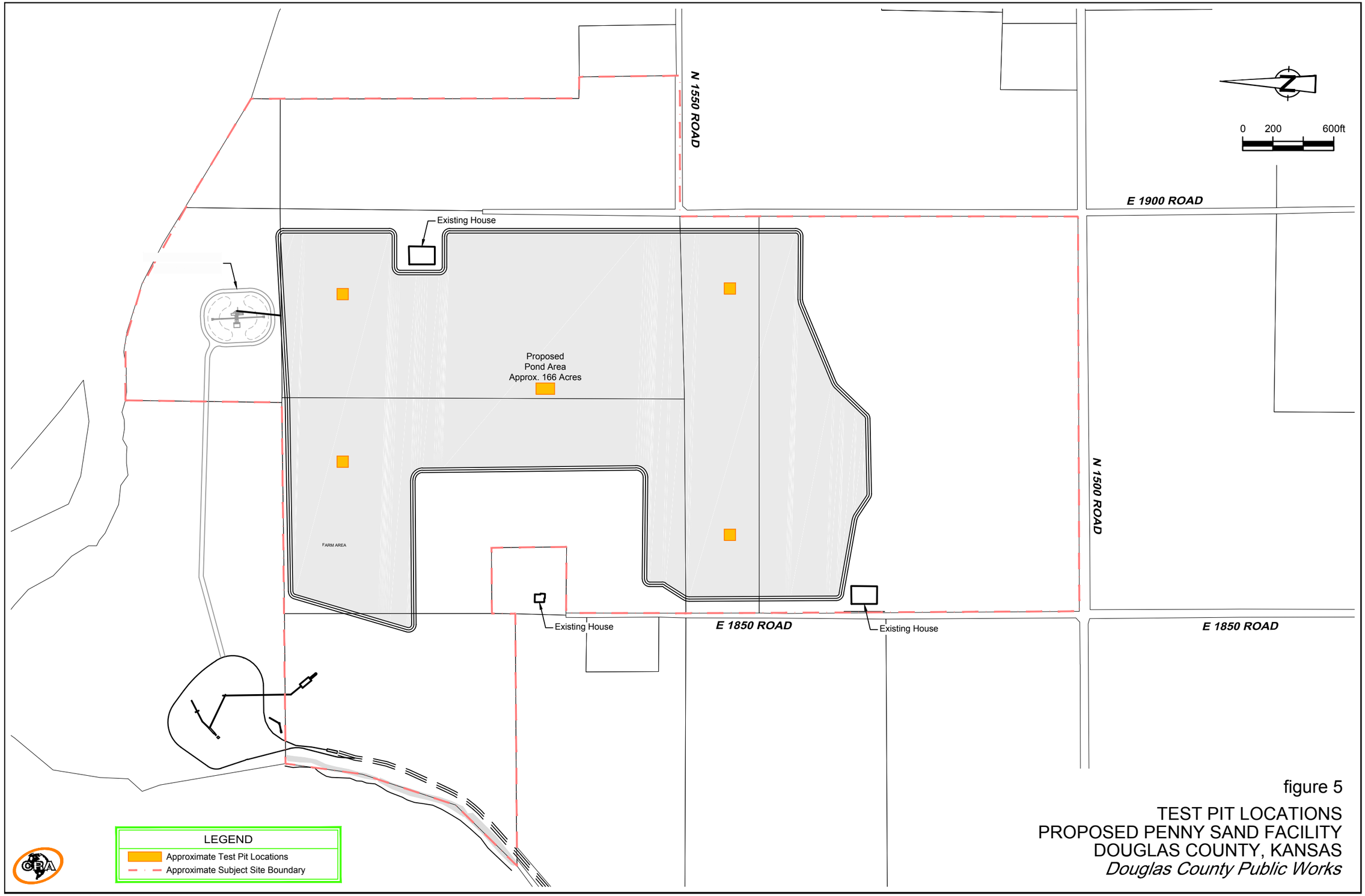


figure 5

TEST PIT LOCATIONS
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY, KANSAS
Douglas County Public Works

080649-00(000)GN-DL001 JUL 16/2013

TABLE 1
DOUGLAS COUNTY PUBLIC WORKS
SUMMARY OF GRAIN SIZE ANALYSIS

Sample Location	*Sample ID*	*Depth (ft.)*	*% Sand*	*% Gravel*	*% Silt/Clay*
MW-1	050113-KH-001	35	97.6	1.7	0.7
MW-2	050113-KH-001	25	97.3	1.1	1.6
MW-4	050313-KH-003	50	92.2	7.4	0.4
MW-4	050313-KH-004	55	73.2	26.2	0.7
MW-5	050313-KH-005	30	98.2	1.2	1.2

TABLE 1

DOUGLAS COUNTY PUBLIC WORKS
SINGLE-WELL RESPONSE TEST RESULTS

Well ID	*Aquifer Condition*	*Analytical Method (1)*		*Hydraulic Conductivity*		*Geometric*	*Screened Material*
	Confined / Unconfined	*Falling Head Tests*	*Rising Head Tests*	*Falling Head Tests (cm/sec)*	*Rising Head Tests*	*Mean (cm/sec)*	
MW-1	confined	Bouwer-Rice	Butler	2.16E-02	7.47E-02	4.17E-02	SW-Sand, very fine to medium, SP-Sand, very fine to fine, SW-Sand, very fine to coarse
		Bouwer-Rice	Butler	1.63E-02	8.19E-02		
		Butler	Butler	3.92E-02	6.21E-02		
MW-2	confined	Butler	Butler	4.50E-02	5.17E-02	5.67E-02	SW-Sand, very fine to coarse, SP-Sand, very fine to fine
		Butler	Butler	9.40E-02	5.67E-02		
		Butler	Butler	4.94E-02	5.41E-02		
MW-3	confined	Butler	Butler	4.94E-02	5.93E-02	5.88E-02	SP-Sand, very fine to fine, SW-Sand, very fine to coarse
		Butler	--	6.21E-02	--		
		Butler	Butler	6.21E-02	6.21E-02		
MW-4	unconfined	Springer-Gelhar	Springer-Gelhar	5.17E-02	4.50E-02	4.27E-02	SW-Sand, very fine to coarse, with gravel
		Springer-Gelhar	Springer-Gelhar	4.94E-02	3.74E-02		
		Springer-Gelhar	Springer-Gelhar	4.71E-02	2.97E-02		
MW-5	unconfined	Springer-Gelhar	Springer-Gelhar	4.50E-02	2.26E-02	3.02E-02	SP-Sand, very fine to coarse, SW-Sand, very fine to coarse
		Springer-Gelhar	Springer-Gelhar	3.26E-02	2.47E-02		
		Springer-Gelhar	Springer-Gelhar	3.26E-02	2.84E-02		

References:

Bouwer, H. and R.C. Rice, 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

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TABLE 3

DOUGLAS COUNTY PUBLIC WORKS
MONITORING WELL ANALTYICAL RESULTS
MAY-JUNE 2013

Sample Location		*MW-1*	*MW-1*	*MW-2*	*MW-2*	*MW-3*	*MW-3*	*MW-4*	*MW-4*	*MW-5*	*MW-5*
Sample Date		*5/16/2013*	*6/20/2013*	*5/16/2013*	*6/20/2013*	*5/16/2013*	*6/20/2013*	*5/16/2013*	*6/20/2013*	*5/16/2013*	*6/20/2013*
	Units										
Biological											
Total coliform bacteria	none	-	Present	-	Present	-	Present	-	Present	-	Present
Escherichia coli	none	-	Present	-	Absent	-	Absent	-	Absent	-	Absent
Herbicides											
2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP)	ug/L	380 U	-	380 U	-	380 U	-	380 U	-	400 U	-
2,4,5-T	ug/L	0.95 U	-	0.96 U	-	0.94 U	-	0.95 U	-	1.0 U	-
2,4,5-TP (Silvex)	ug/L	0.95 U	-	0.96 U	-	0.94 U	-	0.95 U	-	1.0 U	-
2,4-DB	ug/L	3.8 U	-	3.8 U	-	3.8 U	-	3.8 U	-	4.0 U	-
2,4-Dichlorophenoxyacetic acid (2,4-D)	ug/L	3.8 U	-	3.8 U	-	3.8 U	-	3.8 U	-	4.0 U	-
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	ug/L	380 U	-	380 U	-	380 U	-	380 U	-	400 U	-
Dalapon	ug/L	4.8 U	-	4.8 U	-	4.7 U	-	4.8 U	-	5.0 U	-
Dicamba	ug/L	1.9 U	-	1.9 U	-	1.9 U	-	1.9 U	-	2.0 U	-
Dichlorprop	ug/L	3.8 U	-	3.8 U	-	3.8 U	-	3.8 U	-	4.0 U	-
Pentachlorophenol	ug/L	0.48 U	-	0.48 U	-	0.47 U	-	0.48 U	-	0.50 U	-
Metals											
Arsenic (dissolved)	ug/L	8.2 J	-	23	-	8.8 J	-	12	-	6.9 J	-
Barium (dissolved)	ug/L	360	-	540	-	650	-	560	-	840	-
Cadmium (dissolved)	ug/L	5.0 U	-	5.0 U	-	5.0 U	-	5.0 U	-	5.0 U	-
Iron (dissolved)	ug/L	1400	-	5700	-	3600	-	14000 B	-	12000	-
Lead (dissolved)	ug/L	3.0 U	-	3.0 U	-	3.0 U	-	3.0 U	-	3.0 U	-
Mercury (dissolved)	ug/L	0.041 JB	-	0.057 JB	-	0.050 JB	-	0.057 JB	-	0.047 JB	-
Pesticides											
0,0,0-Triethylphosphorothioate	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
4,4'-DDD	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
4,4'-DDE	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
4,4'-DDT	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Aldrin	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
alpha-BHC	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
alpha-Chlordane	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Azinphos-methyl	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
beta-BHC	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Bolstar (Sulprofos)	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Chlorpyrifos	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Coumaphos	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
delta-BHC	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Demeton	ug/L	2.1 U	-	1.9 U	-	1.9 U	-	1.9 U	-	2.1 U	-
Demeton-o	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Demeton-s	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Diazinon	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Dichlorvos	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-

TABLE 3

DOUGLAS COUNTY PUBLIC WORKS
MONITORING WELL ANALTYICAL RESULTS
MAY-JUNE 2013

Sample Location		*MW-1*	*MW-1*	*MW-2*	*MW-2*	*MW-3*	*MW-3*	*MW-4*	*MW-4*	*MW-5*	*MW-5*
Sample Date		*5/16/2013*	*6/20/2013*	*5/16/2013*	*6/20/2013*	*5/16/2013*	*6/20/2013*	*5/16/2013*	*6/20/2013*	*5/16/2013*	*6/20/2013*
	Units										
Dieldrin	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Dimethoate	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Disulfoton	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Endosulfan I	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Endosulfan II	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Endosulfan sulfate	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Endrin	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Endrin aldehyde	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Endrin ketone	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
EPN	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Ethyl parathion	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Famphur	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Fensulfothion	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Fenthion	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
gamma-BHC (lindane)	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
gamma-Chlordane	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Heptachlor	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Heptachlor epoxide	ug/L	0.049 U	-	0.049 U	-	0.050 U	-	0.048 U	-	0.050 U	-
Malathion	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Methoxychlor	ug/L	0.098 U	-	0.098 U	-	0.10 U	-	0.095 U	-	0.10 U	-
Methyl parathion	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Mevinphos	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Phorate	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Ronnel	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Stirophos	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Sulfotep	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Thionazin (O,O-diethyl-O-2-pyrazinyl phosphorothic	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Tokuthion	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
Toxaphene	ug/L	3.9 U	-	3.9 U	-	4.0 U	-	3.8 U	-	4.0 U	-
Trichloronate	ug/L	1.0 U	-	0.95 U	-	0.95 U	-	0.97 U	-	1.0 U	-
General Chemistry											
Alkalinity, total (as CaCO3)	mg/L	550 B	-	360 B	-	370 B	-	380 B	-	390 B	-
Ammonia	mg/L	0.67 B	-	0.25 B	-	0.71 B	-	0.42 B	-	0.31 B	-
Chloride	mg/L	16	-	4.1	-	5.0	-	11	-	44	-
Nitrite/Nitrate as N	mg/L	0.33	-	0.10 U	-	0.10 U	-	0.10 U	-	0.10 U	-
Sulfate	mg/L	110	-	77	-	38	-	130	-	110	-
Sulfide	mg/L	0.72 J	-	3.0 U	-	4.6	-	3.0 U	-	3.0 U	-
Total dissolved solids (TDS)	mg/L	680	-	390	-	420	-	490	-	520	-

Notes:

U - Not detected at the associated reporting limit.
B Compound was found in the blank and sample.
J Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value

TABLE 4

DOUGLAS COUNTY PUBLIC WORKS
DOMESTIC WATER WELL ANALTYICAL RESULTS
JUNE 2013

Sample Location		*Paxson*	*Perkins*	*Strong*	*Van LLC*	*Espinosa*	*McElwee*
Sample Date		*6/20/2013*	*6/20/2013*	*6/20/2013*	*6/24/2013*	*6/24/2013*	*6/24/2013*
	Units						
Biological							
Total coliform bacteria	none	Present	Present	Present	Present	Present	Present
Escherichia coli	none	Absent	Absent	Absent	Absent	Absent	Absent
Arsenic	ug/L	5.6 J	10 U	10 U	10 U	4.2 J	3.2 J
Barium	ug/L	830	850	140 J	210	660	310
Cadmium	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	0.32 J
Iron	ug/L	9100	3600	150	100 U	13000	3300
Lead	ug/L	3.0 U	1.6 J	3.0 U	4.9	3.0 U	3.0 U
Mercury	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
General Chemistry							
Alkalinity, total (as CaCO3)	mg/L	330 B	390 B	330 B	330 B	330 B	370 B
Ammonia	mg/L	0.34 B	0.20 B	0.18 B	0.10 B	0.30 B	0.18 B
Chloride	mg/L	5.8B	7.7 B	8.9 B	6.4 B	11	15 B
Nitrite/Nitrate	mg/L	0.039 JB	0.031 JB	21 B	0.034 JB	0.040 JB	0.062 JB
Sulfate	mg/L	47 B	9.3 B	88 B	44 B	78 B	190 B
Sulfide	mg/L	3.0 U	3.0 U	3.0 U	0.72 J	3.0 U	0.38 J
Total dissolved solids (TDS)	mg/L	360	400	500	410	390	550

Notes:

U - Not detected at the associated reporting limit.
B Compound was found in the blank and sample.
J Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value

TABLE 5

DOUGLAS COUNTY PUBLIC WORKS
SUMMARY OF SOIL ANALTYICAL RESULTS
JUNE 2013

Sample Location		*Test Pit 3*
Sample Date		*6/13/2013*
	Units	
Herbicides		
2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP)	ug/kg	9500 U
2,4,5-T	ug/kg	24 U
2,4,5-TP (Silvex)	ug/kg	24 U
2,4-DB	ug/kg	95 U
2,4-Dichlorophenoxyacetic acid (2,4-D)	ug/kg	95 U
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	ug/kg	9500 U
Dalapon	ug/kg	110 U
Dicamba	ug/kg	48 U
Dichlorprop	ug/kg	95 U
Pentachlorophenol	ug/kg	13 U
Metals		
Arsenic	mg/kg	1.9
Barium	mg/kg	82 B
Cadmium	mg/kg	0.081 J
Iron	mg/kg	7700
Lead	mg/kg	6.2
Mercury	mg/kg	0.039 U
Pesticides		
4,4'-DDD	ug/kg	2.0 U
4,4'-DDE	ug/kg	2.0 U
4,4'-DDT	ug/kg	2.0 U
Aldrin	ug/kg	2.0 U
alpha-BHC	ug/kg	2.0 U
alpha-Chlordane	ug/kg	2.0 U
beta-BHC	ug/kg	2.0 U
delta-BHC	ug/kg	2.0 U
Dieldrin	ug/kg	2.0 U
Endosulfan I	ug/kg	2.0 U
Endosulfan II	ug/kg	2.0 U
Endosulfan sulfate	ug/kg	2.0 U
Endrin	ug/kg	2.0 U
Endrin aldehyde	ug/kg	2.0 U
Endrin ketone	ug/kg	2.0 U
gamma-BHC (lindane)	ug/kg	2.0 U
gamma-Chlordane	ug/kg	2.0 U
Heptachlor	ug/kg	2.0 U
Heptachlor epoxide	ug/kg	2.0 U
Methoxychlor	ug/kg	3.9 U
Toxaphene	ug/kg	80 U

TABLE 5

DOUGLAS COUNTY PUBLIC WORKS
SUMMARY OF SOIL ANALTYICAL RESULTS
JUNE 2013

Sample Location		*Test Pit 3*
Sample Date		*6/13/2013*
	Units	
General Chemistry		
Ammonia	mg/kg	7.4 B
Chloride	mg/kg	2.7 JB
Nitrate (as N)	mg/kg	0.74
Nitrite (as N)	mg/kg	0.59 U
Sulfate	mg/kg	2.6 JB
Sulfide	mg/kg	36 U

Notes:

U - Not detected at the associated reporting limit.

B Compound was found in the blank and sample.
J Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value

APPENDIX A

SITE SPECIFIC HEALTH AND SAFETY PLAN

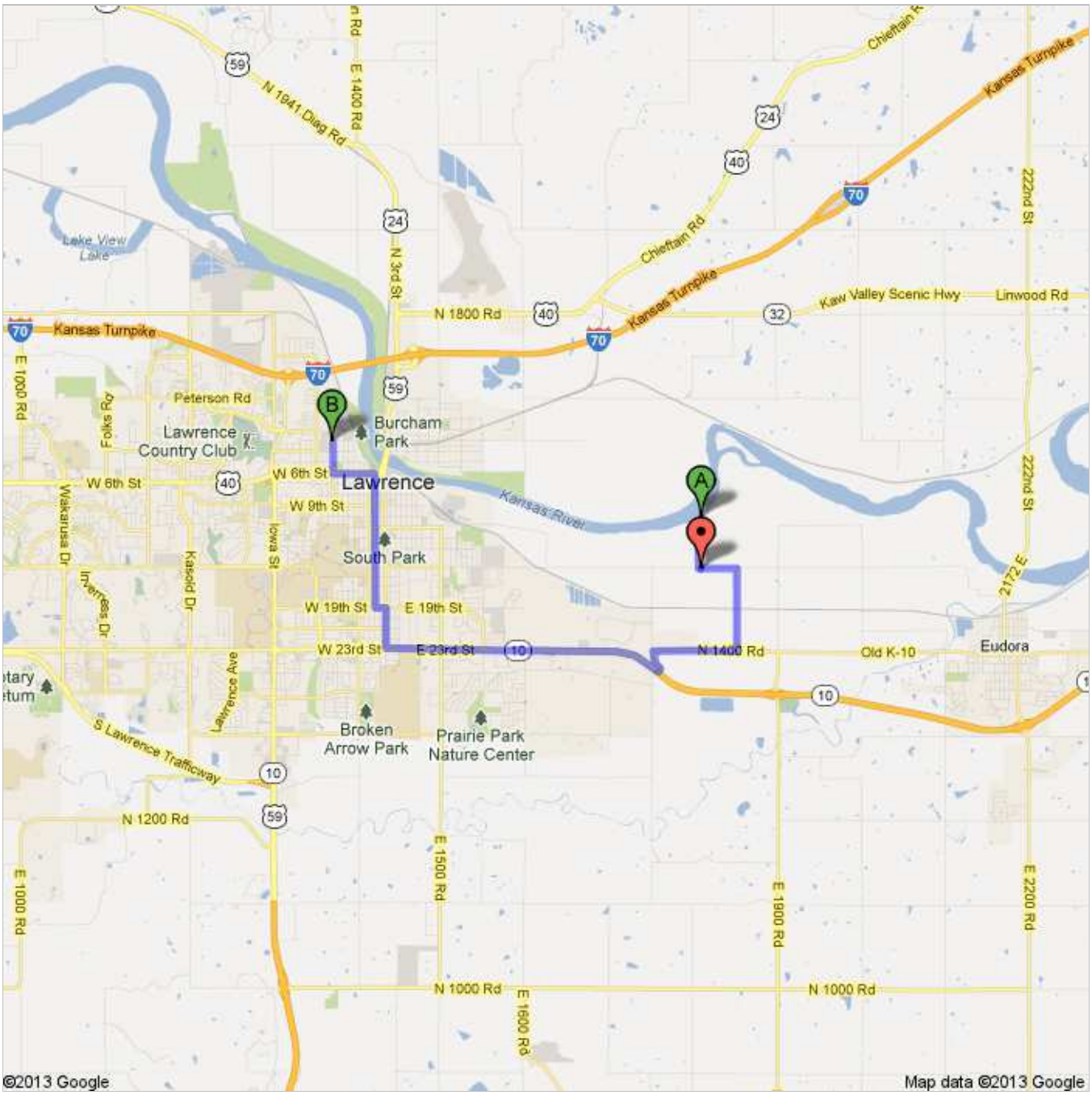
EMERGENCY CONTACT LIST AND HOSPITAL ROUTE MAP

EMERGENCY CONTACT SHEET
CRA HYDROGEOLOGIC STUDY, PENNY'S CONCRETE AND SAND LLC SITE

EMERGENCY INFORMATION		
Contact	**Phone Number**	**Hospital Directions**
Local Police	**785-542-3121** **911**	Directions: 1. Head south on E 1810 Rd toward N 1500 2. Turn right onto N 1500 Rd 3. Continue onto 15th Street 4. Turn right on Kentucky Street 5. Turn left onto 6th Street 6. Turn right onto Maine Street Driving Time: 19 minutes Driving Distance: 6.5 miles **(See Attached Map)**
Fire Department	**785-542-3653** **911**	
Ambulance	**911**	
Local Hospital: Lawrence Memorial Hospital Address: 325 Maine Street Lawrence, Kansas 66044	**785-505-5000**	
National Poison Center	**800-222-1222**	CRA – Incident Reporting Hotline Please call **(866) 529-4886** and provide: • Name and location of caller • Description of incident • Name of any injured persons • Description of injuries • Phone number for return call
Project Manager Kirk Hoeffner Work: Cell:	 785-783-8982 785.249.7062	
Site Supervisor Nick Laskares Work: Cell:	 785-783-8982 913-488-4494	
CRA Regional S&H Manager Matt Downing Work: Cell:	 720-974-0949 720-445-2055	
Site Contact (Name) Work: Cell:		
Client Contact (Name) Work: Cell:		
Other Contact (Name) Work: Cell:		
Person to verify hospital route Nick Laskares	**Signature**	

* Hospital Route must be field validated before site work commences.

Directions to Lawrence Memorial Hospital Emergency Department
325 Maine St, Lawrence, KS 66044
9.8 mi – about **25 mins**



E 1810 Rd/1810E Rd

	1. Head **south** on **E 1810 Rd/1810E Rd** toward **N 1500 Rd** About 2 mins	go 0.6 mi total 0.6 mi
	2. Turn left onto **N 1500 Rd** About 1 min	go 0.5 mi total 1.1 mi
	3. Take the 1st right onto **E 1850 Rd** About 4 mins	go 1.0 mi total 2.1 mi
	4. Take the 1st right onto **Co Rd 442/N 1400 Rd/Old K-10** About 2 mins	go 1.0 mi total 3.1 mi
	5. Turn left onto **E 1750 Rd/Noria Rd**	go 0.3 mi total 3.4 mi
	6. Take the 1st right onto **KS-10 W** About 5 mins	go 3.3 mi total 6.6 mi
	7. Turn right onto **Massachusetts St** About 1 min	go 0.5 mi total 7.2 mi
	8. Turn left onto **W 19th St** About 47 secs	go 0.1 mi total 7.3 mi
	9. Take the 2nd right onto **Kentucky St** About 5 mins	go 1.6 mi total 8.9 mi
	10. Turn left onto **W 6th St** About 55 secs	go 0.5 mi total 9.4 mi
	11. Turn right onto **Maine St** Destination will be on the left About 1 min	go 0.4 mi total 9.8 mi

Lawrence Memorial Hospital Emergency Department
325 Maine St, Lawrence, KS 66044

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

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HEALTH AND SAFETY PLAN
Signature Page

Site Name: Hydrogeologic Study, Penny's Concrete and Sand LLC – Condition Use Permit

Location Address: 1752 N. 1500 Road

Reference No.: 080649 CRA Office: Topeka

Anticipated Start Date: 4/30/13 Anticipated Project Duration: On Going

Prepared By (Signature): Date: 4/11/2013

Project Manager (Signature): Date: 4/15/2013

Reviewed By (Signature:) Date: 4/26/13

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this site-specific health and safety plan (HASP) is to provide specific guidelines and establish procedures for the protection of personnel performing the activities described in Section 2.0 Site Operations. The information in this HASP has been developed in accordance with applicable standards and is, to the extent possible, based on information available to date. The HASP is also a living document, in that it must continually evolve as site conditions and knowledge of the site work activities develop.

A vital element of CRA's Safety and Health Policies and Procedures is the implementation of a site-specific HASP for field activities. The HASP, as applicable to this project, includes the following measures:

- Communicate the contents of this HASP to site personnel.
- Eliminate unsafe conditions. Efforts must be initiated to identify conditions that can contribute to an incident and to remove exposure to these conditions.
- Utilize the STAR (Stop, Think, Act, and Review) process before beginning any activity/task/job, after an incident, and/or during any unusual circumstances. Stop the activities to think about the task, analyze the task hazards and determine methods to reduce risk, and review the results with affected personnel.
- Revise or develop Job Safety Analysis (JSA) forms for activities. Supervisors and affected personnel are responsible for JSA development. A blank JSA form has been included in Appendix B of this HASP.
- Complete behavioral-based safety (BBS) observations via the use of the Safe Task Evaluation Process (STEP).
- Reduce unsafe acts. Please note that 88 percent of all incidents are directly caused by unsafe acts. Use the CRA BBS tools (STEPs, JSAs, STAR, etc.) to reduce the number of unsafe acts. Personnel shall make a conscious effort to work safely. A high degree of safety awareness must be maintained so that safety factors become an integral part of the task. Supervisory personnel shall ensure that personnel committing unsafe acts are held accountable via counseling, mentoring, and, if necessary, reprimand.
- Inspect frequently. Regular documented safety inspections of the work site, materials, and equipment by qualified persons ensure early detection of unsafe conditions. Safety and health deficiencies shall be corrected as soon as possible or

project activities shall be suspended. Documentation of daily inspections and corrective actions should be kept with the project files.

1.2 STOP WORK AUTHORITY

All CRA employees are empowered and expected to stop the work of co-workers, subcontractors, client employees, or other contractors if any person's safety or the environment are at risk. No repercussions will result from this action. Reporting of unsafe condition/acts and/or Stop Work Authority (SWA) shall be documented using the Unsafe Condition/Acts and SWA form located in Appendix A.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated shall result in the removal of site personnel from that area and re-evaluation of the hazard and the levels of protection.

1.3 PERSONNEL REQUIREMENTS

All personnel conducting activities on site must conduct their activities in compliance with all applicable Safety and Health legislation throughout North America to include, but not limited to the Occupational Safety and Health Administration (OSHA) 29 CFR 1910, 29 CFR 1926, and CRA's policies and procedures. **Project personnel must also be familiar with the procedures and requirements of this HASP**. In the event of conflicting safety procedures/requirements, personnel must implement those safety practices affording the highest level of safety and protection.

1.4 SHORT SERVICE EMPLOYEES

CRA Employees identified as Short Service Employees (SSE) (6 months or less) shall not be permitted to work without another non-SSE employee present.

1.5 PROJECT MANAGEMENT AND SAFETY RESPONSIBILITIES

Project Manager – CRA – Kirk Hoeffner

The CRA Project Manager (PM) shall be responsible for the overall implementation of the HASP, and for ensuring that all safety and health (S&H) responsibilities are carried

out in conjunction with this project. This shall include, but is not limited to, review and approval of the HASP, ensuring that the Safe Task Evaluation Process (STEP) forms are completed properly, qualifying and directing subcontractors relative to S&H performance, coordinating all S&H submittals, and consultation with the SS regarding appropriate changes to the HASP. The PM will also ensure that the appropriate resources are provided to support the project with respect to all operations.

Site Supervisor – CRA – Nick Laskares

The Site Supervisor (SS) is the person who, under the supervision of the project manager, shall be responsible for the communication of site requirements to site project personnel and subcontractors, and is responsible for carrying out the safety and health responsibilities by ensuring:

1. Conduct a daily Tailgate Safety meeting that communicates the site-specific hazards for the operations that day and what proactive measure will minimize the hazards. Each meeting must be documented on the Tailgate Safety Meeting Form to include all topics covered and the signatures of those in attendance.
2. All necessary cleanup and maintenance of safety equipment is conducted by project personnel.
3. Emergency phone numbers and services, including hospital and clinic locations, are verified.
4. Site personnel are implementing the STAR process before initiating activities.
5. JSA forms are developed and revised accordingly.
6. Forms attached to the HASP are completed, filed, and submitted correctly, including daily tailgate meetings and completion of daily inspection checklists.
7. A pre-entry briefing is conducted and documented, and serves to familiarize on-site personnel with the procedures, requirements, and provisions of the HASP.

Other duties include overall implementation of the HASP and ensuring that all safety and health responsibilities are carried out in conjunction with the project. This shall include, but is not limited to, review and approval of the HASP, communication of site requirements to subcontractor personnel, and consultation with the client/site representative regarding appropriate changes to the HASP.

The SS is also responsible for enforcing safe work practices for project employees. The SS watches for ill effects on any crew member, especially those symptoms caused by

cold/heat stress or chemical exposure. The SS oversees the safety of visitors who enter the site. The SS maintains communication with the client/site representative(s).

Other specific duties of the SS include:

- Ordering the immediate shutdown and/or stop work of site activities in the case of a medical emergency, unsafe condition, or unsafe practice
- Providing the safety equipment, personal protective equipment (PPE), and other items necessary for employees
- Enforcing the use of required safety equipment, PPE, and other items necessary for employee or community safety
- Conducting job site inspections as a part of quality assurance for safety and health
- Reporting safety and health concerns to site and/or project management as necessary

Regional Safety & Health Manager - CRA – Matt Downing

The Regional Safety & Health Manager (RSHM) is a full-time CRA employee who is trained as a safety and health professional, and serves in a consulting role to the PM and SS regarding potential safety and health issues.

Employee Safety Responsibility

CRA employees are responsible for their own safety as well as the safety of those around them. CRA employees shall use any equipment provided in a safe and responsible manner, as directed by their supervisor.

Employees are directed to take the following actions when appropriate:

- Suspend any operations that may cause an imminent health hazard to employees, subcontractors, or others.
- Utilize the STAR process before initiating work.
- Assist in the development and revision of JSA forms that are appropriate to their current scope of work.
- Prepare, submit, and review behavior-based safety observations using the STEP form. The STEP form is to be used in conjunction with the appropriate JSA to identify positive aspects of task performance as well as to identify any deficiencies associated with the observed task.

- Inspect tools and other equipment before each use or as manufacturer and/or OSHA dictates.
- Correct job site hazards when possible without endangering life or health.
- Report safety and health concerns to the SS, PM, or RSHM.

Subcontractors. CRA subcontractors are responsible for the implementation of their own HASP and agree to comply with its contents. In the event of conflicting safety procedures or requirements, personnel must implement those safety practices that afford the highest level of safety and protection. In addition, non-compliance with safety and health policies and procedures may subject the subcontractor to disciplinary action up to and including termination of their contract with CRA. Subcontractors will be required to attend an initial site orientation and subsequent safety meetings.

Equipment Operators. All equipment operators are responsible for the safe operation of heavy equipment. Operators are responsible for inspecting their equipment on a daily basis to ensure safe performance. Brakes, hydraulic lines, backup alarms, and fire extinguishers must be inspected routinely throughout the project. Equipment will be taken out of service if an unsafe condition occurs. Documentation of daily inspections is required.

Authorized Visitors. Authorized visitors, as approved by Kirk Hoeffner**,** shall be provided with all known information with respect to the site operations and hazards as applicable to the purpose of their visit.

1.6 SITE HASP AMENDMENTS

Any change to the scope of work must be evaluated for its impact on the overall health and safety of the project and associated personnel. A minor change is one that adjusts already documented hazards within the HASP and does not expose site personnel to chemicals above exposure limits, such as the introduction of a new JSA/JLA, Journey Management Plan, or PPE that does not involve a change in respiratory protection. Minor amendments must be documented on the Site Health and Safety Plan Minor Amendment Form located in Appendix A, in addition to notifications to key personnel.

Significant changes to the scope of work require a rewrite and review/approval of the HASP.

1.7 TRAINING REQUIREMENTS

All personnel conducting work at this site shall have completed the appropriate safety and health training as applicable to their job tasks/duties. The required training is referenced throughout the HASP and identified on each JSA form.

1.7.1 SITE-SPECIFIC TRAINING

An initial site-specific training session or briefing shall be conducted by the PM or SS prior to commencement of work activities. During this initial training session, employees shall be instructed on the following topics:

- Personnel responsibilities
- Content and implementation of the HASP
- Site hazards and controls
- Site-specific hazardous procedures (e.g., drilling, excavations, etc.)
- Training requirements
- PPE requirements
- Emergency information, including local emergency response team phone numbers, route to nearest hospital, incident reporting procedures, and emergency response procedures
- Instruction in the completion of required inspections and forms
- Location of safety equipment, such as portable eyewash, first aid kit, fire extinguishers, etc.

The various components of the project HASP will be presented, followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel will not be permitted to enter or work in potentially contaminated areas of the site until they have completed the site-specific training session. Personnel successfully completing the training session shall sign the HASP Training Acknowledgement Form, which is presented in Appendix A.

In addition to the initial site briefing conducted at the commencement of the project, supplemental brief safety meetings shall be conducted by the SS to discuss potential safety and health hazards associated with upcoming tasks and necessary precautions to be taken.

1.7.2 SAFETY MEETING/SAFETY AND HEALTH PLAN REVIEW

"Tailgate" safety meetings will take place each day prior to beginning the day's work. All site personnel will attend these safety meetings conducted by the SS. The safety meetings will cover specific safety and health issues, including the appropriate JSAs, site activities, changes in site conditions, and a review of topics covered in the site-specific pre-entry briefing. The safety meetings will be documented each day with written sign-in sheets containing a list of topics discussed. To assist with the compliance of documentation of the Tailgate safety meetings, there are two formats available. For meetings attended by more than four people, please use the Tailgate Safety Meeting Form-Large Group daily format, which requires one page for each Tailgate safety meeting conducted. If there are four or less people at the site, please use the Tailgate Safety Meeting Form-Small Group multiple-day format, which provides room to document three Tailgate safety meetings on one page. The two Tailgate Safety Meeting Forms (Large Group and Small Group) are located in Appendix A.

2.0 SITE OPERATIONS

2.1 SITE HISTORY/BACKGROUND

The site is currently used for agriculture and is located in the floodplain on the south bank of the Kansas River. Adjacent properties include an existing sand mining operation which historically dredges within the river and other agricultural properties.

2.2 SCOPE OF WORK

The objective of this project is to conduct a hydrogeologic study of the Site to assist Douglas County Public Works with the assessment of impacts the proposed facility would have on the area. Tasks associated with the study will include installing monitoring wells via hollow-stem augering and the subsequent screening and logging of subsurface soils, oversight of excavations of test pits, soil sampling associatied with the test pits, and providing hydrostatic information of the aquifer via slug tests.

This HASP covers the specific site activities that will be conducted by CRA personnel and their subcontractors. These activities are as follows:

- Mobilization of personnel, materials, and equipment to and from the site
- Site reconnaissance activities
- Oversight of drilling activities associcated with the installation of monitoring wells
- Logging and screening of soils
- Monitoring well development
- Monitoring well sampling
- Oversight of excavation activites associated with test pits
- Soil sampling associated with test pit excavation
- Shipping and sample handling
- Logging hydrostatic information associated with performing a slug test
- Installation of River Staffs
- Decontamination of personnel and equipment

If site operations are altered or if additional tasks are assigned, an addendum to this HASP shall be developed to address the specific hazards associated with these changes.

3.0 HAZARD EVALUATION

This section identifies and evaluates the potential chemical, physical, and biological hazards that may be encountered during the completion of this project. These hazards and the anticipated initial exposure levels are based on client data, and historical data

Specific activity JSA forms (located in Appendix B) have been developed to address the hazards associated with the site operations outlined in Section 2.0. New JSAs will be developed on an as-necessary basis if a JSA for that specific task is not available in the HASP. Additionally, current JSAs will be modified and customized in the field to ensure that the task-specific requirements are addressed each time the task is performed.

3.1 CHEMICAL HAZARDS

The chemical hazards associated with conducting site operations include the potential exposure to products used in decontamination of equipment, and support products such as fuel. The potential routes of exposure from these products during normal use may occur through inhalation of vapors and dusts, or direct contact or absorption with the materials. There are no anticipated chemical hazards of concern that might be encountered during the tasks identified in the project's scope of work**.** Should any be encounterd either through soil screening or olfactory indication, a Stop Work Authority will be initiated until further determination can be made on the chemicals of concern and the HASP is amended appropriately.

3.1.1 CHEMICAL HAZARD CONTROLS

Exposure to chemicals, such as those listed Appendix C Material Safety Data Sheets (MSDSs), shall be controlled by:

- Revising JSAs to list chemical hazards and associated hazard controls on a task-specific basis
- Employing dust control measures such as wetting the immediate area
- Using PPE/respiratory protection, as appropriate, in areas known to have concentrations above the specified action level for each contaminant

3.1.2 SKIN CONTACT AND ABSORPTION CONTAMINANTS

Skin contact with chemicals may be controlled by use of the proper PPE and good housekeeping procedures. The proper PPE (e.g., Tyvek®, gloves) as described in Section 4.0 shall be worn for all activities where contact with potentially harmful media or materials is anticipated. Utilize manufacturer data on permeation and degradation to minimize skin contact potential (see Section 4.2.1 for additional information).

3.1.3 HAZARD COMMUNICATION

Personnel required to handle or use hazardous materials as part of their job duties will be trained and educated in accordance with the Hazard Communication standard as applicable. The training shall include instruction on the safe use and handling procedures of hazardous materials, how to read and access MSDSs, and the proper labeling requirements.

The appropriate MSDS for the chemicals in use at the site will be maintained by and available for project personnel throughout the course of the project. A copy of all MSDSs is provided in Appendix C.

3.1.4 FLAMMABLE AND COMBUSTIBLE LIQUIDS

The storage, dispensing, and handling of flammable and combustible liquids must be in accordance with industry standards such as National Fire Protection Agency (NFPA) guidelines. The specific flammable or combustible liquids used at the site may include gasoline, diesel, kerosene, oils, and solvents.

Flammable and combustible liquids are classified according to flash point. This is the temperature at which the liquid gives off sufficient vapors to readily ignite. Flammable liquids have flash points below 100°F (37.8°C). Combustible liquids have flash points above 100°F (37.8°C) and below 200°F (93.3°C).

Storage

Many flammables can ignite at temperatures at or below room temperature. They are far more dangerous than combustibles when they are heated. As a result, these products must be handled very carefully. At normal temperatures, these liquids can release

vapors that are explosive and hazardous to employee health. Exposure to heat can cause some of these liquids to break down into acids, corrosives, or toxic gases. For this reason, flammable and combustible liquids should be stored in cool, well ventilated areas away from any source of ignition. Always consult the MSDS of the product for specific information.

Flammable and combustible liquids must be stored in designated areas. Such areas must be isolated from equipment and work activity that may produce flames, sparks, heat, or any form of ignition, including smoking. The most practical method is the use of one or more approved (commercially available) flammable/combustible liquid storage cabinets.

Cabinets must be labeled "Flammable – Keep Fire Away." Doors must be kept closed and labeled accordingly. Containers must be kept in the cabinet when not in use.

General Requirements

- Keep containers of flammable/combustible liquids closed when not in use.
- Keep flammable/combustible liquids in designated areas and approved cabinets.
- Do not allow use of unapproved containers for transfer or storage. Use only approved safety cans (5-gallon maximum) with a spring closing lid and spout cover, designated to safely relieve internal pressure when exposed to heat or fire.
- Use only approved self-closing spigots, faucets, and manual pumps when drawing flammable/combustible liquids from larger containers/barrels.
- Use only approved metal waste cans with lids for disposal of shop towels/oily rags.
- Designate "Smoking" and "No Smoking" areas.
- Designate fueling areas.
- Observe all signs indicating "No Smoking," "No Flames," and "No Ignition."

Transferring Flammable/Combustible Liquids

- This seemingly routine task can be hazardous if certain precautions are not followed. Grounding and bonding must be observed at all times to prevent the accumulation of static electricity when transferring containers/barrels one to another.
- Drums should be grounded to a grounding rod using a #4 copper conductor.
- Bonding is necessary between conductive containers (e.g., a barrel and a 5-gallon container).

3.2 PHYSICAL HAZARDS

Physical hazards that may be present during project work include: potential for close proximity to heavy equipment and drilling devices, noise, overhead or underground utilities, vehicle traffic, material handling, heavy lifting, excavations, use of hand and power tools, slip/trip/hit/fall injuries, heat/cold stress, working on or near water, boating, biological hazards, other potential adverse weather conditions, working alone, and aggressive or menacing behavior. In addition, personnel must be aware that the protective equipment worn may limit dexterity and visibility and may increase the difficulty of performing some tasks.

3.2.1 HEAVY EQUIPMENT AND DRILLING SAFETY

Heavy Equipment

The following practices shall be adhered to by personnel operating heavy equipment (such as backhoes) and personnel working in the vicinity of heavy equipment:

- Heavy equipment is to be inspected when equipment is initially mobilized, delivered to a job site, or after it is repaired and returned to service, to ensure that it meets all manufacturer and OSHA specifications (e.g., fire extinguishers, backup alarms, etc.).
- Heavy equipment is to be inspected on a daily basis. Documentation of this daily pre-operational inspection is to be filed with the project files.
- Heavy equipment is only to be operated by authorized, competent operators.
- Seat belts are to be provided on heavy equipment that is not designed for stand-up operation.
- Equipment/vehicles whose payload is loaded by crane, excavator, loader, etc. will have a cab shield and/or canopy to protect the operator.
- Personnel will not be raised/lowered in buckets.
- Personnel will not ride on fender steps or any place outside the cab.
- Before leaving the equipment controls, ensure that the equipment is in its safe resting position. For a backhoe, apply the parking brake, put the front loader bucket down on the ground level, and ensure that the rear excavator bucket is locked in the

travel position. Bulldozers and scraper blades, loader buckets, dump bodies, and similar equipment will be fully lowered or blocked when not in use.

- Before raising any booms, buckets, etc., check for overhead obstructions.
- Employees involved in the operation shall not wear any loose-fitting clothing, as it has the potential to be caught in moving machinery.
- Personnel shall wear high visibility safety vests, steel toed shoes, safety glasses, hearing protection, and hard hats during heavy equipment operations.
- When moving heavy equipment or when working within 10 feet of a stationary object or in tight quarters, a spotter will be used.

Drilling Equipment

The following practices shall be adhered to by drilling personnel:

- Equipment should be inspected daily by the operator to ensure that there are no operational problems.
- The kill switch will be function-checked and verified to be operational during the documented daily equipment check.
- Personnel shall be instructed in the location and use of the emergency kill switch on the drill rig.
- Employees involved in the operation shall not wear any loose-fitting clothing, including untied shoe/boot laces, draw strings, etc., which have the potential to be caught in moving machinery.
- Before leaving the controls, shift the transmission controlling the rotary drive into neutral and place the feed lever in neutral. Before leaving the vicinity of the drill, shut down the drill engine.
- Before raising the mast, check for overhead obstructions.
- Before the mast of a drill rig is raised, the drill rig must first be leveled and stabilized with leveling jacks and/or cribbing. Re-level the drill rig if it settles after initial setup. Lower the mast only when the leveling jacks are down, and do not raise the leveling jack pads until the mast is lowered completely.
- During freezing weather, do not touch any metal parts of the drill rig with exposed flesh. Freezing of moist skin to metal can occur almost instantaneously.
- Personnel shall wear steel toed shoes, safety glasses, hearing protection, and hard hats during drilling operations.

- The area shall be roped off, marked, or posted to keep the area clear of pedestrian traffic or spectators.

3.2.2 NOISE

Project activities that include working in close proximity to heavy equipment and/or drilling operations, or using power tools that generate noise levels exceeding the decibel range of 85 dBA, will require the use of hearing protection with a Noise Reduction Rating (NRR) of at least 20. Hearing protection (earplugs/muffs) will be available to personnel and visitors requiring entry into these areas.

When it is difficult to hear a coworker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All site personnel who may be exposed to high noise levels will participate in CRA's Hearing Conservation Program.

3.2.3 UTILITY CLEARANCES

Elevated superstructures (e.g., drill rigs, back hoes, scaffolding, ladders, cranes) shall remain a distance of 10 feet away from utility lines (<50 kV) and 20 feet away from power lines (>50 kV). Underground utilities, if present, shall be clearly marked and identified prior to commencement of work. Follow local/state/provincial regulations and client requirements with regards to utility locating requirements (e.g., One-Call).

Personnel involved in intrusive work shall:

- Confirm proposed excavation(s) and heavy truck routes are not in the area of subsurface utilities. This meeting is to be documented.
- Review and adhere to CRA's Subsurface Utility Clearance Protocol. Use prudent digging techniques inside 18 inches of the outside edge of an underground facility. This distance will vary based on state law, facility/client requirements, etc.
- **Utilize the Property Access/Utility Clearance Data Sheet (QSF-019). This is to be completed prior to initiating excavation activities.**
- Be able to determine the minimum distance from marked utilities, identify the work that can be conducted with the assistance of the locator line service, coordinate document/drawing review, and inspect the site for manholes, catch basins, valve

boxes, etc. that may indicate the direction/depth of underground installations. Marking indicates only the approximate location of buried lines. After obtaining the facility owner's permission, hand dig test holes (or use an equivalent means) in a careful and prudent manner to determine the precise location of underground facility lines. If the location of the lines is still undeterminable after hand digging/probing/soft digging, call the facility owner for additional direction and assistance prior to initiating intrusive operations.

- If you must expose a line, state law requires CRA to protect and support the underground facility line while working at the site.

3.2.4 MATERIAL HANDLING AND STORAGE

Material handling and storage practices to be conducted at the project site include manual lifting of materials and possibly the use of hoisting and rigging equipment. As a rule, use mechanical means for lifting heavy loads whenever possible.

General Storage Practices

The basic safety requirement for storage areas is that the storage of materials and supplies shall not create a hazard. Additional general storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers shall be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. shall be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects should be corrected as they are detected.
- Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Storage areas shall have provisions to minimize manual lifting and carrying. Aisles and passageways shall provide for the movement of mechanical lifting and conveyance devices.
- Stored materials shall not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.

- "NO SMOKING" signs shall be conspicuously posted, as needed, in areas where combustible or flammable materials are stored and handled.

Cylindrical materials such as pipes and poles shall be stored in racks or stacked on the ground and blocked.

Special Precautions for Hazardous or Incompatible Materials Storage

Generally, materials are considered hazardous if they are ignitable, corrosive, reactive, or toxic. Manufacturers and suppliers of these materials must provide the recipient with MSDSs, which describe their hazardous characteristics and give instructions for their safe handling and storage.

Many hazardous materials are incompatible, which means they form mixtures that may have hazardous characteristics not described on the individual MSDSs. The following special precautions shall be followed regarding the storage of hazardous materials:

- Based on the information available on the MSDSs, incompatible materials shall be kept in separate storage areas
- Warning signs shall be conspicuously posted, as needed, in areas where hazardous materials are stored

3.2.5 MANUAL LIFTING

Proper lifting takes the hazard out of moving heavy objects. Below are some items that should be considered prior to a lift.

- Establish that you can lift the load safely; if the load is in excess of 50 pounds, you are required to ask for assistance
- Use a mechanical lifting device if available
- Inspect route to be traveled, confirming sufficient clearance
- Look for any obstructions or spills
- Inspect the object to determine how it should be grasped
- Look for any sharp edges, slivers, or other things that may cause personal injury
- Do not move any object that will obstruct your field of vision when transporting the load

When lifting objects, use the following proper lifting techniques:

- Feet must be parted, with one foot alongside the object being lifted and one foot behind. When the feet are comfortably spread, a more stable lift can occur and the rear foot is in a better position for the upward thrust of the lift.
- Use the squat position and keep the back straight - but remember that straight does not mean vertical. A straight back keeps the spine, back muscles, and organs of the body in correct alignment, and minimizes the compression of the guts that can cause a hernia.
- Grip is one of the most important elements of correct lifting. The fingers and the hand are extended around the object, using the full palm. Fingers have very little power, so use the strength of your entire hand.
- The load must be drawn close, and the arms and elbows must be tucked into the side of the body. Holding the arms away from the body increases the strain on the arms and elbows. Keeping the arms tucked in helps keep the body weight centered.

The body must be positioned so that the weight of the body is centered over the feet. This provides a more powerful line of thrust and also ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

3.2.6 HAND AND POWER TOOLS

Hand Tools

- Hand tools must meet the manufacturer's safety standards
- Hand tools must not be altered in any way
- At a minimum, eye protection must be used when working with hand tools
- Wrenches (including adjustable, pipe, end, and socket wrenches) must not be used when jaws are sprung to the point that slippage occurs
- Impact tools (such as drift pins, wedges, and chisels) must be kept free of mushroom heads
- Wooden handles must be free of splinters or cracks and secured tightly to the tool
- Any damaged or defective tools must be immediately removed from service and tagged for destruction

Power Tools

- All power tools must be inspected regularly and used in accordance with the manufacturer's instructions and the tool's capabilities
- Electric tools must not be used in areas subject to fire or explosion hazards, unless they are approved for that purpose
- Portable electric tools must be connected to a Ground Fault Circuit Interrupter (GFCI) when working in wet areas
- Proper eye protection must be used when working with power tools
- Personnel must be trained in the proper use of each specific tool
- Any damaged or defective power tools must be immediately tagged and removed from service

3.2.7 EXCAVATIONS

All CRA excavation and trenching operations that employees shall enter will be observed by a designated competent person. The competent person shall be responsible for evaluating and inspecting excavation and trenching operations to prevent possible cave-in and entrapment, and to avoid other hazards presented by excavation activities.

Each employee in an excavation shall be protected from cave-ins by one of three systems:

- Sloping and benching systems
- Shoring
- Shielding systems

All excavation and trenching operations shall be conducted in accordance and in compliance with OSHA's Standards for the Construction Industry, specifically outlined in CRA's Safety and Health Program for excavation and trenching activities. At a minimum, the following safety guidelines shall be adhered to while conducting excavation and trenching activities:

- Excavation and trenching operations require pre-planning to determine whether sloping or shoring systems are required, and to develop appropriate designs for such systems. Also, the estimated location of all underground installations must be determined before digging/drilling begins. Necessary clearances must be observed.

- If there are any nearby buildings, walls, sidewalks, trees, or roads that may be threatened or undermined by the excavation, or where the stability of any of these items may be endangered by the excavation, they must be removed or supported by adequate shoring, bracing, or underpinning.
- Excavations may **not** go below the base of footings, foundations, or retaining walls unless they are adequately supported or a person who is registered as a Professional Engineer (PE) has determined that they will not be affected by the soil removal. Civil engineers or those with licenses in a related discipline and experience should be consulted in the design and use of sloping and shoring systems. PE qualifications must be documented in writing.

Access and Egress

Personnel access and egress from trench and/or excavations are as follows:

- A stairway, ladder, ramp, or other means of egress must be provided in trenches greater than 4 feet deep and for every 25 feet of lateral travel
- All ladders shall extend 3 feet above the top of the excavation
- Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design or by a licensed professional engineer

Atmosphere Monitoring and Testing

Air quality is measured using three parameters: oxygen concentration, flammability, and the presence of hazardous substances.

Employees should not be exposed to atmospheres containing less than 19.5 percent oxygen or having a lower flammable limit greater than 10 percent, and employees should not be exposed to hazardous levels of atmospheric contaminants.

Whenever potentially hazardous atmospheres are suspected in excavations and trenches, the atmosphere shall be tested by a competent person. Detector tubes, gas monitors, and explosion meters are examples of monitoring equipment that may be used.

In the event that an unusual odor or liquid is suspected in excavations and trenches, the competent person shall stop work on the site and arrange for air quality assessment and mitigation, if necessary.

Atmospheric testing and monitoring shall be performed in excavations in or adjacent to landfill areas, in areas where hazardous materials are/were stored, or in areas where the presence of hazardous materials is suspected.

Daily Inspections

The competent person shall perform daily inspections of excavations, the adjacent areas, and all protective systems for situations that could potentially result in slope failure.

Additionally, the competent person shall be aware of the potential for confined space situations and other hazardous work conditions.

The competent person shall inspect, evaluate, and complete the excavation checklist at the following intervals:

- Prior to the start of work, after each extended halt in work, and as needed throughout the shift, as new sections of the excavation or trench are opened
- After every rainstorm and other natural or manmade event that may increase the load on the walls of the excavation, or otherwise affect their stability

The inspections shall be documented using the CRA Excavation Inspection Checklist attached to this HASP.

The competent person shall stop the work and instruct all employees to leave the excavation or trench when any potential hazards are detected. The competent person has the **authority** to immediately suspend work if any unsafe condition is detected.

3.2.8 COMPRESSED GAS CYLINDERS

Compressed gases present several hazards. The cylinder must be properly labeled, identifying the hazardous properties of the gas, such as toxicity, flammability, or the presence of an oxidizer, and a MSDS must be supplied by the manufacturer. In addition to the gas hazards, compressed gas cylinders pose other hazards simply because they contain gas under pressure.

Regardless of the properties of the gas, any gas under pressure can explode if the cylinder is improperly stored or handled. Improperly releasing the gas from a

compressed gas cylinder is extremely dangerous. A sudden release of the gas can cause a cylinder to become a missile-like projectile, destroying everything in its path. Cylinders have been known to penetrate concrete-block walls. To prevent such a dangerous situation, there are several general procedures to follow for the safe storage and handling of a compressed gas cylinder:

- Store cylinders in an area specifically designated for that purpose. This area must protect the cylinders from being struck by another object. The area must be well-ventilated, away from sources of heat, and at least 20 feet away from highly combustible materials. Oxidizers must be stored at least 20 feet away from flammable gases.
- Cylinders must not be dropped or allowed to fall. Chain and rack them in an upright position during use and storage. When transporting cylinders, they must be secured from falling.
- When moving a cylinder, even for a short distance, all the valves must be closed, the regulator removed, and the valve cap installed. Never use the valve cap to lift a cylinder.
- Never permit cylinders to contact live electrical equipment or grounding cables.
- Cylinders must be protected from the sun's direct rays, especially in high-temperature climates. Cylinders must also be protected from ice and snow accumulation.

Before the gas is used, install the proper pressure-reducing regulator on the valve. After installation, verify the regulator is working, all gauges are operating correctly, and all connections are tight to ensure that there are no leaks. When you are ready to use the gas, open the valve with your hands. Never use a wrench or other tool. If you cannot open it with your hands, do not use it.

3.2.9 SLIP/TRIP/HIT/FALL

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot check the work area to identify hazards
- Establish and utilize a pathway free of slip and trip hazards
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain

- Carry only loads you can see over
- Keep work areas clean and free of clutter, especially in storage rooms and walkways
- Communicate hazards to on-site personnel
- Secure all loose clothing and ties, and remove jewelry while around machinery
- Report and/or remove hazards
- Keep a safe buffer zone between workers using equipment and tools

3.2.10 HEAT STRESS

Recognition and Symptoms

Temperature stress is one of the most common illnesses faced by project personnel when working in elevated temperatures and/or humidity. Acclimatization and frequent rest periods must be established for conducting activities where temperature stress may occur. Below are listed signs and symptoms of heat stress. Personnel should follow appropriate guidelines if any personnel exhibit these symptoms:

- **Heat Rash**: Redness of skin. Frequent rest and change of clothing.
- **Heat Cramps**: Painful muscle spasms in hands, feet, and/or abdomen. Administer lightly salted water by mouth, unless there are medical restrictions.
- **Heat Exhaustion**: Clammy, moist, pale skin, along with dizziness, nausea, rapid pulse, fainting. Remove to cooler area and administer fluids.
- **Heat Stroke**: Hot dry skin; red, spotted, or bluish; high body temperature of 104°F; mental confusion; loss of consciousness; convulsions or coma. Immediately cool victim by immersion in cool water. Wrap with wet sheet and sponge with cool liquid while fanning, treat for shock. **DO NOT DELAY TREATMENT. COOL BODY WHILE AWAITING AMBULANCE.**

Work Practices

The following procedures will be carried out to reduce heat stress:

- Heat stress monitoring
- Acclimatization
- Work/rest regimes (schedule of breaks) - mandatory breaks scheduled in summer months or during high risk activities for heat stress
- Heat stress safety personal protective equipment (cool-vests, bandanas, etc.)

- Liquids that replace electrolytes, water, and salty foods available during rest
- Use of buddy system

Acclimatization

The level of heat stress at which excessive heat strain will result depends on the heat tolerance capabilities of the worker. Each worker has an upper limit for heat stress, beyond which the resulting heat strain can cause the worker to become a heat casualty. In most workers, appropriate repeated exposure to elevated heat stress causes a series of physiologic adaptations called acclimatization, whereby the body becomes more efficient in coping with the heat stress. Work/rest regimes should be planned as a component of project preparation and discussed during the daily tailgate safety meetings.

Worker Information and Training

All new and current employees who work in areas where there is a reasonable likelihood of heat injury or illness should be kept informed through continuing education programs (e.g., hazards, effects, preventative measures, drug/alcohol interaction).

3.2.11 SUN EXPOSURE

Overexposure to sunlight is a common concern when field activities occur during warm weather conditions. Overexposure can occur on clear, sunny days as well as on overcast and cloudy days. Ultraviolet (UV) rays from the sun can cause skin damage or sunburn, but can also result in vision problems, allergic reactions, and other skin concerns. Two types of UV rays are emitted from the sun: UVA and UVB rays.

UVB rays cause sunburn, skin cancer, and premature aging of the skin. UVB rays stimulate tanning but are also linked to other problems such as impaired vision, skin rashes, and some allergic and other reactions to certain drugs. Extra care should be taken if activities are to be conducted on or near water. Sunlight reflected off the surface of the water is intensified resulting in accelerated effects. The following steps should be taken to protect against overexposure to sunlight:

- **Always Use Sunscreen**: Apply a broad spectrum sunscreen with Sun Protection Factor (SPF) of at least 15 or higher liberally on exposed skin. Reapply every 2 hours or more. Even waterproof sunscreen can come off when you towel off or sweat.

- **Cover Up**: Wearing tightly woven, loose-fitting, and full-length clothing is a good way to protect your skin from UV rays.
- **Wear a Hat**: A hat with a wide brim offers good sun protection to your eyes, ears, face, and the back of your neck – areas particularly prone to overexposure to the sun.
- **Wear Sunglasses That Block 99 to 100 Percent of UV Radiation**: Sunglasses that provide 99 to 100 percent UVA and UVB protection will greatly reduce sun exposure that can lead to cataracts and other eye damage. Check the label when buying sunglasses.
- **Seek Shade**: Shade is a good source of protection, but keep in mind that shade structures (e.g., trees, umbrellas, canopies) do not offer complete sun protection.
- **Limit Time in the Midday Sun**: The sun's rays are strongest between 10 a.m. and 4 p.m. Whenever possible, limit exposure to the sun during these hours.

3.2.12 COLD STRESS

Cold stress is similar to heat stress, in that it is caused by a number of interacting factors including environmental conditions, clothing, and workload, as well as the physical and conditioning characteristics of the individual. Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6°F (37°C), can be life threatening. A drop in core temperature to 95°F (35°C) or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind chill must be considered as it contributes to the effective temperature and insulating capabilities of clothing. The equivalent chill temperature should be used when estimating the combined cooling affect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the body's core temperature.

The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of incidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly, and numb extremities make for

increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F (35°C). This must be taken as a sign of danger to the employees on site, and cold exposures should be immediately terminated for any employee when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

Predisposing Factors for Cold Stress

Certain predisposing factors make an individual more susceptible to cold stress. The project team members are responsible for informing the SHO/SS to monitor an individual, if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

Predisposing factors that will increase an individual's susceptibility to cold stress are listed below:

- **Dehydration:** The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities.
- **Fatigue During Physical Activity:** Exhaustion reduces the body's ability to constrict blood vessels. This results in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat.
- **Age:** Some older and very young individuals may have an impaired ability to sense cold.
- **Poor Circulation:** Vasoconstriction of peripheral vessels reduces blood flow to the skin surface.
- **Heavy Work Load:** Heavy workloads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed by the individual's clothing and is in contact with the skin, cooling of the body will occur.
- **Use of PPE:** PPE usage that traps sweat inside the PPE may increase an individual's susceptibility to cold stress.
- **Lack of Acclimatization:** Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions.

- **History of Cold Injury:** Previous injury from cold exposures may result in increased cold sensitivity.

Prevention of Cold Stress

A variety of measures can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well-balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

- **Acclimatization:** Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiological changes are usually minor and require repeated uncomfortably cold exposures to induce them.
- **Fluid and Electrolyte Replenishment:** Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine-free, non-alcoholic drinks and soup are good sources to replenish body fluids.
- **Eating a Well-Balanced Diet:** Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high-energy foods throughout the day.
- **Warm Clothing:** Maintaining air space between the body and outer layers of clothing is beneficial in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.
- **Work/Rest Regimes:** Schedule work during the warmest part of the day, if possible. Rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

3.2.13 ADVERSE WEATHER CONDITIONS

The SS shall decide on the continuation or discontinuation of work based on current and pending weather conditions. Electrical storms, heavy rains, hurricanes, tornado

warnings, and sustained strong winds (approximately 40 mph) are examples of conditions that would call for the discontinuation of work and evacuation of site.

In addition, no work with elevated super structures (e.g., drilling, crane operations) will be permitted during any type of electrical storm or during wind events that have wind speeds exceeding 40 mph.

3.2.14 WORKING OVER OR NEAR WATER

The procedures outlined in this section are to be implemented by all CRA and subcontractor personnel when there is the potential for slipping or falling into water that is greater than 3 feet in depth. Additionally, these procedures are to be adhered to when water is flowing and has the potential to carry personnel away.

- When working at ground level, a 5-foot "no entry zone" can be established between the work area and the water hazard. The no entry zone is to be clearly defined and/or demarcated. Personnel will not be permitted to enter into this area unless the other provisions of this section are in place.
- Standard guardrails are required on any walking/working surface over or near water.
- Where guardrails are not practical due to impairment of work being performed, other types of safeguarding, such as safety harnesses, lifelines, and lanyards may be used (see CRA's Fall Protection SOP).
- If providing fall protection is not feasible due to the scope of work or location, personnel will be required to wear U.S. Coast Guard-approved life jackets or buoyant work vests. Prior to each use and after each use, the buoyant work vests and life preservers must be inspected for defects that would affect strength and/or buoyancy. Any damaged or defective buoyant work vest or life preserver cannot be used.
- Call in or make prearranged contacts after each activity posing a drowning hazard is completed.
- If work on wet or slippery surfaces above water is necessary, non-slip tape or other methods are to be used to increase traction.
- Ring buoys with a minimum 90 feet of line must be readily available for emergency operations. The distance between buoys cannot exceed 200 feet.

Due to the anticipated scope of work, a life saving skiff may be necessary. However, the SS in conjunction with the RSHM will evaluate current site conditions to determine if a skiff is required. [Identify emergency response preplan for water hazards.]

3.2.15 BOATING SAFETY

Safety precautions must be taken when project activities include working in or from a boat. It is always recommended for operators of small boats or vessels to complete a boating safety course. Some of these courses can now be taken online. In addition, a few states require operators to be licensed.

The following summarizes key guidelines for the safe operation of boats:

1. An approved Type I, II, III, or V personal floatation device (PFD) must be available onboard for each person on the boat. A PFD shall be worn when working in the smaller boats used for collecting samples from bodies of water.
2. Vessels longer than 16 feet in length shall also have an approved Type IV throwable ring buoy or buoyant cushion onboard.
3. No vessel shall be operated in a reckless or negligent manner. Examples of reckless or negligent operation include:
   - Excessive speed in regulated or congested areas
   - Operating in a manner that may cause an accident
   - Operating in a swimming area with bathers present
   - Operating while under the influence of alcohol
   - Operation of a personal watercraft that endangers life or property
4. Every vessel shall display the lights and shapes required by the navigation rules.
5. Accidents should be reported immediately to a law enforcement agency.
6. It is a good idea for all vessels with a motor to have an approved, fully charged fire extinguisher on board.

Operator's Responsibilities

1. Make sure the boat is in top operating condition and that there are no tripping hazards. The boat should be free of fire hazards and have clean bilges.
2. Ensure that safety equipment required by law is on board, equipment is maintained in good condition, and you know how to properly use these devices.
3. File a float plan with a co-worker who is ashore.

4. Have a complete knowledge of the operation and handling characteristics of your boat.
5. Know your position and know where you are going.
6. Maintain a safe speed at all times to avoid collision.
7. Keep an eye out for changing weather conditions and act accordingly.
8. Know and practice the Rules of the Road (Navigational Rules).
9. Know and obey federal and state regulations and waterway markers.
10. Maintain a clear, unobstructed view forward at all times. Scan the water back and forth; avoid tunnel vision. Most boating collisions are caused by inattention.

Overloading

Never overload your boat with passengers and cargo beyond its safe carrying capacity. Too many people and/or gear will cause the boat to become unstable. Always balance the load so that the boat maintains proper trim. Here are some things to remember when loading your boat:

1. Distribute the load evenly fore and aft from side to side.
2. Keep the load low.
3. Keep passengers seated (do not stand up in a small boat).
4. Fasten gear to prevent shifting.
5. Do not exceed the "U.S. Coast Guard Maximum Capacities" information label (commonly called the Capacity Plate). This plate displays three important items: a) the maximum weight of persons on board in pounds; b) the maximum carrying weight of the vessel in pounds; and c) the maximum horsepower recommended for the boat.
6. If there is no capacity plate, use the following chart as a guide to determine the maximum number of persons you can safely carry in calm weather. The chart is applicable only to mono-hull boats less than 20 feet in length. A mono-hull is a boat that makes a single "footprint" in the water when loaded to its rated capacity. For example, a catamaran, trimaran, or a pontoon boat is not a mono-hull boat.

Maximum Persons	1	2	2	3	4	5	6	7
Boat Length (feet)	6	8	10	12	14	16	18	20

Or use the following formula to determine the safe loading capacity when a capacity plate is not available.

FORMULAS FOR SAFE LOADING			
Horsepower Capacity: For small, flat-bottom boats: Multiply boat length (feet) times transom width (feet)		**Person Capacity:** Average weight per person is 150 lbs	
If answer is: 35 or less 36-39 40-42 43-45 46-52	Maximum HP is: 3 5 7.5 10 15	(Boat length X Boat width) 15	= Number of People
Note: for flat-bottom, hard chine boats, with an answer of 52 or less, reduce one increment (e.g., 5 to 3).		Boat length and width are measured in feet. Round fractions down to next lower number.	

Always check the capacity plate to make sure you are not overlooking or over-powering the vessel. A motor larger than recommended will make the stern too heavy and can cause the boat to flip. The transom will ride too low in the water and you could be swamped by your own wake or a passing boat's wake. Your boat will not sit properly in the water and will be difficult to handle.

Too many people (and/or gear) will also cause the boat to become unstable. Always balance the load so that your vessel maintains proper trim. Too much weight to one side or the other will cause the boat to list and increase the chance of taking on water. Too much weight in the bow causes the vessel to plow through the water and too much weight in the stern will create a large wake. All of these situations make the vessel difficult to handle and susceptible to swamping.

Anchoring

Anchoring is done for two principal reasons: to stop and stay in one location and to keep you from running aground in bad weather as a result of engine failure. Anchoring can be a simple task if you follow these guidelines:

1. Make sure you have the proper type of anchor (Danforth/plow/mushroom).
2. A 3- to 6-foot length of galvanized chain should be attached to the anchor. The chain will stand up to the abrasion of sand, rock, or mud on the bottom much better than a fiber line.

3. A suitable length of nylon anchor line should be attached to the end of the chain (this combination is called the "Rode"). The nylon will stretch under heavy strain cushioning the impact of the waves or wind on the boat and the anchor.
4. Determine depth of water and type of bottom (preferably sand or mud).
5. Calculate the amount of anchor line you will need. As a general rule, five to seven times as much anchor line as the depth of water plus the distance from the water to where the anchor will attach to the bow. For example, if the water depth is 8 feet and it is 2 feet from the top of water to your bow cleat, you would multiply 10 feet x 5 to 7 to get the amount of anchor line to put out.
6. Secure the anchor line to the blow cleat at the point you want it to stop.
7. Bring the bow of the vessel into the wind or current.
8. When you get to the spot you want to anchor, place the engine in neutral.
9. When the boat comes to a stop, slowly lower the anchor. Do not throw the anchor over, as it will tend to entangle the anchor.
10. When all anchor line has been let out, back down on the anchor with engine in idle reverse to help set the anchor.
11. When anchor is firmly set, use reference points (landmarks) in relation to the boat to make sure you are not drifting. Check these points frequently.

Do not anchor by the Stern!!

Anchoring a small boat by the stern has caused many to capsize and sink. The transom is usually squared off and has less freeboard than the bow. In a current, the force of the water can pull the stern under. The boat is also vulnerable to swamping by wave action. The weight of a motor, fuel tank, or other gear in the stern increases the risk.

Fueling Precautions

Most fires and explosions happen during or after fueling. To prevent an accident follow these rules:

1. Portable tanks should be refueled ashore.
2. Close all hatches and other openings before fueling.
3. Extinguish all smoking materials.
4. Turn off engines, all electrical equipment, radios, stoves and other appliances.
5. Remove all passengers.

6. Keep the fill nozzle in contact with the tank and wipe up any spilled fuel.
7. Open all ports, hatches, and doors to ventilate.
8. Run the blower for at least 4 minutes.
9. Check the bilges for fuel vapors before starting the engine.
10. Do the "sniff test." Sniff around to make sure there is no odor of gasoline anywhere in the boat.

Fuel Management

Practice the "One-Third Rule" by using:

1. One-third of the fuel going out
2. One-third to get back
3. One-third in reserve

Weather

You should never leave the dock without first checking the local weather forecast. You can get the weather information from the TV, radio, local newspaper, online, or from one of the weather channels on your VHF radio.

At certain times of the year, weather can change rapidly and you should continually keep a "weather eye" out. While you are out in a boat, here are a few signs that indicate an approaching weather change.

1. Weather changes generally come from the west. Scan the sky, especially to the west.
2. Watch for cloud build-up, especially rapid vertically rising clouds.
3. Sudden drop in temperature.
4. Sudden change in wind direction and/or speed.
5. If you have a barometer on your boat, check it every 2 to 3 hours. A rising barometer indicates fair weather and rise in wind velocity; a falling barometer indicates stormy or rainy weather.

What To Do in Severe Weather

1. Reduce speed, but keep just enough power to maintain headway.

2. Put on your PFD.
3. Turn on running lights.
4. Head for nearest shore that is safe to approach, if possible.
5. Head the bow of the boat into the waves at about a 45-degree angle.
6. Keep bilges free of water.
7. Seat passengers on the bottom of the boat near the centerline.
8. If the engine fails, trail a sea anchor on a line from the bow to keep the boat headed into the waves. A bucket will work as a sea anchor in an emergency.

ANCHOR THE BOAT IF NECESSARY.

3.2.16 SPECIAL WORK CONDITIONS/SITUATIONS

CRA may be asked to conduct work that requires special precautions/considerations due to the following factors:

• Remote work locations.	Mandatory: No working alone, Journey Management Plan, call in procedure to include use of satellite phone if no cell or direct line access.
• Project site is in an area known for high crime or violence activity.	Mandatory: No working alone, police or security escort.
• Entry into abandoned buildings.	Mandatory: No working alone, call in procedure.
• Entry into wooded areas during hunting season.	Mandatory: No working alone, reflective vest, Journey Management Plan, call in procedure.
• Project work involving single employees (lone worker).	Mandatory: Call in procedure.

If these situations are possible, please consult with your Regional Safety Manager to develop a plan.

Safety During Hunting Season

A significant number of hunting clubs and deer stands may be in the project area; precaution is advised. During hunting season, blaze orange vests and hats must be

worn at all times. Also, unless absolutely required, avoid field surveys or land entry before 10 a.m. and after 3 p.m. during active hunting. When walking or driving on or near active hunting areas, make noise at regular intervals using air horn, whistle, or equivalent. Be aware the large animals are on the move and drive accordingly.

3.2.17 AGGRESSIVE OR MENACING BEHAVIOR

When confronted by an individual whose behavior becomes aggressive or menacing, staff should remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call 911. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.

The use of physical force is justified when a person believes that such force is necessary to protect himself or herself against the use or imminent use of unlawful physical force by another person. The use of physical force is also justified in the defense of another party, such as a co-worker, who is being subjected to unlawful physical force. Staff members can use any technique of legal self-defense in order to halt or distract an attacker until law officers arrive on the scene.

Should an aggressor only be interested in the taking or damaging of property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, facial piercings, scars, hair color, and weapon, if any.

File an Incident Report with your immediate supervisor who will forward same accordingly.

3.3 BIOLOGICAL HAZARDS

CRA employees conduct numerous project activities that may encounter biological hazards, including bloodborne pathogens, insects, spiders, scorpions, rodents, snakes, and large predators. This section identifies precautions to be taken if these hazards are encountered.

3.3.1 VEGETATION OVERGROWTH

Overgrown weeds, bushes, trees, grass, and other vegetation are fire and safety hazards. A number of hidden hazards may not be immediately recognized due to the overgrowth of vegetation in areas where field activities may occur, including discarded junk, litter, and debris. Construction materials such as boards, nails, concrete, and other debris may be hidden beneath tall grass, weeds, and bushes. Other hazards may include steep slopes, potholes, trenches, soft spots, dips, etc., all dangerously concealed from the view of the individual walking or operating motorized equipment in the area. Additionally, biological hazards such as snakes, ticks, chiggers, and mosquitoes may be present, as they breed in overgrowth conditions.

Here are some simple actions you can take:

- Assess the work area and determine if the area requires vegetation clearance. Consider that overgrowth extending above the lowest level of motorized equipment (i.e., bumper or fender) or 6 inches above your ankle has hidden hazards that you will not be able to readily identify.
- Determine if the area is safe to walk or whether you need motorized equipment. Consider the limitations of the equipment.
- Identify slip, trip, and fall hazards and remove from the general work area. Remember to give adequate clearance so that the items being removed do not pose future hazards.
- Adequately protect yourself against the hazards by wearing boots that protect the ankles, wearing long pants, and using insecticides.
- Consider the limitations of manual or mechanical equipment for the clearance of overgrowth, particularly the safety hazards when using sling blades, machetes, weed eaters, bush hogs, or other brush removing equipment.

Before taking any action, determine whether there any ecological issues that would affect or prevent the removal of overgrowth in protected areas such as wetlands, wildlife habitats, or sanctuaries for endangered and/or protected species.

3.3.2 POISONOUS PLANTS

Common **poison ivy** grows as a small plant, a vine, and a shrub. Poison ivy occurs in every state. The leaves always consist of three glossy leaflets. **Poison sumac** grows as a

woody shrub or small tree 5 to 25 feet tall. It usually contains nine leaves, with eight paired leaves and one on top, and is common in swampy areas. The plants are potent sensitizers and can cause a mild to severe allergic reaction, referred to as "contact dermatitis." ***These plants are found in the U.S. and Canada.***

Dermatitis, in Rhus-sensitive persons, may result from contact with the milky sap found in the roots, stems, leaves, and fruit, and may be carried by contacted animals, equipment, or apparel.

The best form of prevention is to avoid contact. Wearing long sleeves, gloves, and disposable clothing, such as Tyvek, is recommended in high-risk areas to avoid exposure from contaminated apparel. Barrier creams and cleaners are also recommended.

3.3.3 INSECTS

Ticks

Ticks are blood feeding external parasites of mammals, birds, and reptiles throughout the world. Some human diseases of current interest in the United States caused by tick-borne pathogens include Lyme disease, ehrlichiosis, babesiosis, Rocky Mountain spotted fever, tularemia, and tick-borne relapsing fever. Lyme disease is caused by a bacterial parasite called spirochete and is spread by infected ticks that live in and near wooded areas, tall grass, and brush. The ticks that cause the disease in the Northeast and Midwest are often no bigger than a poppy seed or a comma in newsprint. The peak months for human infection are June through October. Many other tick-borne diseases, such as Rocky Mountain spotted fever, can be carried by a variety of ticks. The prevention and treatment of these diseases are similar to those of Lyme disease.

Prevention

Preventative measures include wearing light-colored clothing, keeping clothing buttoned, tucking pant legs in socks, and keeping shirttails tucked in. Periodic checks for ticks should be made during the day, and especially at night. Hair should also be checked by parting it and combing through it to make sure that no ticks have attached to the scalp. Also, check clothing when it is first removed, before ticks have a chance to crawl off. A shower or bath should be taken as soon as possible after leaving the site for the day.

The most common repellent recommended for ticks is N,N-dimethyl-m-toluamide, or DEET. It is important to follow the manufacturer's instructions found on the container with all insecticides, especially those containing DEET.

In general, DEET insect repellent should only be applied to clothing, not directly on the skin. Do not apply to sunburns, cuts, or abrasions. Use soap and water to remove DEET once indoors. However, the DEET user is required to read the insect repellant label and/or MSDS for safe use requirements. If ticks are not responding to DEET or other safety methods, then the PM and RSHM are to be notified and additional safety controls may be utilized.

Removal

The best way to remove a tick is removal by tweezers. If tweezers are not available, cover your fingers (tissue paper) while grasping the tick. It is important to grasp the tick as close as possible to the site of attachment and use a firm steady pull to remove it. When removing the tick, be certain to remove all the mouth parts from your skin so as not to cause irritation or infection. Wash hands immediately after with soap and water, and apply antiseptic to the area where tick was removed. Get medical attention if necessary.

Symptoms of Lyme Disease

The first symptoms of Lyme disease usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick attached, and is often bulls eye-like with red on the outside and clear in the center. The rash may be warm, itchy, tender, and/or "doughy" and appears in only 60 to 80 percent of infected persons. An infected person also has flu-like symptoms of fever, fatigue, chills, headaches, a stiff neck, and muscle aches and pains (especially knees). Rashes may be found some distance away from original rash. Symptoms often disappear after a few weeks.

Bees, Wasps, and Yellow Jackets

Stinging insects are members of the order Hymenoptera of the class Insecta. There are two major subgroups: Apidae (honeybees and bumblebees) and vespids (wasps, yellow jackets, and hornets). Apidae are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detach after a sting. Vespids have few barbs and can inflict multiple stings.

Types of stinging insects that might be encountered on this project site may include:

- Carpenter bees
- Bumblebees
- Mud dauber wasps
- Africanized killer bees
- Cicada killer wasps
- Giant hornets
- Honeybees
- Paper wasps
- Yellow jackets

Symptoms

If you are stung, three types of reactions are possible: a normal, a toxic, or an allergic reaction.

- **Normal Reaction**: Only lasts a few hours and consists of pain, redness, swelling, itching, and warmth near the sting area
- **Toxic Reaction**: Will last for several days, results from multiple stings, and may cause cramps, headaches, fever, and drowsiness
- **Allergic Reaction:** Can cause hives, itching, swelling, tightness in the chest area, and a possibility of breathing difficulties, dizziness, unconsciousness, and cardiac arrest.

The stingers of many Hymenoptera may remain in the skin and should be removed as quickly as possible without concern for the method of removal. An ice cube placed over the sting will reduce pain; aspirin may also be useful. Persons with known hypersensitivity to such stings should carry a kit containing epinephrine in a prefilled syringe. Antihistamines may help decrease hives and angioedema. Persons who have severe symptoms of anaphylaxis, have positive venom skin test results, and are at risk for subsequent stings should receive immunotherapy regardless of age or time since anaphylaxis.

Precautions

The following precautions can help you avoid stings. Try to wear light colored clothing and shy away from dark or floral prints. Avoid wearing perfumes, hairsprays, colognes, and scented deodorants while working outside. If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects as well. Never swat or swing at the insect; it is best to wait for it to leave, softly blow it away, or gently brush it aside. Seek medical attention when the reaction to a sting includes swelling, itching, dizziness, or shortness of breath.

If physical control measures are not effective, use a pesticide that will have a minimal impact on both you and the environment.

Mosquitoes

Mosquitoes are common pests that can be found in any state and any work environment where warm, humid conditions exist. Mosquitoes can pass along diseases such as West Nile virus and malaria. Several different methods can be used to control adult mosquito populations: repellants such as DEET, mosquito traps, foggers, and vegetation and water management. ***Mosquitoes are found from the tropics to the Arctic Circle and from lowlands to the peaks of high mountains***.

3.3.4 POISONOUS SPIDERS

Black Widow

Black Widow spiders are not usually deadly (especially to adults) and only the female is venomous. The female spider is shiny black, usually with a reddish hourglass shape on the underside of her spherical abdomen. Her body is about 1.5 inches long, while the adult male's is approximately half that. The spider's span ranges from 1 to 3 inches. The adult males are harmless, have longer legs, and usually have yellow and red bands and spots over their back, while the young black widows are colored orange and white. The bite of a black widow is often not painful and may go unnoticed. However, the poison injected by the spider's bite can cause severe reactions in certain individuals.

Symptoms

Symptoms include abdominal pain, profuse sweating, swelling of the eyelids, pains to muscles or the soles of the feet, salivation and dry-mouth (alternating), and paralysis of the diaphragm. If a person is bitten, they should seek immediate medical attention. Clean the area of the bite with soap and water. Apply a cool compress to the bite location. Keep effected limb elevated to about heart level. Ask a doctor if Tylenol or aspirin can be taken to relieve minor symptoms. Additional information can be obtained from the Poison Center (1-800-222-1222). ***Black widows are found throughout the tropics, U.S., and Canada.***

Brown Recluse

Brown recluse spiders are usually light brown in color, but in some instances they may be darker. Brown recluse spiders are highly venomous spiders, native to the United States, and found coast to coast. The brown recluse can vary in size, but some can obtain bodies of 5/8 inches in length with a leg span of 1 1/2 inches in diameter. They can be identified by their three pairs of eyes along the head area and their fiddle shaped

markings on the back. Most brown recluse bites are defensive rather than offensive. They generally only bite when they feel threatened.

Symptoms

If bitten by a brown recluse, an individual may experience open, ulcerated sores, which when left untreated may become infected and cause tissue necrosis. If an individual believes a spider has bitten them, they need to seek medical attention as soon as possible. In order to minimize the occurrence of brown recluse bites, individuals should shake their clothing and shoes thoroughly, eliminate the presence of cluttered areas, and spray the building perimeters with pesticides. ***Brown recluse are found throughout the U.S., Mexico, and Canada.***

3.3.5 THREATENING DOGS

If you are approached by a frightened or menacing dog:

- Do not attempt to run and don't turn your back
- Stay quiet, and remember to breathe
- Be still, with arms at sides or folded over chest with hands in fists
- Slowly walk away sideways
- Don't stare a dog in the eyes, as this will be interpreted as a threat
- Avoid eye contact
- If you have a jacket, you could wrap it around your arm and should he snap, take the bite harmlessly

3.3.6 RODENTS

Rodentia: (rats, mice, beavers, squirrels, guinea pigs, capybaras, coypu)

Rodents, or Rodentia, are the most abundant order of mammals. There are hundreds of species of rats; the most common are the black and brown rat.

The **Brown Rat** has small ears, blunt nose, and short hair. It is approximately 14 to 18 inches long (with tail). They frequently infest garbage/rubbish, slaughterhouses, domestic dwellings, warehouses, shops, and supermarkets; they also frequent any space with an easy meal and potential nesting sites.

The **Black Rat** can be identified by its tail, which is always longer than the combined length of the head and body. It is also slimmer and more agile than the Norwegian or Brown rat. Its size varies according to its environment and food supply.

The **House Mouse** has the amazing ability to adapt and now can frequently be found in human dwellings. In buildings, mice will live anywhere and they are very difficult to keep out. Mice are also totally omnivorous; in other words, they will eat anything.

Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when excavation work disturbs their in-ground nesting locations or their food source is changed.

There are six major problems caused by rats and mice:

1. They eat food and contaminate it with urine and excrement.
2. They gnaw into materials such as paper, books, wood, or upholstery, which they use as nest material. They also gnaw plastic, cinder blocks, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard.
3. Rats occasionally bite people and may kill small animals.
4. They, or the parasites they carry (such as fleas, mites, and worms), spread many diseases such as salmonella, trichinosis, rat bite fever, hantavirus, Weil's disease, and the bubonic plague.
5. Rats can damage ornamental plants by burrowing among the roots or feeding on new growth or twigs. They also eat some garden vegetables, such as corn and squash.
6. Rats and mice are socially unacceptable. These rodents have been a problem for centuries, chiefly because they have an incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs.

3.3.7 SNAKES

Snakes may be found in any region of the country. While many snakes encountered are not venomous, a few are, so all snakes should be given a wide berth. Of the 7,000 venomous snakebites reported each year, only about 15 prove to be fatal, so your

chances of survival are extremely high. The usual snake encounter is one in which they see you before you see them, and they slither away from you quickly, startling you. If you see a snake, back away from it slowly and do not touch it. If you or someone you know are bitten, try to see and remember the color and shape of the snake, which can help with treatment of the snakebite.

Venomous snakes include the coral snake and pit vipers, such as the cottonmouth (water moccasin), copperhead, and rattlesnake. The venom of pit vipers is primarily *hematoxic* because it acts upon the victim's blood system. This venom breaks down blood cells and blood vessels and affects heart action. Bite victims experience severe burning pain, localized swelling and discoloration for the first 3 to 30 minutes, followed by nausea, vomiting, occasional diarrhea, and usually shock.

Preventing Snakebites

The best ways to prevent snakebites are to watch where you step, put your hands, or sit down. Poisonous snakes live on or near the ground and often like rocks, woodpiles, and other spots that offer both a place to sun and a place to hide. Most bites occur in and around the ankle. About 99 percent of all bites occur below the knee, except when someone accidentally picks up or falls on the snake.

Watching where you step and wearing boots in tall grass can prevent most snakebites. Snake chaps can also help protect against snakebites.

Signals that indicate a poisonous snakebite include:

- One or two distinct puncture wounds, which may or may not bleed - the exception is the coral snake, whose teeth leave a semicircular mark
- Severe pain and burning at the wound site immediately after or within 4 hours of the incident
- Swelling and discoloration at the wound site immediately after or within 4 hours of the incident

Emergency First Aid for Poisonous Snakebite

Although it is important to obtain medical aid immediately, emergency first aid can slow the spread of poison from the bite. Remain calm and avoid unnecessary movement, especially if someone is with you. The rate of venom distribution throughout your body will be slower if you are still and quiet. *Do not* use home remedies, and *do not* drink alcoholic beverages.

To care for a bite from a pit viper, such as a rattlesnake, copperhead, or cottonmouth, follow these steps:

- Call 9-1-1 or the local emergency number
- Wash the wound
- Keep the injured area still and lower than the heart; if possible, carry a person who must be taken to a medical facility or have him or her walk slowly
- Do not apply ice
- Do not cut the wound
- Do not apply suction
- Do not apply a tourniquet
- Do not use electric shock, such as from a car battery

Care for a bite from an elapid snake, such as a coral snake, is the same as for a pit viper, except that after washing the wound you should apply an elastic roller bandage by following these steps (see Section 10 for more information on using an elastic bandage):

- Check for feeling, warmth, and color of the limb beyond where you will be placing the bandage by noting changes in skin color and temperature.
- Place the end of the bandage against the skin and use overlapping turns.
- Gently stretch the bandage as you continue wrapping. The wrap should cover a long body section, such as an arm or a calf, beginning at the point farthest from the heart. For a joint like a knee or ankle, use figure-eight turns to support the joint.
- Always check the area above and below the injury site for feeling, warmth, and color, especially fingers and toes, after you have applied an elastic roller bandage. By checking before and after bandaging, you will be able to tell if any tingling or numbness is from the bandaging or the injury.
- Check the snugness of the bandaging—a finger should easily, but not loosely, pass under the bandage.
- Keep the injured area still and lower than the heart. If possible, carry a person who must be taken to a medical facility or have him or her walk slowly.
- Do not apply ice.
- Do not cut the wound.
- Do not apply suction.

- Do not apply a tourniquet.
- Do not use electric shock, such as from a car battery.

3.3.8 BLOODBORNE PATHOGENS

Hepatitis and other communicable diseases are largely transmitted through exposure to bodily fluids containing the hepatitis virus, which could be found on refuse encountered in subsurface investigations. This includes activities occurring at landfills, sewage treatment facilities, sewers, topical spreading of treated waste and medical wastes (e.g., contaminated needles and syringes). Additionally, these diseases can be transmitted while rendering first aid or CPR in an emergency situation. Individuals performing tasks for these types of project should consult with their physicians and be properly vaccinated. The primary method of transmission depends on the prevalence of the disease in a given area.

Hepatitis A is a liver disease caused by the hepatitis A virus. Hepatitis A can affect anyone and can occur in situations ranging from isolated cases of disease to widespread epidemics.

Hepatitis B is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death.

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV), which is found in the blood of persons who have the disease. HCV is spread by contact with the blood of an infected person.

Hepatitis D is a liver disease caused by the hepatitis D virus (HDV), a defective virus that needs the hepatitis B virus to exist. HDV is found in the blood of persons infected with the virus.

Hepatitis E is a liver disease caused by the hepatitis E virus (HEV) and is transmitted in much the same way as hepatitis A virus. Hepatitis E, however, does not often occur in North America.

Prevention

Preventative measures include wearing appropriate PPE: cut and puncture resistant gloves, a long sleeved shirt, and safety footwear with puncture resistant soles. If you

choose to respond to someone in need of first aid or CPR, protect yourself by using latex or nitrile gloves, safety glasses with side shields or goggles, and a CPR shield/barrier. Wash thoroughly with soap and water after contact with any bodily fluids and report the contact to your supervisor.

Drug Activity

The safe retrieval and disposal of used hypodermic needles and syringes:

CRA employees may not handle or remove any hypodermic needles or syringes due to the potential for exposure to bloodborne pathogens. You should use SWA and contact the local Police Department, Fire Department or Health Department for removal from the jobsite.

If you are injured by a discarded needle, you can receive a vaccination against Hepatitis B within 48 hours of the incident.

First Aid Treatment:

If an accident occurs where a needle or other sharp object has punctured the skin, then the following advice is recommended:

The injured person should:

- Encourage the wound to bleed gently
- Wash well with soap under cold running water
- Cover the wound with a waterproof dressing
- Seek medical attention as soon as possible
- Inform your Supervisor and/or Project Manager

Complete the accident/incident form

3.4 AGRICULTURAL HAZARDS

Special Note for Farm Visits

- The need to be aware of the dangers associated with heavy equipment still exists when on location. Ensure that the operator is aware of your presence, be mindful of the blind spots the operator may have, and wear reflective vests if you are in an area where farm equipment traffic is a potential hazard.

- Ensure that the farm operator is aware of your presence before beginning work activities.

4.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

4.1 GENERAL

This section shall cover the applicable personal protective equipment (PPE) requirements, which shall include eye, face, hand, head, foot, and respiratory protection.

The purpose of PPE is to shield or isolate individuals from the chemical and physical hazards that may be encountered during work activities.

4.2 TYPES OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE required for a project will vary based on the level of protection required to protect the employee from physical, chemical, biological, and thermal hazards.

4.2.1 TYPES OF PROTECTIVE MATERIAL

Protective clothing is constructed of a variety of different materials for protection against exposure to specific chemicals. No universal protective material exists. All will decompose, be permeated, or otherwise fail to protect under certain circumstances.

Fortunately, most manufacturers list guidelines for the use of their products. These guidelines usually concern gloves or coveralls and generally only measure rate of degradation (failure to maintain structure). It should be noted that a protective material may not necessarily degrade but may allow a particular chemical to permeate its surface. For this reason, guidelines must be used with caution. When permeation tables are available, they should be used in conjunction with degradation tables.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all site personnel using PPE:

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift
- Inspect all clothing, gloves, and boots both prior to and during use for
  - Imperfect seams
  - Non-uniform coatings
  - Tears

- Poorly functioning closures

- Inspect reusable garments, boots, and gloves both prior to and during use for
  - Visible signs of chemical permeation
  - Swelling
  - Discoloration
  - Stiffness
  - Brittleness
  - Cracks
  - Any sign of puncture
  - Any sign of abrasion

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of chemicals will not be reused.

4.3 RESPIRATORY PROTECTION

The PM has evaluated this condition and determined that it is not a hazard for this site or project based upon the current work scope. If conditions change indicates the need to upgrade to Level C PPE, SWA will be exercised. The PM, SS, and RSHM will review the changes and the HASP will be revised to include this section. Those affected will be notified.

4.4 LEVELS OF PROTECTION

The level of protection must correspond to the level of hazard known or suspected in the specific work area. PPE has been selected with specific considerations to the hazards associated with site activities. The specific PPE to be used for each activity is outlined in each JSA table located in Appendix B.

- All PPE will be disposed of and/or decontaminated at the conclusion of each workday as described below. Decontamination procedures will follow the concept of decontaminating the most contaminated PPE first.

- All disposable equipment shall be removed before meal breaks and at the conclusion of the workday, and replaced with new equipment prior to commencing work.
- Eating, drinking, chewing gum or tobacco, and smoking are prohibited while working in areas where the potential for chemical and/or explosive hazards may be present. Personnel must wash thoroughly before initiating any of the aforementioned activities.

4.4.1 REASSESSMENT OF PROTECTION LEVELS

Protection levels provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or the review of the results of air monitoring or the initial exposure assessment-monitoring program, if one was conducted.

When a significant change occurs, the hazards shall be reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase
- Change in job tasks during a work phase
- Change of season/weather
- Temperature extremes or individual medical considerations limit the effectiveness of PPE
- Chemicals other than those expected to be encountered are identified
- Change in ambient levels of chemicals
- Change in work scope, which affects the degree of contact with areas of potentially elevated chemical presence

All proposed changes to protection levels and PPE requirements will be reviewed and approved prior to their implementation by the SS.

5.0 AIR MONITORING PROGRAM

Inhalation hazards are caused from the intake of vapors and contaminated dust. Air monitoring shall be performed while intrusive activities are taking place to detect the presence and relative level of those air contaminants that are inhalation hazards. The purpose of air monitoring is to identify and quantify airborne contaminants in order to determine the level of worker protection needed. Initial screening for identification is often qualitative, but the determination of its concentration (quantification) must await subsequent testing.

All instruments will be calibrated on a daily basis in accordance with the manufacturer's guidelines. Records of all calibrations and real-time measurements will be kept in a bound field logbook or documented via air monitoring and calibration log sheets.

When air monitoring is required, the workers breathing zone(s) will be monitored and the results recorded. Additionally, area samples at the following locations will be taken daily. Record time, location, and results of monitoring and actions taken based on the readings:

- Upwind of work areas to establish background concentrations
- In support zone to check for contamination or migration of emissions
- Along decontamination line to check that decontamination workers are properly protected and on-site workers are not removing protective equipment in a contaminated area
- Downwind of work area to track any contaminants/emissions leaving the site

The data collected throughout the monitoring effort shall be used to determine the appropriate levels of protection. Action levels for upgrading or downgrading of PPE have been established and Table 1 presents the action levels for the on-site Air Monitoring Program.

5.1 EXPOSURE MONITORING

Air monitoring equipment to be used during site activities shall consist of:

- Photoionization detector

5.1.1 PHOTOIONIZATION DETECTORS

Exposure to volatile organic compounds (VOCs) shall be monitored with a photoionization detector (PID) with a 10.6 eV lamp. The PID has the ability to detect organic vapor concentrations from 1 part per million (ppm) to 2,000 ppm. All PID monitoring shall be conducted in the breathing zone.

5.1.10 MONITORING FREQUENCY

Monitoring will be conducted continuously during ground intrusive activities or during any activity where airborne hazards (e.g., organic vapors) may be present. The monitoring equipment listed per work activity relates to the initial level of protection. The monitoring frequency may be decreased if the work areas and activities are unchanging, the result of the first hour of monitoring indicate contaminant concentrations are non-detect, and no differing conditions are observed.

Monitoring results will be legibly documented each work day. They will note project name/number, date, time, serial number, date of last calibration, name of person performing calibration, name of person performing monitoring, monitor location within the site, and monitoring results. Daily documentation will be kept with the SS and included in the project file.

5.1.11 SAFETY AND HEALTH ACTION LEVELS

An action level is a point at which increased protection or cessation of activities is required due to the concentration of contaminants in the work area. All activities shall be initiated in Modified Level D. The appropriate actions are to be taken at designated action levels. The initial action level(s) for site work can be located in Table 1.

In addition to the action level, an upgrade to Level C is required if:

- Any symptoms occur, as described in Section 3.0
- Requested by an individual performing the task
- Any irritation to eye, nose, throat, or skin occurs

A work stoppage and evacuation (cease and desist) at the specific work area is required if levels in the breathing zone exceed the protection factor of the respirator.

6.0 SITE CONTROL

The purpose of site control is to minimize potential contamination of workers and protect the public from hazards found on site. Site control is especially important in emergency situations.

- Site control and work area demarcation will be achieved through posting of signage and placement of barricades. All construction areas will have the appropriate signage posted. Barricades and warning signs will be placed to warn personnel of potential hazards. A standby person (spotter) may be utilized in place of barricades, where appropriate. The following materials may be used to barricade construction areas, crane swing radius, and control traffic:
  - Temporary fence
  - Traffic cones

One pathway should be established for heavy equipment and one for personnel decontamination.

The majority of site operations, as well as access to the site, could be controlled from the support zone. The support zone will provide for team communications, emergency response, and sanitary facilities. Appropriate safety and support equipment also will be located in this zone.

The support zone will be located upwind of site operations if possible, and would be used as a potential evacuation point if appropriate. No potentially contaminated personnel or materials are allowed in this zone.

6.1 COMMUNICATION

Each member of the project team will be able to communicate with other team members at all times. Communications will be by way of an air horn, walkie-talkie, telephone, or hand signals.

The primary means for external communication are telephones and radio. If telephone lines are not installed at a site, all team members should:

- Know the location of the nearest telephone

- Have the necessary telephone numbers readily available

(Note: The authorized use of cellular phones must be cleared by the client prior to entering site.)

Understanding of the following standard hand signals will be mandatory for all employees, regardless of other means of communication:

- Hand gripping throat — Cannot breathe
- Hands on top of head — Need assistance
- Thumbs up — OK, I'm all right, I understand
- Thumbs down — No, negative
- Gripping partner's wrist, or gripping both of your own hands on wrist (if partner is out of reach) – Leave area immediately

6.2 BUDDY SYSTEM

6.2.1 RESPONSIBILITIES

A buddy system shall be implemented when conducting intrusive activities on this site. This buddy shall be able to:

- Provide his or her partner with assistance
- Observe his or her partner for signs of chemical exposure or temperature stress
- Periodically check the integrity of his or her partner's protective clothing
- Notify emergency personnel if emergency help is needed

6.3 SITE SECURITY

Site security is necessary to prevent the exposure of unauthorized, unprotected people to site hazards and to avoid interference with safe working procedures. Security shall be maintained outside of the actual work area(s) so as to prevent unauthorized entry into the work area(s). Members of the general public are to be protected from site hazards.

6.4 DECONTAMINATION

The SS is responsible for ensuring that all personnel and pieces of equipment coming off site are properly decontaminated according to the procedures outlined below. Documentation of decontamination must be made in the field log notebook and will become part of the permanent project file.

6.4.1 PERSONNEL AND EQUIPMENT DECONTAMINATION PROCEDURES

All PPE will be disposed of and/or decontaminated at the conclusion of each workday as described below. Decontamination procedures will follow the concept of decontaminating the most contaminated PPE first.

All disposable equipment shall be removed before meal breaks and at the conclusion of the workday, and will be replaced with new equipment prior to commencing work.

Procedures for decontamination must be followed to prevent the spread of contamination and to eliminate the potential for chemical exposure:

- **Personnel:** Decontamination will be initiated prior to exiting the contaminated work area and completed in the Contamination Reduction Zone.
- **Modified Level D**: First, remove outer protective wear. Remove gloves and properly dispose in designated waste container. Wash hands and face.
-
- **Equipment:** All equipment must be decontaminated with Alconox/Liquinox solution or discarded upon exit from the contaminated area in a well-ventilated area. A temporary decontamination pad with a low-volume high-pressure washer will be set up on site during project operations. All decontamination materials will be drummed for subsequent disposal.

7.0 EMERGENCY PROCEDURES

7.1 ON-SITE EMERGENCIES

Emergencies can range from minor to serious conditions. Various procedures for responding to site emergencies are listed in this section. The PM or SS is responsible for contacting local emergency services, if necessary, for specific emergency situations. Various individual site characteristics will determine preliminary action to ensure that these entry procedures are successfully implemented in the event of an emergency. The project team will address necessary facility/client emergency protocols to ensure compatibility between this document and facility/client programs and expectations.

An Emergency Information Sheet containing the hospital location, directions, government agency phone numbers, emergency phone numbers, and a map with directions to the hospital is located in Appendix A.

7.2 INCIDENT, INJURY, AND ILLNESS REPORTING AND INVESTIGATION

Any work-related incident, injury, illness, exposure, or property loss must be reported to your supervisor, the SS, and **within 1 hour** through the CRA Incident Reporting Hotline. Motor vehicle accidents must also be reported through this system. CRA's Incident Reporting Form, located in Appendix A, must also be filled out and provided to the SS. The report must be filed for the following circumstances:

- Incident, injury, illness, or exposure of an employee
- Injury of a subcontractor
- Damage, loss, or theft of property
- Any motor vehicle accident, regardless of fault, which involves a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment

Occupational incidents resulting in employee injury or illness will be investigated by the SS. This investigation will focus on determining the cause of the incident and modifying future work activities to eliminate the hazard.

All employees have the right and obligation to report unsafe work conditions, previously unrecognized safety hazards, or safety violations of others. If you wish to

make such a report, it may be made orally to your supervisor or other member of management, or you may submit your concern in writing, either signed or anonymously.

7.3 EMERGENCY EQUIPMENT/FIRST AID

Safety equipment will be available for use by site personnel, located within 30 feet of the work area(s), and maintained at the site. The safety equipment may include, but is not limited to, the following:

- First Aid kit (size is dependant upon the number of personnel on site):

  Contents: Each first aid kit shall contain, as a minimum (ANSI 308.1-2003):

1	Absorbent Compress (32 square inches, no side less than 4 inches)
16	Adhesive Bandages (1 inch x 3 inches)
1	Adhesive Tape (roll, 3/8 inch x 5 yards)
10	Individual Antiseptic (0.5 g)
6	Burn Treatments (Antibiotic) (each 1/32 oz.)
2 pair	Medical Exam Gloves (not to be reused)
4	Sterile Pads (3 inches x 3 inches)
1	Triangular Bandage

This list shall be placed in each first aid kit for the purposes of inspection and restocking.

- Automated External Defibrillators (AEDs) are optional first aid response equipment for conditions related to heart stoppage. If a unit is on site, designated personnel must be trained in the specific AED unit in addition to First Aid and CPR certification, conduct monthly inspections, and contact listed AED Unit coordinator.
- Emergency eyewash bottles and/or an eyewash station lasting 15 minutes.
- Emergency alarms as a means to alert all personnel instantaneously for an emergency.
- Fire extinguisher (at a minimum, a 2A/10BC will be on site).

7.4 EMERGENCY PROCEDURES FOR CONTAMINATED PERSONNEL

Whenever possible, personnel should be decontaminated in the contamination reduction zone before administering first aid, without causing further harm to the patient.

- **Skin Contact:** Remove contaminated clothing, wash immediately with water, and use soap, if available.
- **Inhalation:** Remove victim from contaminated atmosphere. Remove any respiratory protection equipment. Initiate artificial respiration, if necessary. Transport to the hospital.
- **Ingestion:** Remove from contaminated atmosphere. Do not induce vomiting if victim is unconscious. Never induce vomiting when acids, alkalis, or petroleum products are suspected. Transport to the hospital, if necessary.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a listing of the contaminants of concern to which they may have been exposed.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated, as necessary.

7.5 SITE EVACUATION

In the event of an emergency situation such as fire, explosion, or significant release of toxic gases, project personnel in the field will be notified through established communications to evacuate the area. In the event of an emergency, CRA personnel will gather at their primary mustering point for a head count. The SS will determine a primary and secondary muster point to be used as an assembly area in the event of an emergency. The secondary muster point will be located at least 90 degrees from the primary. These locations will be communicated to the work crew(s) during the site-specific training prior to commencement of work activities, weekly thereafter, and prior to the advent of potentially threatening weather. Muster points will be identified in the Emergency Information Sheet and may be indicated on the map.

7.6 SPILL AND RELEASE CONTINGENCIES

If a spill has occurred, the first step is personal safety, then controlling the spread of contamination, if possible. CRA personnel will immediately contact site management to inform them of the spill and activate emergency spill procedures.

8.0 RECORDKEEPING

The SS shall establish and maintain records of all necessary and prudent monitoring activities as described below:

- Name and job classification of the employees involved on specific tasks
- Air monitoring/sampling results and instrument calibration logs
- Records of training acknowledgment forms (site-specific training, toolbox meetings, etc.)
- Documentation of site inspections, results of inspections, and corrective actions implemented
- Emergency reports describing any incidents or accidents

TABLE 1

ON-SITE AIR MONITORING PROGRAM ACTION LEVELS
HEALTH AND SAFETY PLAN
PENNY'S CONCRETE AND SAND
DOUGLAS COUNTY, KS

Monitoring Device	*Action Level*	*Action*
Photoionization Detector (PID) 10.6 or greater eV lamp	**Consistant Readings Over Background** (Breathing Zone)	Cease operations and move to a safe place. Notify PM and RSHM. Do not continue work until HASP has been updated, and change has been managed.

If CRA is unable to identify/quantify the contaminants, supplied air will be required when the PID reading is greater than background, as the contaminant will be unknown and NIOSH, OSHA, and the manufacturer's use requirements for Level C (air purifying respirators) will not be met. If PID readings subside, workers can downgrade as necessary. CRA will upgrade to supplied air and attempt to obtain additional information for possible chemicals present in CRA's work area. The Owner will need to provide/obtain additional information as to the identity of the contaminant(s) in order to permit the use of Modified D and/or Level C.

Notes:

SHO Safety and Health Officer
LEL Lower Explosive Limit
PPE Personnel Protective Equipment
ppm parts per million

APPENDIX A

FORMS

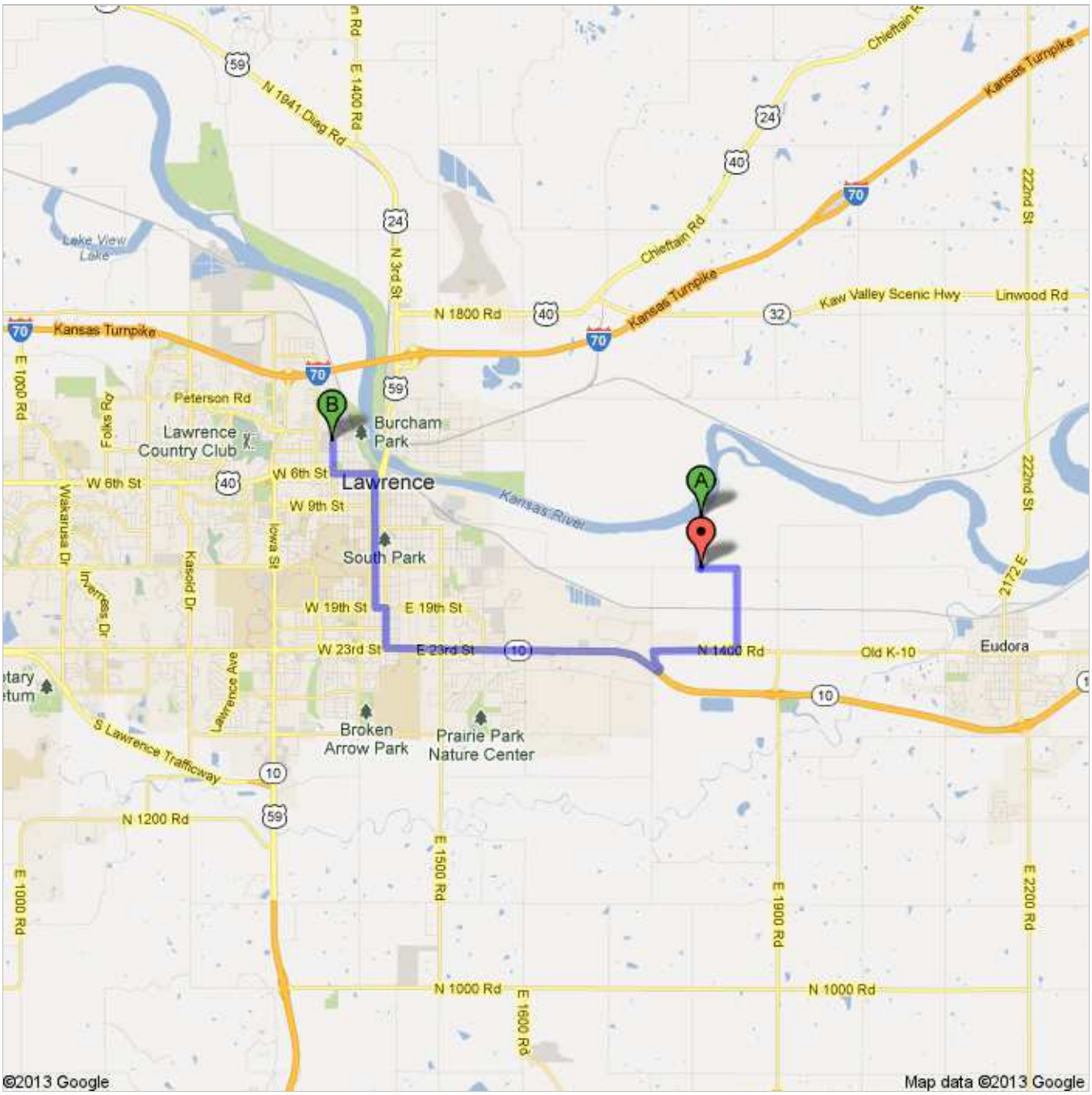
1. EMERGENCY CONTACT SHEET
2. MAP TO THE HOSPITAL
3. HASP ACKNOWLEDGEMENT FORM
4. TAILGATE SAFETY MEETING FORMS:
   - LARGE GROUP
   - SMALL GROUP
5. CRA INCIDENT REPORTING FORM
6. CRA NEAR LOSS REPORTING FORM
7. UNSAFE ACT AND CONDITIONS AND STOP WORK AUTHORITY FORM
8. SAFE TASK EVALUATION PROCESS FORM
9. PROPERTY ACCESS/UTILITY CLEARANCE DATA SHEET
10. SAFETY COORDINATION REVIEW
11. MOTOR VEHICLE DAILY OPERATOR CHECKLIST
12. SITE HASP MINOR AMENDMENT FORM

EMERGENCY CONTACT SHEET
CRA HYDROGEOLOGIC STUDY, PENNY'S CONCRETE AND SAND LLC SITE

EMERGENCY INFORMATION		
Contact	**Phone Number**	**Hospital Directions**
Local Police	**785-542-3121** **911**	Directions: 1. Head south on E 1810 Rd toward N 1500 2. Turn right onto N 1500 Rd 3. Continue onto 15th Street 4. Turn right on Kentucky Street 5. Turn left onto 6th Street 6. Turn right onto Maine Street Driving Time: 19 minutes Driving Distance: 6.5 miles **(See Attached Map)**
Fire Department	**785-542-3653** **911**	
Ambulance	**911**	
Local Hospital: Lawrence Memorial Hospital Address: 325 Maine Street Lawrence, Kansas 66044	**785-505-5000**	
National Poison Center	**800-222-1222**	CRA – Incident Reporting Hotline Please call **(866) 529-4886** and provide: • Name and location of caller • Description of incident • Name of any injured persons • Description of injuries • Phone number for return call
Project Manager Kirk Hoeffner Work: Cell:	 785-783-8982 785.249.7062	
Site Supervisor Nick Laskares Work: Cell:	 785-783-8982 913-488-4494	
CRA Regional S&H Manager Matt Downing Work: Cell:	 720-974-0949 720-445-2055	
Site Contact (Name) Work: Cell:		
Client Contact (Name) Work: Cell:		
Other Contact (Name) Work: Cell:		
Person to verify hospital route Nick Laskares	**Signature**	

* Hospital Route must be field validated before site work commences.

Directions to Lawrence Memorial Hospital Emergency Department
325 Maine St, Lawrence, KS 66044
9.8 mi – about **25 mins**



E 1810 Rd/1810E Rd

	1. Head **south** on **E 1810 Rd/1810E Rd** toward **N 1500 Rd** About 2 mins	go 0.6 mi total 0.6 mi
	2. Turn left onto **N 1500 Rd** About 1 min	go 0.5 mi total 1.1 mi
	3. Take the 1st right onto **E 1850 Rd** About 4 mins	go 1.0 mi total 2.1 mi
	4. Take the 1st right onto **Co Rd 442/N 1400 Rd/Old K-10** About 2 mins	go 1.0 mi total 3.1 mi
	5. Turn left onto **E 1750 Rd/Noria Rd**	go 0.3 mi total 3.4 mi
	6. Take the 1st right onto **KS-10 W** About 5 mins	go 3.3 mi total 6.6 mi
	7. Turn right onto **Massachusetts St** About 1 min	go 0.5 mi total 7.2 mi
	8. Turn left onto **W 19th St** About 47 secs	go 0.1 mi total 7.3 mi
	9. Take the 2nd right onto **Kentucky St** About 5 mins	go 1.6 mi total 8.9 mi
	10. Turn left onto **W 6th St** About 55 secs	go 0.5 mi total 9.4 mi
	11. Turn right onto **Maine St** Destination will be on the left About 1 min	go 0.4 mi total 9.8 mi

Lawrence Memorial Hospital Emergency Department
325 Maine St, Lawrence, KS 66044

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

HASP ACKNOWLEDGMENT SHEET

This is to certify that I have received a pre-entry briefing regarding this HASP (CRA HYDROGEOLOGIC STUDY, PENNY'S CONCRETE AND SAND LLC Site, and I understand its contents. My failure to follow and comply with the requirements contained in this plan may result in disciplinary action and/or termination.

Print Name	Signature	Date

TAILGATE SAFETY MEETING FORM
LARGE GROUP FORMAT - SINGLE DAY
CRA HYDROGEOLOGIC STUDY, PENNY'S CONCRETE AND SAND LLC SITE

Date: _____ Time: _____ Project No.: _____
Presenter: _____ Project Name: _____

Safety topics/items discussed:

_____

_____

_____

_____

Site personnel in attendance:

Print Name	Signature	Company

TAILGATE SAFETY MEETING FORM
SMALL GROUP FORMAT - MULTIPLE DAYS
CRA HYDROGEOLOGIC STUDY, PENNY'S CONCRETE AND SAND LLC SITE

Date: _____ Time: _____ Project No.: _____
Presenter: _____ Project Name: _____

Safety topics/items discussed:

_____
_____
_____

Site personnel in attendance:

Print Name	Signature	Company

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Print Name	Signature	Company

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Print Name	Signature	Company

TAILGATE SAFETY MEETING FORM
SMALL GROUP FORMAT - MULTIPLE DAYS
CRA HYDROGEOLOGIC STUDY, PENNY'S CONCRETE AND SAND LLC SITE

Date: _____ Time: _____ Project No.: _____
Presenter: _____ Project Name: _____

Safety topics/items discussed:

_____
_____
_____

Site personnel in attendance:

Print Name	Signature	Company

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Print Name	Signature	Company

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Print Name	Signature	Company

TAILGATE SAFETY MEETING FORM
SMALL GROUP FORMAT - MULTIPLE DAYS
CRA HYDROGEOLOGIC STUDY, PENNY'S CONCRETE AND SAND LLC SITE

Date: _____ Time: _____ Project No.: _____
Presenter: _____ Project Name: _____

Safety topics/items discussed:

_____
_____
_____

Site personnel in attendance:

Print Name	Signature	Company

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Print Name	Signature	Company

Date: _____ Time: _____ Presenter: _____

Safety topics/items discussed:

_____
_____
_____

Print Name	Signature	Company

CONESTOGA-ROVERS & ASSOCIATES (CRA) INCIDENT REPORTING FORM

Incidents must be called into Incident Hot Line: 1-866-529-4886

Safety Means Awareness Responsibility Teamwork

Instructions: For Personal Injuries, Occupational Illnesses, and Property Damage, complete Sections 1 and 2.
For Vehicle Accidents, Complete Sections 1, 2, and 4. **Initial report must be submitted within 24 hours.**

Report Status (insert date)					
	Initial Report	**Update Report**	**Final Report**	**Verification/Validation**	**Report Input into SMART Database**

SECTION 1

A. Employee Identification ☐ **CRA Employee** ☐ **Temporary Employee** ☐ **Subcontractor**

Employee No.	Last Name	First Name	Middle Name/Initial	☐ Male ☐ Female
Area Code ( ) Telephone Number	Employee Home Address (Street, City, State, Province, Zip Code)			
Date of Hire	Position/Title	Supervisor	Employee's Company/Home Office Location	

B. General Information

Where did the Incident occur and which country? ☐ Office ☐ Project Site ☐ Other _____ ☐ Canada ☐ United States ☐ UK	Type of incident (Check all that apply) ☐ Employee Injury/Illness ☐ Vehicle Accident ☐ Property Damage Only		
Address of Incident (City, State, Providence, Zip Code)	Specific Location of incident (e.g., where on site)		
Date and Hour of Incident	Date and Hour Reported to Employer	Date and Hour Last Worked	Time Employee Began Work
MM/DD/YYYY a.m. p.m.	MM/DD/YYYY a.m. p.m.	MM/DD/YYYY a.m. p.m.	a.m. p.m.
Normal Work Hours From:. To:	Witnesses? ☐ Yes ☐ No	Witness Name and Telephone Number	

C. Project Information (Project Related Incident Only) Project Related? ☐ Yes ☐ No

Project #	Project Name	Project Manager	Site Telephone Number ( )	Project Manager Cell Number ( )
Client Name	Was the Client Advised of the Incident? ☐ Yes ☐ No	Name of Person Contacted	Date and Time Contacted	

SECTION 2

A. Details of the Incident

1. What job/task was being performed when the incident occurred? (Example: collecting groundwater samples).
2. Provide a detailed description of the employee's specific activities at the time of the incident. Include details of equipment/materials being used, including the size and weight of objects being handled, and weather conditions at time of the incident. If necessary, attach additional pages to the report.
3. For injuries, identify the specific part of body injured, and specify left or right side. For illnesses, identify and describe the affected area/body part.
4. Identify the object or substance that directly injured the employee and how. Include size, weight, and shape of object, quantity of substance, etc.
5. Identify property damaged and how it was damaged (include owner of property, nature and source of damage, and model and serial number, if appropriate).

B. Health Care/Medical Treatment

Employee received health care? ☐ Yes ☐ No	Identify the type of health care provided and where it was performed. **(Check all that apply).** ☐ First Aid ☐ Medical treatment other than first aid (sutures, etc.) ☐ Hospitalized ☐ Clinic ☐ Hospital emergency room ☐ On location by self or CRA employee) ☐ On site by EMT
Name of Health Care Provider, Physician's Name, Phone Number, Address (Street, City, Province/State, and Postal/Zip Code)	

SECTION 2 (continued)

C. Incident Investigation ☐ **5 Why Root Cause Analysis Investigation [Non-OSHA Recordable, <$5,000 damage]** ☐ **Tap Root Cause Analysis [OSHA Recordable, and/or >$5,000 damages]**	
HASP prepared? ☐ Yes ☐ No ☐ N/A Submit a PDF of HASP and relevant JSA(s) to Investigation Team. If yes, was the HASP on site? ☐ Yes ☐ No	Did the safety plan identify and provide safety procedures for the specific tasks the employee was conducting when injured? ☐ Yes ☐ No If no, why not? (Explain) _____ Did the employee utilize the STAR process before initiating the task? ☐ Yes ☐ No If no, why not? (Explain) _____ Was the employee drug & alcohol tested post incident? ☐ Yes ☐ No

5-Why Root Cause: Incident Statement	Additional information: Attach photos, witness statement(s), affected employee statement, accident diagrams, as applicable, to the end of this document.
1. Why did "above" happen?	
2. Why did "1" happen?	
3. Why did "2" happen?	
4. Why did "3" happen?	
	See *Corrective Actions/Verification and Validation* Section (Page 4)
5. Why did "4" happen?	
6. Why did "5" happen?	

D. Accountability		
Initial Report Date Month Day Year	Initial Report Prepared by: (please print)	Initial Report Prepared by: (signature)
Investigation Team	Company	Position/Title
Final Report Date Month Day Year	Final Report Prepared by: (please print)	Final Report Prepared by: (signature)

E. Stewardship		
Will an Incident Summary be Prepared? ☐ Yes ☐ No By:	Disciplinary Action Taken? ☐ Yes ☐ No	
Quality Review By:	Date:	Findings:

Fax Completed Form to CRA's Incident Reporting Fax: (832) 485-5259
Send Original to CRA's Incident Reporting Department, Houston, Texas

SECTION 3

A. Agency Reporting and Recording Information (To be completed by the Regional Safety and Health Manager)			
CANADA			
Form 7 Sent to WSIB? ☐ Yes ☐ Not required	Employee Injury Information (Injury met the following criteria): ☐ First Aid ☐ Medical Treatment ☐ Critical Injury ☐ Modified Duty ☐ Lost Time Injury If medical treatment, what?		
Joint Safety and Health Committee Notified? ☐ Yes ☐ No	Total days of modified duty If exceeds 7 days, report to WSIB	Total days of lost time (if any)	Date employee returned to work Month Day Year
UNITED STATES			
OSHA Recordable Injury? ☐ Yes ☐ No	Employee Injury Information (Injury met the following OSHA 300 Log criteria) ☐ First Aid ☐ Medical Treatment ☐ Restricted Duty ☐Lost Time Injury If medical treatment, what?		
Total days of restricted duty:	Total days of lost time (if any)		Date employee returned to work Month Day Year

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VEHICLE ACCIDENT SECTION

(Complete this Section for all Vehicle Accidents)

SECTION 4

A. Vehicle CRA Employee was Operating ☐ Personal ☐ CRA-Owned ☐ Rental - Rental Company:

License Plate No.	State/Province	Police Department City	State/Province

Vehicle Year/Make/Model	Odometer Reading at Time of Accident	Police Report Number	Weather Conditions

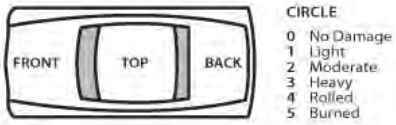
Name of Person Operating Vehicle

Address

City State/Province Zip Code

Telephone: Area Code ( )

"X" IN AREA OF VEHICLE DAMAGE



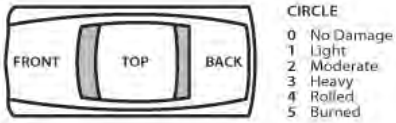
Description of Vehicle Damage:

B. Other Vehicles Involved

Name of Owner	Address	City/State/Prov./Zip	Area Code and Telephone Number ( )
Operator's Name (if different from above)	Address	City/State/Prov./Zip	Area Code and Telephone Number ( )

Year/Make/Model	Description of Property Damage:
Insurance Co. Name & Telephone	
License Plate No./State/Province	

"x" IN AREA OF VEHICLE DAMAGE



C. Injured Persons

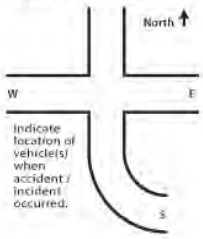
Name	Address Street, City, State/Prov./Zip Code	Phone Number	Nature of Injury	Indicate if Injured was a Vehicle Driver/ Passenger, CRA Employee, Other, or Pedestrian
1.				
2.				
3.				

D. Witnesses

Name	Address Street, City, State/Prov./Zip Code	Area Code and Telephone Number
1.		( )
2.		( )

E. Description of Accident

PLEASE COMPLETE OR ATTACH SEPARATE DIAGRAM



Was Ticket Issued? Reason:

☐ Other Operator

☐ CRA Operator

Report Date Month Day Year	Report Prepared by: (please print)	Report Prepared by: (signature)

Note: If Additional Space is Required to Complete this Report, Use Separate Sheet of Paper and Attach.

Fax Completed Form to CRA's Incident Reporting Fax: (832) 485-5259
Send Original to CRA's Incident Reporting Department, Houston, Texas

INCIDENT REPORT
CORRECTIVE ACTIONS/VERIFICATION AND VALIDATION

Causative Factors and Corrective Actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	CF	Corrective Actions (Must match Causative Factor)	Responsible Party	Date Due	Date Completed	Verified By/ Validated By	Date	Details
						Verified By:		
						Validated By:		
						Verified By:		
						Validated By:		
						Verified By:		
						Validated By:		
						Verified By:		
						Validated By:		

CRA 10 CAUSATIVE FACTORS

Personal Factors		Company Factors		External Factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
		9	Improper workplace layout		

NL	CONESTOGA-ROVERS & ASSOCIATES (CRA) NEAR LOSS REPORTING FORM **A Significant Near Loss must be called into Incident Hot Line: 1-866-529-4886**	CRA SMART PROGRAM Safety Means Awareness Responsibility Teamwork

Instructions:
1) *Employee completes the Near Loss Report and submits to Supervisor.*
2) *Supervisor reviews and makes other comments.*
3) *Employee discusses Near Loss with Project Manager.*
4) *Submit to Regional Safety & Health Manager.*

Report Status (insert date)					
	Initial Report	**Update Report**	**Final Report**	**Verification/Validation**	**Report Input into SMART Database**

SECTION 1

A. Employee Identification ☐ **CRA Employee** ☐ **Temporary Employee** ☐ **Subcontractor**			
Employee No.	Last Name	First Name	Employee's Company - if Subcontractor
Date of Hire	Position/Title	Supervisor	Home Office Location - if CRA Employee

B. General Information	
Where did the Near Loss occur? ☐ Office ☐ Project Site ☐ Other _____ ☐ Canada ☐ United States ☐ UK	Type of Near Loss (Check all that apply) ☐ Employee Injury/Illness ☐ Vehicle Accident ☐ Property Damage ☐ Environmental
Address of Near Loss (City, State, Province, Zip Code)	Specific Location of Near Loss (e.g., where on site)

Date and Hour of Near Loss		Date and Hour Reported to CRA		Time Employee Began Work
Month Day Year	a.m. p.m.	Month Day Year	a.m. p.m.	a.m. p.m.
Witnesses? ☐ Yes ☐ No	Witness Name and Telephone Number			

C. Project Information (Project Related Near Loss Only): Project Related: ( ) Yes ( ) No				
Project #	Project Name	CRA Project Manager	Client	Client Contact
Was the Client Advised of the Near Loss? ☐ Yes ☐ No ☐ N/A	Name:		Date and Time	

SECTION 2

A Details of the Near Loss
1. What job/task was being performed when the Near Loss occurred? (Example: collecting groundwater samples).
2. Provide a detailed description of the employee's specific activities at the time of the Near Loss. Include details of equipment/materials being used, including the size and weights of objects being handled, and weather conditions at time of the Near Loss. If necessary, attach additional pages to the report.

B. Near Loss Investigation	
Conduct a 5-Why Root Cause Analysis Investigation. In addition, if there was the potential for a significant injury or loss, report the Near Loss to the Incident Hot Line (this will determine if a Tap Root Cause Analysis is necessary).	
HASP prepared? ☐ Yes ☐ No ☐ N/A Submit a PDF of HASP to Investigation Team. If yes, was the HASP on site? ☐ Yes ☐ No	Did the safety plan identify and provide safety procedures for the specific tasks being performed when the Near Loss occurred? ☐ Yes ☐ No If no, why not? (Explain) _____ Did the employee utilize the STAR process before initiating the task? ☐ Yes ☐ No If no, why not? (Explain) _____

SECTION 2 (continued)

Root Cause:	Additional information: Attach photos, witness statement(s), affected employee statement, as applicable, to the end of this document.
Why did "above" happen?	
2. Why did "1" happen?	
3. Why did "2" happen?	
4. Why did "3" happen?	
5. Why did "4" happen?	See Section 3 Below: Corrective Actions/ Verification and Validation
6. Why did "5" happen?	

C. Accountability		
Initial Report Date Month Day Year	Initial Report Prepared by: (please print)	Initial Report Prepared by: (signature)
Investigation Team	Company	Position/Title
Final Report Date Month Day Year	Final Report Prepared by: (please print)	Final Report Prepared by: (signature)

D. Stewardship		
Will a Near Loss Summary be Prepared? ☐ Yes ☐ No If yes, by:		
Quality Review By:	Date:	Findings:

SECTION 3

Corrective Action					Validation & Verification		
CF	**Corrective Actions (Must match Causative Factor)**	**Responsible Party**	**Due Date**	**Date Completed**	**Verified By/ Validated By**	**Date**	**Details**
					Verified By		
					Validated By		
					Verified By		
					Validated By		
					Verified By		
					Validated By		

CRA 10 CAUSATIVE FACTORS (CF)

PERSONAL FACTORS		COMPANY FACTORS		EXTERNAL FACTORS	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
		9	Improper workplace layout		

UNSAFE ACTS/UNSAFE CONDITIONS/ STOP WORK AUTHORITY (SWA) REPORT

Reported By:		Employee's Office:	
To: CRA RSHM -		Date:	Time:
Employee Supervisor:		Employee Principal:	
Project Related:	☐ No ☐ Yes If yes, Name of Client:		
Client Contact:		Project No (if applicable):	

Re: (check all that apply) ☐ **Unsafe Act** ☐ **Unsafe Condition** ☐ **Stop Work Authority (SWA)**

Location: (check one) ☐ Driving ☐ Field ☐ Office

Date Reported to Supervisor/PM:		Date Corrected:	
Time Reported to Supervisor/PM:		Time Corrected:	

Describe the unsafe act, unsafe condition, or SWA Situation:

List corrective action(s) implemented:

Did the corrective action(s) mitigate the unsafe act/unsafe condition?

For SMART Administrators Use Only:

CRA Category:

- ☐ **PPE** - Personal Protective Equipment
- ☐ **BP** - Body Positioning
- ☐ **WE** – Work Environment
- ☐ **OP** – Operating Procedures
- ☐ **TE** – Tools and Equipment
- ☐ **CU** – Computer Usage
- ☐ **PD** – Pre-Driving
- ☐ **OPP** – Operating Procedures – Parking

Chevron Category:

- ☐ **A –** Person or People
- ☐ **B –** Equipment
- ☐ **C –** Environmental
- ☐ **D –** Procedures/ Processes/ JSA-review/revise
- ☐ **E –** Visitors

Causative Factor:

- ☐ 1. Insufficient training for task
- ☐ 2. Hurrying to complete the task
- ☐ 3. Easier if proper process not followed
- ☐ 4. Took shortcuts without prior incident
- ☐ 5. Incomplete or no procedures
- ☐ 6. Procedures not known or enforced
- ☐ 7. Improper PPE
- ☐ 8. Improper tools
- ☐ 9. Improper workplace layout
- ☐ 10. Exposure to conditions

Energy Source:

- ☐ **G –** Gravity
- ☐ **M –** Motion
- ☐ **ME –** Mechanical
- ☐ **E –** Electrical
- ☐ **P –** Pressure
- ☐ **T –** Temperature
- ☐ **C –** Chemical
- ☐ **B –** Biological
- ☐ **R –** Radiation
- ☐ **S –** Sound

Are additional actions required? ☐ No ☐ Yes If yes, what? _____

DRIVING SAFE TASK EVALUATION PROCESS (D-STEP)

Report Status: (insert date)	Initial Report	Updated Report	Final Report	Verification/Validation	Report Input to SMART Database

Observer's Name	Date:	Time:
Client:	Project Name:	
Observer's Office:	Site Location:	
Observer's Supervisor:	Project No. (If applicable):	
Subcontractor: ☐ Yes ☐ No	Subcontractor Company Name:	

Feedback Conducted By:	Date:
Observee's Supervisor:	Time:

Driving Conditions			
☐ Freeway/Interstate	☐ Wet	☐ Day	☐ Raining
☐ Surface Street	☐ Dry	☐ Night	☐ Windy
☐ Dirt Road	☐ Snow/Ice		☐ Snowing
	☐ Mud		☐ Fog

Driving Conditions			
☐ Car	☐ Truck	☐ Van	☐ Pulling Trailer
☐ Company Owned	☐ Rental	☐ Personal	

Give a brief description of where you are driving from and to and your surroundings

Observer's Positive Comments

1.

2.

3.

Feedback Session Conclusion:
If NO Questionable Items: Brief Recap of Positive Actions/Comments
If Questionable Items: Brief Recap of Positive Actions/Comments AND Why the Questionable Item(s) Occurred

DRIVING SAFE TASK EVALUATION PROCESS (D-STEP)

PRE-DRIVING	Meets Work Standards	???	N/A	Evaluation Comments
1. JMP/JSA developed and/or reviewed			☐	
2. STAR performed/job planning			☐	
3. Stop Work Authority – understood and considered			☐	
4. Registration/insurance/last maintenance report			☐	
5. Tire inflation and tread			☐	
6. Wipers and washer fluid/clean windows/mirrors			☐	
7. Horn/lights operation/instrument panel			☐	
8. Body damage/overall vehicle appearance			☐	
9. Under-vehicle check for leaks/obstructions			☐	
10. Secure loose items			☐	
11. Check fluid levels			☐	
12. Fire extinguisher/triangles/first aid kit/jack/spare			☐	
13. Verifies area is clear before moving vehicle			☐	
BODY POSITIONING	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
14. Adjust seat			☐	
15. Adjust head rest			☐	
16. Adjust mirrors to minimize blind spots			☐	
17. Seat belts (driver/passengers)			☐	
18. Locks doors			☐	
OPERATING PROCEDURES	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
19. Yields right-of-way and allows other vehicles to merge, change lanes, turn			☐	
20. Respects pedestrians, cyclists, other drivers			☐	
21. Is courteous/tolerant of others' poor driving			☐	
22. Two hands on wheel at 9 and 3 or 10 and 2			☐	
23. Skill in handling distractions			☐	
24. Adjusts to traffic conditions (speed / traffic)			☐	
25. Uses turn signals (for turns and lane changes)			☐	
26. Following distance is appropriate (4-second rule)			☐	
27. Avoids sudden acceleration and deceleration			☐	
28. Before backing up, looks behind vehicle/checks for traffic, pedestrians, parked vehicles, uses spotter			☐	
29. Scans the road ahead (15-second eye lead or 2-3 blocks-1/4 mile) and anticipates actions of others to avoid sudden swerves, stops, lane changes			☐	
30. Checks mirrors every 5-8 seconds			☐	
31. Checks for hazards on the road (e.g., animals, debris, road conditions)			☐	
32. Reads and obeys traffic signals			☐	
33. Makes complete stops at signals, at a safe distance			☐	
34. Scans intersection left and right/anticipates intent of other vehicles before reaching "point of no return"			☐	
35. Covers brakes safely and adjusts speed			☐	
36. Does not use cell phone during operation of vehicle			☐	
37. Other (be specific)			☐	
OPERATING PROCEDURES - PARKING	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
38. Looks for pull through parking before backing in			☐	
39. Uses signals, leaves adequate space before pulling back into lane			☐	
40. Obeys signs and uses signals in parking lot			☐	
41. Maintains proper speed inside the lot			☐	
42. Ensures vehicle is legally/properly parked			☐	
43. Sets parking brake and secures vehicle			☐	
44. Other (be specific)			☐	
Observation Total Occurrences				
% Observations to Meet Work Standards				
Item Specific to Work Task	**Meets Work Standards**	**???**		**Evaluation Comments**
Insert Task/JSA/SOP Step				
Insert Task/JSA/SOP Step				
Insert Task/JSA/SOP Step				

DRIVING SAFE TASK EVALUATION PROCESS (D-STEP)

Causative Factors and Corrective Actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	CF	Corrective Actions (Must match Causative Factor)	Responsible Party	Date Due	Date Completed	Verified By/ Validated By	Date	Details
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		

CRA 10 CAUSATIVE FACTORS

Personal Factors		Company Factors		External Factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
		9	Improper workplace layout		

FIELD SAFE TASK EVALUATION PROCESS (F-STEP)

Report Status: (insert date)	Initial Report	Updated Report	Final Report	Verification/Validation	Report Input to SMART Database

Observer's Name	Date:	Time:
Client:	Project Name:	
Observer's Office:	Site Location:	
Observer's Supervisor:	Project No. (If applicable):	
Subcontractor: ☐ Yes ☐ No	Subcontractor Company Name:	

Feedback Conducted By:	Date:
Observee's Supervisor:	Time:

Check Task Being Observed (if not listed here, go to columns at right)		If checking this column, write in the specific task	
☐ Air Knifing	☐ Mob/Demob	☐ Agricultural Services	
☐ Clearing	☐ Project Oversight	☐ Construction	
☐ Demolition	☐ Soil Sampling	☐ Landfill	
☐ Drilling	☐ Stack Testing	☐ Office Operations	
☐ Electrical Work	☐ Surveys & Audits	☐ O&M	
☐ Excavation	☐ Traffic Control	☐ Pipeline	
☐ General Site Cleaning	☐ UST Removal	☐ Refinery	
☐ Heavy Equipment Operations	☐ Water Sampling	☐ Treatment Plants	
☐ IH Sampling	☐ Well Management	☐ Other	
☐ Manual Lifting			

Give a brief description of task being performed and your surroundings

Observer's Positive Comments

1.

2.

3.

Feedback Session Conclusion:
If NO Questionable Items: Brief Recap of Positive Actions/Comments
If Questionable Items: Brief Recap of Positive Actions/Comments AND Why the Questionable Item(s) Occurred

FIELD SAFE TASK EVALUATION PROCESS (F-STEP)

PERSONAL PROTECTIVE EQUIPMENT	Meets Work Standards	???	N/A	Evaluation Comments
1. Hearing Protection (e.g., Ear Plugs)			☐	
2. Head Protection (e.g., Hard Hat)			☐	
3. Eye Protection (e.g., Safety Glasses/Goggles)			☐	
4. Hand Protection (e.g., Gloves)			☐	
5. Foot Protection (e.g., Steel-toe Boots)			☐	
6. Respiratory Protection			☐	
7. Fall Protection (e.g., lanyard/harness)			☐	
8. High Visibility Clothing (e.g., Work Vest)			☐	
9. First Aid Kit/Fire Extinguisher			☐	
10. Other (be specific)			☐	
BODY POSITION	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
11. Proper Body Positioning When Exerting Force (Lifting/Pushing/Pulling)			☐	
12. Pinch Points/Moving Equipment - Hands/Body Placement			☐	
13. 3-Points of Contact			☐	
14. Other (be specific)			☐	
WORK ENVIRONMENT	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
15. Work/Walk Surface Clear (Free And Clear Pathway)			☐	
16. Housekeeping/Equipment Storage			☐	
17. Controlled Work Zone (e.g., Warning Devices, Barricades, Cones, Flags)			☐	
18. Emergency Stop/Safety Switches			☐	
19. Materials Labeled Correctly			☐	
20. Storage/Disposal of Waste			☐	
21. Other (be specific)			☐	
OPERATING PROCEDURES	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
22. STAR Performed/Job Planning			☐	
23. Stop Work Authority Process – understood and considered			☐	
24. JSA/JLA Reviewed and Followed			☐	
25. Daily Site Inspection			☐	
26. High Risk Task Specific (Hot Work, Confined Space, LOTO, Excavation/ Trenching)			☐	
27. Inspect Work Zone for Hazards			☐	
28. Coordinate/Communicate with Site Rep and/or others on site			☐	
29. Spotters used appropriately			☐	
30. Underground/Overhead Utilities Identified			☐	
31. Other (be specific)			☐	
TOOLS/EQUIPMENT	**Meets Work Standards**	**???**	**N/A**	**Evaluation Comments**
32. Hand/Power Tool - Selection, Condition, and Use			☐	
33. Field/Test Equipment - Selection, Condition, and Use			☐	
34. Heavy Equipment - Selection, Condition, and Use			☐	
35. Other (be specific)			☐	
Observation Total Occurrences				
% Observations to Meet Work Standards				
Item Specific to Work Task	**Meets Work Standards**	**???**		**Evaluation Comments**
Insert Task/JSA/SOP Step				
Insert Task/JSA/SOP Step				
Insert Task/JSA/SOP Step				

FIELD SAFE TASK EVALUATION PROCESS
(F-STEP)

Causative Factors and Corrective Actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	CF	Corrective Actions (Must match Causative Factor)	Responsible Party	Date Due	Date Completed	Verified By/ Validated By	Date	Details
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		
						Verified By: Validated By:		

CRA 10 CAUSATIVE FACTORS

Personal Factors		Company Factors		External Factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
		9	Improper workplace layout		

PROPERTY ACCESS/UTILITY CLEARANCE DATA SHEET

(QSF-019)

PROJECT NAME: _____ PROJECT NUMBER: _____

CRA REPRESENTATIVE: _____

CLIENT: _____ CLIENT REPRESENTATIVE: _____ PHONE: _____

ON-SITE PROPERTY ACCESS APPROVAL _____ (OWNER OR AUTHORIZED AGENT SIGNATURE)

OFF-SITE PROPERTY ACCESS APPROVAL (if applicable) _____ (OWNER OR AUTHORIZED AGENT SIGNATURE)

UTILITY CLEARANCE APPROVAL _____ (OWNER OR AUTHORIZED AGENT SIGNATURE)

CONTRACTOR VERIFICATION APPROVAL _____ (OWNER OR AUTHORIZED AGENT SIGNATURE)

UTILITIES (INDICATE THAT LOCATION/UTILITY PRESENCE WAS CHECKED) *												
Borehole/ Excavation Location	Date (m/d/y)	Telephone	Water	Storm Sewer	Sanitary Sewer	Process Sewer	Gas	Electrical	Cable	Overhead Utilities	Other	Comments/Warnings

Additional Comments:

_____

_____

_____

* Note as appropriate, Contractor, Client or Owner, or Agent to sign, indicating no utilities are at the selected borehole/excavation locations.

THIS COMPLETED FORM IS A QUALITY RECORD

CRA SAFETY COORDINATION REVIEW

SECTION A - JOB SCOPE

		Completed by:
	Pre-Job Meeting/Prep HASP	
	On-Site Orientation Meeting	
	End of Job Evaluation	
	Tailgate Safety Meeting Planning Tool	
	Site Audit	

Date: _____ Project Name:_____ Project Number: _____

Project Location: _____

Project Description _____

CRA Project Team

PM:_____ Site Supervisor: _____ SHO: _____

Technician(s): _____ Others:_____

CLIENT INFORMATION
Company Name: _____
Address: _____
Primary Contact: _____
Phone: _____ Cell: _____ Fax: _____

SUBCONTRACTOR INFORMATION
Company Name: _____
Address: _____
Primary Contact: _____
Phone: _____ Cell: _____ Fax: _____
additional subcontractors listed on last page

SECTION B - PROJECT SAFETY COORDINATION

1.1 High Risk Activities

Confirm activities to be conducted during project	Resource	Yes	No
Working at or above 6 feet (fall protection)	PM		
Aerial lift	PM		
Heavy equipment	PM		
Drilling	PM		
Excavation	PM		
Lock-Out Tag-Out permit(s) required	PM		
Hot work	PM		
Hot work permit(s) required	PM		
Confined space entry	PM		
Confined space entry permit required	PM		
Subsurface activities	PM		
ATV, Snowmobile, 4 wheeler	PM		
Access agreements in-hand and signed by property owner	PM		
Permit requirements communicated to affected employees	PM		

CRA SAFETY COORDINATION REVIEW

1.2 Guiding Principals

(All items identified, verified and discussed)	Resource	Yes	No
Safety Commitment	SMART		
Injury Free Operation (IFO)	SMART		
Stop Work Authority	SMART		
Lessons Learned	SMART		
Any unresolved safety concerns or issues	SS		

1.3 Personnel Requirements

(All items identified, verified and discussed)	Resource	Yes	No	N/A
Site personnel trained to execute the Scope of Work	PM			
Verification of all personnel's training certifications	PM			
Potential for language barrier issues for this project	PM			
Potential technical understanding barriers for this project	PM			
Number of SSE(s) on site concurrent with CRA/client policy	PM			
Short Service Employee(s) identification	PM			
Mentor assignment for each SSE(s)	PM			
Employees trained to use the tools/equipment	PM			
Verification of all personnel's:				
- Medical clearance & respirator fit test (as required)	Safety Admin			
- Alcohol & drug clearance	Safety Admin			
Daily personnel evaluation if they are fit to function and working safely	SS			
Safety Health Officer required for the site	PM			

1.4 Behavior Based Safety - SMART Tools

(All items identified, verified and discussed)	Resource	Yes	No	N/A
STAR/Loss Prevention Self Assessment (LPSAs)	SMART			
Near loss/incident reporting procedure	SMART			
STEP/LPO	SMART			
At-risk behaviors and observation trends	SMART			

1.5 HASP Development & Review

(All items identified, verified and discussed)	Resource	Yes	No	N/A
Site-specific Health & Safety Plan developed	HASP			
Site-specific Health & Safety Plan approval by CRA safety professional	HASP			
System to modify the Health & Safety Plan in the field (i.e., "dirty JSA/JLA")	HASP			

1.6 JSA/JLA

(All items identified, verified and discussed)	Resource	Yes	No	N/A
On-site hazard assessment	PM			
JSA/JLAs available for all tasks including those performed by subcontractors	HASP			
Requirement to have JSA/JLAs modified in the field daily (i.e., "dirty JSA/JLA")	SS			
MSDSs obtained, reviewed, and hazards incorporated into JSA/JLAs	HASP			

CRA SAFETY COORDINATION REVIEW

1.7	**PPE**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Confirm task-specific PPE per JSA/JLAs	HASP			
	System to inspect PPE before start of work	SS			
1.8	**Site Emergency Response**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	First-aid requirements	HASP			
	Minimum - one first-aid trained person on-site	HASP			
	First-aid equipment within 50 feet of risk	HASP			
	Eye wash/shower within 50 feet of risk	HASP			
	Spill response equipment inspected and available within 50 feet of risk	HASP			
	Emergency Action Plan (EAP) - specific personnel identified for key incident command roles - discussed role responsibilities and actions with all site personnel, mustering/meeting location set	HASP			
	Site emergency evacuation alarm confirmed	SS			
	EAP drill schedule	HASP			
	Nearest hospital confirmation	HASP			
	Nearest hardwired telephone confirmation	Site Drawing			
	Emergency shut-off switch/valve locations confirmation	Site Drawing			
	Emergency contact confirmation - coordinate with facility and client	HASP			
1.9	**Utility Locates**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	CRA and/or client-specific Subsurface Utility Clearance Protocol reviewed and adhered to	PM			
	QSF-019 Property Access Form completed	PM			
	Client-specific requirements communicated to all affected employees	PM			
	One-call responses verified	PM			
1.10	**Traffic Control Program**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Temporary Traffic Control Plan (TTCP) required	PM			
	TTCP provided	PM			
	TTCP approval by the client, if required	PM			
1.11	**Site Control**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Have the following areas been considered for site control:				
	Fencing, barricades or other identifiers	SS			
	Signage to control pedestrian traffic	SS			
	Safety perimeter around equipment and work zone	SS			
	Swing radius barricades and/or signage struck-by (crush zones) reviewed and controlled.	SS			
1.12	**Equipment**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Proper lifting/transport of heavy objects (drums, augers)	SS			
	Equipment inspected and documented where required	SS			
	GFCI used and tested	SS			

CRA SAFETY COORDINATION REVIEW

1.13	**Weather**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Weather condition changes discussed - how to handle during work	HASP			
	Weather monitoring- who is responsible	HASP			
	Weather related hazards (heat/cold accommodations)	HASP			
	Hold time after lightning and thunder	SS			
1.14	**Crew Commitment**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Crew is aware of Safety Commitment that they are making	TBD			
1.15	**Materials**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	MSDSs availability for all HAZCOM/WHMIS regulated materials on the job site	HASP			
	Affected employees aware of special handling instructions for hazardous materials	HASP			
	Hazardous materials stored appropriately	HASP			
	Plan for dealing with leftover and/or waste materials	WP			
1.16	**Sub-Contractors**				
	(All items identified, verified and discussed)	**Resource**	**Yes**	**No**	**N/A**
	Approval through the QSF 12, 22, 30, 31	PM			
	CRA Safety Coordination Review Form completed with the subcontractor as applicable	PM			
1.17	**Documentation**				
	All required QS Forms are available and attached to the project file	PM	**Yes**	**No**	**N/A**
	- QSF-12	PM			
	- QSF-13	PM			
	- QSF-16	PM			
	- QSF-19	PM			
	- QSF-22	PM			
	- QSF-30/31	PM			
	- Meeting attendance sign in sheets	PM			
	Daily Tailgate sign in sheets	PM			
	Permits/air monitoring records	PM			
	STEP observation form	PM			
	Equipment inspection forms	PM			
	Client specific forms	PM			

CRA SAFETY COORDINATION REVIEW

SECTION C - ACTION ITEMS		
Action Items:	Responsible	Due Date

HASP Health and Safety Plan
PM Project Manager
SS Site Supervisor
SHO Safety & Health Officer

SUBCONTRACTOR INFORMATION
Company Name: _____
Address: _____
Primary Contact: _____
Phone: _____ Cell: _____ FAX: _____

SUBCONTRACTOR INFORMATION
Company Name: _____
Address: _____
Primary Contact: _____
Phone: _____ Cell: _____ FAX: _____

Copies of the forms for Pre-Job Meeting and On-Site Orientation shall be maintained in the Project File

SAFETY INSPECTION CHECKLIST – MOBILE EQUIPMENT SAFETY

Week Ending: | Job No.: | Equipment:

(This form is to be completed daily by the operator. Deficiencies should be addressed immediately.)

Superintendent: _____

	Date:	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	Comments
Equipment Hours:	*Start:*								
	Stop:								
Fluid Levels:									
Oil									
Hydraulic									
Transmission									
Radiator									
Grease Fittings									
Fuel									
Safety Checks:									
Fire Extinguisher									
Seat and Safety Belts									
Warning Devices (backup alarms, lights, etc.)									
Housekeeping									
Brakes									
Mirrors									
Windshield and Wipers									
Steering									
Horn									
Lights									
Tires									
Guards									
Instruments									
Exhaust System									
Accessories:									
Boom or Mast									
Controls									
Level Indicators									
Tracks									
Other									
Sign-Off:									
Operator's Initials									
Supervisor's Initials									

Additional Comments: (Please write any additinnal comments here. Use the back of this form if necessary.)

√ = OK NR = Needs Repair NA = Not Applicable

SITE HEALTH AND SAFETY PLAN MINOR AMENDMENT FORM

Amendment # _____

Site Name/Project ID _____

JSA/JLA Title _____

Date _____

Type of Amendment _____

Reason for Amendment _____

_____

_____

Alternate or Additional Safeguard Procedures _____

_____

_____

Required changes in PPE _____

_____

_____

Project Manager Notified ☐

RSHM Notified ☐

Client PM Notified (if necessary) ☐

_____ _____

Site Safety and Health Officer Date

Note: To be used for changes such as MSDS additives, JSA changes, and equipment changes.

This original form must remain on site and a copy placed in the project file. Any changes to the original HASP must be discussed with all affected site personnel prior to commencing work.

APPENDIX B

JOB SAFETY ANALYSIS SHEETS

JOB SAFETY ANALYSIS (JSA)

Wading Through a River

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	River Assessment
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Wading through a river		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	River Staff		
Task-specific Training:	Reference HASP for additional site/client safety training requirements		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)						
☒ Reflective Vest	☐ Goggles	☐ Gloves*	**APR:**			☐ Particulate
☐ Hard Hat	☐ Face Shield*	☐ Coveralls*		☐ Half Mask APR	☐ Full Face APR	☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☒ PPE Clothing*	☐ Supplied Air	☐ SCBA	☐ Airline Respirator	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				(attach description)	☐ Acid Gas
☒ Other* First Aid Kit				☐ Other*		☐ Other*
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)						
Waterproof waders, life jacket, bug spray						

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Wading Through a River

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Check weather	• Unexpected storm • Fog; rain; snow; lightening/thunder • Heat/cold stress	• Check local and destination weather forecast • Discuss weather issues and precautions to take while driving to the destination • If weather conditions (e.g., fog, rain, snow) impair the ability/vision reschedule site visit • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection	CRA Personnel
2	Prepare to enter river	• Boat traffic • Proper PPE • Prepare to carry equipment in river • River current • River Depth • River water temperature • Slip/trip/fall hazards	• Maintain awareness river traffic • Make sure PPE is properly secured. This includes water proof waders and life jacket • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing • Refer to the HASP for additional lifting information • Maintain resistance to river current. If current is too swift do not enter the river. • If river water is greater than three feet deep, do not enter the river. Utilize a boat for field activities and follow proper boat protocol. • Test river water temperature to not induce hypothermia. If river water is extremely cold, do not enter the river. • Practice STAR	CRA Personnel
3	River Wading	• Slips/trips/hit/fall hazards • Heat stress • Cold stress • Biological hazards • Wildlife encounters • Potential adverse weather conditions	• Use buddy system while walking through the river • Spot check to identify underwater hazards, establish pathways which is most free of slip and trip hazards, beware of trip hazards, communicate hazards to on-site personnel • Heightened awareness of wasps, ants, bees, snakes, turtles, alligators and use bug spray as necessary • Monitor for heat stress, establish work/rest regimes, wear heat stress PPE, and have liquids available • Monitor for cold stress, wear warm clothing, have access to fluids and high energy food and schedule a work and rest regime • Be aware of any rapidly changing environmental conditions and respond accordingly	CRA Personnel

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Soil Sampling

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Drilling, Soil Sampling
Work Type:	Environmental	**Client:**	
Work Activity:	Soil sampling		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Air monitoring equipment, PPE		
Task-specific Training:	CRA Field Method Training on Soil Sampling Procedures,		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☐ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☒ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☐ Other*			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Tyvek if Level C initiated; gloves dependent on the task and chemical contamination present or suspected present					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Soil Sampling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting • Use SWA to stop any work that is unsafe	Site Personnel
2	Inspect and calibrate sampling and monitoring equipment	• Lost time from improperly functioning equipment • Incorrect sampling procedures/ collection due to malfunctioning equipment	• Ensure all equipment is functioning properly • Complete Quality Control documents	Sampling Technician
3	Prepare to collect soil samples	• Lifting hazards • Back injury • Manual material handling • Pinch points • Cuts • Punctures • Sample misidentification	• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing • No bending or twisting while under load • Refer to the HASP for additional lifting information • Avoid placing hands/fingers in pinch point locations • Use proper tools when opening container packaging • Do not use fixed open blade knives when opening boxes or containers • Ensure the sample id label matches sample location with site plan/CRA site supervisor/subcontractor	Sampling Technician
4	Opening the sample sleeve (if applicable)	• Cuts due to sharp edges of sample sleeve • Contaminant exposure	• Use sleeve cutter for opening the sample sleeves • Keep hands clear of the sleeve when cutting • Wear nitrile gloves • Maintain awareness of sharp edges of sample sleeve	Sampling Technician
5	Sample collection	• Contaminant exposure • Cuts from container breakage • Sample misidentification	• Wear nitrile gloves and replace between soil samples • Inspect glass bottles for breaks/cracks • Do not attempt to use any suspect containers • Close glass sample containers carefully to avoid breakage • Check sample labels for accuracy prior to placing in cooler	Sampling Technician
6	Headspace screening of samples	• Contaminant exposure • Incorrect headspace readings	• Wear nitrile gloves • Ensure proper calibration of equipment	Sampling Technician
7	Sample selection	• Bottle breakage • Contaminant exposure • Pinch points • Lost time due to incorrect sample selection	• Wear nitrile gloves when handling sample containers • Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid)	Sampling Technician

JOB SAFETY ANALYSIS (JSA)

Soil Sampling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
8	Packing samples in cooler(s)	• Bottle breakage • Contaminant exposure • Cuts • Pinch points • Lifting hazards • Back injury • Manual material handling • Lost time due to incorrect sample packaging or hold time exceedances	• Wear nitrile gloves when handling sample containers • Pack glass containers in bubble wrap • Check COC against sample labels and SSOW for accuracy before shipping • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) • Use proper lifting techniques as discussed in step 3 • If possible use a dolly or cart if cooler is heavy or has to be moved over a long distance • Ensure equipment and supplies are loaded correctly and do not shift during transport	Sampling Technician
9	Investigation derived waste (IDW) management	• Contaminant exposure • Lifting hazards • Back injury • Manual material handling • Pinch points • Slips/trips/fall hazards • Mislabeled waste	• Wear nitrile gloves when handling IDW • Use proper lifting techniques as discussed in step 3 • Avoid placing hands/fingers in pinch point locations • Maintain awareness of walking surfaces • Label IDW with generator, a contact number, identification of contents, and site location • Specify IDW as either hazardous or non-hazardous material	Sampling Technician

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Hazard Assessment - Site Inspection
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Site walkthrough to assess and inventory hazards posed by site work activities		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Basic PPE, hand/power tools based on site condition, site inspection checklist or notebook, JSA forms, pens		
Task-specific Training:	SMART Safety training (STAR), JSA development, Poison Plant Identification		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☐ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☒ Other* Flashlight			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Insect repellant. Coveralls may be necessary based on type of brush/plants/insects in work area(s) being inspected. Leather gloves if overgrown vegetation or rundown buildings.					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting • Use SWA to stop any work that is unsafe	All persons on project team
2	Check weather	• Unexpected storm, fog; rain; snow; lightening, thunder • Heat/cold stress	• Check local weather forecast • Discuss weather issues and precautions to take while driving and on site during the pre-job safety meeting • If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Assessor
3	Sign in	• Site Manager and Operator not aware of CRA staff presence in facility or on grounds	• Sign in at front desk • Ask to speak to Site Manager or alternate designate	Assessor
4	Don necessary CRA and client required PPE	• Contact with recyclable material or equipment	• Wear all required PPE (hard hat, vest, boots, and glasses) at all times while in the facility	Assessor
5	Unload equipment from vehicle	• Lifting hazards • Back injury • Manual material handling • Cuts • Pinch points • Hand/foot injury • Forgotten equipment • Damaged equipment	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing • Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations • Wear steel-toed boots • Verify requested equipment against warehouse form • Load equipment in an organized manner to prevent shifting during transport or use cargo netting	Assessor
6	Complete site inspection and walkover of the property and work areas – Note any hazards that will impact site personnel and/or their operations	• Slip/trip/fall hazards • Insects/reptiles • Pedestrian injury • Poison plants	• Check in with site personnel and sign appropriate visitor or safety log (may require watching safety video [i.e., plant]) • Check with site contact to determine safely accessible areas and areas where PPE are required • Wear PPE as directed by site personnel or dependent upon your evaluation of conditions • If building(s) looks dilapidated or in poor condition, do not enter • Watch for vehicles or other mobile equipment moving around • Make sure areas are well lit and you are accompanied by a site representative (if applicable) • Watch where you step on pavement (potholes, dips, or obstructions) and in vegetated/wooded areas (dips, holes, branches, vines, etc.) • Do not take photographs while walking • Do not talk on cell phone while walking • If in vegetated or wooded areas, watch for beehives, wear insect repellent (if area and season dictate) as needed, be mindful of gopher holes/tunnels, small animal dens, snakes, stray dogs/cats, transient/homeless individuals, poison ivy/oak/sumac, etc.	Assessor

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
7	Sign out	• Site Manager and Operator not aware that CRA staff have left facility	• Sign out at front desk • Ask to speak to Site Manager or alternate designate	Assessor
8	Demobilization	• Collision • Injury or death to vehicle occupants or other parties	• Perform perimeter vehicle check • Maintain awareness of pedestrian/vehicular traffic when exiting the site • Utilize defensive driving techniques • Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	Assessor

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Single Well Response Test (Slug Testing)

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Groundwater Sampling
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Single well response testing (slug testing)		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Water level recorder, pressure transducers, slugs		
Task-specific Training:	CRA Field Method Training, PPE, WHMIS, Back Safety		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☐ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☒ Other* Sunscreen and Insect Repellant			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Use Ndex nitrile gloves when handling wet sampling containers; use abrasion/cut-resistant gloves for other tasks; use hearing protection as necessary based on site conditions.					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Single Well Response Test (Slug Testing)

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Establish work zone at monitoring location	• On-site traffic • Pinch points • Lifting hazards • Back injury • Manual material handling • Slip/trip/fall hazards	• Maintain awareness of on-site traffic patterns and walking paths (i.e., uneven terrain) • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing • Practice STAR	Sampling Technician
2	Open monitoring well	• Pinch points • Hand injury • Biological hazards • Cold/heat stress	• Avoid placing hands in pinch points • Wear proper PPE (gloves) for tasks and use the proper tools when opening well (inspect for other hazards that may affect hands) • Heighten awareness of wasps, ticks, ants, bees, spiders, snakes, mice, and poisonous plants • Follow cold/heat stress procedures in the Health and Safety Plan (HASP) • Use sunscreen and insect repellant if necessary • Practice STAR	Sampling Technician
3	Measure water levels	• Contaminant exposure • Cold/heat stress • Biological hazards	• Wear proper PPE (Ndex nitrile gloves) • Follow cold/heat stress procedures in the HASP • Use sunscreen and insect repellant if necessary • Practice STAR	Sampling Technician
4	Remove tubing from monitoring well	• Slip/trip/fall hazards • Cuts • Pinch point • Lifting hazards • Back injury • Manual material handling • Chemical exposure • Biological hazards • Cold/heat stress	• Maintain housekeeping; be aware of ground condition • Wear proper PPE (gloves) • Avoid pinch points • Refer to step 1 and HASP for additional lifting techniques/information • Ensure no personnel are near top of riser (in particular with flushmount installations) when removing tubing as tubing can be under tension as it is pulled out of the well and strike individuals too close to the riser • Stretch affected muscles prior to/during/after activity • Heightened awareness of wasps, ticks, ants, bees, spiders, snakes and poison plants • Follow cold/heat stress procedures in the HASP • Use of sunscreen and insect repellant if necessary • Practice STAR	Sampling Technician
5	Install pressure transducer	• Contaminant exposure • Cold/heat stress • Biological hazards	• Wear proper PPE (Ndex nitrile gloves) • Follow cold/heat stress procedures in the HASP • Use sunscreen and insect repellant if necessary • Practice STAR	Sampling Technician

JOB SAFETY ANALYSIS (JSA)

Single Well Response Test (Slug Testing)

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
6	Release and pull out slug	• Slip/trip/fall hazards • Cuts • Pinch point • Lifting hazards • Back injury • Manual material handling • Chemical exposure • Biological hazards • Cold/heat stress	• Maintain housekeeping; be aware of ground condition • Wear proper PPE (gloves) • Avoid pinch points • Refer to step 1 and HASP for additional lifting techniques/information • Ensure no personnel are near top of riser (in particular with flushmount installations) when removing tubing as tubing can be under tension as it is pulled out of the well and strike individuals too close to the riser • Stretch affected muscles prior to/during/after activity • Heightened awareness of wasps, ticks, ants, bees, spiders, snakes and poison plants • Follow cold/heat stress procedures in the HASP • Use of sunscreen and insect repellant if necessary • Practice STAR	Sampling Technician

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Residential Well Sampling

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Monitoring
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Residential well sampling		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Sample bottles		
Task-specific Training:	Groundwater Sampling		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☒ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☐ Other*			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Residential Well Sampling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Inform owner of sampling time	• Delays or added work	• Notify owner of schedule	Site Superintendent
2	Mobilize with proper equipment/ supplies for sampling	• Delay or improper/unsafe performance of work due to improper equipment on site • Cross-contamination of wells	• Review work plan to determine equipment/supply needs • Make sure all sampling/gauging equipment is decontaminated • Bring ice for sample storage • Review HASP and gather necessary PPE	Site Superintendent
3	Notify other personnel on site	• Unknown traffic or other work hazards • Lack of communication between all interested parties	• Meet with on-site workers and explain planned activities	Site Superintendent
4	Perform STAR and tailgate safety meeting upon arrival at site	• Consider worst-case scenario (including weather conditions)	• Review HASP with co-workers • Highlight aspects identified by STAR and, if necessary, add to HASP • Get signature of all co-workers on HASP	Site Superintendent
5	Park in the driveway, out of traffic	• Accident during placement or as a result of improper traffic control equipment placement	• Beware of other vehicles on the property	Site Superintendent
6	Enter the work area	• Slip/trip/fall hazards	• Be cautions of steps and turn on lights • Set up work area free of trip hazards	Site Superintendent
7	Purge well by turning on both the influent and effluent sample ports	• Cross-contamination • Slip/trip/fall hazards • Spilling contaminated water	• Keep work area clear of tripping or slipping hazards • Direct purge water to the drain area	Site Superintendent
8	Collect samples in accordance with sampling plan	• Cross-contamination • Slip/trip/fall hazards • Improper labeling or storage • Injury from broken sample bottle (cuts or acid burn)	• Use PPE in accordance with HASP • Label samples in accordance with sampling plan • Keep samples stored in proper containers, at correct temperature, and away from work area • Handle bottles carefully	Site Superintendent
9	Clean site/demobilize/turn off sample ports	• Nuisance or safety hazard left on site	• Leave site clean of refuse and debris • Turn off lights and close doors	Site Superintendent
10	Package and deliver samples to lab	• Bottle breakage • Improper temperature • Exceeding hold times • Improper completion of Chain of Custody (COC)	• Pack samples in ice, use bubble wrap/bags for sample bottles • Use standard COC forms and labels • Submit samples to lab as soon as possible (no more than 3 days, but check sampling plan for any special requirements such as rush turnaround or special hold time restrictions)	Site Superintendent

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Phase I ESA Site Inspection

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Phase I ESA Site Inspection
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Phase I ESA Site Inspection		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Camera, site inspection checklist or notebook, pens, PPE based on Site knowledge		
Task-specific Training:	CRA Phase I ESA training and experience with other assessors		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☐ Reflective Vest	☐ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☒ Other* Flashlight, Cell phone			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
In some manufacturing plants, long sleeves must be worn (sheet metal) and jewelry may be prohibited					
. At undeveloped lots/woods, a reflective safety vest and cellular phone is required.					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Phase I ESA Site Inspection

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting • Use SWA to stop any work that is unsafe	All persons on project team
2	Check weather	• Unexpected storm, fog; rain; snow; lightening, thunder • Heat/cold stress	• Check local weather forecast • Discuss weather issues and precautions to take while driving and on site during the pre-job safety meeting • If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Assessor
3	Load equipment into vehicle	• Manual material handling • Cuts • Pinch points • Hand/foot injury • Forgotten equipment • Damaged equipment	• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing • Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations • Wear steel-toed boots • Verify requested equipment against warehouse form • Load equipment in an organized manner to prevent shifting during transport or use cargo netting	Assessor
4	Complete CRA Daily Operator Vehicle Checklist	• Damaged vehicle lights, tires, windows, mirrors, horn • Inadequate vehicle documents and/or safety items	• Check for fluid leaks under vehicle • Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers • Visually check the pressure/wear of tires • Ensure the vehicle has a spare tire • Ensure windshield and window glass is clean and free from obstructions • Test the windshield wipers and horn • Verify vehicle registration, insurance card, and inspection sticker is present and valid • Ensure the vehicle contains a first aid kit, fire extinguisher, and road hazard kit	Assessor
5	Check and adjust seat, steering wheel, headrest, and mirrors	• Back/body strain • Blind spot • Impaired vision	• Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach • Ensure mirrors are properly adjusted	Assessor
6	Fasten seat belt(s) and ensure passenger(s) seat belts are fastened	• Serious injury, ejection, or death from collision • Traffic citation	• Verify driver and passenger(s) seat belts are in good condition and properly latched	Assessor
7	Lock vehicles door(s)	• Serious injury, ejection, or death from collision • Unwanted intrusion • Lost equipment	• Ensure all doors to the vehicle are locked. If automatic locks are unavailable, manually lock all doors.	Assessor
8	Start engine and check gauges and warning lights	• Vehicle breakdown	• Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit	Assessor

JOB SAFETY ANALYSIS (JSA)

Phase I ESA Site Inspection

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
9	Mobilize to site	• Arriving late • Collision • Injury or death to vehicle occupants or other parties	• Do not use cell phones or perform other distracting activities while vehicle is in motion • Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale) • Maintain safety cushion around vehicle (front, sides, and rear) and 4-second following distance • Utilize all driving defensive techniques	Assessor
10	Arrive at site	• Pedestrian injury • Collision	• Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone	Assessor
11	Park vehicle	• Pedestrian injury • Collision • Property damage	• Maintain awareness of pedestrian/vehicular traffic • Park vehicle in pull-through parking space or facing the exit • Use caution and mirrors/spotter when backing vehicle • Gather camera, site inspection checklist, pens, clipboard, business cards, etc. • Set cell phone to vibrate or not to ring • Don appropriate PPE	Assessor
12	Complete site inspection and walkover of the interior of all structures and exterior property areas	• Working Alone • Woods during Hunting Season • Slip/trip/fall hazards • Insects/reptiles • Pedestrian injury	• Check in with site personnel and sign appropriate visitor or safety log [may require watching safety video (i.e., plant)], If performing a solo Site investigation, check in with local CRA office admin or PM to inform of presence at Site. • If inspecting an empty lot or wooded area where hunters may be present, wear high-visibility reflective vest and/or hat • Check with site contact to determine safely accessible areas and areas where PPE are required • Wear PPE as directed by site personnel or dependent upon your evaluation of conditions • If building(s) looks dilapidated or in poor condition, do not enter • Make sure areas are well lit and you are accompanied by a site representative (if applicable) • Watch where you step on pavement (potholes, dips, or obstructions) and in vegetated/wooded areas (dips, holes, branches, vines, etc.) • Do not take photographs while walking • Ensure that while taking photographs in areas where a camera flash may pose a real or perceived safety hazard to workers (i.e., areas where personnel are working on electrical equipment), that all personnel are aware that photos are being taken • If in vegetated or wooded areas, watch for hives (insect repellent (if area and season dictate)) and be aware of hunting seasons (wear reflective vest and had as needed), be mindful of gopher holes/tunnels, small animal dens, snakes, stray dogs/cats, transient/homeless individuals, poison ivy/oak/sumac, etc. • If potential mold or potential ACM that is damaged or appears friable are present, avoid those areas • Watch for vehicles or other mobile equipment moving around	Assessor
13	Demobilization	• Collision • Injury or death to vehicle occupants or other parties	• Perform perimeter vehicle check • Maintain awareness of pedestrian/vehicular traffic when exiting the site • Utilize defensive driving techniques • Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	Assessor

JOB SAFETY ANALYSIS (JSA)

Phase I ESA Site Inspection

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Monitoring Well Sampling

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	O&M]
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Monitoring well sampling/gauging		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:			
Task-specific Training:	[Identify any special/additional training necessary to safely complete this task]		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☐ Reflective Vest	☐ Goggles	☐ Gloves*	**Supplied Air**	**APR**	
☐ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☐ Safety Glasses	☐ Safety-toed Boots				☐ Acid Gas
☐ Other*			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Nitrile gloves					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Monitoring Well Sampling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Coordinate site access	• Delays or added work	• Notify Station Manager of schedule • Notify other required personnel if applicable (city, regulators, private property owners, etc.)	
2	Mobilize with proper equipment/ supplies for sampling	• Delay or improper/unsafe performance of work due to improper equipment on site • Cross-contamination of wells	• Review work plan to determine equipment/supply needs • Make sure all sampling/gauging equipment is decontaminated • Bring ice for sample storage • Review THE HASP and gather necessary PPE	
3	Notify other personnel on site	• Unknown traffic or other work hazards • Lack of communication between all interested parties	• Meet with station attendant or other site personnel and explain planned activities	
4	Determine sampling order	• Cross-contamination of samples and wells due to incomplete decontamination of sampling equipment	• Review prior analytical results and set sampling order from lowest to highest concentration wells	
5	Perform STAR and tailgate safety meeting upon arrival at site	• Consider worst-case scenario (including weather conditions)	• Review HASP with co-workers • Highlight aspects identified by HASP and, if necessary, add to HASP • Get signature of all co-workers on HASP	
6	Set up exclusion zone(s)	• Injury or exposure to public or other on-site personnel • Slip/trip/fall hazards	• Implement exclusion zone setup instructions of THE HASP (barricades, caution tape, cones, etc.) • Set up work area free of trip hazards	
7	Gauge water levels and product thickness (where applicable) in wells	• Back strain • Inhalation or dermal exposure to chemical hazards	• Don any additional PPE and initiate air quality monitoring in accordance with the HASP • Maintain safe distance from well head • Bend at knees, not waist	
8	Purge well(s) and collect purge water	• Cross-contamination • Lifting hazards • Back injury • Manual material handling • Inhalation or dermal exposure to chemicals • Slip/trip/fall hazards • Spilling contaminated water	• Decontaminate purging equipment between each sampling location • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing • Use PPE and monitoring in accordance with the HASP • Keep work area clear of tripping or slipping hazards • Store purge water in appropriate containers	

JOB SAFETY ANALYSIS (JSA)

Monitoring Well Sampling

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
9	Collect samples in accordance with sampling plan	• Cross-contamination • Lifting hazards • Back injury • Manual material handling • Inhalation or dermal exposure to chemical hazards • Slip/trip/fall hazards • Improper labeling or storage • Injury due to acid burn (unsealed or leaking sample bottle) • Injury from broken sample bottle (cuts or acid burn)	• Use PPE in accordance with the HASP • Use PPE whenever handling or labeling samples • Decontaminate sampling equipment between each well (unless disposable) • Refer to step 9 and the HASP for additional lifting methods • Label samples in accordance with sampling plan • Keep samples stored in proper containers, at correct temperature, and away from work area • Wear nitrile gloves when handling bottles • Handle bottles carefully	
10	Dispose or store purge water onsite	• Lifting hazards • Back injury • Manual material handling • Exposure to chemicals • If disposing through on-site treatment system, damage or injury from improper use of equipment • Improper storage or disposal	• Use proper equipment to transport water (pumps, drum dollies, etc.) • Refer to step 9 and the HASP for additional lifting methods • Where PPE in accordance with the HASP • Review any necessary instructions for use of on-site treatment systems • Label storage containers properly and locate in isolated area away from traffic and other site functions • Coordinate off-site disposal (where applicable)	
11	Clean site/demobilize	• Traffic • Nuisance or safety hazard left on site • Back strain	• Use buddy system as necessary to remove traffic control • Leave site clean of refuse and debris • Notify station personnel of departure, and note any purge water left on site • Exercise caution when lifting coolers out of the trunk of a car; use the buddy system if justified	
12	Package and deliver samples to lab	• Bottle breakage • Improper temperature • Exceeding hold times • Improper completion of Chain of Custody (COC)	• Pack samples in ice, use bubble wrap/bags for sample bottles • Use standard COC forms and labels • Submit samples to lab as soon as possible (no more than 3 days, but check sampling plan for any special requirements such as rush turnaround or special hold time restrictions)	

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Fluid Level Monitoring

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Fluid Level Monitoring
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Fluid level monitoring (collecting water/LNAPL levels/gauging wells)		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Water level meter or oil/water interface meter, PID, PPE		
Task-specific Training:	Fluid Level Monitoring; reference HASP for additional site/client safety training requirements		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☐ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☒ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☐ Other*			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Use nitrile gloves when performing work; use hearing protection as necessary based on site conditions					

Project Development Team						
Name	**Signature**	**Position/Title**	**Modified By**	**Reviewed By**	**Position/Title**	**Date**
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Fluid Level Monitoring

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Inspect/calibrate equipment	• Loss due to malfunctioning equipment	• Check all equipment to ensure it is in proper working order and has been calibrated to CRA and manufacturer's standards, then document	Sampling Technician
2	Establish work zone at monitoring well location	• Traffic • Pinch points • Lifting hazards • Back injury • Manual material handling	• Review work zone controls using the STAR process; is it safe to proceed? • Maintain awareness of on-site traffic patterns and walking paths • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing	Sampling Technician
3	Open monitoring well cover(s)	• Pinch points • Hand injury • Biological hazards	• Avoid placing hands in pinch points • Wear proper PPE for task and use the proper tool when opening well covers (open face wrench/socket wrench) • Maintain good housekeeping; stow bolts, locks, wrench, plug, etc. in a safe area to prevent loss • Inspect for other hazards that may affect the hands (hypodermic needles, etc.) • Use PID to monitor air quality in breathing space • Heightened awareness of wasps, ants, bees, spiders, and poison plants	Sampling Technician
4	Measure water/LNAPL levels	• Contaminant exposure • Cross contamination	• Wear proper PPE; use chemical-resistant gloves but be aware of abrasion hazards using the STAR process • Use PID to monitor air quality in breathing space • Decon probe and measuring tape following gauging of well	Sampling Technician
5	Close monitoring well cover	• Traffic • Hand injury • Pinch points	• Maintain awareness of on-site traffic patterns; verify barricades are still in place • Wear abrasion-resistant gloves and use proper tools • Avoid placing hands in pinch points	Sampling Technician

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(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Decontamination of Sampling Equipment and Personnel (PPE Level D)

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Decontamination
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Decontamination of sampling equipment and personnel (PPE Level D)		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Alconox/Liquinox, brushes, _____		
Task-specific Training:	Decontamination/Site Control; Quality Control/Sampling Plan		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☐ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☐ Other*			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Nitrile gloves to be worn when decontaminating reusable equipment					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Decontamination of Sampling Equipment and Personnel (PPE Level D)

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Decontamination of sampling equipment (including pumps, bailers, tubing, etc.)	• Contaminant exposure • Pinch points • Slip/trip/hit/fall hazards • Lifting hazards • Back injury • Manual material handling	• Set up decon station to capture any spills to avoid cross-contamination and manage wastes • Wear appropriate PPE • Scrub equipment clean then rinse and verify it is clean and free of contamination • Avoid putting hands in or near pinch points • Maintain good housekeeping and be aware of surroundings • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical means, such as a dolly, cart, or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Refer to the HASP for additional lifting techniques	Sampling personnel
2	Decontamination of personnel	• Contaminant exposure • Slip/trip/hit/fall hazards	• Refer to the HASP for specific procedures but in general start with most contaminated article and remove until inner gloves are the last item left • Dispose of used PPE in accordance with site requirements • Wash hands and face before eating, drinking, or using tobacco products • Take care when removing PPE (boots, gloves, etc.); sit down to remove/change boots as necessary	Sampling personnel
3	Management of waste derived from decontamination activities	• Contaminant exposure • Lifting hazards • Back injury • Manual material handling	• Containerize decon waste (e.g., water, used PPE) as required • Properly dispose of decon fluids (e.g., sediments) • Refer to step 1 and the HASP for additional lifting information	Sampling personnel

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(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Boat Safety

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Surveying Activities on Water
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Surveying activities on water		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:			
Task-specific Training:	Towing and Trailering, Boating Safety		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☐ Reflective Vest	☐ Goggles	☐ Gloves*	**Supplied Air**	**APR**	
☐ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☐ Safety Glasses	☐ Safety-toed Boots				☐ Acid Gas
☒ Other* CSA approved Life Jacket or PFD			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Sunglasses; sunscreen					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Boat Safety

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Mob equipment to boat launch	• Over loading boat capacity • Inclement weather • Lifting hazards • Manual material handling • Back injury • Pinch points • Moving or flying projectiles inside vehicle while transporting equipment • Slip/trip/fall hazards • Fuel spill	• Review boat capacity and complete weight survey including personnel and gear • Monitor weather forecasts • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Ensure all equipment is properly secured during transport • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing • Refuel in appropriate location, no sparks or static buildup • Practice STAR	Competent operator and survey crew
2	Launch boat	• Lifting hazards • Manual material handling • Back injury • Pinch points • Moving or flying projectiles inside vehicle while transporting equipment • Slip/trip/fall hazards • Fuel spill • Drowning	• Practice STAR • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one-handed carrying if possible; maintain awareness of footing • Review JSA for proper fuelling • Wear appropriate PFD or life vest • Bring boating safety kit	Competent operator
3	Navigate boat to site	• Causing unnecessary wake • Running aground • Disturbing others • Drowning	• Obey posted signage • Follow channel marked with buoys • Follow proper boating etiquette • Practice STAR • Wear appropriate PFD or life vest • Bring boating safety kit • Remain seated	Competent operator
4	Perform survey activities	• Tipping boat • Wet equipment • Boating traffic	• Remain seated when operating; If the boat tips over, remain with the boat • Keep equipment dry by storing in waterproof storage containers during transport • Be aware of surroundings, verify water depth in shallow waters	Survey crew

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JOB SAFETY ANALYSIS (JSA)

Driving and Off-Road Driving

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Driving
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Travel on rough roads, fields, ravines, creek beds		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Four-wheel drive vehicle, valid driver's license, 360-degree topper		
Task-specific Training:	Defensive Driving; review of owner's/operator's manual		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)						
☐ Reflective Vest	☐ Goggles	☐ Gloves*	**Supplied Air**	**APR**		
☐ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate	☐ Organic Vapor
☐ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined	
☐ Safety Glasses	☐ Safety-toed Boots				☐ Acid Gas	
☒ Other* Seat belt			☐ Other*	☐ Other*		
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)						

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Driving and Off-Road Driving

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Discuss STAR and SWA – Discuss traffic patterns and review the accepted traffic route(s) for project/site travel	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting • Discuss route, concerns and alternate routes with passenger and drivers of other vehicles • Use SWA to stop any work that is unsafe • Ensure proper vehicle selected for travel (use a truck if going to construction site or area with rough conditions that would damage a small vehicle?)	Driver and passenger
2	Check weather	• Unexpected storm • Fog; rain; snow; lightning/thunder • Heat/cold stress	• Check local weather forecast • Discuss weather issues and precautions to take while driving and on site during the pre-job safety meeting • If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Driver or Passenger
3	Complete CRA Daily Operator Vehicle	• Damaged vehicle lights, tires, windows, mirrors, horn • Inadequate vehicle documents and/or safety items	• Check for fluid leaks under vehicle • Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers • Visually check the pressure/wear of tires • Ensure the vehicle has a properly inflated spare tire and associated tools to install • Assure windshield and window glass is clean and free from obstructions • Assure all fluids are topped off (ex. windshield wiper fluid) and scheduled routine maintenance has occurred (ex. Oil changes). • Test the windshield wipers and horn • Verify vehicle registration, insurance card, and inspection sticker is present and valid • If the vehicle contains a first aid kit, fire extinguisher, and road hazard kit and that all items with expiration dates are current, that fire extinguisher has had documented monthly check. • Do not use vehicle if any safety device is found not functioning	Driver or Passenger
4	Check and adjust seat, steering wheel, headrest, and mirrors	• Back/body strain • Blind spot • Impaired vision	• Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach • Ensure mirrors are properly adjusted	Driver or Passenger
5	Fasten seat belt(s) and ensure passenger(s) seat belts are fastened	• Serious injury, ejection, or death from collision and/or traffic citation	• Verify driver and passenger(s) seat belts are in good condition and properly latched	Driver or Passenger

JOB SAFETY ANALYSIS (JSA)

Driving and Off-Road Driving

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
6	Ensure vehicle doors are locked	• Serious injury, ejection, or death from collision • Unwanted intrusion • Lost equipment	• Manually lock all doors to vehicle prior to starting the vehicle.	Driver
7	Start engine and check gauges and warning lights	• Vehicle breakdown	• Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit	Driver
8	Driving – Do not deviate from established traffic patterns unless new path/area has been physically walked by personnel and reviewed for hazards; pay attention to hidden obstacles (holes, obscured objects, etc.)	• Arriving late • Collision • Vehicle damage • Injury or death to occupants or other parties • Unseen/hidden obstacles or other hazards	• Acknowledge and comply with all traffic regulations, laws, and ordinances • Do not use 2-way communicating devices or perform other distracting activities while vehicle is in motion • Constantly scan intersections, move eyes, check mirrors, and assess traffic patterns • Maintain safety cushion around vehicle (front, sides, and rear) and 4-second following distance (add an extra second for each hazardous condition, triple following distance in poor weather conditions) • Avoid driving in treed areas that would result in paint and side mirror damage • Do not drive in other vehicles' blind spots • Review path of travel or follow established traffic pattern(s) • Utilize all driving defensive techniques	Driver
9	Walk the selected route if covered with tall vegetation before driving	• Slip/trip/fall hazards	• Use a walking stick to probe in high vegetation to ensure that ground conditions are suitable for driving at slow speeds	Driver
10	Clear and grub path if access is required frequently	• Refer to Clearing and Grubbing JSA	• Refer to Clearing and Grubbing JSA	Project Coordinator
11	Park vehicle	• Pedestrian injury • Property damage	• Maintain awareness of pedestrian/vehicular traffic • Park vehicle in pull-through parking space or facing the exit • Parking in a parking space that is not a designated parking space will require the placement of the 360-degree topper on the hood of the vehicle • Use caution and mirrors/spotter when backing vehicle • Set parking brake	Driver
12	Demobilization	• Collision • Injury or death to occupants or other parties	• Perform perimeter vehicle check • Maintain awareness of pedestrian/vehicular traffic when exiting site • Utilize defensive driving techniques • Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	Driver or Passenger
13	Report maintenance or mechanical problems upon returning vehicle	• Conditions worsen leading to mechanical failure resulting in collision and injury	• Report vehicle problems immediately to company representative or rental car agency • Schedule and/or perform repairs as soon as possible	Driver

JOB SAFETY ANALYSIS (JSA)

Driving and Off-Road Driving

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Operating Geoprobe with Augers

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Drilling
Work Type:	Environmental	**Client:**	Douglas County Public Works
Work Activity:	Drilling with auger (General procedures)		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Geoprobe drill rig		
Task-specific Training:	Spinning augers with Geoprobe		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☐ Reflective Vest	☐ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☐ Lifeline/Harness*	☒ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☒ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☐ Other*			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Gloves are dependent on the task and chemical contamination suspected or present					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Operating Geoprobe with Augers

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	• Discuss STAR and SWA	• Site personnel not using the STAR process and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting • Use SWA to stop any work that is unsafe	Site Personnel
2	• Raise mask, slide extension ¾ ways out, lower foot on ground surface, lower out riggers to level machine • Raise hammer assembly to fold out auger head and secure with a bolt or pin.	• Slip/trip/fall hazards • Overhead wires • Underground utility • Pinch and crush points - hands, feet, fingers • Unstable ground conditions	• Use STAR process • Be aware of footing at all times • Verify that all utilities have been cleared • Machine has all pinch and crush points marked in reflective tape • Wear appropriate PPE • Inspect soil for loose, soft or unstable conditions under rig jacks or outriggers	Driller and Sampling Technician
3	• Place HSA drive cap in auger head and secure with pin • Place wooden auger plug into cutting head • Lift auger with cutting head and bolt to HSA drive cap • Apply down pressure with hammer assembly • Keep auger plum • Clear soils as needed	• Back strain • Pinch points • Pulled in by rotation of auger • Shift or kick out of auger • Shovel hitting auger during rotation	• Use proper lifting techniques • Use two people when lifting augers • Maintain awareness of pinch and crush points at all times • No loose clothing or jewelry • Adjust side to side or forward and backward to keep auger plumb • Keep shovel clear of auger while auger is in rotation • Wear proper PPE	Driller
4	• Don't raise foot off the ground while advancing auger • Repeat step 3 as you add more flights	• Pinch and crush points - hands, feet, and fingers • Kick out of auger	• Maintain awareness of pinch and crush points at all times • Maintain awareness of auger	Driller
5	• Pulling augers, remove HSA from auger and then remove from auger head • Fold auger head back and secure with bolt or pin • Lower hammer assembly to place, auger pulling system on hammer and flights • Raise hammer assembly to pull augers from ground, and fork lower auger at ground surface • Unbolt the auger connection • Lift auger and place on ground repeat until all flights are removed from ground	• Back strain • Pinch and crush points - hands, feet, and fingers • Contaminant exposure	• Use proper lifting techniques • Use two people when lifting augers • Maintain awareness of pinch and crush points at all times • Wear proper PPE	Driller and Sampling Technician
6	• Lower hammer all the way down • Raise foot from ground surface, slide extension in • Lower mask, raise out riggers	• Slip/trip/fall hazards • Pinch and crush points - hands, feet, and fingers	• Be aware of footing at all times • Machine has all pinch and crush points marked in reflective tape	Driller

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

JOB SAFETY ANALYSIS (JSA)

Operating Geoprobe with Augers

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Earthwork Trenching

Safety Means Awareness Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	4/25/13	**JSA Type:**	Construction
Work Type:	Construction	**Client:**	Douglas County Public Works
Work Activity:	Trench excavation		
Work Site:	Hydrogeologic Study, Penny's Concrete and Sand LLC, Douglas County, KS		
Key Equipment:	Excavator; backhoe		
Task-specific Training:	Excavation Safety Training; Excavation Competent Person (for supervisors); Heavy Equipment Safety; Trench Box Setup/Entry/Egress		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
☒ Reflective Vest	☐ Goggles	☒ Gloves*	**Supplied Air**	**APR**	
☒ Hard Hat	☐ Face Shield*	☐ Coveralls*	☐ SCBA	☐ Full Face APR	☐ Particulate ☐ Organic Vapor
☒ Lifeline/Harness*	☐ Hearing Protection*	☐ PPE Clothing*	☐ Airline Respirator (attach description)	☐ Half Mask APR	☐ Particulate/Organic Vapor Combined
☐ Safety Glasses	☒ Safety-toed Boots				☐ Acid Gas
☒ Other* Trench box (as necessary)			☐ Other*	☐ Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Leather abrasion-resistant gloves					
Lifeline and harness will be used in deep excavations. Tabulated data sheet for trench box must be on site with box(es).					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Kirk Hoeffner						4/25/13

JOB SAFETY ANALYSIS (JSA)

Earthwork Trenching

Job Steps[1]	Task Activity	Potential Hazard(s)[2]	Corrective Measure(s)[3]	Person Responsible
1	Verify Utility Clearance procedures completed (overhead and underground); verify excavation trench layout	• Underground utility strike • Overhead utilities	• QSF-019 on file? • Utility Locate Ticket number on file within 10 days of excavation startup? • Mark work area and safe distances for overhead lines • use spotter as necessary	Site Supervisor Project Manager
2	Setup necessary work area and traffic controls	• Fall-in • Caught-between and struck-by hazards	• Demarcate site and work areas to ensure that personnel and truck/equipment traffic is maintained safely and smoothly • Stockpile and laydown area are setup properly	Site Supervisor Laborers
3	Hand digging and pot holing activities conducted (where/if necessary based on utility locates)	• Underground utility strike	• Use preventive techniques • Maintain proper utility clearances with heavy equipment and use hand digging/pot holing when necessary	Site Supervisor Laborers Operator
4	Heavy equipment operations to excavate and handle soils and spoils	• Caught-between and struck-by hazards • Underground/overhead utilities	• Stay out of swing radius • Use spotters to verify clear route of travel and work area; maintain eye contact with operator and/or signal operator; keep soil 2 feet from edges • Inspect heavy equipment – document inspection • Ensure above utility clearances and safe work protocols are followed	All Affected Personnel
5	Trenching activities	• Soil cave-in; noise • Struck-by/against • Encountering impacted soils	• Keep proper distances from edge of excavation • Limit equipment operations in trench area • Keep work area free of trip hazards • Perform necessary soil classification • Use hearing protection as necessary • Follow air monitoring protocols • Contact site supervisor if odors and/or discolored soils are encountered	Operator Radiation Contractor Laborers Site Supervisor
6	Trench entry activities	• Soil cave-in • Struck-by/against • Encountering slag • Hazardous atmospheres • Slip/trip/fall hazards • Emergency egress	• Keep proper distances from edge of excavation • Limit equipment operations in trench area • Keep work area free of trip hazards • Perform necessary soil classification • Use daily inspection form to document/meet competent person inspection requirements • Inspect trench after any change in conditions (rain, equipment vibrations, etc.) • Utilize trench box properly; ensure that tabulated data sheet is on site • Contact health physics/radiation safety contractor if slag encountered • Use 4-gas monitor and PID to screen excavation air prior to and during entry • Ladder safety and proper slope of ladder • If necessary based on air monitoring and/or other site conditions use harness and lifeline when entering trenches over 5 feet deep	Site Supervisor Operators Laborers

(1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

(2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

(3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

APPENDIX C

MATERIAL SAFETY DATA SHEETS

ALCONOX MSDS

Section 1 : PRODUCT AND COMPANY IDENTIFICATION

Chemical family: Detergent.

Product name: Alconox

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Supplier: Same as manufacturer.

Section 2 : INGREDIENT INFORMATION

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A: ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : HAZARD IDENTIFICATION

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of acute exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

Section 4 : FIRST AID MEASURES

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Additional information: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any inaccuracies.

Section 5 : FIRE FIGHTING MEASURES

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability Not applicable.

limit (% vol):

Upper flammability limit (% vol): Not applicable.

Explosion Data

Sensitivity to static discharge: Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 6 : ACCIDENTAL RELEASE MEASURES

Leak/Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Section 7 : HANDLING AND STORAGE

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : EXPOSURE CONTROLS / PERSONAL PROTECTION

Precautionary Measures

Gloves/Type:

Neoprene or rubber gloves.

Respiratory/Type:

If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye/Type:

Safety glasses with side-shields.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Exposure limit of material: Not available for mixture, see the ingredients section.

Section 9 : PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Chemical family: Detergent.

Section 10 : STABILITY AND REACTIVITY

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 11 : TOXICOLOGICAL INFORMATION

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Section 12 : ECOLOGICAL INFORMATION

Environmental toxicity: No data at this time.

Environmental fate: No data at this time.

Section 13 : DISPOSAL CONSIDERATIONS

Waste disposal: In accordance with municipal, provincial and federal regulations.

Section 14 : TRANSPORT INFORMATION

ADR CLASSIFICATION: Not regulated.

Special shipping information: Not regulated.

Section 15 : REGULATORY INFORMATION

Canadian Regulatory Information

WHMIS classification:

D2B

DSL status: The supplier has certified that all substances in this product appear on the domestic substances list.

USA Regulatory Information

SARA hazard catagories sections 311/312: Immediate (Acute) Health Hazard: Yes.
Delayed (Chronic) Health Hazard: No.
Fire Hazard: No.
Sudden Release of Pressure: No.
Reactive: No.

SARA Section 313: None

TSCA inventory: All components of this product are listed on the TSCA inventory.

EU Regulatory Information

European Union (EU) Regulatory Information: EU labeling required.

EU Risks: R20: Harmful by inhalation.
R36/37/38: Irritating to eyes, respiratory system and skin.

EU Safety: S8: Keep container dry.
S22: Do not breathe dust.
S24/25: Avoid contact with skin and eyes.

EINECS#: CAS# 25155-30-0 - EINECS# 246-680-4.
CAS# 7758-29-4 - EINECS# 231-838-7.
CAS# 497-19-8 - EINECS# 207-838-8.
CAS# 7722-88-5 - EINECS# 231-767-1.

EU Symbols:

Irritant.

NFPA

Health Hazard: 1

Flammability: 0

Physical hazard: 0

Section 16 : OTHER INFORMATION

Supplier MSDS date: 2009/04/20

General note: This material safety data sheet was prepared from information obtained from various sources, including product suppliers and the Canadian Center for Occupational Health and Safety.

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

CHEVRON and TEXACO REGULAR UNLEADED GASOLINES

Product Use: Fuel
Product Number(s): CPS201000 [See Section 16 for Additional Product Numbers]
Synonyms: Calco Regular Unleaded Gasoline, Chevron Regular Unleaded Gasoline, Gasolines, Automotive, Texaco Unleaded Gasoline
Company Identification
Chevron Products Company
Marketing, MSDS Coordinator
6001 Bollinger Canyon Road
San Ramon, CA 94583
United States of America

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
Technical Information: (510) 242-5357

SPECIAL NOTES: This MSDS applies to: all motor gasoline.

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Gasoline	86290-81-5	100 %vol/vol
Benzene	71-43-2	0.1 - 4.9 %vol/vol
Toluene (methylbenzene)	108-88-3	1 - 17 %vol/vol
Ethyl benzene	100-41-4	0.1 - 3 %vol/vol
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	1330-20-7	1 - 15 %vol/vol
Butane	106-97-8	1 - 12 %vol/vol
Heptane	142-82-5	1 - 4 %vol/vol
Hexane	110-54-3	1 - 5 %vol/vol
Cyclohexane	110-82-7	1 - 3 %vol/vol
Methylcyclohexane	108-87-2	1 - 2 %vol/vol
Pentane, 2,2,4-trimethyl- (Isooctane)	540-84-1	1 - 13 %vol/vol
Naphthalene	91-20-3	0.1 - 2 %vol/vol
Ethanol	64-17-5	0 - 10 %vol/vol
Methyl tert-butyl ether (MTBE)	1634-04-4	0 - 15 %vol/vol

Tertiary amyl methyl ether (TAME)	994-05-8	0 - 17 %vol/vol
Ethyl tert-butyl ether (ETBE)	637-92-3	0 - 18 %vol/vol

Information on ingredients that are considered Controlled Products and/or that appear on the WHMIS Ingredient Disclosure List (IDL) is provided as required by the Canadian Hazardous Products Act (HPA, Sections 13 and 14). Ingredients considered hazardous under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, are also listed. See Section 15 for additional regulatory information.

SECTION 3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

- EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE
- HARMFUL OR FATAL IF SWALLOWED - MAY CAUSE LUNG DAMAGE IF SWALLOWED
- VAPOR HARMFUL
- CAUSES EYE AND SKIN IRRITATION
- LONG-TERM EXPOSURE TO VAPOR HAS CAUSED CANCER IN LABORATORY ANIMALS
- KEEP OUT OF REACH OF CHILDREN
- TOXIC TO AQUATIC ORGANISMS

****

IMMEDIATE HEALTH EFFECTS
Eye: Contact with the eyes causes irritation. Symptoms may include pain, tearing, reddening, swelling and impaired vision.
Skin: Contact with the skin causes irritation. Skin contact may cause drying or defatting of the skin. Symptoms may include pain, itching, discoloration, swelling, and blistering. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death.
Inhalation: The vapor or fumes from this material may cause respiratory irritation. Symptoms of respiratory irritation may include coughing and difficulty breathing. Breathing this material at concentrations above the recommended exposure limits may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: This material is not expected to cause birth defects or other harm to the developing fetus based on animal data.
Cancer: Prolonged or repeated exposure to this material may cause cancer. Gasoline has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Whole gasoline exhaust has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Contains benzene, which has been classified as a carcinogen by the National Toxicology Program (NTP) and a Group 1 carcinogen (carcinogenic to humans) by the International Agency for Research on Cancer (IARC).
Contains ethylbenzene which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).
Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC). Contains benzene, which has been classified as an A1 Group Confirmed Human Carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH).
See Section 11 for additional information. Risk depends on duration and level of exposure.

SECTION 4 FIRST AID MEASURES

Eye: Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.
Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.
Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.
Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

See Section 7 for proper handling and storage.

FLAMMABLE PROPERTIES:
Flashpoint: (Tagliabue Closed Cup ASTM D56) < -45 °C (< -49 °F)
Autoignition: > 280 °C (> 536 °F)
Flammability (Explosive) Limits (% by volume in air): Lower: 1.4 Upper: 7.6 (Typical)

EXTINGUISHING MEDIA: Dry Chemical, CO2, AFFF Foam or alcohol resistant foam if >15% volume polar solvents (oxygenates).

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: Use water spray to cool fire-exposed containers and to protect personnel. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL. This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Do not store in open or unlabeled containers. Use only as a motor fuel. Do not use for cleaning, pressure appliance fuel, or any other such use. Never siphon gasoline by mouth.
Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe vapor or fumes. Wash thoroughly after handling. Keep out of the reach of children.
Unusual Handling Hazards: WARNING! Do not use as portable heater or appliance fuel. Toxic fumes may accumulate and cause death.
General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable

atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'. Improper filling of portable gasoline containers creates danger of fire. Only dispense gasoline into approved and properly labeled gasoline containers. Always place portable containers on the ground. Be sure pump nozzle is in contact with the container while filling. Do not use a nozzle's lock-open device. Do not fill portable containers that are inside a vehicle or truck/trailer bed.

General Storage Information: DO NOT USE OR STORE near heat, sparks, flames, or hot surfaces . USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Chlorinated Polyethylene (or Chlorosulfonated Polyethylene), Nitrile Rubber, Polyurethane, Viton.
Respiratory Protection: Determine if airborne concentrations are below the recommended occupational exposure limits for jurisdiction of use. If airborne concentrations are above the acceptable limits, wear an approved respirator that provides adequate protection from this material, such as: Air-Purifying Respirator for Organic Vapors.
When used as a fuel, this material can produce carbon monoxide in the exhaust. Determine if airborne concentrations are below the occupational exposure limit for carbon monoxide. If not, wear an approved positive-pressure air-supplying respirator.
Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.
Occupational Exposure Limits:

Component	Country/ Agency	TWA	STEL	Ceiling	Notation
Benzene	ACGIH	.5 ppm (weight)	2.5 ppm (weight)	--	Skin A1 Skin
Butane	ACGIH	1000 ppm (weight)	--	--	--
Cyclohexane	ACGIH	100 ppm (weight)	--	--	--
Ethanol	ACGIH	1000 ppm (weight)	--	--	A4
Ethyl benzene	ACGIH	100 ppm (weight)	125 ppm (weight)	--	A3

Ethyl tert-butyl ether (ETBE)	ACGIH	5 ppm (weight)	--	--	--
Gasoline	ACGIH	300 ppm (weight)	500 ppm (weight)	--	A3
Heptane	ACGIH	400 ppm (weight)	500 ppm (weight)	--	--
Hexane	ACGIH	50 ppm (weight)	--	--	Skin
Methyl tert-butyl ether (MTBE)	ACGIH	50 ppm (weight)	--	--	A3
Methyl tert-butyl ether (MTBE)	CVX	--	50 ppm	--	--
Methylcyclohexane	ACGIH	400 ppm (weight)	--	--	--
Naphthalene	ACGIH	10 ppm (weight)	15 ppm (weight)	--	Skin
Pentane, 2,2,4-trimethyl- (Isooctane)	ACGIH	300 ppm (weight)	--	--	--
Tertiary amyl methyl ether (TAME)	ACGIH	20 ppm (weight)	--	--	--
Tertiary amyl methyl ether (TAME)	CVX	--	50 ppm	--	--
Toluene (methylbenzene)	ACGIH	50 ppm (weight)	--	--	Skin A4
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	ACGIH	100 ppm (weight)	150 ppm (weight)	--	A4

NOTE ON OCCUPATIONAL EXPOSURE LIMITS: Consult local authorities for acceptable provincial values in Canada. Consult the Canadian Standards Association Standard 94.4-2002 Selection, Use and Care of Respirators.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Colorless to yellow
Physical State: Liquid
Odor: Petroleum odor
pH: Not Applicable
Vapor Pressure: 5 psi - 15 psi (Typical) @ 37.8 °C (100 °F)
Vapor Density (Air = 1): 3 - 4 (Typical)
Boiling Point: 37.8°C (100°F) - 204.4°C (400°F) (Typical)
Solubility: Insoluble in water; miscible with most organic solvents.
Freezing Point: Not Applicable
Melting Point: Not Applicable
Specific Gravity: 0.7 g/ml - 0.8 g/ml @ 15.6°C (60.1°F) (Typical)
Viscosity: <1 SUS @ 37.8°C (100°F)
Evaporation Rate: No Data Available
Odor Threshold: No Data Available
Coefficient of Water/Oil Distribution: No Data Available

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.
Sensitivity to Mechanical Impact: No.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The Draize eye irritation mean score in rabbits for a 24-hour exposure was: 0/110.
Skin Irritation: For a 4-hour exposure, the Primary Irritation Index (PII) in rabbits is: 4.8/8.0.
Skin Sensitization: This material did not cause skin sensitization reactions in a Buehler guinea pig test.
Acute Dermal Toxicity: LD50: >3.75g/kg (rabbit).
Acute Oral Toxicity: LD50: >5 ml/kg (rat)
Acute Inhalation Toxicity: 4 hour(s) LD50: >20000mg/m3 (rat). For additional information on the acute toxicity of the components, call the technical information center.**Subchronic Effects:** Exposure of rats for 13 weeks (6 hr/day for 5 days/week) to the light ends of gasoline (up to 20,000 mg/m3) resulted in minimal responses of toxicity. There were no indications of neurotoxicity based morphological, functional and biochemical indices. There was also no evidence of immunotoxicity in the rats. However, when rats were exposed to gasoline vapor containing ethanol up to 20,000 mg/m3 there was evidence of both humoral immune suppression and mild astrogliosis. **Reproduction and Birth Defects:** Exposure of rats to the light ends of gasoline at up to 20,000 mg/m3 had generally no impact upon reproductive abilities and did not cause birth defects.
Genetic Toxicity: Gasoline was not mutagenic, with or without activation, in the Ames assay (Salmonella typhimurium), Saccharamyces cerevisesae, or mouse lymphoma assays. In addition, point mutations were not induced in human lymphocytes. Gasoline was not mutagenic when tested in the mouse dominant lethal assay. Administration of gasoline to rats did not cause chromosomal aberrations in their bone marrow cells. Inhalation exposure of rats to the light ends of gasoline caused increased sister chromatid exchange in their peripheral white blood cells but did not cause an increase in micronucleated red blood cells in their bone marrow.
ADDITIONAL TOXICOLOGY INFORMATION:
Gasolines are highly volatile and can produce significant concentrations of vapor at ambient temperatures. Gasoline vapor is heavier than air and at high concentrations may accumulate in confined spaces to present both safety and heath hazards. When vapor exposures are low, or short duration and infrequent, such as during refueling and tanker loading/unloading, neither total hydrocarbon nor components such as benzene are likely to result in any adverse health effects. In situations such as accidents or spills where exposure to gasoline vapor is potentially high, attention should be paid to potential toxic effects of specific components. Information about specific components in gasoline can be found in Sections 2, 8 and 15 of this MSDS. More detailed information on the health hazard of specific gasoline components can be obtained calling the Chevron Emergency Information Center (see Section 1 for phone numbers).
Pathological misuse of solvents and gasoline, involving repeated and prolonged exposure to high concentrations of vapor is a significant exposure on which there are many reports in the medical literature. As with other solvents, persistent abuse involving repeated and prolonged exposures to high concentrations of vapor has been reported to result in central nervous system damage and eventually, death. In a study in which ten human volunteers were exposed for 30 minutes to approximately 200, 500 or 1000 ppm concentrations of gasoline vapor, irritation of the eyes was the only significant effect observed, based on both subjective and objective assessments.
Lifetime inhalation of wholly vaporized unleaded gasoline at 2056 ppm has caused increased liver tumors in female mice and kidney cancer in male rats. In their 1988 review of carcinogenic risk from gasoline, The International Agency for Research on Cancer (IARC) noted that, because published epidemiology studies did not include any exposure data, only occupations where gasoline exposure may have occurred were reviewed. These included gasoline service station attendants and automobile mechanics. IARC also noted that there was no opportunity to separate effects of combustion products from those of gasoline itself. Although IARC allocated gasoline a final overall classification of Group 2B, i.e. possibly carcinogenic to humans, this was based on limited evidence in experimental animals plus supporting evidence including the presence in gasoline of benzene. The actual evidence for carcinogenicity in humans was considered inadequate.
To explore the health effects of workers potentially exposed to gasoline vapors in the marketing and distribution sectors of the petroleum industry, the American Petroleum Institute sponsored a cohort mortality study (Publication 4555), a nested case-control study (Publication 4551), and an exposure assessment study (Publication 4552). Histories of exposure to gasoline were reconstructed for cohort of more than 18,000 employees from four companies for the time period between 1946 and 1985. The results of the cohort mortality study indicated that there was no increased mortality from either kidney cancer or leukemia among marketing and marine distribution employees who were exposed to gasoline in the petroleum industry, when compared to the general population. More importantly, based on internal comparisons, there was no association between mortality from kidney cancer or leukemia and various indices of gasoline exposure. In particular, neither duration of employment, duration of exposure, age at first exposure, year of first exposure, job category, cumulative exposure, frequency of peak exposure, nor average intensity of exposure had any effect on kidney cancer or leukemia mortality. The results of the nested case-control study confirmed the findings of the original cohort study. That is, exposure to gasoline at the levels experienced by this cohort of distribution workers is not a significant risk factor for leukemia (all cell types), acute myeloid leukemia, kidney cancer or multiple myeloma.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
96 hour(s) LC50: 8.3 mg/l (Cyprinodon variegatus)
96 hour(s) LC50: 1.8 mg/l (Mysidopsis bahia)
48 hour(s) LC50: 3.0 mg/l (Daphnia magna)
96 hour(s) LC50: 2.7 mg/l (Oncorhynchus mykiss)
This material is expected to be toxic to aquatic organisms. Gasoline studies have been conducted in the laboratory under a variety of test conditions with a range of fish and invertebrate species. An even more extensive database is available on the aquatic toxicity of individual aromatic constituents. The majority of published studies do not identify the type of gasoline evaluated, or even provide distinguishing characteristics such as aromatic content or presence of lead alkyls. As a result, comparison of results among studies using open and closed vessels, different ages and species of test animals and different gasoline types, is difficult.

The bulk of the available literature on gasoline relates to the environmental impact of monoaromatic (BTEX) and diaromatic (naphthalene, methylnaphthalenes) constituents. In general, non-oxygenated gasoline exhibits some short-term toxicity to freshwater and marine organisms, especially under closed vessel or flow-through exposure conditions in the laboratory. The components which are the most prominent in the water soluble fraction and cause aquatic toxicity, are also highly volatile and can be readily biodegraded by microorganisms.

ENVIRONMENTAL FATE
This material is expected to be readily biodegradable. Following spillage, the more volatile components of gasoline will be rapidly lost, with concurrent dissolution of these and other constituents into the water. Factors such as local environmental conditions (temperature, wind, mixing or wave action, soil type, etc), photo-oxidation, biodegradation and adsorption onto suspended sediments, can contribute to the weathering of spilled gasoline.

The aqueous solubility of non-oxygenated unleaded gasoline, based on analysis of benzene, toluene, ethylbenzene+xylenes and naphthalene, is reported to be 112 mg/l. Solubility data on individual gasoline constituents also available.

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by USEPA under RCRA (40CFR261), Environment Canada, or other State, Provincial, and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

TC Shipping Description: UN1203, GASOLINE, 3, II

IMO/IMDG Shipping Description: UN1203,GASOLINE,3,II,FLASH POINT SEE SECTION 5

ICAO/IATA Shipping Description: UN1203, GASOLINE, 3, II

DOT Shipping Description: GASOLINE,3,UN1203,II

SECTION 15 REGULATORY INFORMATION

REGULATORY LISTS SEARCHED:
01-1=IARC Group 1
01-2A=IARC Group 2A
01-2B=IARC Group 2B
35=WHMIS IDL

The following components of this material are found on the regulatory lists indicated.

Benzene	01-1, 35
Butane	35
Cyclohexane	35
Ethanol	01-1, 35
Ethyl benzene	01-2B, 35
Gasoline	01-2B
Heptane	35
Hexane	35
Methylcyclohexane	35
Naphthalene	01-2B, 35
Pentane, 2,2,4-trimethyl- (Isooctane)	35
Toluene (methylbenzene)	35
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	35

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: DSL (Canada), EINECS (European Union), KECI (Korea), TSCA (United States).

One or more components does not comply with the following chemical inventory requirements: AICS (Australia), ENCS (Japan), IECSC (China), PICCS (Philippines).

WHMIS CLASSIFICATION:
Class B, Division 2: Flammable Liquids
Class D, Division 2, Subdivision A: Very Toxic Material - Carcinogenicity
Class D, Division 2, Subdivision B: Toxic Material - Skin or Eye Irritation

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations. (See Hazardous Products Act (HPA), R.S.C. 1985, c.H-3,s.2).

MSDS PREPARATION:

This Material Safety Data Sheet has been prepared by the Toxicology and Health Risk Assessment Unit, ERTC, P.O. Box 1627, Richmond, CA 94804, (888)676-6183.

Revision Date: August 11, 2006

SECTION 16 OTHER INFORMATION

Additional Product Number(s): CPS201023, CPS201054, CPS201055, CPS201075, CPS201090, CPS201105, CPS201106, CPS201120, CPS201121, CPS201122, CPS201126, CPS201128, CPS201131, CPS201136, CPS201141, CPS201142, CPS201148, CPS201153, CPS201158, CPS201161, CPS201162, CPS201168, CPS201181, CPS201185, CPS201186, CPS201188, CPS201216, CPS201217, CPS201218, CPS201236, CPS201237, CPS201238, CPS201266, CPS201267, CPS201268, CPS201277, CPS201278, CPS201279, CPS201286, CPS201287, CPS201289, CPS201296, CPS201297, CPS201298, CPS201849, CPS201850, CPS201855, CPS201856, CPS201857, CPS204000, CPS204001, CPS204002, CPS204003, CPS204010, CPS204011, CPS204022, CPS204023, CPS204046, CPS204047, CPS204070, CPS204071, CPS204088, CPS204089, CPS204104, CPS204105, CPS204116, CPS204117, CPS204140, CPS204141, CPS204164, CPS204165, CPS204188, CPS204189, CPS204200, CPS204201, CPS204207, CPS204212, CPS204213, CPS204224, CPS204225, CPS204248, CPS204249, CPS204272, CPS204273, CPS204290, CPS204291, CPS204322, CPS204323, CPS204324, CPS204350, CPS204352, CPS204354, CPS204356, CPS204358, CPS204359, CPS204364, CPS204365, CPS204370, CPS204371, CPS204376, CPS204377, CPS204382,

CPS204383, CPS204388, CPS204389, CPS204394, CPS204395, CPS204400, CPS204401, CPS204406, CPS204407, CPS204412, CPS204413, CPS204418, CPS204419, CPS204424, CPS204425, CPS204430, CPS204431, CPS204436, CPS204437, CPS204442, CPS204446, CPS204450, CPS204454, CPS204458, CPS204462, CPS204466, CPS204467, CPS204484, CPS204485, CPS204502, CPS204503, CPS204520, CPS204521, CPS204538, CPS204539, CPS204556, CPS204557, CPS204574, CPS204575, CPS204592, CPS204593, CPS204610, CPS204611, CPS204628, CPS204629, CPS204646, CPS204647, CPS204664, CPS204665, CPS204682, CPS204690, CPS204691, CPS204696, CPS204697, CPS204702, CPS204703, CPS204708, CPS204709, CPS204721, CPS204722, CPS204727, CPS204728, CPS204739, CPS241765

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: 16

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Government Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	MSDS - Material Safety Data Sheet
CVX - Chevron	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

APPENDIX B

SURVEY DATA

ANDERSON
SURVEY COMPANY
203 N.W. EXECUTIVE WAY
P.O. BOX 637
Since 1946 LEE'S SUMMIT, MO 64063
www.andersonsurvey.com
PHONE: (816) 246-5050
FAX: (816) 246-0502

LAND SURVEYORS
INDUSTRIAL MEASUREMENT SPECIALISTS

FOUNDER: JAMES P. ANDERSON 1897 — 1948

PROFESSIONAL LAND SURVEYORS
JAMES S. ANDERSON, President
OLIVER S. ANDERSON 1926-1983
ROBERT W. ANDERSON 1924-1965
THOMAS L. LANG
PHILIP J. HENEHAN
JOHN P. WEBSTER
ROBERT J. ANDERSON
JENIFER K. ANDERSON

June 4, 2013

Conestoga Rovers & Associates
1502 SW 41st Street
Topeka, KS 66609

Attention: Mr. Kirk Hoeffner, P.G.

Email: khoeffner@craworld.com

RE: Monitor Well Locations at the Penny Sand Facility, Lawrence, Douglas County, Kansas.

Dear Mr. Hoeffner:

Listed below are the positions for the monitor wells located on June 3, 2013.

Well Number	North	East	Concrete Elevation	Top of PVC Elevation
MW1	245192.9	2122908.6	803.95	806.77
MW-2	243497.7	2122847.7	809.19	812.08
MW-3	241623.9	2122893.8	808.16	810.62
MW-4	241116.1	2120293.0	815.12	816.76
MW-5	245044.7	2120316.7	809.09	811.94

The coordinates shown are NAD'83 Kansas State Plane, North Zone, converted to feet. The elevations are NAVD'88. All positions are derived from GPS observations using the MoDOT RTK Network.

PHILIP J. HENEHAN
LICENSED
LS-1479
KANSAS
LAND SURVEYOR
6/4/13

Sincerely,

Philip J. Henehan, PLS
ANDERSON SURVEY COMPANY, INC.

The quiet of our estates, in a great measure, depends upon the faithfulness, understanding, and care of our surveyors.
Virginia Statutes, 1705

ANDERSON
SURVEY COMPANY
203 N.W. EXECUTIVE WAY
P.O. BOX 637
Since 1946 LEE'S SUMMIT, MO 64063
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PHILIP J. HENEHAN
JOHN P. WEBSTER
ROBERT J. ANDERSON
JENIFER K. ANDERSON

June 21, 2013

Conestoga Rovers & Associates
1502 SW 41st Street
Topeka, KS 66609

Attention: Mr. Kirk Hoeffner, P.G.

Email: khoeffner@craworld.com

RE: River Staff Locations at the Penny Sand Facility, Lawrence, Douglas County, Kansas.

Dear Mr. Hoeffner:

Listed below are the positions for the river staffs located on June 20, 2013.

River Staff	North	East	Staff Mark	Elevation
West Side	243904.5	2118861.9	8.00	788.22
East Side	245928.8	2123369.4	8.00	787.97

The coordinates shown are NAD'83 Kansas State Plane, North Zone, converted to feet. The elevations are NAVD'88. All positions are derived from GPS observations using the MoDOT RTK Network.

PHILIP J. HENEHAN
LICENSED
LS-1479
KANSAS
LAND SURVEYOR
6/21/13

Sincerely,

Philip J. Henehan, PLS
ANDERSON SURVEY COMPANY, INC.

The quiet of our estates, in a great measure, depends upon the faithfulness, understanding, and care of our surveyors.
Virginia Statutes, 1705

APPENDIX C

WWC-5 WATER WELL RECORDS

WATER WELL RECORD **Form WWC-5** Division of Water Resources App. No.

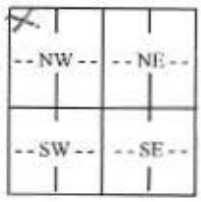
1 LOCATION OF WATER WELL: County: Douglas	Fraction NW ¼ NW ¼ NW ¼ NW ¼	Section Number 35	Township No. T 12 S	Range Number R 20 ☑E ☐W

Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here ☐.
~1/2-mile North of the intersection of E. 1900 Rd and N 1550 Rd.
Eudora, KS 66044

Global Positioning System (GPS) information:
Latitude: 38.971456 (in decimal degrees)
Longitude: 95.148561 (in decimal degrees)
Elevation: ~~896~~ 805.95
Datum: ☑ WGS 84, ☐ NAD 83, ☐ NAD 27
Collection Method:
☐ GPS unit (Make/Model: .....)
☑ Digital Map/Photo, ☐ Topographic Map, ☐ Land Survey
Est. Accuracy: ☑ <3 m, ☐ 3-5 m, ☐ 5-15 m, ☐ >15 m

2 WATER WELL OWNER: Penny's Concrete, Inc.
RR#, Street Address, Box #: 23400 W. 82nd Street
City, State, ZIP Code : Shawnee, KS 66227

3 LOCATE WELL WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL 40 ft.
Depth(s) Groundwater Encountered (1) 32.24 ft. (2) N/A ft. (3) N/A ft.
WELL'S STATIC WATER LEVEL 20.21 ft. below land surface measured on mo/day/yr 5-1-13
Pump test data: Well water was N/A ft. after N/A hours pumping N/A gpm
EST. YIELD N/A gpm. Well water was N/A ft. after N/A hours pumping N/A gpm
Bore Hole Diameter 8.25 in. to 40 ft., and N/A in. to N/A ft.
WELL WATER TO BE USED AS: ☐ Public water supply ☐ Geothermal ☐ Injection well
☐ Domestic ☐ Feedlot ☐ Oil field water supply ☐ Dewatering ☐ Other (Specify below)
☐ Irrigation ☐ Industrial ☐ Domestic-lawn & garden ☑ Monitoring well MW-1
Was a chemical/bacteriological sample submitted to Department? ☐ Yes ☑ No
If yes, mo/day/yr sample was submitted.....
Water well disinfected? ☐ Yes ☑ No

5 TYPE OF CASING USED: ☐ Steel ☑ PVC ☐ Other .....
CASING JOINTS: ☐ Glued ☐ Clamped ☐ Welded ☑ Threaded
Casing diameter 2 in. to 20 ft., Diameter N/A in. to N/A ft., Diameter N/A in. to N/A ft.
Casing height above land surface 30 in., Weight N/A lbs./ft., Wall thickness or gauge No. Schedule 40
TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☑ PVC ☐ Other (Specify) .....
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous slot ☑ Mill slot ☐ Gauze wrapped ☐ Torch cut ☐ Drilled holes ☐ None (open hole)
☐ Louvered shutter ☐ Key punched ☐ Wire wrapped ☐ Saw cut ☐ Other (specify) .....
SCREEN-PERFORATED INTERVALS: From 20 ft. to 40 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.
GRAVEL PACK INTERVALS: From 18 ft. to 40 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.

6 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☑ Bentonite ☑ Other Concrete pad from 0 to 2-feet
Grout Intervals: From 2 ft. to 18 ft., From N/A ft. to N/A ft., From N/A ft. to N/A ft.
What is the nearest source of possible contamination:
☐ Septic tank ☐ Lateral lines ☐ Pit privy ☐ Livestock pens ☐ Insecticide storage ☑ Other (specify below)
☐ Sewer lines ☐ Cesspool ☐ Sewage lagoon ☐ Fuel storage ☐ Abandoned water well
☐ Watertight sewer lines ☐ Seepage pit ☐ Feedyard ☐ Fertilizer storage ☐ Oil well/gas well Agricultural
Direction from well Adjacent Distance from well Adjacent

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	6	Clay, silty, sandy, very fine grained, soft, low plasticity dark brown w/ organic matter rootlets	15	24	Clay, silty, soft, high plasticity, black saturated.
			24	28.5	Sandy clay very fine to fine grained silty soft saturated
6	7	Sand, fine grained, silty, trace clay, loose, moist	24.5	31.0	Sand, well graded, compact, very fine to med. grained trace of coarse grained bluish grey saturated
7	14	Clay, silty, trace of very fine sand soft dark brown saturated	31	40	Sand saturated clay seam 32.25-33.10
14	15	Sand, fine grained, trace of clay loose, bluish grey, moist			Gravel w/ very fine coarse sand compact strong brown saturated.

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☑ constructed, ☐ reconstructed, or ☐ plugged under my jurisdiction and was completed on (mo/day/year) 5-1-2013 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 759 This Water Well Record was completed on (mo/day/year) 6/16/2013 under the business name of RAZEK Environmental, LLC by (signature) [signature]

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

KSA 82a-1212 Check: ☐ White Copy, ☐ Blue Copy, ☐ Pink Copy

WATER WELL RECORD **Form WWC-5** Division of Water Resources App. No.

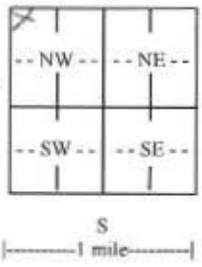
1 LOCATION OF WATER WELL: County: Douglas	Fraction NW ¼ NW ¼ NW ¼ NW ¼	Section Number 35	Township No. T 12 S	Range Number R 20 ☑E ☐W

Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here ☐.
~1/4-mile North of the intersection of E. 1900 Rd and N 1550 Rd.
Eudora, KS 66044

Global Positioning System (GPS) information:
Latitude: 38.966992 (in decimal degrees)
Longitude: 95.148894 (in decimal degrees)
Elevation: 809.19
Datum: ☑ WGS 84, ☐ NAD 83, ☐ NAD 27
Collection Method:
☐ GPS unit (Make/Model: .....)
☑ Digital Map/Photo, ☐ Topographic Map, ☐ Land Survey
Est. Accuracy: ☑ <3 m, ☐ 3-5 m, ☐ 5-15 m, ☐ >15 m

2 WATER WELL OWNER: Penny's Concrete, Inc.
RR#, Street Address, Box #: 23400 W. 82nd Street
City, State, ZIP Code : Shawnee, KS 66227

3 LOCATE WELL WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL 40 ft.
Depth(s) Groundwater Encountered (1) 32.24 ft. (2) N/A ft. (3) N/A ft.
WELL'S STATIC WATER LEVEL 24.51 ft. below land surface measured on mo/day/yr 5-1-13
Pump test data: Well water was N/A ft. after N/A hours pumping N/A gpm
EST. YIELD N/A gpm. Well water was N/A ft. after N/A hours pumping N/A gpm
Bore Hole Diameter 8.25 in. to 40 ft., and N/A in. to N/A ft.
WELL WATER TO BE USED AS: ☐ Public water supply ☐ Geothermal ☐ Injection well
☐ Domestic ☐ Feedlot ☐ Oil field water supply ☐ Dewatering ☐ Other (Specify below)
☐ Irrigation ☐ Industrial ☐ Domestic-lawn & garden ☑ Monitoring well MW-1 MW-2
Was a chemical/bacteriological sample submitted to Department? ☐ Yes ☑ No
If yes, mo/day/yr sample was submitted
Water well disinfected? ☐ Yes ☑ No

5 TYPE OF CASING USED: ☐ Steel ☑ PVC ☐ Other
CASING JOINTS: ☐ Glued ☐ Clamped ☐ Welded ☑ Threaded
Casing diameter 2 in. to 20 ft., Diameter N/A in. to N/A ft., Diameter N/A in. to N/A ft.
Casing height above land surface 30 in., Weight N/A lbs./ft., Wall thickness or gauge No. Schedule 40
TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☑ PVC ☐ Other (Specify)
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous slot ☑ Mill slot ☐ Gauze wrapped ☐ Torch cut ☐ Drilled holes ☐ None (open hole)
☐ Louvered shutter ☐ Key punched ☐ Wire wrapped ☐ Saw cut ☐ Other (specify)
SCREEN-PERFORATED INTERVALS: From 20 ft. to 40 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.
GRAVEL PACK INTERVALS: From 18 ft. to 40 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.

6 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☑ Bentonite ☑ Other Concrete pad from 0 to 2-feet
Grout Intervals: From 2 ft. to 18 ft., From N/A ft. to N/A ft., From N/A ft. to N/A ft.
What is the nearest source of possible contamination:
☐ Septic tank ☐ Lateral lines ☐ Pit privy ☐ Livestock pens ☐ Insecticide storage ☑ Other (specify below)
☐ Sewer lines ☐ Cesspool ☐ Sewage lagoon ☐ Fuel storage ☐ Abandoned water well
☐ Watertight sewer lines ☐ Seepage pit ☐ Feedyard ☐ Fertilizer storage ☐ Oil well/gas well Agricultural
Direction from well Adjacent Distance from well Adjacent

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	4	Clay, silty, soft, low plasticity trace roots black damp med plst. Soft Brown			grained, trace of silt compact blushgrey Saturated.
		moist @ 1.0 ft. BGS	29	33.6	Sand poorly graded very fine to fine grained
4	5.5	Silt trace of clay soft brown very moist			compact blushgrey Saturated clay seam black
5.5	19.0	Clay silty med. plasticity firm dark brown moist. Saturated @ 12'	33.6	35	Sand well graded very fine to coarse grained compact trace of clay and silt
		very silty @ 14'			blush grey Saturated.
19	19.5	Silt w/clay soft brown saturated.	35	38	Sand poorly graded very fine to fine grained
19.5	24	Clay silty soft med plst. black moist			compact blushgrey Saturated
24	29	Sand well graded very fine to coarse	38	40	Sand well graded trace of gravel blushgrey.

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☑ constructed, ☐ reconstructed, or ☐ plugged under my jurisdiction and was completed on (mo/day/year) 5-1-2013 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 759 This Water Well Record was completed on (mo/day/year) 6/16/2013 under the business name of RAZEK Environmental, LLC by (signature)

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367 Telephone 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html

KSA 82a-1212 Check: ☐ White Copy, ☐ Blue Copy, ☐ Pink Copy

WATER WELL RECORD **Form WWC-5** Division of Water Resources App. No.

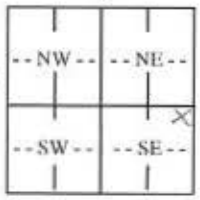
1 LOCATION OF WATER WELL: County: Douglas	Fraction: NE ¼ NE ¼ NE ¼ SE ¼	Section Number: 35	Township No.: T 12 S	Range Number: R 20 ☑E ☐W

Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here ☐.
~1/4-mile South of the intersection of E. 1900 Rd and N 1550 Rd. Eudora, KS 66044

Global Positioning System (GPS) information:
Latitude: 38.961744 (in decimal degrees)
Longitude: 95.148944 (in decimal degrees)
Elevation: 809 802.160
Datum: ☑ WGS 84, ☐ NAD 83, ☐ NAD 27
Collection Method:
☐ GPS unit (Make/Model: .....)
☑ Digital Map/Photo, ☐ Topographic Map, ☐ Land Survey
Est. Accuracy: ☑ <3 m, ☐ 3-5 m, ☐ 5-15 m, ☐ >15 m

2 WATER WELL OWNER: Penny's Concrete, Inc.
RR#, Street Address, Box #: 23400 W. 82nd Street
City, State, ZIP Code : Shawnee, KS 66227

3 LOCATE WELL WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL 48 ft.
Depth(s) Groundwater Encountered (1) 22.25 ft. (2) N/A ft. (3) N/A ft.
WELL'S STATIC WATER LEVEL 22.54 ft. below land surface measured on mo/day/yr 5-2-13
Pump test data: Well water was N/A ft. after N/A hours pumping N/A gpm
EST. YIELD N/A gpm. Well water was N/A ft. after N/A hours pumping N/A gpm
Bore Hole Diameter 8.25 in. to 48 ft., and N/A in. to N/A ft.
WELL WATER TO BE USED AS: ☐ Public water supply ☐ Geothermal ☐ Injection well
☐ Domestic ☐ Feedlot ☐ Oil field water supply ☐ Dewatering ☐ Other (Specify below)
☐ Irrigation ☐ Industrial ☐ Domestic-lawn & garden ☑ Monitoring well MW-3
Was a chemical/bacteriological sample submitted to Department? ☐ Yes ☑ No
If yes, mo/day/yr sample was submitted .....
Water well disinfected? ☐ Yes ☑ No

5 TYPE OF CASING USED: ☐ Steel ☑ PVC ☐ Other .....
CASING JOINTS: ☐ Glued ☐ Clamped ☐ Welded ☑ Threaded
Casing diameter 2 in. to 18 ft., Diameter N/A in. to N/A ft., Diameter N/A in. to N/A ft.
Casing height above land surface 30 in., Weight N/A lbs./ft., Wall thickness or gauge No. Schedule 40
TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☑ PVC ☐ Other (Specify) .....
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous slot ☑ Mill slot ☐ Gauze wrapped ☐ Torch cut ☐ Drilled holes ☐ None (open hole)
☐ Louvered shutter ☐ Key punched ☐ Wire wrapped ☐ Saw cut ☐ Other (specify) .....
SCREEN-PERFORATED INTERVALS: From 18 ft. to 48 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.
GRAVEL PACK INTERVALS: From 16 ft. to 48 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.

6 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☑ Bentonite ☑ Other Concrete pad from 0 to 2-feet
Grout Intervals: From 2 ft. to 16 ft., From N/A ft. to N/A ft., From N/A ft. to N/A ft.
What is the nearest source of possible contamination:
☐ Septic tank ☐ Lateral lines ☐ Pit privy ☐ Livestock pens ☐ Insecticide storage ☑ Other (specify below)
☐ Sewer lines ☐ Cesspool ☐ Sewage lagoon ☐ Fuel storage ☐ Abandoned water well
☐ Watertight sewer lines ☐ Seepage pit ☐ Feedyard ☐ Fertilizer storage ☐ Oil well/gas well Agricultural
Direction from well Adjacent Distance from well Adjacent

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	4	Clay, silty soft brn dpt. trace of roots			~~Sity~~ poorly graded trace silt dark blish
4	5.5	Silt soft brn dpt. brn very moist			grey saturated
5.5	17.5	Clay silty firm brn dpt. dk brn	37	38	CLAY silty soft high dpt dark blish
17.5	20	Silt trace very fine sand loay			grey saturated.
		dpt. dark blish grey saturated	38	38.5	Sand very fine to fine grained trace
20	32	Clay firm moderate dpt. silty			of clay compact dark blish grey saturated.
		black moist soft @ 23 sat. @ 25	38.5	48	Sand very fine to coarse grained
32	33	Sandy clay very fine to fine grained			trace of gravel dark blish grey
		silty soft dark blish grey saturated			trace of Rock @ 45
33	37	Sand very fine to fine grained		48'	refusal on bedrock.

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☑ constructed, ☐ reconstructed, or ☐ plugged under my jurisdiction and was completed on (mo/day/year) 5-2-2013 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 759 This Water Well Record was completed on (mo/day/year) 6/16/2013 under the business name of RAZEK Environmental, LLC by (signature) .....

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

KSA 82a-1212 Check: ☐ White Copy, ☐ Blue Copy, ☐ Pink Copy

WATER WELL RECORD **Form WWC-5** Division of Water Resources App. No.

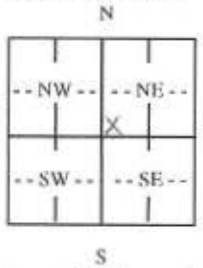
1 LOCATION OF WATER WELL: County: Douglas	Fraction: SW ¼ SW ¼ SW ¼ NE ¼	Section Number: 35	Township No.: T 12 S	Range Number: R 20 ☑E ☐W

Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here ☐.
~1/4-mile North of the intersection of E. 1850 Rd and N 1500 Rd.
Eudora, KS 66044

Global Positioning System (GPS) information:
Latitude: 38.960525 (in decimal degrees)
Longitude: 95.158194 (in decimal degrees)
Elevation: ~~816~~ 815.12
Datum: ☑ WGS 84, ☐ NAD 83, ☐ NAD 27
Collection Method:
☐ GPS unit (Make/Model: .....)
☑ Digital Map/Photo, ☐ Topographic Map, ☐ Land Survey
Est. Accuracy: ☑ <3 m, ☐ 3-5 m, ☐ 5-15 m, ☐ >15 m

2 WATER WELL OWNER: Penny's Concrete, Inc.
RR#, Street Address, Box #: 23400 W. 82nd Street
City, State, ZIP Code : Shawnee, KS 66227

3 LOCATE WELL WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL 69 ft.
Depth(s) Groundwater Encountered (1) ~~32~~ 29 ft. (2) N/A ft. (3) N/A ft.
WELL'S STATIC WATER LEVEL 29.02 ft. below land surface measured on mo/day/yr 5-3-13
Pump test data: Well water was N/A ft. after N/A hours pumping N/A gpm
EST. YIELD N/A gpm. Well water was N/A ft. after N/A hours pumping N/A gpm
Bore Hole Diameter 8.25 in. to 69 ft., and N/A in. to N/A ft.
WELL WATER TO BE USED AS: ☐ Public water supply ☐ Geothermal ☐ Injection well
☐ Domestic ☐ Feedlot ☐ Oil field water supply ☐ Dewatering ☐ Other (Specify below)
☐ Irrigation ☐ Industrial ☐ Domestic-lawn & garden ☑ Monitoring well MW-4
Was a chemical/bacteriological sample submitted to Department? ☐ Yes ☑ No
If yes, mo/day/yr sample was submitted .....
Water well disinfected? ☐ Yes ☑ No

5 TYPE OF CASING USED: ☐ Steel ☑ PVC ☐ Other .....
CASING JOINTS: ☐ Glued ☐ Clamped ☐ Welded ☑ Threaded
Casing diameter 2 in. to 49 ft., Diameter N/A in. to N/A ft., Diameter N/A in. to N/A ft.
Casing height above land surface 30 in., Weight N/A lbs./ft., Wall thickness or gauge No. Schedule 40
TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☑ PVC ☐ Other (Specify) .....
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous slot ☑ Mill slot ☐ Gauze wrapped ☐ Torch cut ☐ Drilled holes ☐ None (open hole)
☐ Louvered shutter ☐ Key punched ☐ Wire wrapped ☐ Saw cut ☐ Other (specify) .....
SCREEN-PERFORATED INTERVALS: From 49 ft. to 69 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.
GRAVEL PACK INTERVALS: From 46 ft. to 69 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.

6 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☑ Bentonite ☑ Other Concrete pad from 0 to 2-feet
Grout Intervals: From 2 ft. to 16 ft., From N/A ft. to N/A ft., From N/A ft. to N/A ft.
What is the nearest source of possible contamination:
☐ Septic tank ☐ Lateral lines ☐ Pit privy ☐ Livestock pens ☐ Insecticide storage ☑ Other (specify below)
☐ Sewer lines ☐ Cesspool ☐ Sewage lagoon ☐ Fuel storage ☐ Abandoned water well
☐ Watertight sewer lines ☐ Seepage pit ☐ Feedyard ☐ Fertilizer storage ☐ Oil well/gas well Agricultural
Direction from well Adjacent Distance from well Adjacent

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	4	CLAY silty soft low plasticity w/	29.5	50	SAND very fine to med grained trace of coarse
		organic material rootlets black damp			grains compact reddish yellow Saturated.
4	13	SILT trace of clay low plasticity brown.	50	69	SAND trace of gravel @ 50'
13	18	Sand very fine to fine grained poorly			gravel @ 62.'
		sorted loose trace of med. to coarse			with cobbles up to 3.5 inches
		grains dark yellowish brown, moist.			@ 68'
18	19	Sand very fine to coarse grained well graded		69	refusal on bedrock.
		compact dark yellowish brn. moist.			
19	29.5	SAND very fine to fine grained poorly			
		sorted compact dark yellowish brown moist			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☑ constructed, ☐ reconstructed, or ☐ plugged under my jurisdiction and was completed on (mo/day/year) 5-3-2013 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 759 This Water Well Record was completed on (mo/day/year) 6/16/2013 under the business name of RAZEK Environmental, LLC by (signature) [signature]

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html

KSA 82a-1212 Check: ☐ White Copy, ☐ Blue Copy, ☐ Pink Copy

WATER WELL RECORD **Form WWC-5** Division of Water Resources App. No.

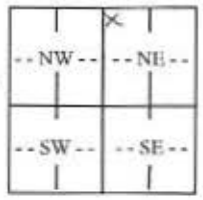
1 LOCATION OF WATER WELL: County: Douglas | Fraction: NW ¼ NW ¼ NW ¼ NE ¼ | Section Number: 35 | Township No. T 12 S | Range Number R 20 ☑E ☐W

Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here ☐.
~1-mile North of the intersection of E. 1850 Rd and N 1500 Rd.
Eudora, KS 66044

Global Positioning System (GPS) information:
Latitude: 38.972594 (in decimal degrees)
Longitude: 95.157078 (in decimal degrees)
Elevation: ~~815~~ 809.09
Datum: ☑ WGS 84, ☐ NAD 83, ☐ NAD 27
Collection Method:
☐ GPS unit (Make/Model: .....)
☑ Digital Map/Photo, ☐ Topographic Map, ☐ Land Survey
Est. Accuracy: ☑ <3 m, ☐ 3-5 m, ☐ 5-15 m, ☐ >15 m

2 WATER WELL OWNER: Penny's Concrete, Inc.
RR#, Street Address, Box #: 23400 W. 82nd Street
City, State, ZIP Code : Shawnee, KS 66227

3 LOCATE WELL WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL 40 ft.
Depth(s) Groundwater Encountered (1) ~~32~~ 24 ft. (2) N/A ft. (3) N/A ft.
WELL'S STATIC WATER LEVEL 24.49 ft. below land surface measured on mo/day/yr. 5-2-13
Pump test data: Well water was N/A ft. after N/A hours pumping N/A gpm
EST. YIELD N/A gpm. Well water was N/A ft. after N/A hours pumping N/A gpm
Bore Hole Diameter 8.25 in. to 40 ft., and N/A in. to N/A ft.
WELL WATER TO BE USED AS: ☐ Public water supply ☐ Geothermal ☐ Injection well
☐ Domestic ☐ Feedlot ☐ Oil field water supply ☐ Dewatering ☐ Other (Specify below)
☐ Irrigation ☐ Industrial ☐ Domestic-lawn & garden ☑ Monitoring well MW-5
Was a chemical/bacteriological sample submitted to Department? ☐ Yes ☑ No
If yes, mo/day/yr sample was submitted.....
Water well disinfected? ☐ Yes ☑ No

5 TYPE OF CASING USED: ☐ Steel ☑ PVC ☐ Other .....
CASING JOINTS: ☐ Glued ☐ Clamped ☐ Welded ☑ Threaded
Casing diameter 2 in. to 20 ft., Diameter N/A in. to N/A ft., Diameter N/A in. to N/A ft.
Casing height above land surface 30 in., Weight N/A lbs./ft., Wall thickness or gauge No. Schedule 40
TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☑ PVC ☐ Other (Specify) .....
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous slot ☑ Mill slot ☐ Gauze wrapped ☐ Torch cut ☐ Drilled holes ☐ None (open hole)
☐ Louvered shutter ☐ Key punched ☐ Wire wrapped ☐ Saw cut ☐ Other (specify) .....
SCREEN-PERFORATED INTERVALS: From 20 ft. to 40 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.
GRAVEL PACK INTERVALS: From 18 ft. to 40 ft., From N/A ft. to N/A ft.
From N/A ft. to N/A ft., From N/A ft. to N/A ft.

6 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☑ Bentonite ☑ Other Concrete pad from 0 to 2-feet
Grout Intervals: From 2 ft. to 18 ft., From N/A ft. to N/A ft., From N/A ft. to N/A ft.
What is the nearest source of possible contamination:
☐ Septic tank ☐ Lateral lines ☐ Pit privy ☐ Livestock pens ☐ Insecticide storage ☑ Other (specify below)
☐ Sewer lines ☐ Cesspool ☐ Sewage lagoon ☐ Fuel storage ☐ Abandoned water well
☐ Watertight sewer lines ☐ Seepage pit ☐ Feedyard ☐ Fertilizer storage ☐ Oil well/gas well Agricultural
Direction from well Adjacent Distance from well Adjacent

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	5.5	CLAY, silty, soft low plast. Trace organic material w/ rootlets. dk brn @ 4'	25	30	SAND very fine to coarse, grained poorly sorted compact bluish grey Saturated
5.5	13	SAND well graded very fine to medium grained light yellowish brown	30	31	CLAY silty coarse grained saturated
			31	31.5	SAND very fine to coarse trace of gravel w/silt compact bluish grey saturated
13	13.5	SAND well graded very fine to medium grained light yellow-brown moist	31.5	33	CLAY silty high plast. soft bluish grey saturated
13.5	19	SAND very fine grained.	33	40	SAND well graded very fine to coarse grained trace of gravel compact bluish grey saturated
19	24	SAND very fine to med grained trace of coarse grains poorly sorted gravel @ 23'			
24	25	SAND light bluish grey saturated			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☑ constructed, ☐ reconstructed, or ☐ plugged under my jurisdiction and was completed on (mo/day/year) 5-2-2013 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 759 This Water Well Record was completed on (mo/day/year) 6/16/2013 under the business name of RAZEK Environmental, LLC by (signature) [signature]

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

KSA 82a-1212 Check: ☐ White Copy, ☐ Blue Copy, ☐ Pink Copy

APPENDIX D

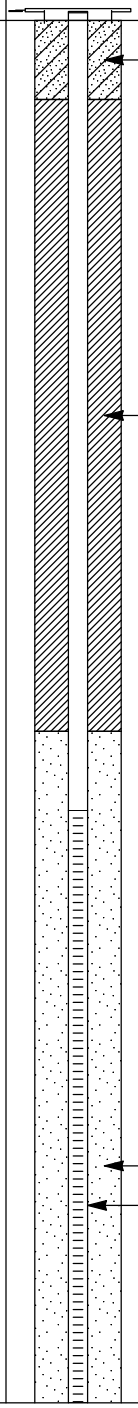
STRATIGRAPHIC AND INSTRUMENTATION LOGS FOR MONITORING WELLS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-1
DATE COMPLETED: 1 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	CL-CLAY, silty, sandy, very fine grained, soft, low plasticity, dark brown (5/2), with organic matter, rootlets - no sand, silty, medium plasticity, moist at 1.0ft BGS	
6	SP-SAND, fine grained, silty, trace of clay, loose, moist	6.00 7.00
8	CL-CLAY, silty, trace of very fine sand, soft, dark brown (3/3), saturated	
14	SP-SAND, fine grained, trace of clay, loose, bluish grey (5/1), moist	14.00 15.00
16	CL-CLAY, silty, soft, high plasticity, black (2.5), saturated	
24	SC-SANDY CLAY, very fine to fine grained, silty, soft, saturated	24.00 24.50
26	SW-SAND, well graded, compact, very fine to medium grained, trace of coarse grained, bluish grey (5/1), saturated	
32	SP-SAND, poorly graded, compact, very fine to fine grained, trace of clay, trace of silt, brown (4/3), saturated - clay seam, silty, with very fine sand, medium plasticity, firm, very dark grey (3/) at 32.5ft BGS	31.00 32.75 33.10 33.75
34	SW-SAND, well graded, very fine to coarse	



SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1				2.8
2				1.7
3				4.3
4				5.1
5				1.2
6				4.3
7				4.2
8				3.2
9				4.3
10				4.6
11				1.2
12				4.6
13				5.6
14				2.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-1
DATE COMPLETED: 1 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	grained, trace of gravel, trace of clay, compact CL-CLAY, with very fine to coarse grained sand, firm, silty, medium plasticity, very dark grey (3/), saturated			15				2.0
38	SW-SAND, well graded, very fine to coarse grained, trace of silt, compact, bluish grey (5/1), saturated	39.00		16				5.0
40	- very fine to medium grained, trace of coarse grained, brown (4/3) at 35.0ft BGS	40.00	WELL DETAILS Screened interval: 20.00 to 40.00ft BGS Length: 20ft Diameter: 2in Slot Size: #10 Material: PVC Sand Pack: 18.00 to 40.00ft BGS Material: SILICA					
42	GP-GRAVEL, with very fine coarse sand, compact, strong brown (5/8), saturated END OF BOREHOLE @ 40.0ft BGS							
44								
46								
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

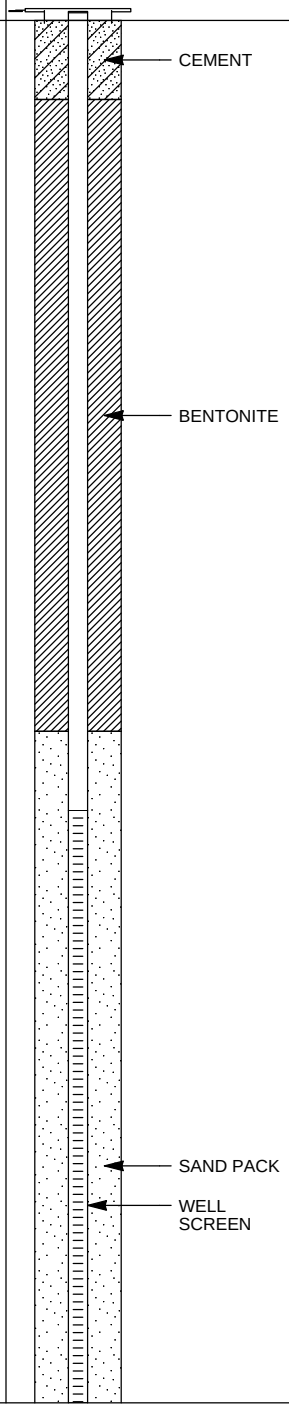
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-2
DATE COMPLETED: 1 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	CL-CLAY, silty, soft, low plasticity, trace of organic material with rootlets, black (2.5/), damp	
2	- medium plasticity, soft, brown (4/2), moist at 1.0ft BGS	
4	ML-SILT, trace of clay, soft, brown (5/3), very moist	4.00
6	CL-CLAY, silty, medium plasticity, firm, dark brown (3/2), moist	5.50
8		
10		
12	- high plasticity, saturated at 12.0ft BGS	
14	- low plasticity, very silty, brown (4/2) at 14.0ft BGS	
16		
18		
	ML-SILT, with clay, soft, brown (4/2), saturated	19.00
20	CL-CLAY, silty, soft, medium plasticity, black (2.5/1), moist	19.50
22		
24	SW-SAND, well graded, very fine to coarse grained, trace of silt, compact, bluish grey (5/1), saturated	24.00
26		
28		
30	SP-SAND, poorly graded, very fine to fine grained, compact, bluish grey (5/1), saturated	29.00
32		
34	- clay seam, low plasticity, silty, firm, black (2.5/1), saturated at 33.5ft BGS	33.60

MONITOR INSTALLATION



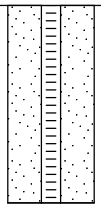
SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1				3.5
2				1.7
3				1.2
4				3.2
5				3.7
6				2.5
7				3.4
8				3.7
9				4.3
10				2.3
11				2.0
12				2.6
13				2.9
14				2.9

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-2
DATE COMPLETED: 1 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	SW-SAND, well graded, very fine to coarse grained, compact, trace of clay and silt, bluish grey (5/1), saturated	35.00		15				3.5
38	SP-SAND, poorly graded, very fine to fine grained, compact, bluish grey (5/1), saturated	38.00		16				4.2
40	SW-SAND, well graded, very fine to coarse grained, trace of gravel, compact, bluish grey (5/1), saturated	40.00						
	END OF BOREHOLE @ 40.0ft BGS							

WELL DETAILS
Screened interval:
20.00 to 40.00ft BGS
Length: 20ft
Diameter: 2in
Slot Size: #10
Material: PVC
Sand Pack:
18.00 to 40.00ft BGS
Material: SILICA

42
44
46
48
50
52
54
56
58
60
62
64
66
68

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

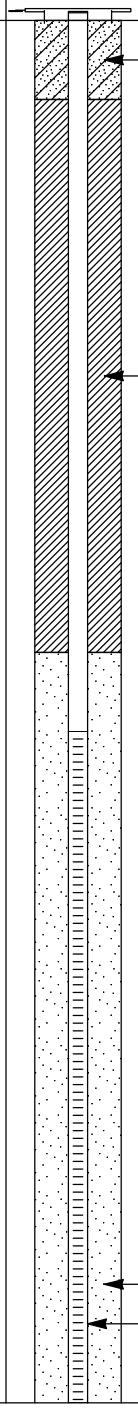
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-3
DATE COMPLETED: 2 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	CL-CLAY, silty, soft, low plasticity, trace of organic material with rootlets - dark brown (3/3), no organic material at 1.0ft BGS	
	ML-SILT, soft, low plasticity, brown (4/2), very moist	4.00
	CL-CLAY, silty, firm, low plasticity, dark brown (3/3)	5.50
	- strong brown (4/6) at 11.0ft BGS	
	- with silt, low plasticity, firm, black (2.5), moist at 14.0ft BGS	
	ML-SILT, trace very fine sand, low plasticity, dark bluish grey (4/1), saturated	17.50
	CL-CLAY, firm, moderate plasticity, silty, black (2.5), moist	20.00
	- becomes soft, high plasticity at 23.0ft BGS	
	- saturated at 25.0ft BGS	
	SC-SANDY CLAY, very fine to fine grained, silty, soft, dark bluish grey (4/1), saturated	32.00
	SP-SAND, very fine to fine grained, poorly graded, trace silt, dark bluish grey (4/1), saturated	33.00

MONITOR INSTALLATION



SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1				0.6
2				3.5
3				5.4
4				3.5
5				3.7
6				3.5
7				2.6
8				1.7
9				3.5
10				3.0
11				2.8
12				1.2
13				4.2
14				4.2

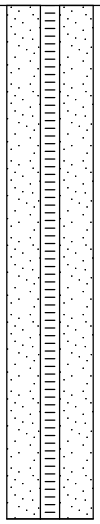
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-3
DATE COMPLETED: 2 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36				15				3.4
	CL-CLAY, silty, soft, high plasticity, dark bluish grey (4/1), saturated	37.00						
38		38.00						
	SP-SAND, very fine to fine grained, trace of clay, compact, dark bluish grey (4/1), saturated	38.50		16				0.7
40	SW-SAND, very fine to coarse grained, trace of gravel, dark bluish grey (4/1)							
42				17				1.7
44	- trace of rock at 45.0ft BGS							
46								
48	END OF BOREHOLE @ 48.0ft BGS	48.00						
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								



WELL DETAILS
Screened interval:
18.00 to 48.00ft BGS
Length: 30ft
Diameter: 2in
Slot Size: #10
Material: PVC
Sand Pack:
16.00 to 48.00ft BGS
Material: SILICA

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

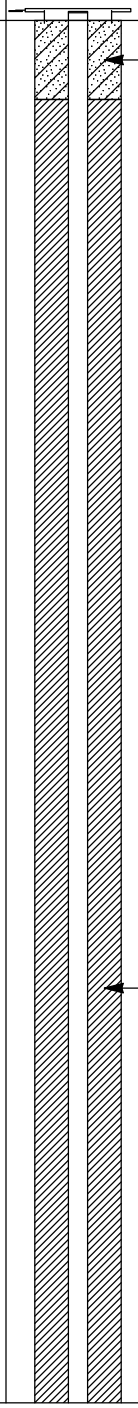
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-4
DATE COMPLETED: 3 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	CL-CLAY, silty, soft, low plasticity, with organic material and rootlets, black (2/1), damp - brown (4/2), very moist, no organic material at 1.5ft BGS	
	ML-SILT, trace of clay, low plasticity, brown (5/3)	4.00
	SP-SAND, very fine to fine grained, poorly sorted, loose, trace of medium to coarse grains, dark yellowish brown, moist	13.00
	SW-SAND, very fine to coarse grained, well graded, compact, dark yellowish brown, moist	18.00
	SP-SAND, very fine to fine grained, poorly sorted, compact, dark yellowish brown, moist	19.00
	SW-SAND, very fine to medium grained, trace of coarse grains, compact, reddish yellow (6/8), saturated - light bluish grey (5/1) at 32.0ft BGS	29.50

MONITOR INSTALLATION



SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1				0.4
2				0.9
3				0.6
4				0.8
5				0.4
6				0.3
7				0.1
8				0.1
9				0.1
10				0.4
11				0.1
12				0.9
13				0.0
14				0.4

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-4
DATE COMPLETED: 3 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
36	SW-SAND, well graded, very fine to coarse grained, compact, bluish grey (5/1), saturated	35.00						
38				15				0.1
40								
42				16				2.7
44								
46								
48				17				2.4
50	- trace of gravel at 50.0ft BGS							
52				18				1.9
54								
56								
58			SAND PACK WELL SCREEN	19				1.8
60								
62	- with gravel at 62.0ft BGS			20				1.6
64								
66				21				2.4
68	- with cobbles up to 3.5in. at 68.0ft BGS							
	- Refusal at 69.0ft BGS	69.00						
	END OF BOREHOLE @ 69.0ft BGS		WELL DETAILS					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-4
DATE COMPLETED: 3 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
72			Screened interval: 49.00 to 69.00ft BGS Length: 20ft Diameter: 2in Slot Size: #10 Material: PVC Sand Pack: 47.00 to 69.00ft BGS Material: SILICA					
74								
76								
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								
100								
102								
104								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

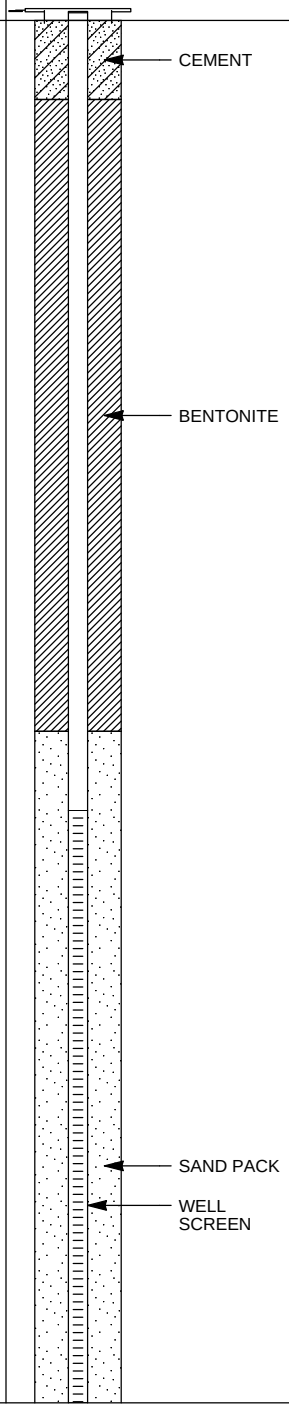
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-5
DATE COMPLETED: 3 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	CL-CLAY, silty, soft, low plasticity, trace organic material with rootlets	
2		
4	- dark brown at 4.0ft BGS	
		5.50
6	SP-SAND, very fine to fine grained, clean, loose, light yellow-brown, moist	
8		
10		
12		
		13.00
	SW-SAND, well graded, very fine to medium grained, light yellow-brown, moist	13.50
14	SP-SAND, very fine grained	
16		
18		
		19.00
20	SW-SAND, very fine to medium grained, trace of coarse grains, poorly sorted - very fine to coarse grained sand at 20.0ft BGS	
22	- trace of gravel at 23.0ft BGS	
24		24.00
	SP-SAND, very fine to fine grained, trace of medium to coarse grained, poorly sorted, light bluish grey (5/1), saturated	25.00
26	SW-SAND, very fine to coarse grained, poorly sorted, compact, bluish grey (5/1), saturated	
28		
30		30.00
	CL-CLAY, silty, with very fine to coarse grained sand, high plasticity, soft, bluish grey (5/1), saturated	31.00 31.50
32	SW-SAND, very fine to coarse grained, trace of gravel, with wilt, compact, bluish grey (5/1), saturated	33.00
34	CL-CLAY, silty, high plasticity, soft, bluish grey (5/1), saturated	

MONITOR INSTALLATION



SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1				0.0
2				0.0
3				0.0
4				0.0
5				0.9
6				0.9
7				0.4
8				1.1
9				1.2
10				1.2
11				1.4
12				2.7
13				2.7
14				2.4

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: MW-5
DATE COMPLETED: 3 May 2013
DRILLING METHOD: DIRECT PUSH/HSA
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36	SW-SAND, well graded, very fine to coarse grained, trace of gravel, compact, bluish grey (5/1), saturated			15				2.2
38				16				2.0
40	END OF BOREHOLE @ 40.0ft BGS	40.00	WELL DETAILS Screened interval: 20.00 to 40.00ft BGS Length: 20ft Diameter: 2in Slot Size: #10 Material: PVC Sand Pack: 18.00 to 40.00ft BGS Material: SILICA					
42								
44								
46								
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

APPENDIX C

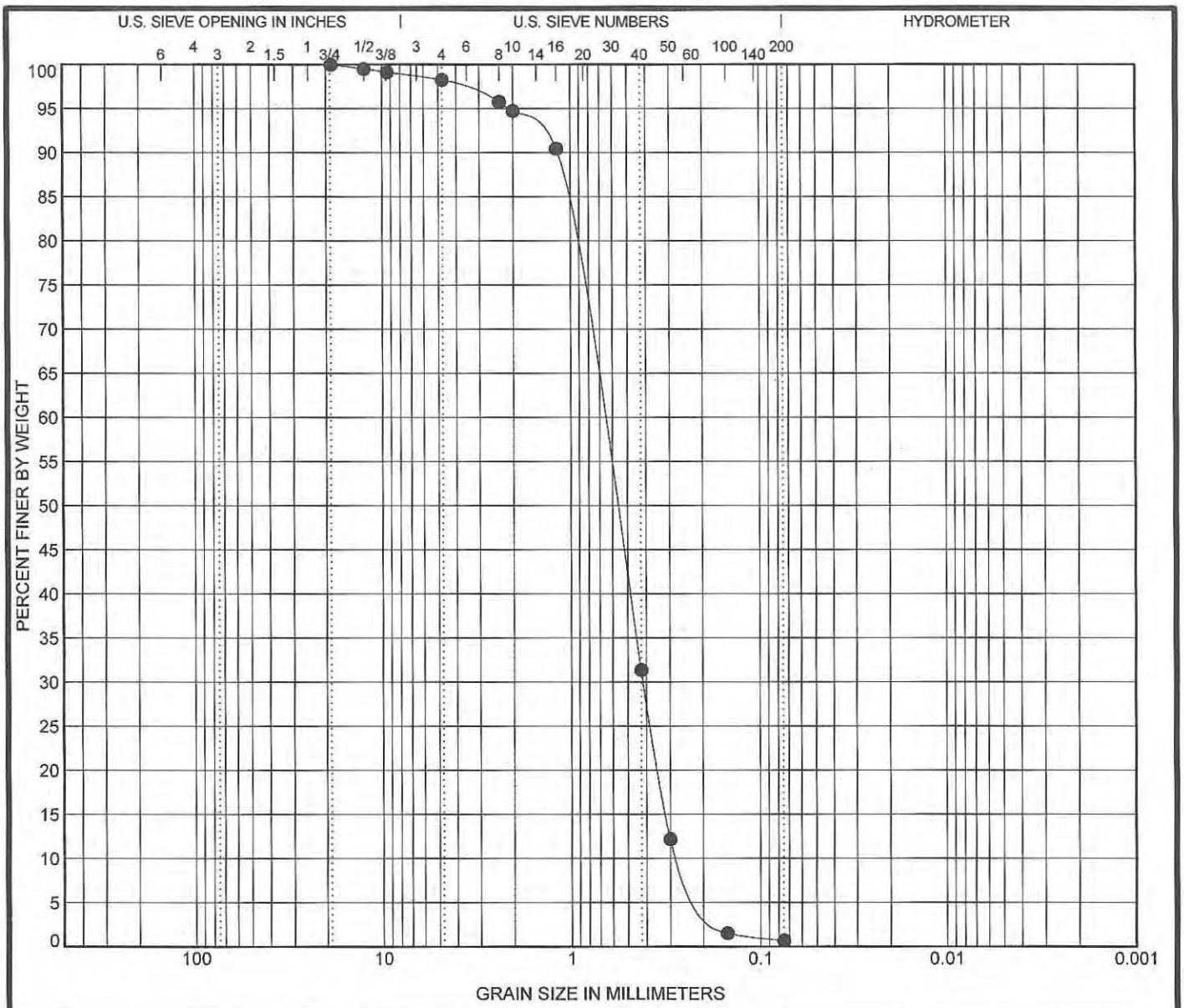
WWC-5 WATER WELL RECORDS

APPENDIX D

STRATIGRAPHIC AND INSTRUMENTATION LOGS FOR MONITOIRNG WELLS

APPENDIX E

GRAIN SIZE ANALYSIS RESULTS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● 050113-KH-001 35	(SP) SAND, trace silt and gravel				0.95	2.68

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 050113-KH-001 35	18.75	0.697	0.415	0.26	1.7	97.6	0.7	

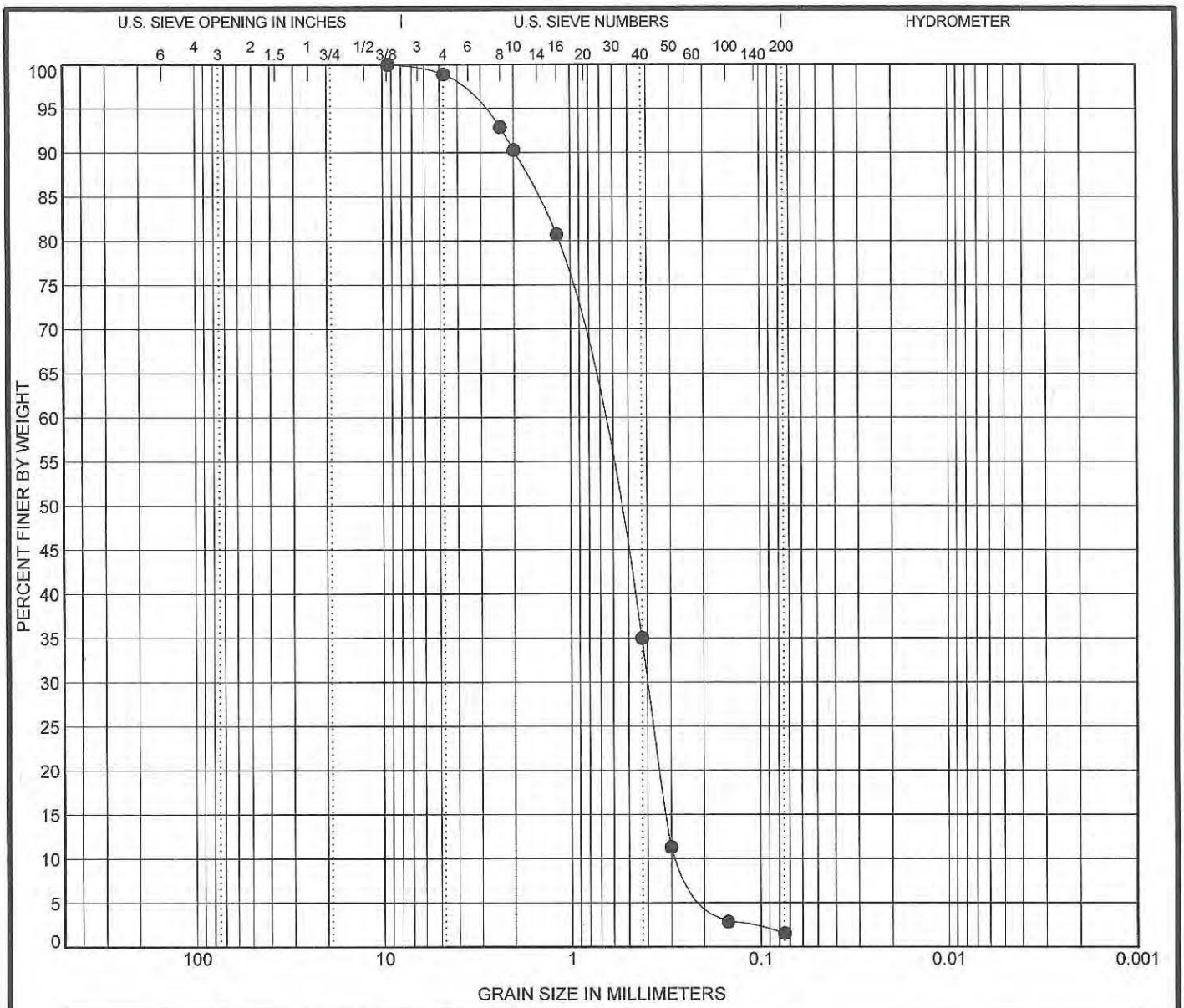
CONESTOGA-ROVERS & ASSOCIATES

GRAIN SIZE DISTRIBUTION

Project Name: Douglas County Public Works
Project Number: 080649
Client: Douglas County Public Works
Location: Lawrence, KS

Test by: BSB Checked by: _____

GRAIN SIZE 081649 DOUGLAS CO PUBLIC WORKS.GPJ CRA PLYMOUTH.GDT 5/29/13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● 050113-KH-002 25	**(SP) SAND, trace silt and gravel**				**0.78**	**2.76**

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 050113-KH-002 25	**9.375**	**0.742**	**0.395**	**0.269**	**1.1**	**97.3**	**1.6**	

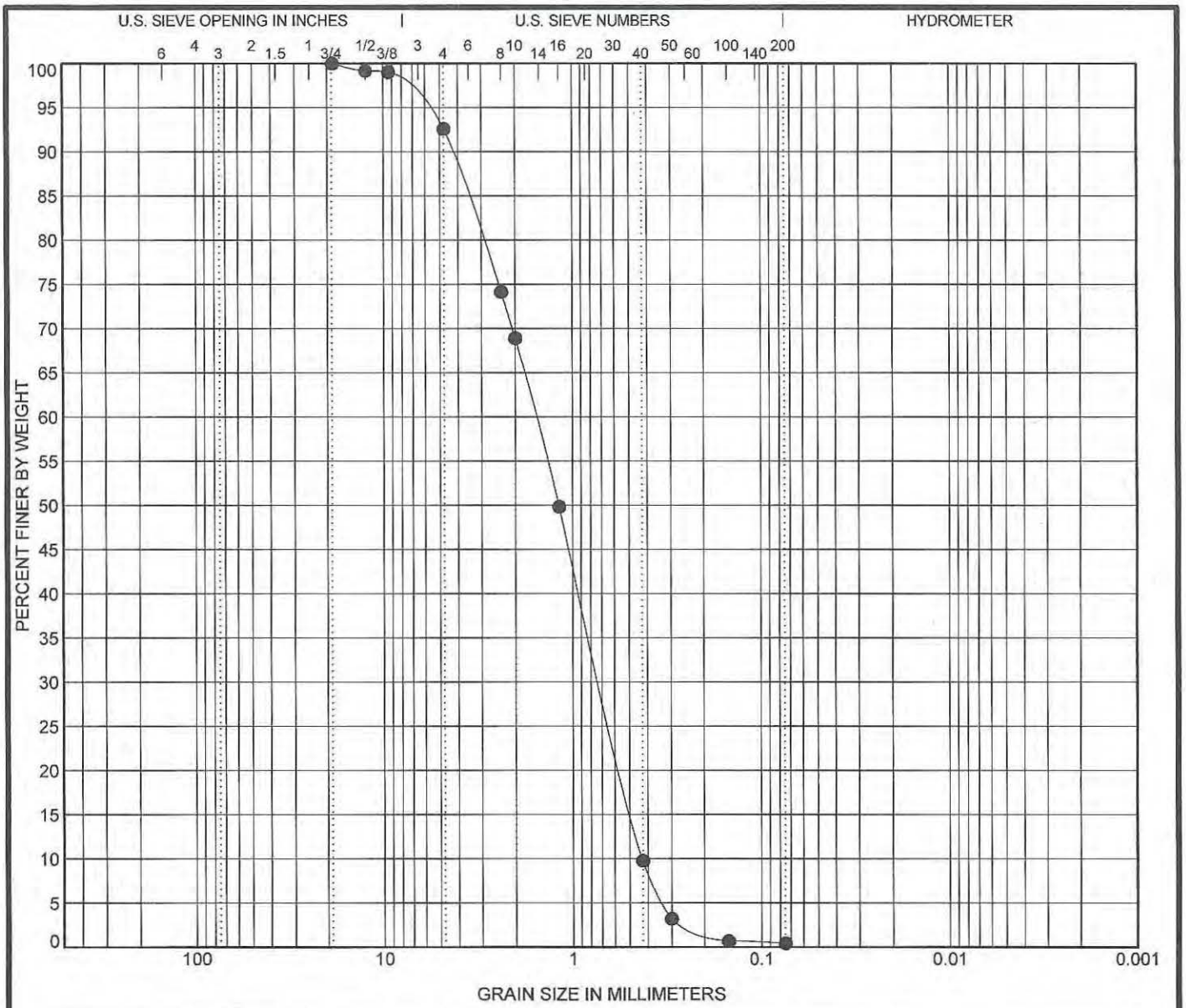
CONESTOGA-ROVERS & ASSOCIATES

GRAIN SIZE DISTRIBUTION

Project Name: Douglas County Public Works
Project Number: 080649
Client: Douglas County Public Works
Location: Lawrence, KS

Test by: BSB **Checked by:** _____

GRAIN SIZE 081649 DOUGLAS CO PUBLIC WORKS.GPJ CRA PLYMOUTH.GDT 5/29/13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● 050313-KH-003	50	**(SP) SAND, trace silt and gravel**				**0.76**	**3.66**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 050313-KH-003	50	**18.75**	**1.563**	**0.712**	**0.427**	**7.4**	**92.2**	**0.4**	

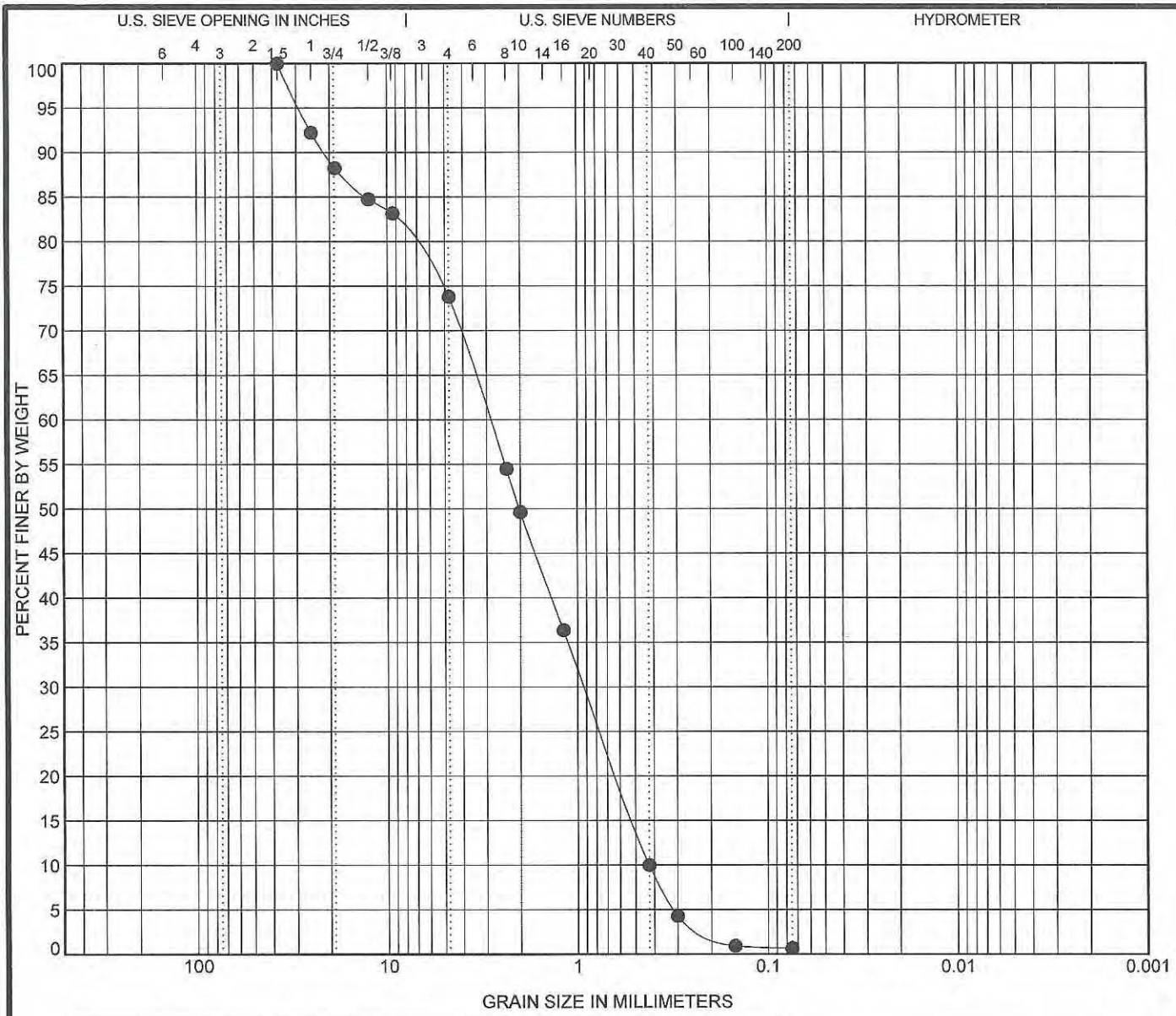
CONESTOGA-ROVERS & ASSOCIATES

GRAIN SIZE DISTRIBUTION

Project Name: Douglas County Public Works
Project Number: 080649
Client: Douglas County Public Works
Location: Lawrence, KS

Test by: BBS **Checked by:**

GRAIN SIZE 081649 DOUGLAS CO PUBLIC WORKS.GPJ CRA PLYMOUTH.GDT 5/29/13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**050313-KH-004**	**55**	**(SP) Gravelly SAND, trace silt**				**0.69**	**6.78**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**050313-KH-004**	**55**	**37.5**	**2.879**	**0.922**	**0.425**	**26.2**	**73.2**	**0.7**	

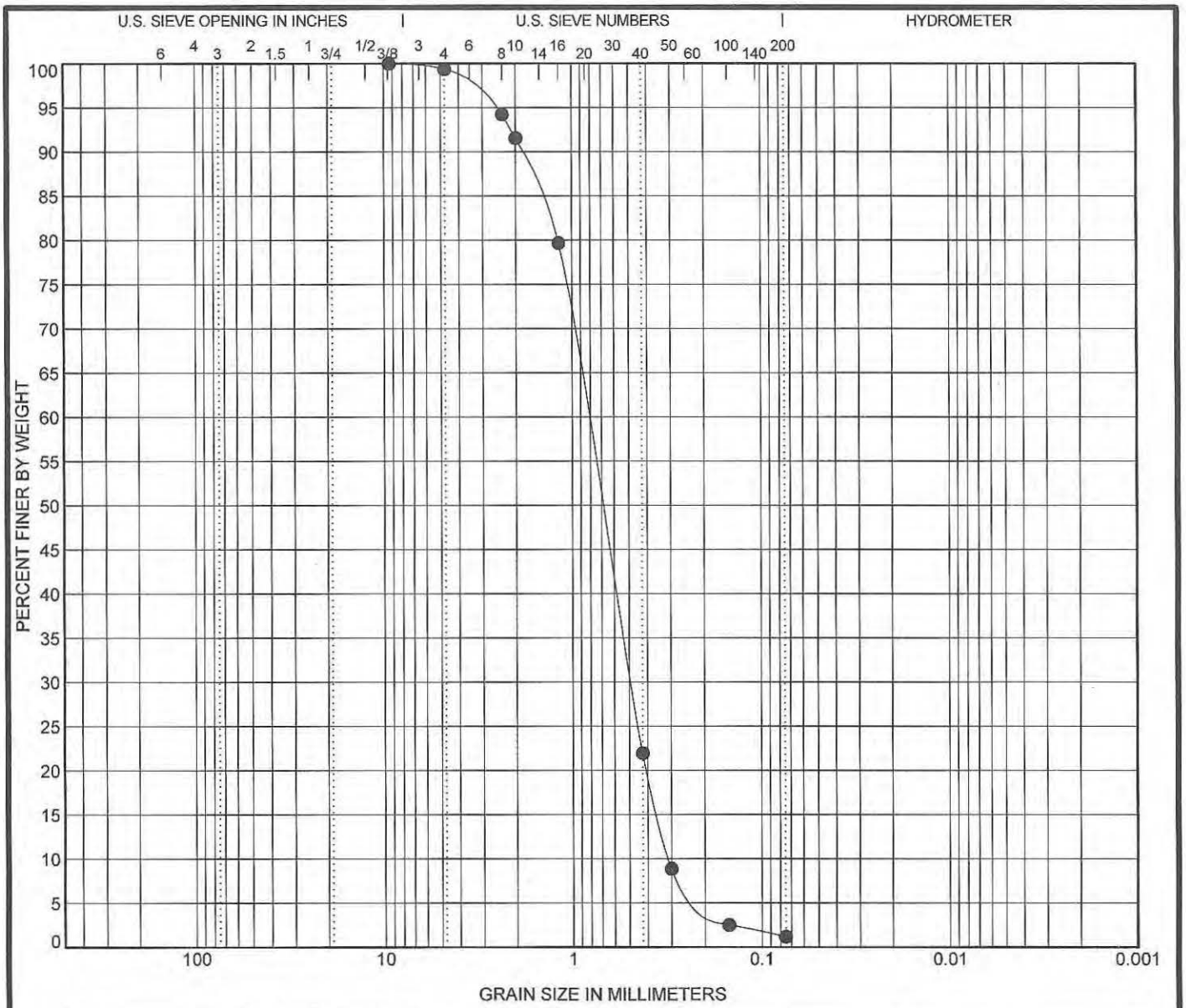
CONESTOGA-ROVERS & ASSOCIATES

GRAIN SIZE DISTRIBUTION

Project Name: Douglas County Public Works
Project Number: 080649
Client: Douglas County Public Works
Location: Lawrence, KS

Test by: _____ **Checked by:** _____

GRAIN SIZE 081649 DOUGLAS CO PUBLIC WORKS.GPJ CRA PLYMOUTH.GDT 5/29/13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● 050313-KH-005 30	**(SP) SAND, trace silt and gravel**				**0.93**	**2.69**

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 050313-KH-005 30	**9.375**	**0.833**	**0.49**	**0.309**	**0.6**	**98.2**	**1.2**	

CONESTOGA-ROVERS & ASSOCIATES

GRAIN SIZE DISTRIBUTION

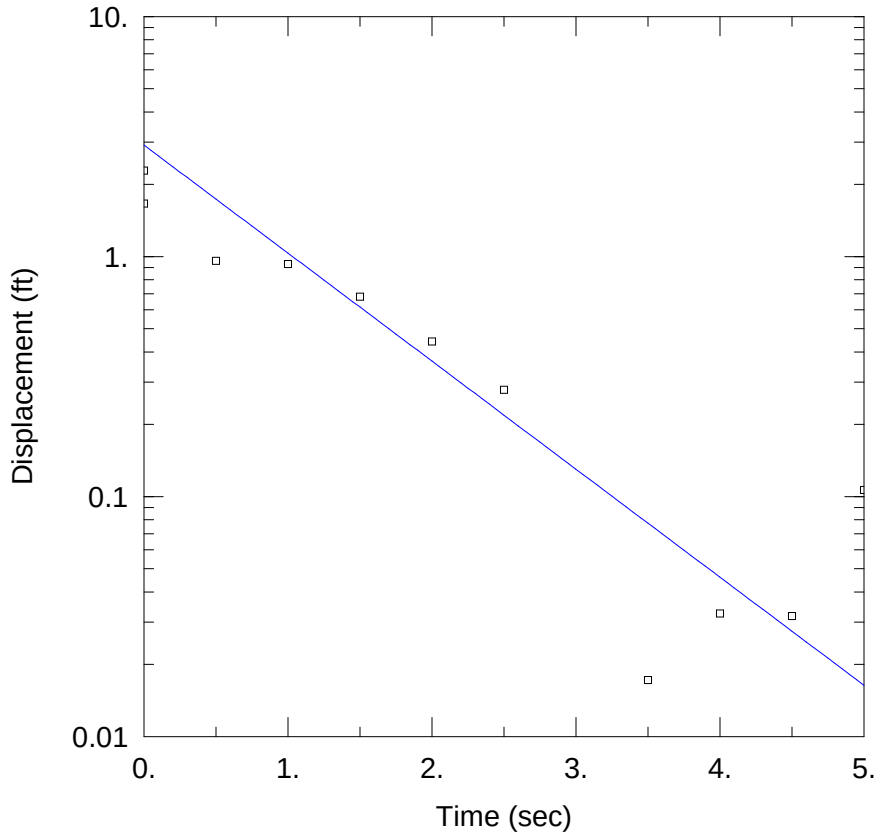
Project Name: Douglas County Public Works
Project Number: 080649
Client: Douglas County Public Works
Location: Lawrence, KS

Test by: BGJ **Checked by:**

GRAIN SIZE 081649 DOUGLAS CO PUBLIC WORKS.GPJ CRA PLYMOUTH.GDT 5/29/13

APPENDIX F

GRAPHS OF A SINGLE WELL RESPONSE



MW-1 FALLING HEAD TEST 1

Data Set: I:\...\MW-1-FH1.aqt
Date: 05/29/13 Time: 11:07:17

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-1
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

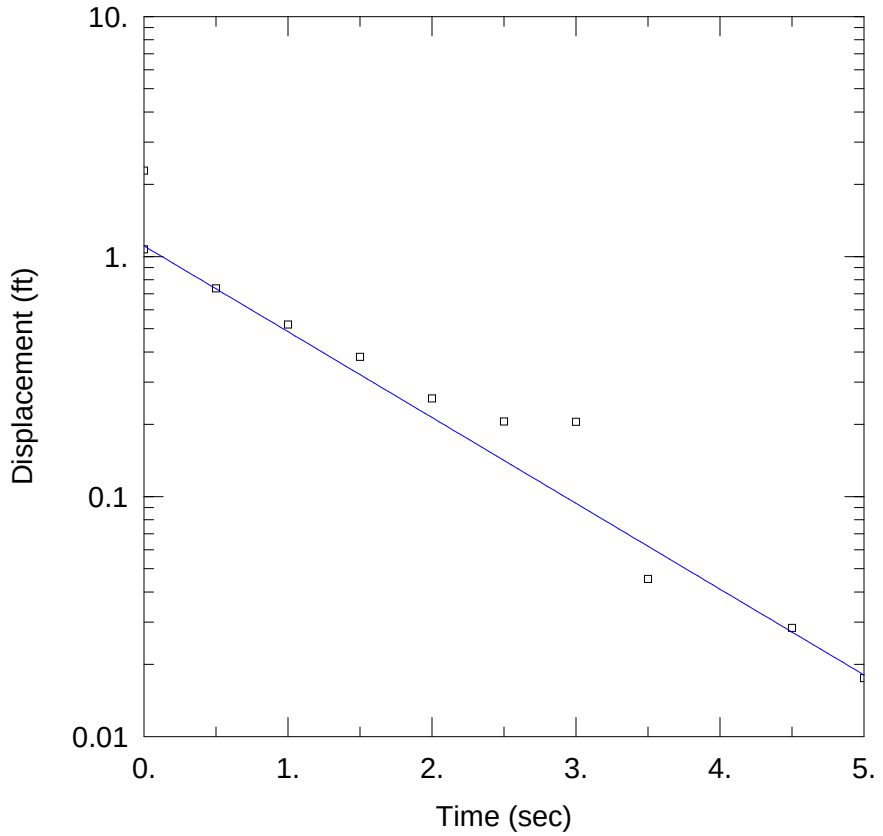
K = 0.02057 cm/sec
y0 = 2.914 ft

AQUIFER DATA

Saturated Thickness: 15.5 ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-1)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 20.75 ft
Screen Length: 15.5 ft
Well Radius: 0.3438 ft



MW-1 FALLING HEAD TEST 2

Data Set: I:\...\MW-1-FH2.aqt
Date: 05/29/13 Time: 11:07:01

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-1
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

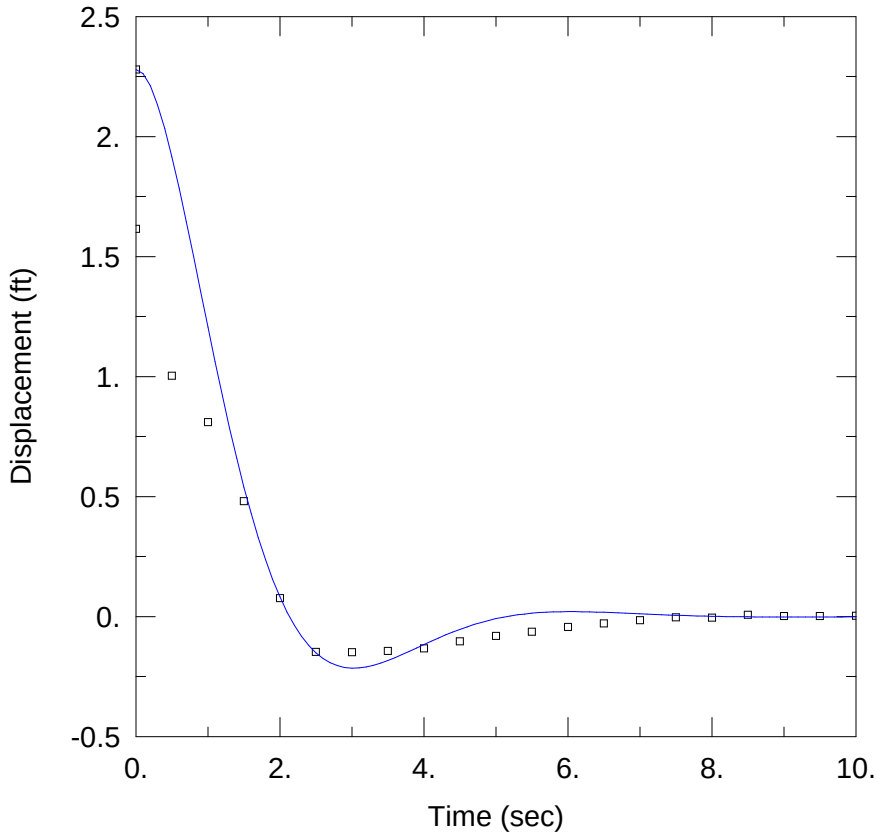
K = 0.01634 cm/sec
y0 = 1.108 ft

AQUIFER DATA

Saturated Thickness: 15.5 ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-1)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 20.75 ft
Screen Length: 15.5 ft
Well Radius: 0.3438 ft



MW-1 FALLING HEAD TEST 3

Data Set: I:\...\MW-1-FH3.aqt
Date: 05/29/13 Time: 11:06:49

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-1
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.0392 cm/sec
Le = 19.05 ft

AQUIFER DATA

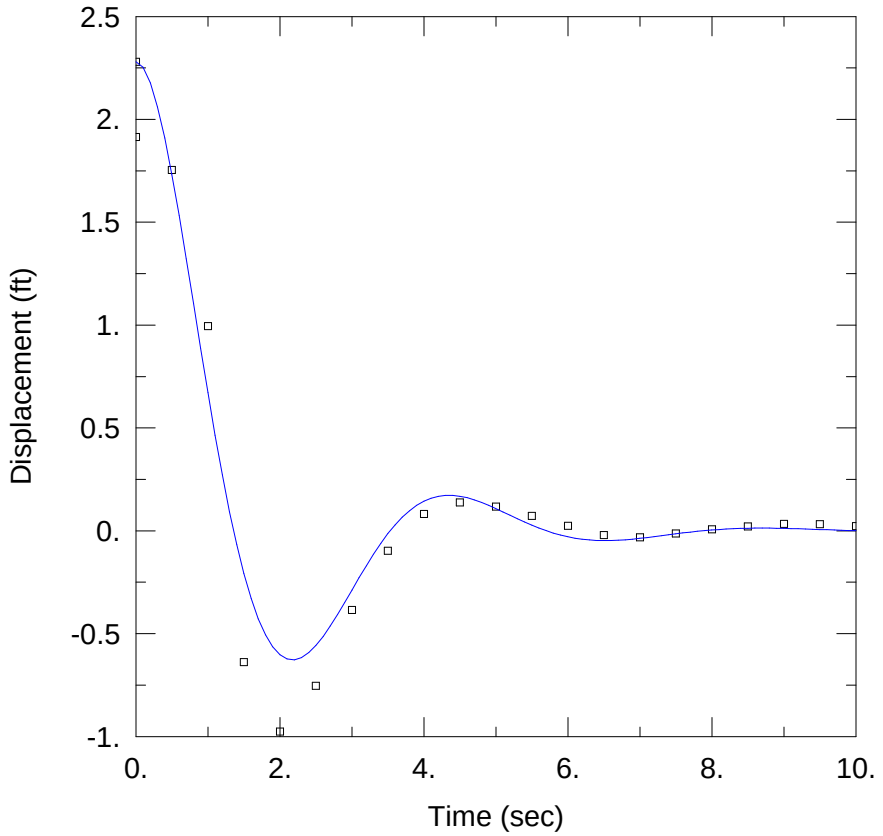
Saturated Thickness: 15.5 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-1)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.5 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 20.75 ft
Screen Length: 15.5 ft
Well Radius: 0.3438 ft



MW-1 RISING HEAD TEST 1

Data Set: I:\...\MW-1-RH1.aqt
Date: 05/29/13 Time: 11:06:33

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-1
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.0747 cm/sec
Le = 13.18 ft

AQUIFER DATA

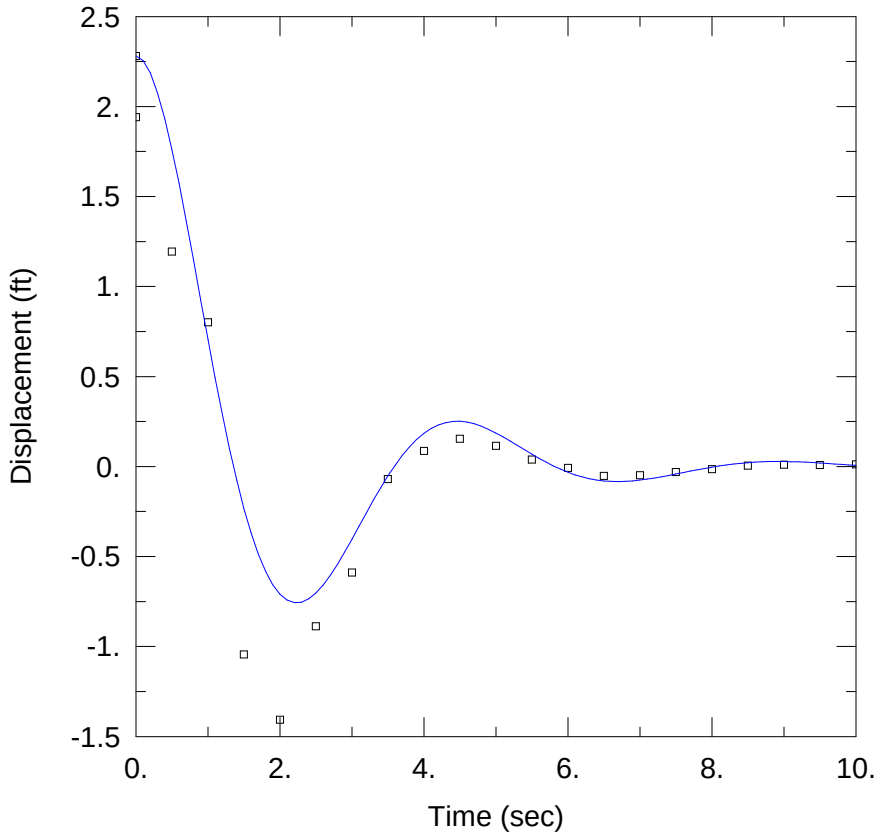
Saturated Thickness: 15.5 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-1)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.5 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 20.75 ft
Screen Length: 15.5 ft
Well Radius: 0.3438 ft



MW-1 RISING HEAD TEST 2

Data Set: I:\...\MW-1-RH2.aqt
Date: 05/29/13 Time: 11:06:17

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-1
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.08191 cm/sec
Le = 14.45 ft

AQUIFER DATA

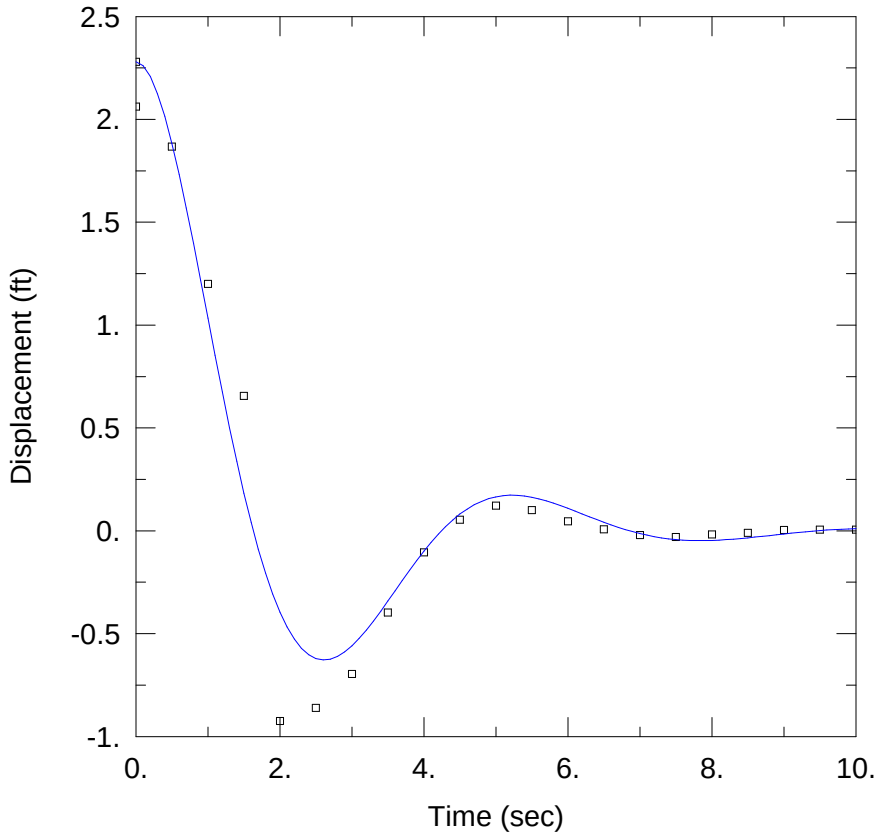
Saturated Thickness: 15.5 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-1)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.5 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 20.75 ft
Screen Length: 15.5 ft
Well Radius: 0.3438 ft



MW-1 RISING HEAD TEST 3

Data Set: I:\...\MW-1-RH3.aqt
Date: 05/29/13 Time: 11:06:05

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-1
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.06213 cm/sec
Le = 19.05 ft

AQUIFER DATA

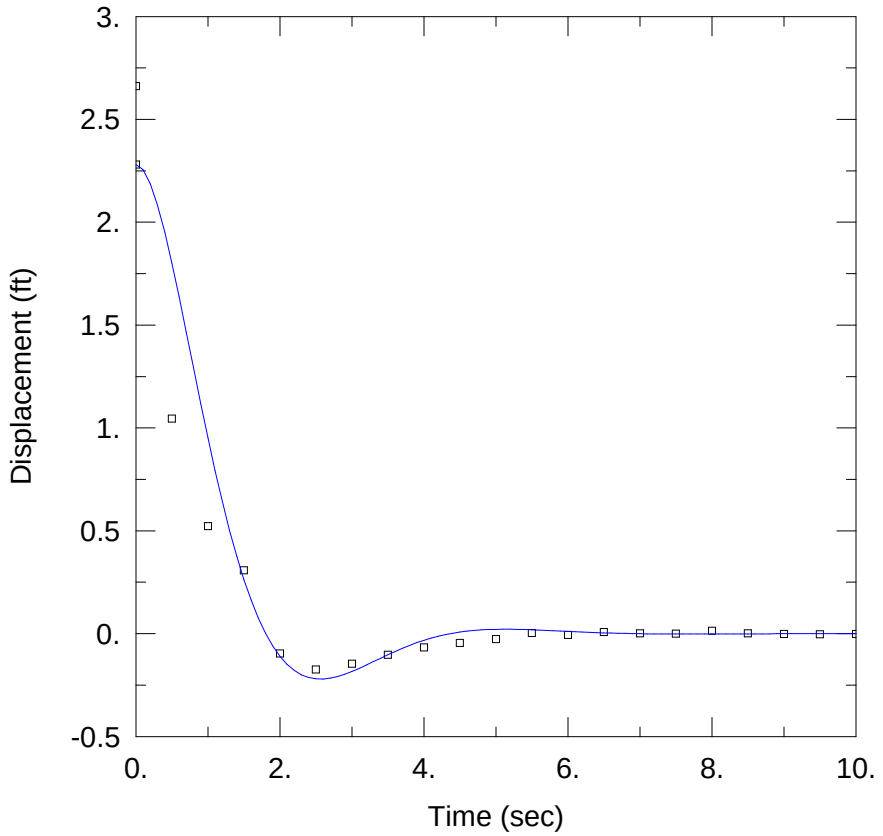
Saturated Thickness: 15.5 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-1)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.5 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 20.75 ft
Screen Length: 15.5 ft
Well Radius: 0.3438 ft



MW-2 FALLING HEAD TEST 1

Data Set: I:\...\MW-2-FH1.aqt
Date: 05/29/13 Time: 11:10:28

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-2
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.04501 cm/sec
Le = 13.8 ft

AQUIFER DATA

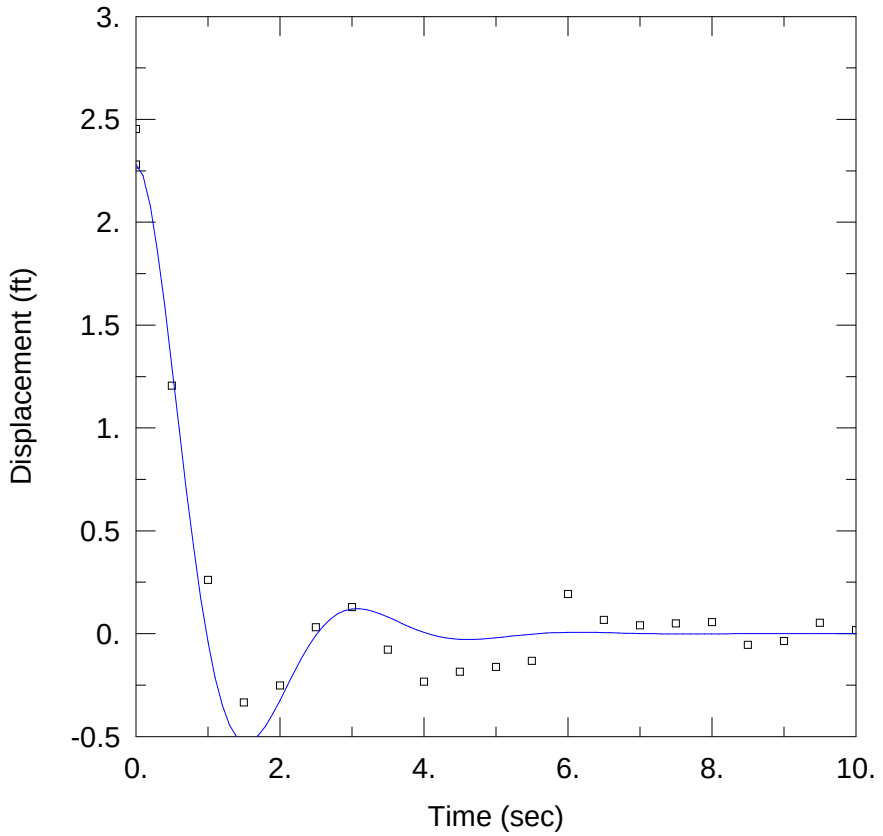
Saturated Thickness: 15.93 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-2)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.93 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.93 ft
Screen Length: 15.93 ft
Well Radius: 0.3438 ft



MW-2 FALLING HEAD TEST 2

Data Set: I:\...\MW-2-FH2.aqt
Date: 05/29/13 Time: 11:10:10

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-2
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.09404 cm/sec
Le = 6.31 ft

AQUIFER DATA

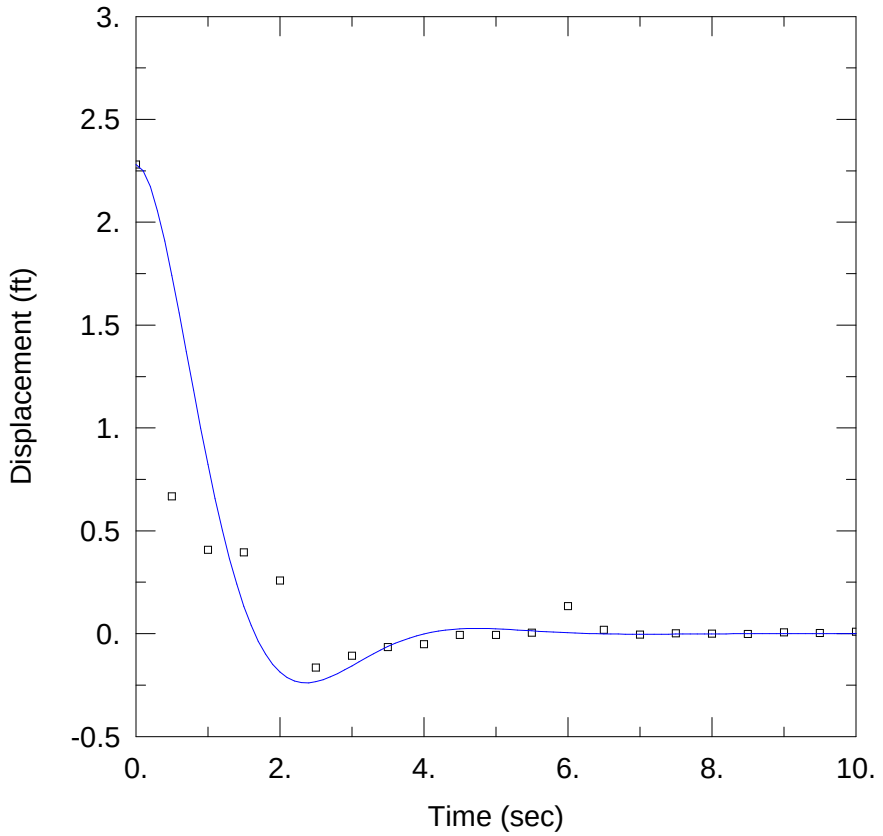
Saturated Thickness: 15.93 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-2)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.93 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.93 ft
Screen Length: 15.93 ft
Well Radius: 0.3438 ft



MW-2 FALLING HEAD TEST 3

Data Set: I:\...\MW-2-FH3.aqt
Date: 05/29/13 Time: 11:09:58

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-2
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.04935 cm/sec
Le = 12.02 ft

AQUIFER DATA

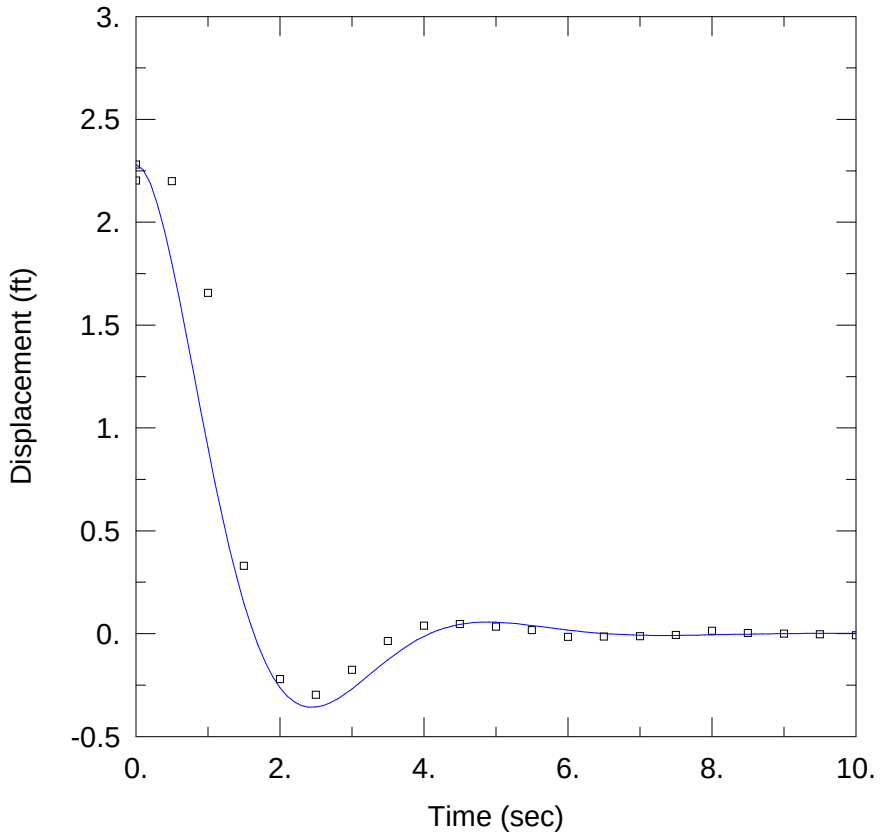
Saturated Thickness: 15.93 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-2)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.93 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.93 ft
Screen Length: 15.93 ft
Well Radius: 0.3438 ft



MW-2 RISING HEAD TEST 1

Data Set: I:\...\MW-2-RH1.aqt
Date: 05/29/13 Time: 11:09:45

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-2
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.05168 cm/sec
Le = 14.45 ft

AQUIFER DATA

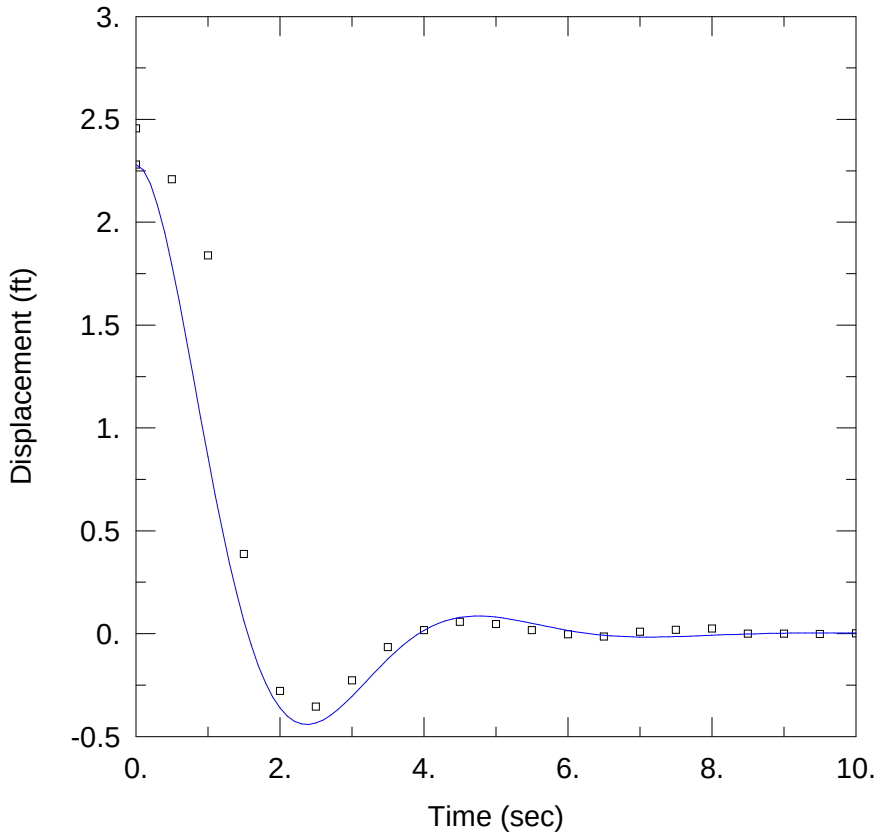
Saturated Thickness: 15.93 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-2)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.93 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.93 ft
Screen Length: 15.93 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3



MW-2 RISING HEAD TEST 2

Data Set: I:\...\MW-2-RH2.aqt
Date: 05/29/13 Time: 11:09:32

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-2
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.05667 cm/sec
Le = 14.45 ft

AQUIFER DATA

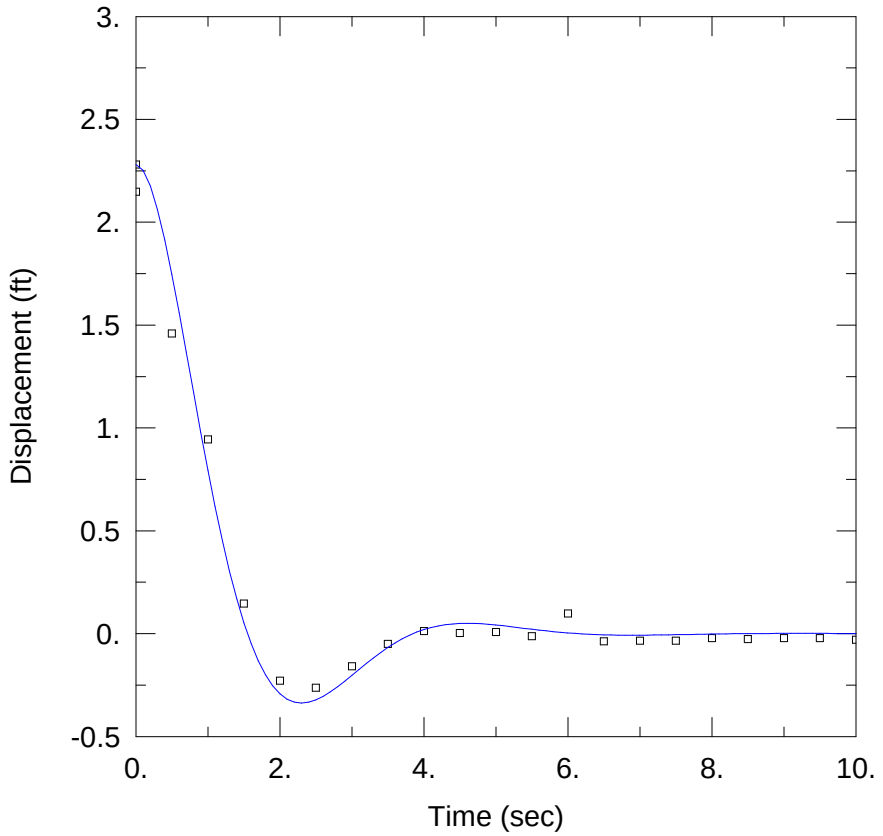
Saturated Thickness: 15.93 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-2)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.93 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.93 ft
Screen Length: 15.93 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3



MW-2 RISING HEAD TEST 3

Data Set: I:\...\MW-2-RH3.aqt
Date: 05/29/13 Time: 11:09:17

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-2
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.05412 cm/sec
Le = 12.59 ft

AQUIFER DATA

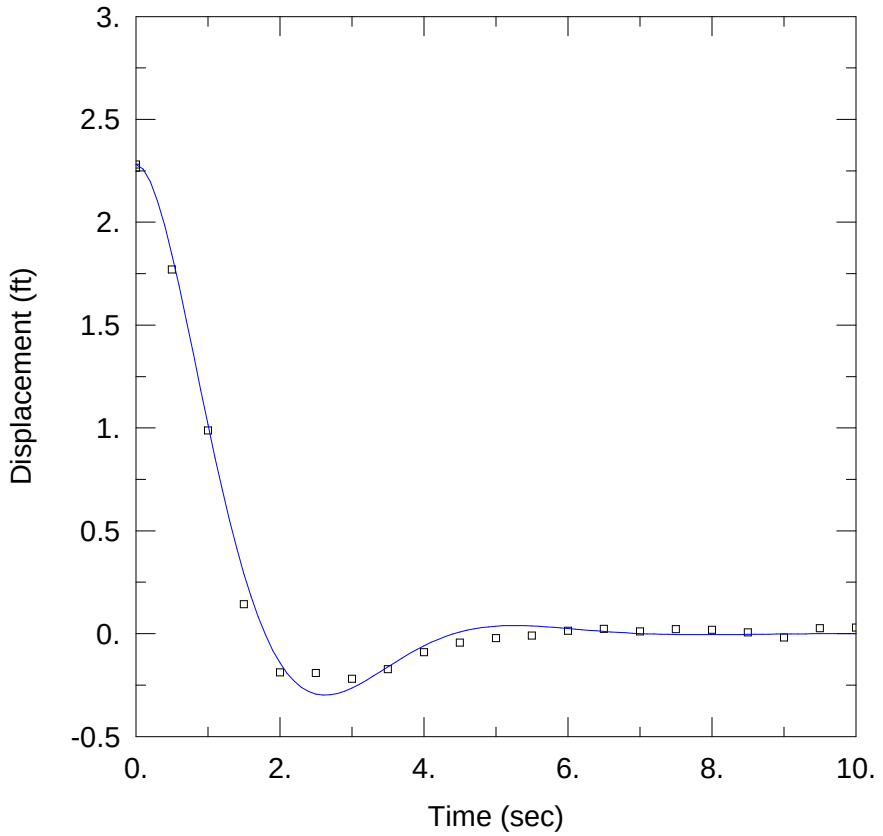
Saturated Thickness: 15.93 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-2)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.93 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.93 ft
Screen Length: 15.93 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3



MW-3 FALLING HEAD TEST 1

Data Set: I:\...\MW-3-FH1.aqt
Date: 05/29/13 Time: 11:18:37

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-3
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.04935 cm/sec
Le = 15.85 ft

AQUIFER DATA

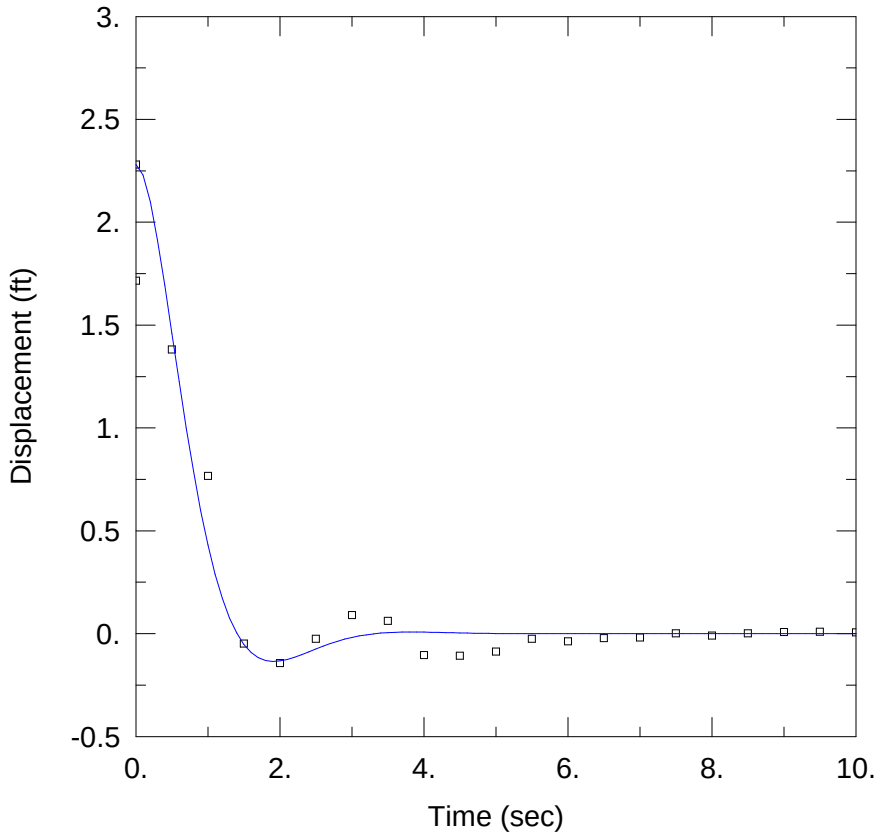
Saturated Thickness: 15. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-3)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.0833 ft

Static Water Column Height: 26.28 ft
Screen Length: 15. ft
Well Radius: 0.3438 ft



MW-3 FALLING HEAD TEST 2

Data Set: I:\...\MW-3-FH2.aqt
Date: 05/29/13 Time: 11:18:20

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-3
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.06213 cm/sec
Le = 6.607 ft

AQUIFER DATA

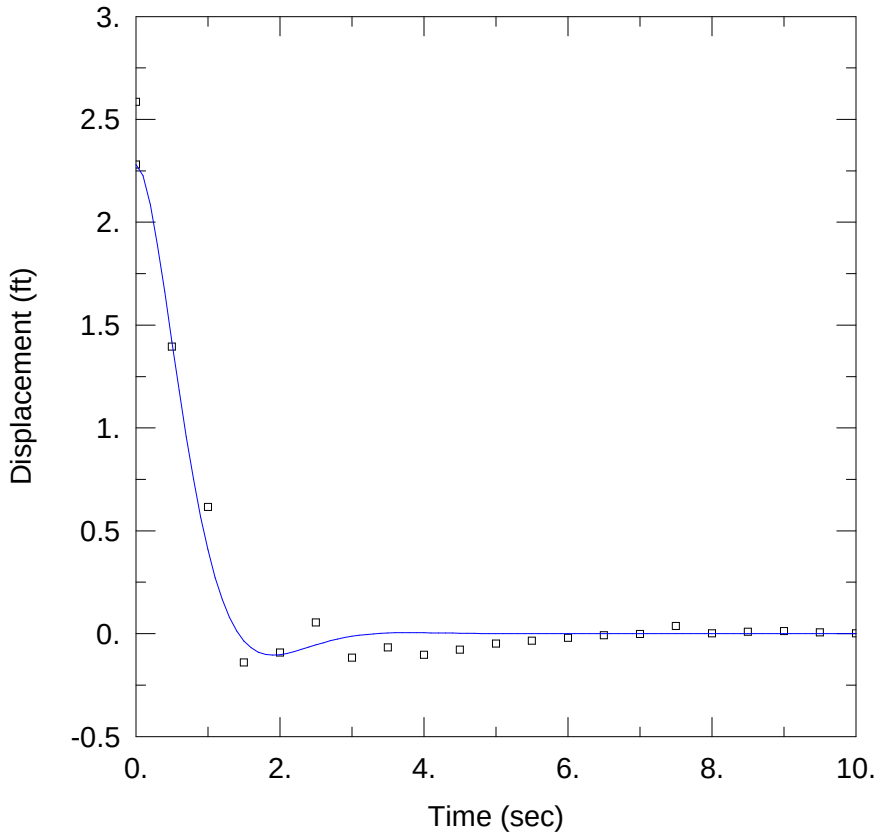
Saturated Thickness: 15. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-3)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.0833 ft

Static Water Column Height: 26.28 ft
Screen Length: 15. ft
Well Radius: 0.3438 ft



MW-3 FALLING HEAD TEST 3

Data Set: I:\...\MW-3-FH3.aqt
Date: 05/29/13 Time: 11:18:04

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-3
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.06213 cm/sec
Le = 6.026 ft

AQUIFER DATA

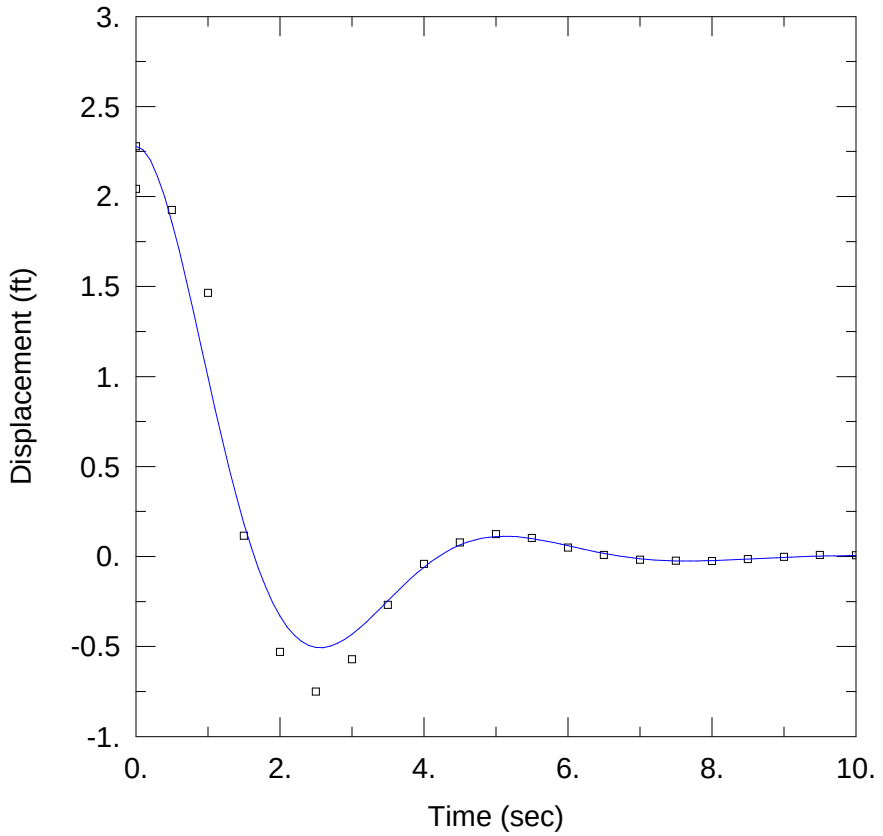
Saturated Thickness: 15. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-3)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.0833 ft

Static Water Column Height: 26.28 ft
Screen Length: 15. ft
Well Radius: 0.3438 ft



MW-3 RISING HEAD TEST 1

Data Set: I:\...\MW-3-RH1.aqt
Date: 05/29/13 Time: 11:17:48

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-3
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.05934 cm/sec
Le = 17.38 ft

AQUIFER DATA

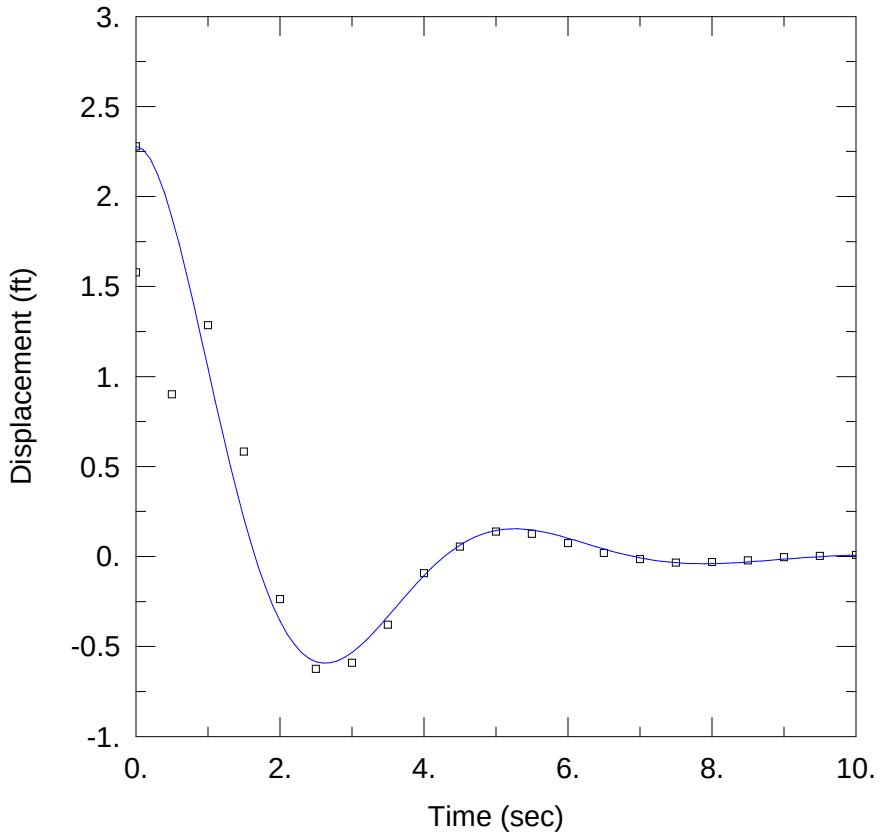
Saturated Thickness: 15. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-3)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.0833 ft

Static Water Column Height: 26.28 ft
Screen Length: 15. ft
Well Radius: 0.3438 ft



MW-3 RISING HEAD TEST 3

Data Set: I:\...\MW-3-RH3.aqt
Date: 05/29/13 Time: 11:17:33

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-3
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.06213 cm/sec
Le = 19.05 ft

AQUIFER DATA

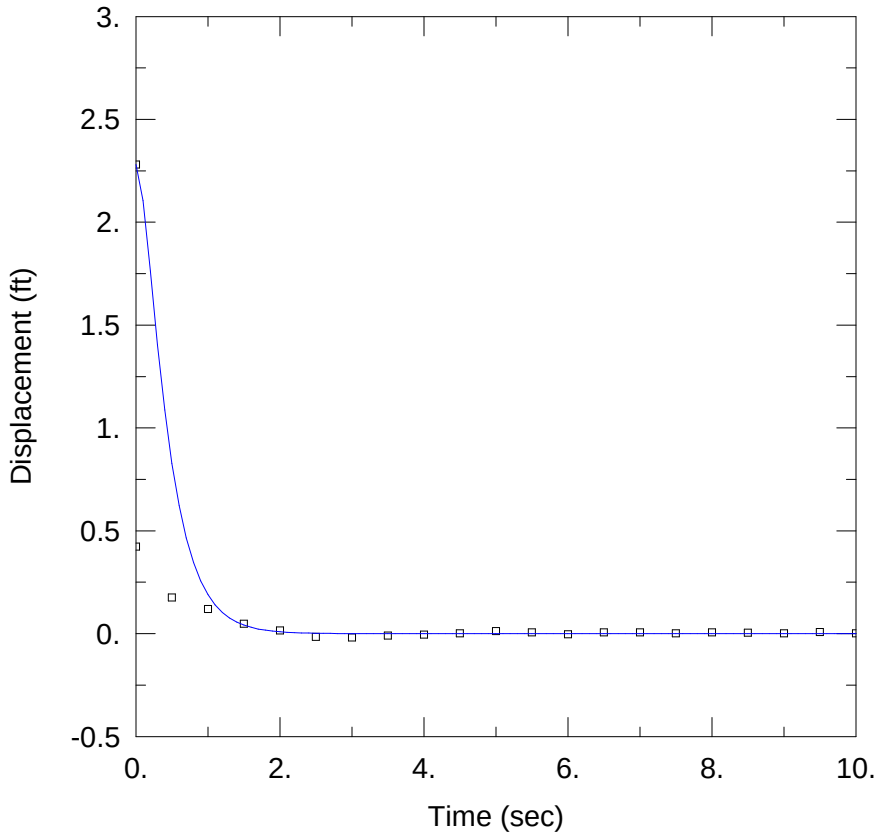
Saturated Thickness: 15. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-3)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.0833 ft

Static Water Column Height: 26.28 ft
Screen Length: 15. ft
Well Radius: 0.3438 ft



MW-4 FALLING HEAD TEST 1

Data Set: I:\...\MW-4-FH1.aqt
Date: 05/29/13 Time: 11:45:56

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-4
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

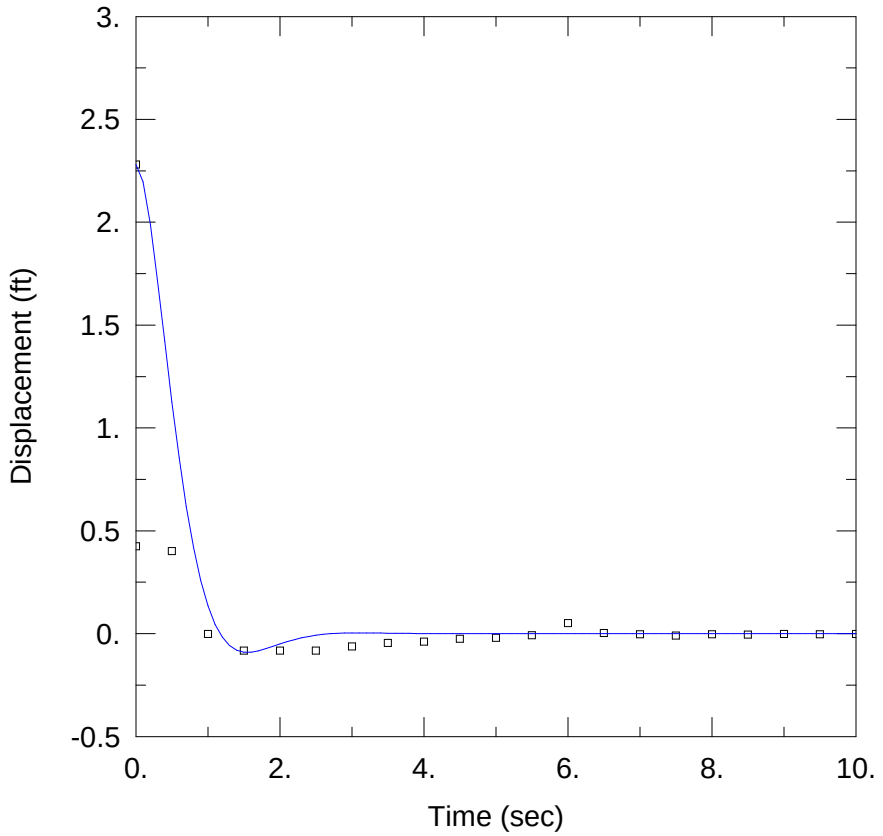
K = 0.05168 cm/sec
Le = 1.514 ft

AQUIFER DATA

Saturated Thickness: 40.26 ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-4)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 40.26 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 40.26 ft
Screen Length: 20. ft
Well Radius: 0.3438 ft



MW-4 FALLING HEAD TEST 2

Data Set: I:\...\MW-4-FH2.aqt
Date: 05/29/13 Time: 11:45:08

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-4
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

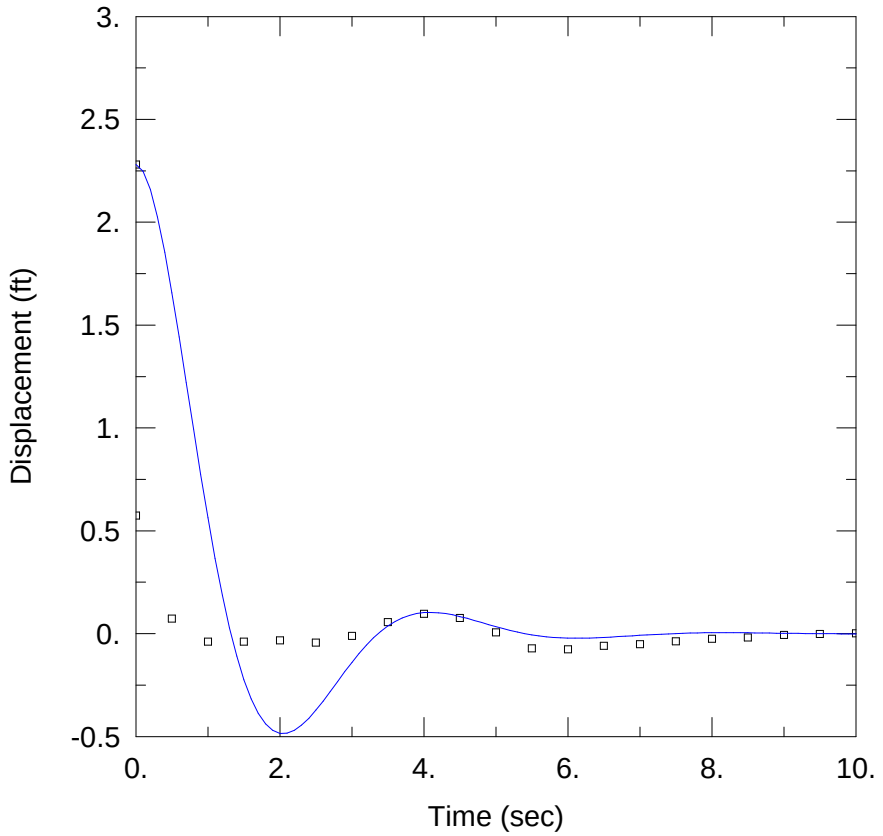
K = 0.04935 cm/sec
Le = 3.802 ft

AQUIFER DATA

Saturated Thickness: 40.26 ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-4)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 40.26 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 40.26 ft
Screen Length: 20. ft
Well Radius: 0.3438 ft



MW-4 FALLING HEAD TEST 3

Data Set: I:\...\MW-4-FH3.aqt
Date: 05/29/13 Time: 11:42:23

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-4
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

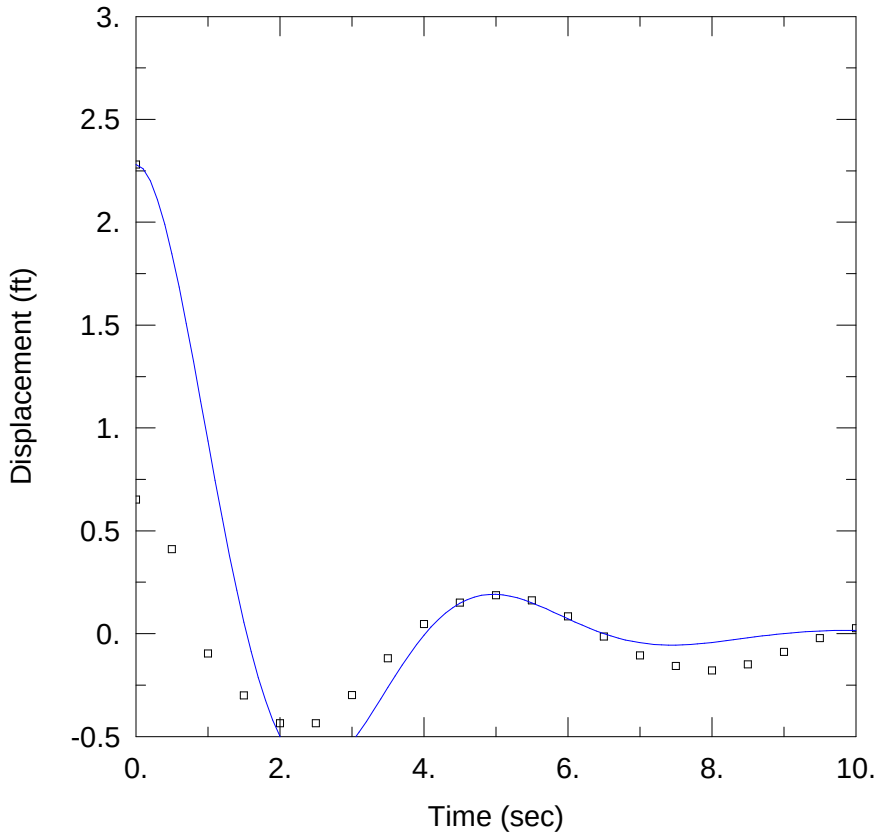
K = 0.04713 cm/sec
Le = 10.96 ft

AQUIFER DATA

Saturated Thickness: 40.26 ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-4)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 40.26 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 40.26 ft
Screen Length: 20. ft
Well Radius: 0.3438 ft



MW-4 RISING HEAD TEST 1

Data Set: I:\...\MW-4-RH1.aqt
Date: 05/29/13 Time: 11:41:32

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-4
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

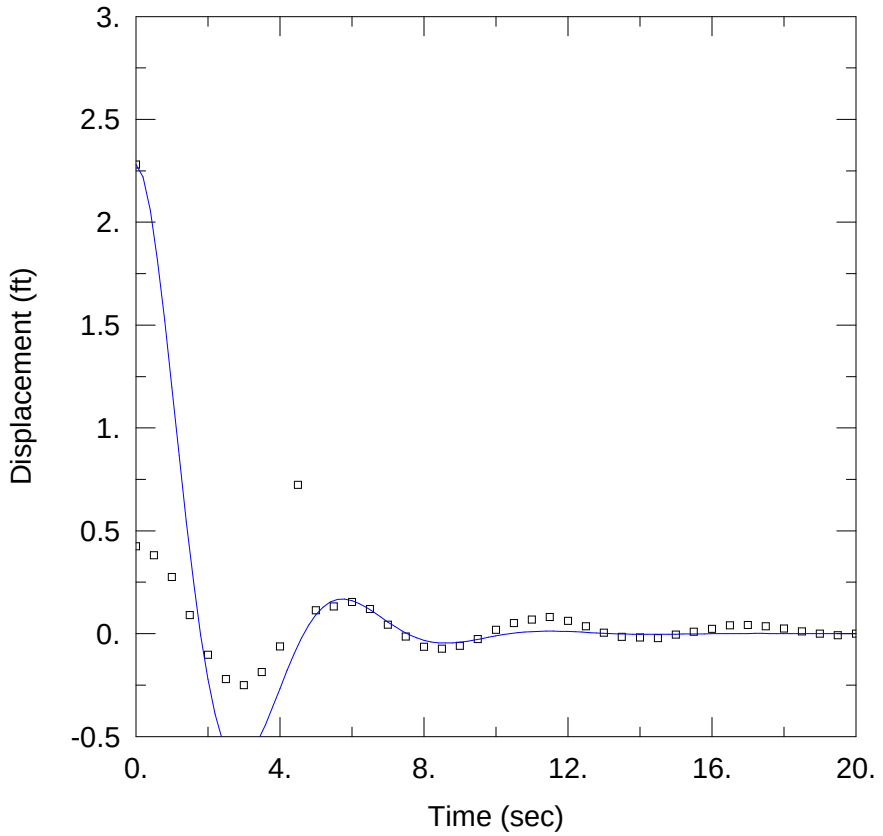
K = 0.04501 cm/sec
Le = 17.38 ft

AQUIFER DATA

Saturated Thickness: 40.26 ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-4)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 40.26 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 40.26 ft
Screen Length: 20. ft
Well Radius: 0.3438 ft



MW-4 RISING HEAD TEST 2

Data Set: I:\...\MW-4-RH2.aqt
Date: 05/29/13 Time: 11:40:58

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-4
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

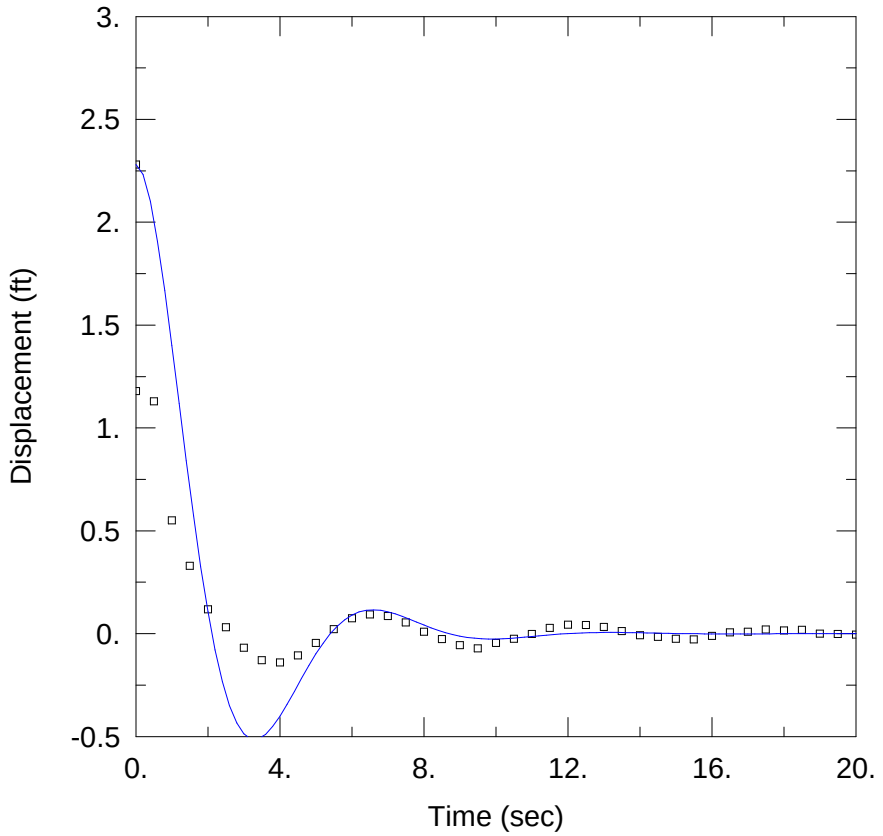
K = 0.03744 cm/sec
Le = 22.91 ft

AQUIFER DATA

Saturated Thickness: 40.26 ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-4)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 40.26 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 40.26 ft
Screen Length: 20. ft
Well Radius: 0.3438 ft



MW-4 RISING HEAD TEST 3

Data Set: I:\...\MW-4-RH3.aqt
Date: 05/29/13 Time: 11:39:10

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-4
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.02974 cm/sec
Le = 28.84 ft

AQUIFER DATA

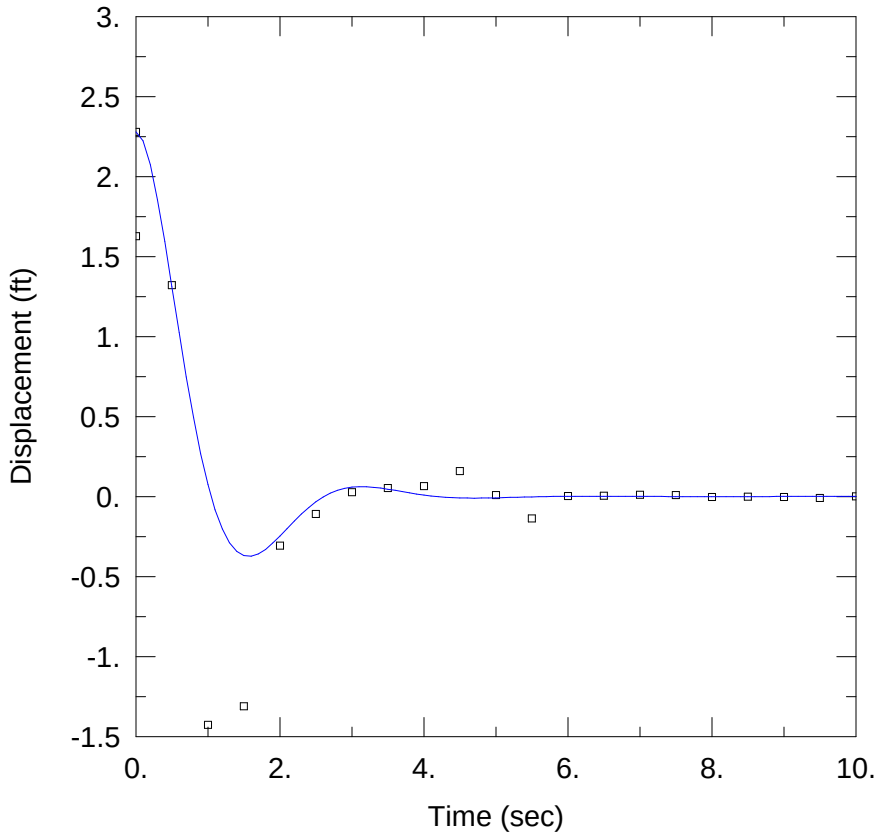
Saturated Thickness: 40.26 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-4)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 40.26 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 40.26 ft
Screen Length: 20. ft
Well Radius: 0.3438 ft



MW-5 FALLING HEAD TEST 1

Data Set: I:\...\MW-5-FH1.aqt
Date: 05/29/13 Time: 13:08:25

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-5
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.04501 cm/sec
Le = 6.026 ft

AQUIFER DATA

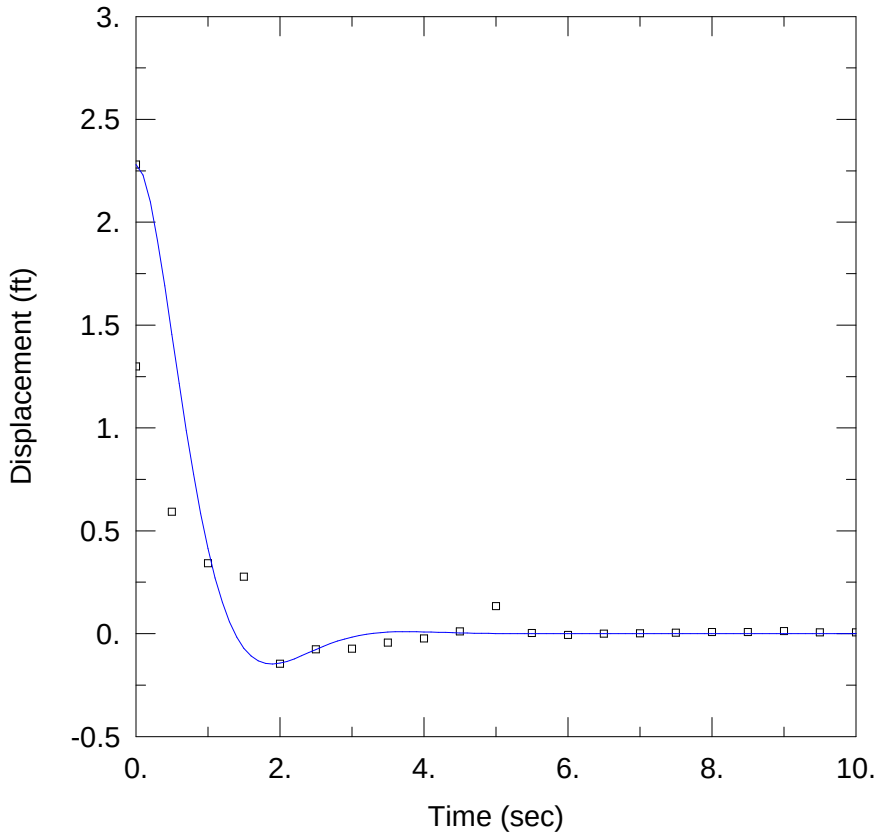
Saturated Thickness: 15.99 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-5)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.99 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.99 ft
Screen Length: 15.99 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3



MW-5 FALLING HEAD TEST 2

Data Set: I:\...\MW-5-FH2.aqt
Date: 05/29/13 Time: 13:08:11

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-5
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.03261 cm/sec
Le = 6.607 ft

AQUIFER DATA

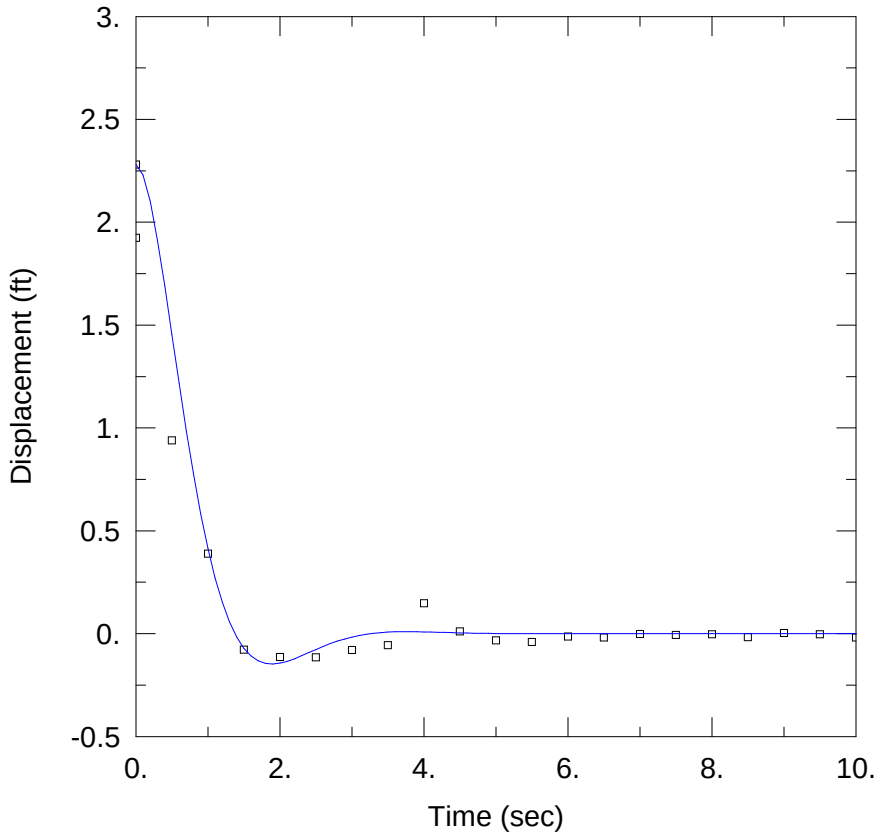
Saturated Thickness: 15.99 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-5)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.99 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.99 ft
Screen Length: 15.99 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3



MW-5 FALLING HEAD TEST 3

Data Set: I:\...\MW-5-FH3.aqt
Date: 05/29/13 Time: 13:07:59

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-5
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.03261 cm/sec
Le = 6.607 ft

AQUIFER DATA

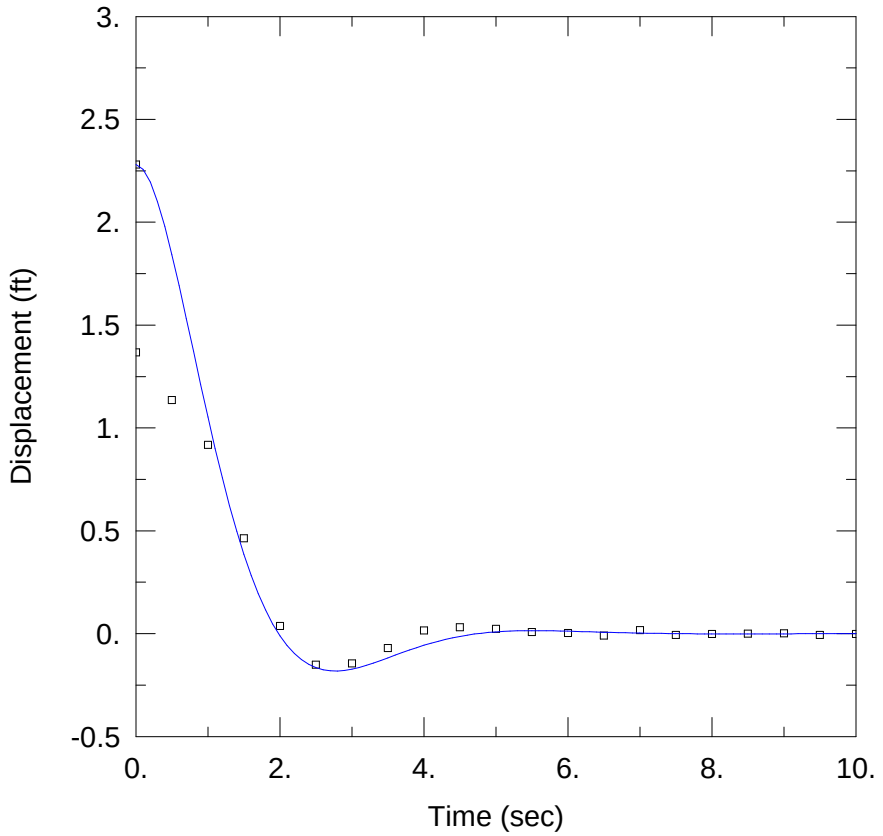
Saturated Thickness: 15.99 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-5)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.99 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.99 ft
Screen Length: 15.99 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3



MW-5 RISING HEAD TEST 1

Data Set: I:\...\MW-5-RH1.aqt
Date: 05/29/13 Time: 13:07:46

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-5
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.02256 cm/sec
Le = 15.14 ft

AQUIFER DATA

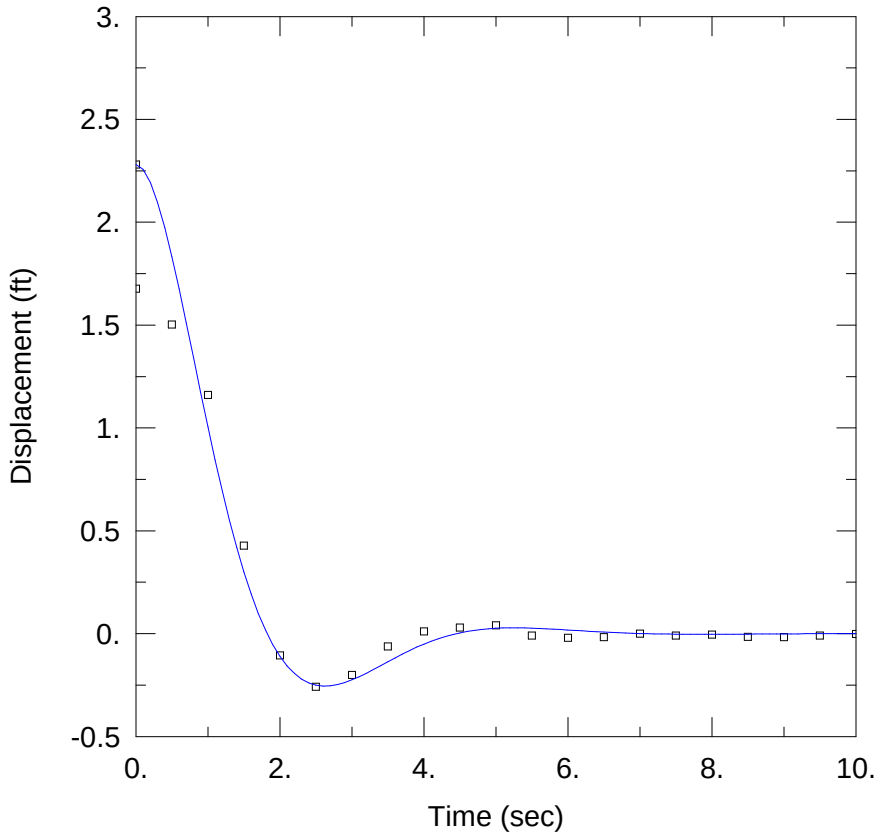
Saturated Thickness: 15.99 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-5)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.99 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.99 ft
Screen Length: 15.99 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3



MW-5 RISING HEAD TEST 2

Data Set: I:\...\MW-5-RH2.aqt
Date: 05/29/13 Time: 13:07:32

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-5
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.02474 cm/sec
Le = 15.14 ft

AQUIFER DATA

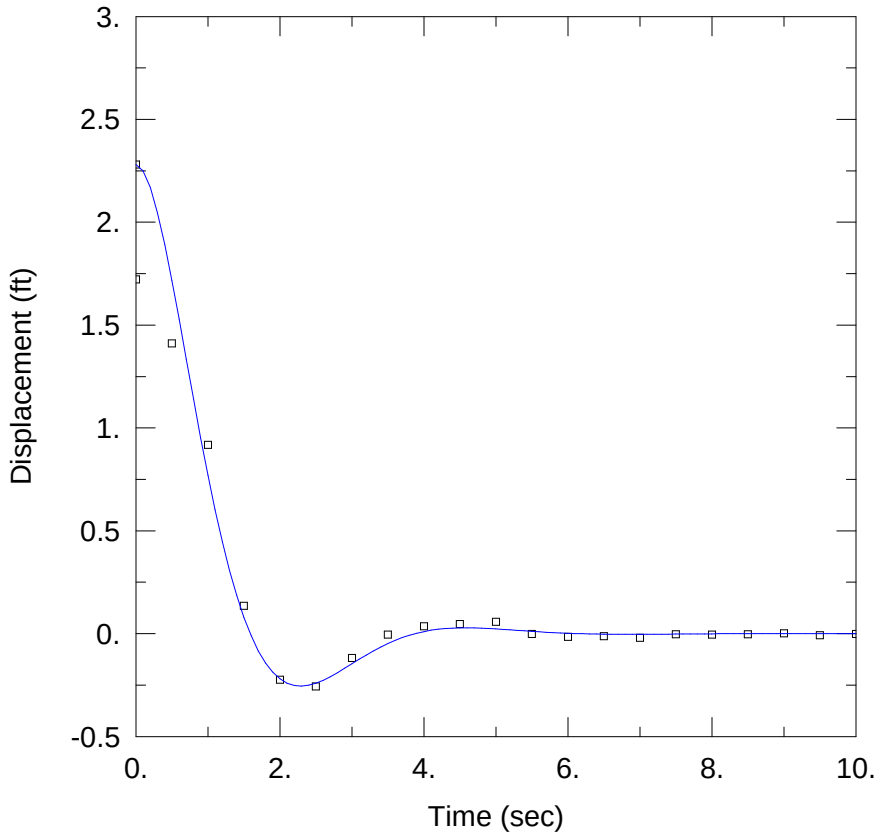
Saturated Thickness: 15.99 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-5)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.99 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.99 ft
Screen Length: 15.99 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3



MW-5 RISING HEAD TEST 3

Data Set: I:\...\MW-5-RH3.aqt
Date: 05/29/13 Time: 13:07:14

PROJECT INFORMATION

Company: Conestoga-Rovers & Associates
Client: Douglas County Public Works
Project: 080649
Location: Lawrence, KS
Test Well: MW-5
Test Date: May 16, 2013

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.0284 cm/sec
Le = 11.48 ft

AQUIFER DATA

Saturated Thickness: 15.99 ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-5)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 15.99 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 15.99 ft
Screen Length: 15.99 ft
Well Radius: 0.3438 ft
Gravel Pack Porosity: 0.3

APPENDIX G

LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY FOR GROUNDWATER MONITORING WELLS

APPENDIX H

LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY FOR DOMESTIC WELLS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

TestAmerica Job ID: 180-21414-1
Client Project/Site: 080649-02-001 Douglas County Public Work

For:
Conestoga-Rovers & Associates, Inc.
9033 Meridian Way
West Chester, Ohio 45069

Attn: Ms. Angela Bown

Authorized for release by:
6/5/2013 4:44:17 PM

Jill Colussy, Project Manager I
jill.colussy@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 180-21414-1

Laboratory: TestAmerica Pittsburgh

Narrative

Job Narrative
180-21414-1

Receipt
The samples were received on 5/21/2013 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 3.1º C, 3.5º C and 3.8º C.

The laboraotry received broken 1-liter amber bottles for sample WG-051613-NL-002 (180-21414-2) and WG-051613-NL-005 (180-21414-5).

Due to limited sample volume, the pesticides, herbiceds and hte PVI

Pesticides
Due to limited sample volume, sample WG-051613-NL-005 (180-21414-5) and WS-051613-NL-002 (180-21414-2) were extracted using 500-mls to a final volume of 0.5ml. The surrogate added was adjuted accordingly. The reporting limits were not affected.

Herbicides
Due to limited sample volume, sample WG-051613-NL-005 (180-21414-5) was extracted using 500-mls to a final volume of 0.5ml. The surrogate added was adjuted accordingly. The reporting limits were not affected.

The laboratory control standard for batch 180-72713 was double spiked with spike solution. The calculations were adjusted accordingly. The relative percent differnece between the laboratory control standard and the laboraotry control duplicate are flagged as being outside of the control limits. The relative percent difference is calcuated based off of the resutls and not recoveries. All recoveries were withi the control limits.

OPPs
No analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

Definitions/Glossary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
*	RPD of the LCS and LCSD exceeds the control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Laboratory: TestAmerica Pittsburgh

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arkansas DEQ	State Program	6	88-0690	06-27-13
California	NELAP	9	4224CA	03-31-14
Connecticut	State Program	1	PH-0688	09-30-14
Florida	NELAP	4	E871008	06-30-13
Illinois	NELAP	5	002602	06-30-13
Kansas	NELAP	7	E-10350	01-31-14
L-A-B	DoD ELAP		L2314	07-24-13
Louisiana	NELAP	6	04041	06-30-13
New Hampshire	NELAP	1	203011	04-05-14
New Jersey	NELAP	2	PA005	06-30-13
New York	NELAP	2	11182	04-01-14
North Carolina DENR	State Program	4	434	12-31-13
Pennsylvania	NELAP	3	02-00416	04-30-14
South Carolina	State Program	4	89014	04-30-13 *
US Fish & Wildlife	Federal		LE94312A-1	11-30-14
USDA	Federal		P-Soil-01	04-16-15
USDA	Federal		P330-10-00139	05-23-16 *
Utah	NELAP	8	STLP	04-30-14
Virginia	NELAP	3	460189	09-14-13
West Virginia DEP	State Program	3	142	01-31-14
Wisconsin	State Program	5	998027800	08-31-13

* Expired certification is currently pending renewal and is considered valid.

Sample Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-21414-1	WG-051613-NL-001	Water	05/16/13 11:00	05/21/13 09:30
180-21414-2	WG-051613-NL-002	Water	05/16/13 13:10	05/21/13 09:30
180-21414-3	WG-051613-NL-003	Water	05/16/13 14:45	05/21/13 09:30
180-21414-4	WG-051613-NL-004	Water	05/16/13 16:10	05/21/13 09:30
180-21414-5	WG-051613-NL-005	Water	05/16/13 17:35	05/21/13 09:30

Method Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Method	Method Description	Protocol	Laboratory
8081A	Organochlorine Pesticides (GC)	SW846	TAL PIT
8141A	Organophosphorous Pesticides (GC)	SW846	TAL PIT
8151A	Herbicides (GC)	SW846	TAL PIT
6010B	Metals (ICP)	SW846	TAL PIT
7470A	Mercury (CVAA)	SW846	TAL PIT
300.0	Anions, Ion Chromatography	MCAWW	TAL PIT
350.1	Nitrogen, Ammonia	MCAWW	TAL PIT
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL PIT
SM 2320B	Alkalinity	SM	TAL PIT
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PIT
SM 4500 S2 F	Sulfide, Total	SM	TAL PIT

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-001

Date Collected: 05/16/13 11:00
Date Received: 05/21/13 09:30

Lab Sample ID: 180-21414-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			1050 mL	40.0 mL	72702	05/22/13 14:10	CY	TAL PIT
Total/NA	Analysis	8081A		1			72858	05/23/13 12:34	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	3510C			1050 mL	40.0 mL	72702	05/22/13 14:10	CY	TAL PIT
Total/NA	Analysis	8081A		1			72858	05/23/13 12:34	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	8151A			1050 mL	10.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 17:14	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	8151A			1050 mL	10.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 17:14	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	3510C			1030 mL	5.0 mL	72812	05/23/13 12:40	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/26/13 03:38	DE	TAL PIT
	Instrument ID: GC5									
Total/NA	Prep	3510C			1030 mL	5.0 mL	72812	05/23/13 12:40	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/26/13 03:38	DE	TAL PIT
	Instrument ID: GC5									
Dissolved	Prep	7470A			50.0 mL	50.0 mL	72772	05/23/13 12:15	JS	TAL PIT
Dissolved	Analysis	7470A		1			72839	05/23/13 18:53	JS	TAL PIT
	Instrument ID: G									
Dissolved	Prep	3005A			50 mL	50 mL	73068	05/28/13 11:57	CH	TAL PIT
Dissolved	Analysis	6010B		1			73200	05/29/13 10:13	RR	TAL PIT
	Instrument ID: Q									
Dissolved	Prep	3005A			50 mL	50 mL	73068	05/28/13 11:57	CH	TAL PIT
Dissolved	Analysis	6010B		1			73205	05/29/13 09:47	RG	TAL PIT
	Instrument ID: T									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	72629	05/22/13 10:06	SK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	72726	05/22/13 10:59	CL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	72828	05/23/13 11:12	CR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	72650	05/23/13 10:45	RH	TAL PIT
Total/NA	Analysis	350.1		1			72922	05/24/13 12:14	CK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	300.0		1			72981	05/24/13 18:53	LW	TAL PIT
	Instrument ID: ICS2000									
Total/NA	Analysis	353.2		1	8 mL	8 mL	73800	06/04/13 09:58	CK	TAL PIT
	Instrument ID: ALPKEM1									

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-002

Lab Sample ID: 180-21414-2

Date Collected: 05/16/13 13:10
Matrix: Water
Date Received: 05/21/13 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			500 mL	20.0 mL	72702	05/22/13 14:10	CY	TAL PIT
Total/NA	Analysis	8081A		1			72858	05/23/13 12:49	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	3510C			500 mL	20.0 mL	72702	05/22/13 14:10	CY	TAL PIT
Total/NA	Analysis	8081A		1			72858	05/23/13 12:49	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	8151A			1060 mL	10.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 17:37	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	8151A			1060 mL	10.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 17:37	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	3510C			1050 mL	5.0 mL	72696	05/22/13 14:00	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/25/13 19:33	DE	TAL PIT
	Instrument ID: GC5									
Total/NA	Prep	3510C			1050 mL	5.0 mL	72696	05/22/13 14:00	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/25/13 19:33	DE	TAL PIT
	Instrument ID: GC5									
Dissolved	Prep	7470A			50.0 mL	50.0 mL	72772	05/23/13 12:15	JS	TAL PIT
Dissolved	Analysis	7470A		1			72839	05/23/13 18:55	JS	TAL PIT
	Instrument ID: G									
Dissolved	Prep	3005A			50 mL	50 mL	72637	05/22/13 10:10	CH	TAL PIT
Dissolved	Analysis	6010B		1			72846	05/23/13 21:47	RG	TAL PIT
	Instrument ID: T									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	72629	05/22/13 10:06	SK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	72726	05/22/13 11:09	CL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	72828	05/23/13 11:16	CR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	72650	05/23/13 10:45	RH	TAL PIT
Total/NA	Analysis	350.1		1			72922	05/24/13 12:18	CK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	300.0		1			72981	05/24/13 19:29	LW	TAL PIT
	Instrument ID: ICS2000									
Total/NA	Analysis	353.2		1	8 mL	8 mL	73800	06/04/13 10:05	CK	TAL PIT
	Instrument ID: ALPKEM1									

Client Sample ID: WG-051613-NL-003

Lab Sample ID: 180-21414-3

Date Collected: 05/16/13 14:45
Matrix: Water
Date Received: 05/21/13 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			1020 mL	40.0 mL	72702	05/22/13 14:10	CY	TAL PIT

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-003

Lab Sample ID: 180-21414-3

Date Collected: 05/16/13 14:45
Matrix: Water
Date Received: 05/21/13 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8081A		1			72858	05/23/13 13:05	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	3510C			1020 mL	40.0 mL	72702	05/22/13 14:10	CY	TAL PIT
Total/NA	Analysis	8081A		1			72858	05/23/13 13:05	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	8151A			1040 mL	10.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 19:37	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	8151A			1040 mL	10.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 19:37	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	3510C			1050 mL	5.0 mL	72696	05/22/13 14:00	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/25/13 20:02	DE	TAL PIT
	Instrument ID: GC5									
Total/NA	Prep	3510C			1050 mL	5.0 mL	72696	05/22/13 14:00	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/25/13 20:02	DE	TAL PIT
	Instrument ID: GC5									
Dissolved	Prep	7470A			50.0 mL	50.0 mL	72772	05/23/13 12:15	JS	TAL PIT
Dissolved	Analysis	7470A		1			72839	05/23/13 18:57	JS	TAL PIT
	Instrument ID: G									
Dissolved	Prep	3005A			50 mL	50 mL	72637	05/22/13 10:10	CH	TAL PIT
Dissolved	Analysis	6010B		1			72846	05/23/13 22:09	RG	TAL PIT
	Instrument ID: T									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	72629	05/22/13 10:06	SK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	72726	05/22/13 11:38	CL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	72828	05/23/13 11:20	CR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	72650	05/23/13 10:45	RH	TAL PIT
Total/NA	Analysis	350.1		1			72922	05/24/13 12:23	CK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	300.0		1			72981	05/24/13 20:05	LW	TAL PIT
	Instrument ID: ICS2000									
Total/NA	Analysis	353.2		1	8 mL	8 mL	73800	06/04/13 10:00	CK	TAL PIT
	Instrument ID: ALPKEM1									

Client Sample ID: WG-051613-NL-004

Lab Sample ID: 180-21414-4

Date Collected: 05/16/13 16:10
Matrix: Water
Date Received: 05/21/13 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			1020 mL	40.0 mL	72702	05/22/13 14:10	CY	TAL PIT

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-004

Lab Sample ID: 180-21414-4

Date Collected: 05/16/13 16:10
Matrix: Water
Date Received: 05/21/13 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8081A		1			72858	05/23/13 13:20	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	3510C			1020 mL	40.0 mL	72702	05/22/13 14:10	CY	TAL PIT
Total/NA	Analysis	8081A		1			72858	05/23/13 13:20	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	8151A			1050 mL	10.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 20:01	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	8151A			1050 mL	10.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 20:01	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	3510C			960 mL	5.0 mL	72696	05/22/13 14:00	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/25/13 20:31	DE	TAL PIT
	Instrument ID: GC5									
Total/NA	Prep	3510C			960 mL	5.0 mL	72696	05/22/13 14:00	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/25/13 20:31	DE	TAL PIT
	Instrument ID: GC5									
Dissolved	Prep	7470A			50.0 mL	50.0 mL	72772	05/23/13 12:15	JS	TAL PIT
Dissolved	Analysis	7470A		1			72839	05/23/13 18:59	JS	TAL PIT
	Instrument ID: G									
Dissolved	Prep	3005A			50 mL	50 mL	72637	05/22/13 10:10	CH	TAL PIT
Dissolved	Analysis	6010B		1			72846	05/23/13 22:26	RG	TAL PIT
	Instrument ID: T									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	72629	05/22/13 10:06	SK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	72726	05/22/13 11:50	CL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	72828	05/23/13 11:25	CR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	72650	05/23/13 10:45	RH	TAL PIT
Total/NA	Analysis	350.1		1			72922	05/24/13 12:25	CK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	300.0		1			72981	05/24/13 20:41	LW	TAL PIT
	Instrument ID: ICS2000									
Total/NA	Analysis	353.2		1	8 mL	8 mL	73800	06/04/13 10:07	CK	TAL PIT
	Instrument ID: ALPKEM1									

Client Sample ID: WG-051613-NL-005

Lab Sample ID: 180-21414-5

Date Collected: 05/16/13 17:35
Matrix: Water
Date Received: 05/21/13 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			500 mL	20.0 mL	72702	05/22/13 14:10	CY	TAL PIT

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-005

Date Collected: 05/16/13 17:35
Date Received: 05/21/13 09:30

Lab Sample ID: 180-21414-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8081A		1			72858	05/23/13 13:36	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	3510C			500 mL	20.0 mL	72702	05/22/13 14:10	CY	TAL PIT
Total/NA	Analysis	8081A		1			72858	05/23/13 13:36	JO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	8151A			500 mL	5.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 20:25	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	8151A			500 mL	5.0 mL	72713	05/22/13 16:50	CY	TAL PIT
Total/NA	Analysis	8151A		20			72978	05/24/13 20:25	LW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	3510C			960 mL	5.0 mL	72696	05/22/13 14:00	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/25/13 20:59	DE	TAL PIT
	Instrument ID: GC5									
Total/NA	Prep	3510C			960 mL	5.0 mL	72696	05/22/13 14:00	CY	TAL PIT
Total/NA	Analysis	8141A		1			73044	05/25/13 20:59	DE	TAL PIT
	Instrument ID: GC5									
Dissolved	Prep	7470A			50.0 mL	50.0 mL	72772	05/23/13 12:15	JS	TAL PIT
Dissolved	Analysis	7470A		1			72839	05/23/13 19:05	JS	TAL PIT
	Instrument ID: G									
Dissolved	Prep	3005A			50 mL	50 mL	72637	05/22/13 10:10	CH	TAL PIT
Dissolved	Analysis	6010B		1			72846	05/23/13 22:31	RG	TAL PIT
	Instrument ID: T									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	72629	05/22/13 10:06	SK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	72726	05/22/13 12:01	CL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	72828	05/23/13 11:29	CR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	72650	05/23/13 10:45	RH	TAL PIT
Total/NA	Analysis	350.1		1			72922	05/24/13 12:26	CK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	300.0		1			72981	05/24/13 21:53	LW	TAL PIT
	Instrument ID: ICS2000									
Total/NA	Analysis	353.2		1	8 mL	8 mL	73800	06/04/13 10:08	CK	TAL PIT
	Instrument ID: ALPKEM1									

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Analyst References:

Lab: TAL PIT

Batch Type: Prep

CH = Caitlyn Haluck

CY = Charles Yushinski

JS = Jim Swanson

RH = Rachael Hartmann

Batch Type: Analysis

CK = Chuck Kieda

CL = Cheryl Loheyde

CR = Carl Reagle

DE = David Eppinger

JO = John Oravec

JS = Jim Swanson

LW = Linx Waclaski

RG = Rob Good

RR = Ron Rosenbaum

SK = Sarah Kunkle

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-001

Lab Sample ID: 180-21414-1

Date Collected: 05/16/13 11:00

Matrix: Water

Date Received: 05/21/13 09:30

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		0.048	0.032	ug/L		05/22/13 14:10	05/23/13 12:34	1
alpha-BHC	ND		0.048	0.025	ug/L		05/22/13 14:10	05/23/13 12:34	1
alpha-Chlordane	ND		0.048	0.037	ug/L		05/22/13 14:10	05/23/13 12:34	1
beta-BHC	ND		0.048	0.038	ug/L		05/22/13 14:10	05/23/13 12:34	1
delta-BHC	ND		0.048	0.017	ug/L		05/22/13 14:10	05/23/13 12:34	1
4,4'-DDD	ND		0.048	0.026	ug/L		05/22/13 14:10	05/23/13 12:34	1
4,4'-DDE	ND		0.048	0.030	ug/L		05/22/13 14:10	05/23/13 12:34	1
4,4'-DDT	ND		0.048	0.028	ug/L		05/22/13 14:10	05/23/13 12:34	1
Dieldrin	ND		0.048	0.031	ug/L		05/22/13 14:10	05/23/13 12:34	1
Endosulfan I	ND		0.048	0.036	ug/L		05/22/13 14:10	05/23/13 12:34	1
Endosulfan II	ND		0.048	0.037	ug/L		05/22/13 14:10	05/23/13 12:34	1
Endosulfan sulfate	ND		0.048	0.022	ug/L		05/22/13 14:10	05/23/13 12:34	1
Endrin	ND		0.048	0.037	ug/L		05/22/13 14:10	05/23/13 12:34	1
Endrin aldehyde	ND		0.048	0.034	ug/L		05/22/13 14:10	05/23/13 12:34	1
Heptachlor	ND		0.048	0.038	ug/L		05/22/13 14:10	05/23/13 12:34	1
Heptachlor epoxide	ND		0.048	0.037	ug/L		05/22/13 14:10	05/23/13 12:34	1
Toxaphene	ND		3.8	0.71	ug/L		05/22/13 14:10	05/23/13 12:34	1
gamma-BHC (Lindane)	ND		0.048	0.031	ug/L		05/22/13 14:10	05/23/13 12:34	1
Endrin ketone	ND		0.048	0.035	ug/L		05/22/13 14:10	05/23/13 12:34	1
gamma-Chlordane	ND		0.048	0.037	ug/L		05/22/13 14:10	05/23/13 12:34	1
Methoxychlor	ND		0.095	0.035	ug/L		05/22/13 14:10	05/23/13 12:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*86*		*45 - 130*	*05/22/13 14:10*	*05/23/13 12:34*	*1*
Tetrachloro-m-xylene	*96*		*45 - 130*	*05/22/13 14:10*	*05/23/13 12:34*	*1*
DCB Decachlorobiphenyl (Surr)	*81*		*45 - 130*	*05/22/13 14:10*	*05/23/13 12:34*	*1*
DCB Decachlorobiphenyl (Surr)	*102*		*45 - 130*	*05/22/13 14:10*	*05/23/13 12:34*	*1*

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND		0.97	0.11	ug/L		05/23/13 12:40	05/26/13 03:38	1
Bolstar	ND		0.97	0.11	ug/L		05/23/13 12:40	05/26/13 03:38	1
Chlorpyrifos	ND		0.97	0.099	ug/L		05/23/13 12:40	05/26/13 03:38	1
Coumaphos	ND		0.97	0.14	ug/L		05/23/13 12:40	05/26/13 03:38	1
Demeton, Total	ND		1.9	0.16	ug/L		05/23/13 12:40	05/26/13 03:38	1
Demeton-O	ND		0.97	0.091	ug/L		05/23/13 12:40	05/26/13 03:38	1
Demeton-S	ND		0.97	0.069	ug/L		05/23/13 12:40	05/26/13 03:38	1
Diazinon	ND		0.97	0.091	ug/L		05/23/13 12:40	05/26/13 03:38	1
Dichlorvos	ND		0.97	0.082	ug/L		05/23/13 12:40	05/26/13 03:38	1
Dimethoate	ND		0.97	0.11	ug/L		05/23/13 12:40	05/26/13 03:38	1
Disulfoton	ND		0.97	0.098	ug/L		05/23/13 12:40	05/26/13 03:38	1
EPN	ND		0.97	0.11	ug/L		05/23/13 12:40	05/26/13 03:38	1
Famphur	ND		0.97	0.12	ug/L		05/23/13 12:40	05/26/13 03:38	1
Fensulfothion	ND		0.97	0.16	ug/L		05/23/13 12:40	05/26/13 03:38	1
Fenthion	ND		0.97	0.082	ug/L		05/23/13 12:40	05/26/13 03:38	1
Malathion	ND		0.97	0.11	ug/L		05/23/13 12:40	05/26/13 03:38	1
Methyl parathion	ND		0.97	0.11	ug/L		05/23/13 12:40	05/26/13 03:38	1
Mevinphos	ND		0.97	0.095	ug/L		05/23/13 12:40	05/26/13 03:38	1
O,O,O-Triethyl phosphorothioate	ND		0.97	0.097	ug/L		05/23/13 12:40	05/26/13 03:38	1
Parathion	ND		0.97	0.16	ug/L		05/23/13 12:40	05/26/13 03:38	1

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-001

Date Collected: 05/16/13 11:00
Date Received: 05/21/13 09:30

Lab Sample ID: 180-21414-1

Matrix: Water

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phorate	ND		0.97	0.090	ug/L		05/23/13 12:40	05/26/13 03:38	1
Ronnel	ND		0.97	0.099	ug/L		05/23/13 12:40	05/26/13 03:38	1
Stirophos	ND		0.97	0.093	ug/L		05/23/13 12:40	05/26/13 03:38	1
Sulfotepp	ND		0.97	0.092	ug/L		05/23/13 12:40	05/26/13 03:38	1
Tokuthion	ND		0.97	0.091	ug/L		05/23/13 12:40	05/26/13 03:38	1
Trichloronate	ND		0.97	0.096	ug/L		05/23/13 12:40	05/26/13 03:38	1
Thionazin	ND		0.97	0.097	ug/L		05/23/13 12:40	05/26/13 03:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Triphenylphosphate	*110*		*45 - 145*	*05/23/13 12:40*	*05/26/13 03:38*	*1*
Triphenylphosphate	*109*		*45 - 145*	*05/23/13 12:40*	*05/26/13 03:38*	*1*
Tributyl phosphate	*112*		*49 - 122*	*05/23/13 12:40*	*05/26/13 03:38*	*1*
Tributyl phosphate	*91*		*49 - 122*	*05/23/13 12:40*	*05/26/13 03:38*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	ND		0.95	0.092	ug/L		05/22/13 16:50	05/24/13 17:14	20
2,4-D	ND		3.8	0.43	ug/L		05/22/13 16:50	05/24/13 17:14	20
2,4-DB	ND		3.8	0.44	ug/L		05/22/13 16:50	05/24/13 17:14	20
Dalapon	ND		4.8	0.66	ug/L		05/22/13 16:50	05/24/13 17:14	20
Dicamba	ND		1.9	0.25	ug/L		05/22/13 16:50	05/24/13 17:14	20
Dichlorprop	ND		3.8	0.51	ug/L		05/22/13 16:50	05/24/13 17:14	20
MCPA	ND		380	49	ug/L		05/22/13 16:50	05/24/13 17:14	20
MCPP	ND		380	44	ug/L		05/22/13 16:50	05/24/13 17:14	20
Pentachlorophenol	ND		0.48	0.074	ug/L		05/22/13 16:50	05/24/13 17:14	20
Silvex (2,4,5-TP)	ND		0.95	0.10	ug/L		05/22/13 16:50	05/24/13 17:14	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*99*		*32 - 140*	*05/22/13 16:50*	*05/24/13 17:14*	*20*
2,4-Dichlorophenylacetic acid	*98*		*32 - 140*	*05/22/13 16:50*	*05/24/13 17:14*	*20*

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**12**		10	2.7	ug/L		05/28/13 11:57	05/29/13 09:47	1
Barium	**560**		200	0.62	ug/L		05/28/13 11:57	05/29/13 09:47	1
Cadmium	ND		5.0	0.13	ug/L		05/28/13 11:57	05/29/13 09:47	1
Iron	**14000**	**B**	100	12	ug/L		05/28/13 11:57	05/29/13 10:13	1
Lead	ND		3.0	1.3	ug/L		05/28/13 11:57	05/29/13 09:47	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.057**	**J B**	0.20	0.038	ug/L		05/23/13 12:15	05/23/13 18:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**11**		1.0	0.20	mg/L			05/24/13 18:53	1
Sulfate	**130**		1.0	0.21	mg/L			05/24/13 18:53	1
Ammonia	**0.42**	**B**	0.10	0.027	mg/L		05/23/13 10:45	05/24/13 12:14	1
Nitrate Nitrite as N	ND		0.10	0.014	mg/L			06/04/13 09:58	1
Alkalinity	**380**	**B**	5.0	0.41	mg/L			05/22/13 10:59	1
Total Dissolved Solids	**490**		10	10	mg/L			05/22/13 10:06	1

Client Sample ID: WG-051613-NL-001

Lab Sample ID: 180-21414-1

Date Collected: 05/16/13 11:00
Matrix: Water
Date Received: 05/21/13 09:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3.0	0.22	mg/L			05/23/13 11:12	1

Client Sample ID: WG-051613-NL-002

Lab Sample ID: 180-21414-2

Date Collected: 05/16/13 13:10
Matrix: Water
Date Received: 05/21/13 09:30

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		0.050	0.033	ug/L		05/22/13 14:10	05/23/13 12:49	1
alpha-BHC	ND		0.050	0.027	ug/L		05/22/13 14:10	05/23/13 12:49	1
alpha-Chlordane	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 12:49	1
beta-BHC	ND		0.050	0.040	ug/L		05/22/13 14:10	05/23/13 12:49	1
delta-BHC	ND		0.050	0.017	ug/L		05/22/13 14:10	05/23/13 12:49	1
4,4'-DDD	ND		0.050	0.027	ug/L		05/22/13 14:10	05/23/13 12:49	1
4,4'-DDE	ND		0.050	0.032	ug/L		05/22/13 14:10	05/23/13 12:49	1
4,4'-DDT	ND		0.050	0.030	ug/L		05/22/13 14:10	05/23/13 12:49	1
Dieldrin	ND		0.050	0.033	ug/L		05/22/13 14:10	05/23/13 12:49	1
Endosulfan I	ND		0.050	0.038	ug/L		05/22/13 14:10	05/23/13 12:49	1
Endosulfan II	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 12:49	1
Endosulfan sulfate	ND		0.050	0.023	ug/L		05/22/13 14:10	05/23/13 12:49	1
Endrin	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 12:49	1
Endrin aldehyde	ND		0.050	0.036	ug/L		05/22/13 14:10	05/23/13 12:49	1
Heptachlor	ND		0.050	0.040	ug/L		05/22/13 14:10	05/23/13 12:49	1
Heptachlor epoxide	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 12:49	1
Toxaphene	ND		4.0	0.74	ug/L		05/22/13 14:10	05/23/13 12:49	1
gamma-BHC (Lindane)	ND		0.050	0.032	ug/L		05/22/13 14:10	05/23/13 12:49	1
Endrin ketone	ND		0.050	0.037	ug/L		05/22/13 14:10	05/23/13 12:49	1
gamma-Chlordane	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 12:49	1
Methoxychlor	ND		0.10	0.037	ug/L		05/22/13 14:10	05/23/13 12:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*90*		*45 - 130*	*05/22/13 14:10*	*05/23/13 12:49*	*1*
Tetrachloro-m-xylene	*98*		*45 - 130*	*05/22/13 14:10*	*05/23/13 12:49*	*1*
DCB Decachlorobiphenyl (Surr)	*85*		*45 - 130*	*05/22/13 14:10*	*05/23/13 12:49*	*1*
DCB Decachlorobiphenyl (Surr)	*107*		*45 - 130*	*05/22/13 14:10*	*05/23/13 12:49*	*1*

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND		0.95	0.11	ug/L		05/22/13 14:00	05/25/13 19:33	1
Bolstar	ND		0.95	0.10	ug/L		05/22/13 14:00	05/25/13 19:33	1
Chlorpyrifos	ND		0.95	0.097	ug/L		05/22/13 14:00	05/25/13 19:33	1
Coumaphos	ND		0.95	0.14	ug/L		05/22/13 14:00	05/25/13 19:33	1
Demeton, Total	ND		1.9	0.16	ug/L		05/22/13 14:00	05/25/13 19:33	1
Demeton-O	ND		0.95	0.089	ug/L		05/22/13 14:00	05/25/13 19:33	1
Demeton-S	ND		0.95	0.068	ug/L		05/22/13 14:00	05/25/13 19:33	1
Diazinon	ND		0.95	0.090	ug/L		05/22/13 14:00	05/25/13 19:33	1
Dichlorvos	ND		0.95	0.081	ug/L		05/22/13 14:00	05/25/13 19:33	1
Dimethoate	ND		0.95	0.11	ug/L		05/22/13 14:00	05/25/13 19:33	1
Disulfoton	ND		0.95	0.096	ug/L		05/22/13 14:00	05/25/13 19:33	1
EPN	ND		0.95	0.11	ug/L		05/22/13 14:00	05/25/13 19:33	1

Client Sample ID: WG-051613-NL-002

Lab Sample ID: 180-21414-2

Date Collected: 05/16/13 13:10

Matrix: Water

Date Received: 05/21/13 09:30

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Famphur	ND		0.95	0.12	ug/L		05/22/13 14:00	05/25/13 19:33	1
Fensulfothion	ND		0.95	0.16	ug/L		05/22/13 14:00	05/25/13 19:33	1
Fenthion	ND		0.95	0.081	ug/L		05/22/13 14:00	05/25/13 19:33	1
Malathion	ND		0.95	0.10	ug/L		05/22/13 14:00	05/25/13 19:33	1
Methyl parathion	ND		0.95	0.11	ug/L		05/22/13 14:00	05/25/13 19:33	1
Mevinphos	ND		0.95	0.093	ug/L		05/22/13 14:00	05/25/13 19:33	1
O,O,O-Triethyl phosphorothioate	ND		0.95	0.095	ug/L		05/22/13 14:00	05/25/13 19:33	1
Parathion	ND		0.95	0.15	ug/L		05/22/13 14:00	05/25/13 19:33	1
Phorate	ND		0.95	0.088	ug/L		05/22/13 14:00	05/25/13 19:33	1
Ronnel	ND		0.95	0.097	ug/L		05/22/13 14:00	05/25/13 19:33	1
Stirophos	ND		0.95	0.091	ug/L		05/22/13 14:00	05/25/13 19:33	1
Sulfotepp	ND		0.95	0.090	ug/L		05/22/13 14:00	05/25/13 19:33	1
Tokuthion	ND		0.95	0.089	ug/L		05/22/13 14:00	05/25/13 19:33	1
Trichloronate	ND		0.95	0.094	ug/L		05/22/13 14:00	05/25/13 19:33	1
Thionazin	ND		0.95	0.095	ug/L		05/22/13 14:00	05/25/13 19:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Triphenylphosphate	*102*		*45 - 145*	*05/22/13 14:00*	*05/25/13 19:33*	*1*
Triphenylphosphate	*104*		*45 - 145*	*05/22/13 14:00*	*05/25/13 19:33*	*1*
Tributyl phosphate	*103*		*49 - 122*	*05/22/13 14:00*	*05/25/13 19:33*	*1*
Tributyl phosphate	*89*		*49 - 122*	*05/22/13 14:00*	*05/25/13 19:33*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	ND		0.94	0.091	ug/L		05/22/13 16:50	05/24/13 17:37	20
2,4-D	ND		3.8	0.43	ug/L		05/22/13 16:50	05/24/13 17:37	20
2,4-DB	ND		3.8	0.44	ug/L		05/22/13 16:50	05/24/13 17:37	20
Dalapon	ND		4.7	0.65	ug/L		05/22/13 16:50	05/24/13 17:37	20
Dicamba	ND		1.9	0.24	ug/L		05/22/13 16:50	05/24/13 17:37	20
Dichlorprop	ND		3.8	0.51	ug/L		05/22/13 16:50	05/24/13 17:37	20
MCPA	ND		380	49	ug/L		05/22/13 16:50	05/24/13 17:37	20
MCPP	ND		380	43	ug/L		05/22/13 16:50	05/24/13 17:37	20
Pentachlorophenol	ND		0.47	0.073	ug/L		05/22/13 16:50	05/24/13 17:37	20
Silvex (2,4,5-TP)	ND		0.94	0.10	ug/L		05/22/13 16:50	05/24/13 17:37	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*42*		*32 - 140*	*05/22/13 16:50*	*05/24/13 17:37*	*20*
2,4-Dichlorophenylacetic acid	*40*		*32 - 140*	*05/22/13 16:50*	*05/24/13 17:37*	*20*

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**8.8**	**J**	10	2.7	ug/L		05/22/13 10:10	05/23/13 21:47	1
Barium	**650**		200	0.62	ug/L		05/22/13 10:10	05/23/13 21:47	1
Cadmium	ND		5.0	0.13	ug/L		05/22/13 10:10	05/23/13 21:47	1
Iron	**3600**		100	12	ug/L		05/22/13 10:10	05/23/13 21:47	1
Lead	ND		3.0	1.3	ug/L		05/22/13 10:10	05/23/13 21:47	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.050**	**J B**	0.20	0.038	ug/L		05/23/13 12:15	05/23/13 18:55	1

Client Sample ID: WG-051613-NL-002

Lab Sample ID: 180-21414-2

Date Collected: 05/16/13 13:10

Matrix: Water

Date Received: 05/21/13 09:30

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**5.0**		1.0	0.20	mg/L			05/24/13 19:29	1
Sulfate	**38**		1.0	0.21	mg/L			05/24/13 19:29	1
Ammonia	**0.71**	**B**	0.10	0.027	mg/L		05/23/13 10:45	05/24/13 12:18	1
Nitrate Nitrite as N	ND		0.10	0.014	mg/L			06/04/13 10:05	1
Alkalinity	**370**	**B**	5.0	0.41	mg/L			05/22/13 11:09	1
Total Dissolved Solids	**420**		10	10	mg/L			05/22/13 10:06	1
Sulfide	**4.6**		3.0	0.22	mg/L			05/23/13 11:16	1

Client Sample ID: WG-051613-NL-003

Lab Sample ID: 180-21414-3

Date Collected: 05/16/13 14:45

Matrix: Water

Date Received: 05/21/13 09:30

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		0.049	0.033	ug/L		05/22/13 14:10	05/23/13 13:05	1
alpha-BHC	ND		0.049	0.026	ug/L		05/22/13 14:10	05/23/13 13:05	1
alpha-Chlordane	ND		0.049	0.039	ug/L		05/22/13 14:10	05/23/13 13:05	1
beta-BHC	ND		0.049	0.039	ug/L		05/22/13 14:10	05/23/13 13:05	1
delta-BHC	ND		0.049	0.017	ug/L		05/22/13 14:10	05/23/13 13:05	1
4,4'-DDD	ND		0.049	0.026	ug/L		05/22/13 14:10	05/23/13 13:05	1
4,4'-DDE	ND		0.049	0.031	ug/L		05/22/13 14:10	05/23/13 13:05	1
4,4'-DDT	ND		0.049	0.029	ug/L		05/22/13 14:10	05/23/13 13:05	1
Dieldrin	ND		0.049	0.032	ug/L		05/22/13 14:10	05/23/13 13:05	1
Endosulfan I	ND		0.049	0.037	ug/L		05/22/13 14:10	05/23/13 13:05	1
Endosulfan II	ND		0.049	0.038	ug/L		05/22/13 14:10	05/23/13 13:05	1
Endosulfan sulfate	ND		0.049	0.022	ug/L		05/22/13 14:10	05/23/13 13:05	1
Endrin	ND		0.049	0.038	ug/L		05/22/13 14:10	05/23/13 13:05	1
Endrin aldehyde	ND		0.049	0.035	ug/L		05/22/13 14:10	05/23/13 13:05	1
Heptachlor	ND		0.049	0.039	ug/L		05/22/13 14:10	05/23/13 13:05	1
Heptachlor epoxide	ND		0.049	0.038	ug/L		05/22/13 14:10	05/23/13 13:05	1
Toxaphene	ND		3.9	0.73	ug/L		05/22/13 14:10	05/23/13 13:05	1
gamma-BHC (Lindane)	ND		0.049	0.031	ug/L		05/22/13 14:10	05/23/13 13:05	1
Endrin ketone	ND		0.049	0.036	ug/L		05/22/13 14:10	05/23/13 13:05	1
gamma-Chlordane	ND		0.049	0.038	ug/L		05/22/13 14:10	05/23/13 13:05	1
Methoxychlor	ND		0.098	0.036	ug/L		05/22/13 14:10	05/23/13 13:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*87*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:05*	*1*
Tetrachloro-m-xylene	*94*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:05*	*1*
DCB Decachlorobiphenyl (Surr)	*88*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:05*	*1*
DCB Decachlorobiphenyl (Surr)	*109*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:05*	*1*

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND		0.95	0.11	ug/L		05/22/13 14:00	05/25/13 20:02	1
Bolstar	ND		0.95	0.10	ug/L		05/22/13 14:00	05/25/13 20:02	1
Chlorpyrifos	ND		0.95	0.097	ug/L		05/22/13 14:00	05/25/13 20:02	1
Coumaphos	ND		0.95	0.14	ug/L		05/22/13 14:00	05/25/13 20:02	1
Demeton, Total	ND		1.9	0.16	ug/L		05/22/13 14:00	05/25/13 20:02	1
Demeton-O	ND		0.95	0.089	ug/L		05/22/13 14:00	05/25/13 20:02	1

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-003

Lab Sample ID: 180-21414-3

Date Collected: 05/16/13 14:45
Matrix: Water
Date Received: 05/21/13 09:30

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Demeton-S	ND		0.95	0.068	ug/L		05/22/13 14:00	05/25/13 20:02	1
Diazinon	ND		0.95	0.090	ug/L		05/22/13 14:00	05/25/13 20:02	1
Dichlorvos	ND		0.95	0.081	ug/L		05/22/13 14:00	05/25/13 20:02	1
Dimethoate	ND		0.95	0.11	ug/L		05/22/13 14:00	05/25/13 20:02	1
Disulfoton	ND		0.95	0.096	ug/L		05/22/13 14:00	05/25/13 20:02	1
EPN	ND		0.95	0.11	ug/L		05/22/13 14:00	05/25/13 20:02	1
Famphur	ND		0.95	0.12	ug/L		05/22/13 14:00	05/25/13 20:02	1
Fensulfothion	ND		0.95	0.16	ug/L		05/22/13 14:00	05/25/13 20:02	1
Fenthion	ND		0.95	0.081	ug/L		05/22/13 14:00	05/25/13 20:02	1
Malathion	ND		0.95	0.10	ug/L		05/22/13 14:00	05/25/13 20:02	1
Methyl parathion	ND		0.95	0.11	ug/L		05/22/13 14:00	05/25/13 20:02	1
Mevinphos	ND		0.95	0.093	ug/L		05/22/13 14:00	05/25/13 20:02	1
O,O,O-Triethyl phosphorothioate	ND		0.95	0.095	ug/L		05/22/13 14:00	05/25/13 20:02	1
Parathion	ND		0.95	0.15	ug/L		05/22/13 14:00	05/25/13 20:02	1
Phorate	ND		0.95	0.088	ug/L		05/22/13 14:00	05/25/13 20:02	1
Ronnel	ND		0.95	0.097	ug/L		05/22/13 14:00	05/25/13 20:02	1
Stirophos	ND		0.95	0.091	ug/L		05/22/13 14:00	05/25/13 20:02	1
Sulfotepp	ND		0.95	0.090	ug/L		05/22/13 14:00	05/25/13 20:02	1
Tokuthion	ND		0.95	0.089	ug/L		05/22/13 14:00	05/25/13 20:02	1
Trichloronate	ND		0.95	0.094	ug/L		05/22/13 14:00	05/25/13 20:02	1
Thionazin	ND		0.95	0.095	ug/L		05/22/13 14:00	05/25/13 20:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Triphenylphosphate	*101*		*45 - 145*	*05/22/13 14:00*	*05/25/13 20:02*	*1*
Triphenylphosphate	*104*		*45 - 145*	*05/22/13 14:00*	*05/25/13 20:02*	*1*
Tributyl phosphate	*101*		*49 - 122*	*05/22/13 14:00*	*05/25/13 20:02*	*1*
Tributyl phosphate	*87*		*49 - 122*	*05/22/13 14:00*	*05/25/13 20:02*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	ND		0.96	0.093	ug/L		05/22/13 16:50	05/24/13 19:37	20
2,4-D	ND		3.8	0.44	ug/L		05/22/13 16:50	05/24/13 19:37	20
2,4-DB	ND		3.8	0.45	ug/L		05/22/13 16:50	05/24/13 19:37	20
Dalapon	ND		4.8	0.66	ug/L		05/22/13 16:50	05/24/13 19:37	20
Dicamba	ND		1.9	0.25	ug/L		05/22/13 16:50	05/24/13 19:37	20
Dichlorprop	ND		3.8	0.52	ug/L		05/22/13 16:50	05/24/13 19:37	20
MCPA	ND		380	49	ug/L		05/22/13 16:50	05/24/13 19:37	20
MCPP	ND		380	44	ug/L		05/22/13 16:50	05/24/13 19:37	20
Pentachlorophenol	ND		0.48	0.075	ug/L		05/22/13 16:50	05/24/13 19:37	20
Silvex (2,4,5-TP)	ND		0.96	0.10	ug/L		05/22/13 16:50	05/24/13 19:37	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*77*		*32 - 140*	*05/22/13 16:50*	*05/24/13 19:37*	*20*
2,4-Dichlorophenylacetic acid	*74*		*32 - 140*	*05/22/13 16:50*	*05/24/13 19:37*	*20*

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**23**		10	2.7	ug/L		05/22/13 10:10	05/23/13 22:09	1
Barium	**540**		200	0.62	ug/L		05/22/13 10:10	05/23/13 22:09	1
Cadmium	ND		5.0	0.13	ug/L		05/22/13 10:10	05/23/13 22:09	1

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-003

Lab Sample ID: 180-21414-3
Matrix: Water

Date Collected: 05/16/13 14:45
Date Received: 05/21/13 09:30

Method: 6010B - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**5700**		100	12	ug/L		05/22/13 10:10	05/23/13 22:09	1
Lead	ND		3.0	1.3	ug/L		05/22/13 10:10	05/23/13 22:09	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.057**	**J B**	0.20	0.038	ug/L		05/23/13 12:15	05/23/13 18:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**4.1**		1.0	0.20	mg/L			05/24/13 20:05	1
Sulfate	**77**		1.0	0.21	mg/L			05/24/13 20:05	1
Ammonia	**0.25**	**B**	0.10	0.027	mg/L		05/23/13 10:45	05/24/13 12:23	1
Nitrate Nitrite as N	ND		0.10	0.014	mg/L			06/04/13 10:00	1
Alkalinity	**360**	**B**	5.0	0.41	mg/L			05/22/13 11:38	1
Total Dissolved Solids	**390**		10	10	mg/L			05/22/13 10:06	1
Sulfide	ND		3.0	0.22	mg/L			05/23/13 11:20	1

Client Sample ID: WG-051613-NL-004

Lab Sample ID: 180-21414-4
Matrix: Water

Date Collected: 05/16/13 16:10
Date Received: 05/21/13 09:30

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		0.049	0.033	ug/L		05/22/13 14:10	05/23/13 13:20	1
alpha-BHC	ND		0.049	0.026	ug/L		05/22/13 14:10	05/23/13 13:20	1
alpha-Chlordane	ND		0.049	0.039	ug/L		05/22/13 14:10	05/23/13 13:20	1
beta-BHC	ND		0.049	0.039	ug/L		05/22/13 14:10	05/23/13 13:20	1
delta-BHC	ND		0.049	0.017	ug/L		05/22/13 14:10	05/23/13 13:20	1
4,4'-DDD	ND		0.049	0.026	ug/L		05/22/13 14:10	05/23/13 13:20	1
4,4'-DDE	ND		0.049	0.031	ug/L		05/22/13 14:10	05/23/13 13:20	1
4,4'-DDT	ND		0.049	0.029	ug/L		05/22/13 14:10	05/23/13 13:20	1
Dieldrin	ND		0.049	0.032	ug/L		05/22/13 14:10	05/23/13 13:20	1
Endosulfan I	ND		0.049	0.037	ug/L		05/22/13 14:10	05/23/13 13:20	1
Endosulfan II	ND		0.049	0.038	ug/L		05/22/13 14:10	05/23/13 13:20	1
Endosulfan sulfate	ND		0.049	0.022	ug/L		05/22/13 14:10	05/23/13 13:20	1
Endrin	ND		0.049	0.038	ug/L		05/22/13 14:10	05/23/13 13:20	1
Endrin aldehyde	ND		0.049	0.035	ug/L		05/22/13 14:10	05/23/13 13:20	1
Heptachlor	ND		0.049	0.039	ug/L		05/22/13 14:10	05/23/13 13:20	1
Heptachlor epoxide	ND		0.049	0.038	ug/L		05/22/13 14:10	05/23/13 13:20	1
Toxaphene	ND		3.9	0.73	ug/L		05/22/13 14:10	05/23/13 13:20	1
gamma-BHC (Lindane)	ND		0.049	0.031	ug/L		05/22/13 14:10	05/23/13 13:20	1
Endrin ketone	ND		0.049	0.036	ug/L		05/22/13 14:10	05/23/13 13:20	1
gamma-Chlordane	ND		0.049	0.038	ug/L		05/22/13 14:10	05/23/13 13:20	1
Methoxychlor	ND		0.098	0.036	ug/L		05/22/13 14:10	05/23/13 13:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*89*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:20*	*1*
Tetrachloro-m-xylene	*100*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:20*	*1*
DCB Decachlorobiphenyl (Surr)	*86*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:20*	*1*
DCB Decachlorobiphenyl (Surr)	*108*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:20*	*1*

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-004

Lab Sample ID: 180-21414-4

Date Collected: 05/16/13 16:10
Matrix: Water
Date Received: 05/21/13 09:30

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 20:31	1
Bolstar	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:31	1
Chlorpyrifos	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:31	1
Coumaphos	ND		1.0	0.16	ug/L		05/22/13 14:00	05/25/13 20:31	1
Demeton, Total	ND		2.1	0.17	ug/L		05/22/13 14:00	05/25/13 20:31	1
Demeton-O	ND		1.0	0.097	ug/L		05/22/13 14:00	05/25/13 20:31	1
Demeton-S	ND		1.0	0.074	ug/L		05/22/13 14:00	05/25/13 20:31	1
Diazinon	ND		1.0	0.098	ug/L		05/22/13 14:00	05/25/13 20:31	1
Dichlorvos	ND		1.0	0.088	ug/L		05/22/13 14:00	05/25/13 20:31	1
Dimethoate	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 20:31	1
Disulfoton	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:31	1
EPN	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 20:31	1
Famphur	ND		1.0	0.13	ug/L		05/22/13 14:00	05/25/13 20:31	1
Fensulfothion	ND		1.0	0.17	ug/L		05/22/13 14:00	05/25/13 20:31	1
Fenthion	ND		1.0	0.088	ug/L		05/22/13 14:00	05/25/13 20:31	1
Malathion	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:31	1
Methyl parathion	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 20:31	1
Mevinphos	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:31	1
O,O,O-Triethyl phosphorothioate	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:31	1
Parathion	ND		1.0	0.17	ug/L		05/22/13 14:00	05/25/13 20:31	1
Phorate	ND		1.0	0.096	ug/L		05/22/13 14:00	05/25/13 20:31	1
Ronnel	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:31	1
Stirophos	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:31	1
Sulfotepp	ND		1.0	0.099	ug/L		05/22/13 14:00	05/25/13 20:31	1
Tokuthion	ND		1.0	0.098	ug/L		05/22/13 14:00	05/25/13 20:31	1
Trichloronate	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:31	1
Thionazin	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Triphenylphosphate	*108*		*45 - 145*	*05/22/13 14:00*	*05/25/13 20:31*	*1*
Triphenylphosphate	*109*		*45 - 145*	*05/22/13 14:00*	*05/25/13 20:31*	*1*
Tributyl phosphate	*105*		*49 - 122*	*05/22/13 14:00*	*05/25/13 20:31*	*1*
Tributyl phosphate	*91*		*49 - 122*	*05/22/13 14:00*	*05/25/13 20:31*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	ND		0.95	0.092	ug/L		05/22/13 16:50	05/24/13 20:01	20
2,4-D	ND		3.8	0.43	ug/L		05/22/13 16:50	05/24/13 20:01	20
2,4-DB	ND		3.8	0.44	ug/L		05/22/13 16:50	05/24/13 20:01	20
Dalapon	ND		4.8	0.66	ug/L		05/22/13 16:50	05/24/13 20:01	20
Dicamba	ND		1.9	0.25	ug/L		05/22/13 16:50	05/24/13 20:01	20
Dichlorprop	ND		3.8	0.51	ug/L		05/22/13 16:50	05/24/13 20:01	20
MCPA	ND		380	49	ug/L		05/22/13 16:50	05/24/13 20:01	20
MCPP	ND		380	44	ug/L		05/22/13 16:50	05/24/13 20:01	20
Pentachlorophenol	ND		0.48	0.074	ug/L		05/22/13 16:50	05/24/13 20:01	20
Silvex (2,4,5-TP)	ND		0.95	0.10	ug/L		05/22/13 16:50	05/24/13 20:01	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*72*		*32 - 140*	*05/22/13 16:50*	*05/24/13 20:01*	*20*
2,4-Dichlorophenylacetic acid	*69*		*32 - 140*	*05/22/13 16:50*	*05/24/13 20:01*	*20*

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-004

Lab Sample ID: 180-21414-4

Date Collected: 05/16/13 16:10
Matrix: Water
Date Received: 05/21/13 09:30

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	8.2	J	10	2.7	ug/L		05/22/13 10:10	05/23/13 22:26	1
Barium	360		200	0.62	ug/L		05/22/13 10:10	05/23/13 22:26	1
Cadmium	ND		5.0	0.13	ug/L		05/22/13 10:10	05/23/13 22:26	1
Iron	1400		100	12	ug/L		05/22/13 10:10	05/23/13 22:26	1
Lead	ND		3.0	1.3	ug/L		05/22/13 10:10	05/23/13 22:26	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.041	J B	0.20	0.038	ug/L		05/23/13 12:15	05/23/13 18:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16		1.0	0.20	mg/L			05/24/13 20:41	1
Sulfate	110		1.0	0.21	mg/L			05/24/13 20:41	1
Ammonia	0.67	B	0.10	0.027	mg/L		05/23/13 10:45	05/24/13 12:25	1
Nitrate Nitrite as N	0.33		0.10	0.014	mg/L			06/04/13 10:07	1
Alkalinity	550	B	5.0	0.41	mg/L			05/22/13 11:50	1
Total Dissolved Solids	680		10	10	mg/L			05/22/13 10:06	1
Sulfide	0.72	J	3.0	0.22	mg/L			05/23/13 11:25	1

Client Sample ID: WG-051613-NL-005

Lab Sample ID: 180-21414-5

Date Collected: 05/16/13 17:35
Matrix: Water
Date Received: 05/21/13 09:30

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		0.050	0.033	ug/L		05/22/13 14:10	05/23/13 13:36	1
alpha-BHC	ND		0.050	0.027	ug/L		05/22/13 14:10	05/23/13 13:36	1
alpha-Chlordane	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:36	1
beta-BHC	ND		0.050	0.040	ug/L		05/22/13 14:10	05/23/13 13:36	1
delta-BHC	ND		0.050	0.017	ug/L		05/22/13 14:10	05/23/13 13:36	1
4,4'-DDD	ND		0.050	0.027	ug/L		05/22/13 14:10	05/23/13 13:36	1
4,4'-DDE	ND		0.050	0.032	ug/L		05/22/13 14:10	05/23/13 13:36	1
4,4'-DDT	ND		0.050	0.030	ug/L		05/22/13 14:10	05/23/13 13:36	1
Dieldrin	ND		0.050	0.033	ug/L		05/22/13 14:10	05/23/13 13:36	1
Endosulfan I	ND		0.050	0.038	ug/L		05/22/13 14:10	05/23/13 13:36	1
Endosulfan II	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:36	1
Endosulfan sulfate	ND		0.050	0.023	ug/L		05/22/13 14:10	05/23/13 13:36	1
Endrin	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:36	1
Endrin aldehyde	ND		0.050	0.036	ug/L		05/22/13 14:10	05/23/13 13:36	1
Heptachlor	ND		0.050	0.040	ug/L		05/22/13 14:10	05/23/13 13:36	1
Heptachlor epoxide	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:36	1
Toxaphene	ND		4.0	0.74	ug/L		05/22/13 14:10	05/23/13 13:36	1
gamma-BHC (Lindane)	ND		0.050	0.032	ug/L		05/22/13 14:10	05/23/13 13:36	1
Endrin ketone	ND		0.050	0.037	ug/L		05/22/13 14:10	05/23/13 13:36	1
gamma-Chlordane	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:36	1
Methoxychlor	ND		0.10	0.037	ug/L		05/22/13 14:10	05/23/13 13:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*93*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:36*	*1*

Client Sample ID: WG-051613-NL-005

Lab Sample ID: 180-21414-5

Date Collected: 05/16/13 17:35

Matrix: Water

Date Received: 05/21/13 09:30

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	103		45 - 130	05/22/13 14:10	05/23/13 13:36	1
DCB Decachlorobiphenyl (Surr)	88		45 - 130	05/22/13 14:10	05/23/13 13:36	1
DCB Decachlorobiphenyl (Surr)	114		45 - 130	05/22/13 14:10	05/23/13 13:36	1

Method: 8141A - Organophosphorous Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 20:59	1
Bolstar	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:59	1
Chlorpyrifos	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:59	1
Coumaphos	ND		1.0	0.16	ug/L		05/22/13 14:00	05/25/13 20:59	1
Demeton, Total	ND		2.1	0.17	ug/L		05/22/13 14:00	05/25/13 20:59	1
Demeton-O	ND		1.0	0.097	ug/L		05/22/13 14:00	05/25/13 20:59	1
Demeton-S	ND		1.0	0.074	ug/L		05/22/13 14:00	05/25/13 20:59	1
Diazinon	ND		1.0	0.098	ug/L		05/22/13 14:00	05/25/13 20:59	1
Dichlorvos	ND		1.0	0.088	ug/L		05/22/13 14:00	05/25/13 20:59	1
Dimethoate	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 20:59	1
Disulfoton	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:59	1
EPN	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 20:59	1
Famphur	ND		1.0	0.13	ug/L		05/22/13 14:00	05/25/13 20:59	1
Fensulfothion	ND		1.0	0.17	ug/L		05/22/13 14:00	05/25/13 20:59	1
Fenthion	ND		1.0	0.088	ug/L		05/22/13 14:00	05/25/13 20:59	1
Malathion	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:59	1
Methyl parathion	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 20:59	1
Mevinphos	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:59	1
O,O,O-Triethyl phosphorothioate	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:59	1
Parathion	ND		1.0	0.17	ug/L		05/22/13 14:00	05/25/13 20:59	1
Phorate	ND		1.0	0.096	ug/L		05/22/13 14:00	05/25/13 20:59	1
Ronnel	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 20:59	1
Stirophos	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:59	1
Sulfotepp	ND		1.0	0.099	ug/L		05/22/13 14:00	05/25/13 20:59	1
Tokuthion	ND		1.0	0.098	ug/L		05/22/13 14:00	05/25/13 20:59	1
Trichloronate	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:59	1
Thionazin	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 20:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Triphenylphosphate	106		45 - 145	05/22/13 14:00	05/25/13 20:59	1
Triphenylphosphate	109		45 - 145	05/22/13 14:00	05/25/13 20:59	1
Tributyl phosphate	104		49 - 122	05/22/13 14:00	05/25/13 20:59	1
Tributyl phosphate	89		49 - 122	05/22/13 14:00	05/25/13 20:59	1

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	ND		1.0	0.097	ug/L		05/22/13 16:50	05/24/13 20:25	20
2,4-D	ND		4.0	0.45	ug/L		05/22/13 16:50	05/24/13 20:25	20
2,4-DB	ND		4.0	0.46	ug/L		05/22/13 16:50	05/24/13 20:25	20
Dalapon	ND		5.0	0.69	ug/L		05/22/13 16:50	05/24/13 20:25	20
Dicamba	ND		2.0	0.26	ug/L		05/22/13 16:50	05/24/13 20:25	20
Dichlorprop	ND		4.0	0.54	ug/L		05/22/13 16:50	05/24/13 20:25	20
MCPA	ND		400	51	ug/L		05/22/13 16:50	05/24/13 20:25	20
MCPP	ND		400	46	ug/L		05/22/13 16:50	05/24/13 20:25	20

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Client Sample ID: WG-051613-NL-005

Lab Sample ID: 180-21414-5

Date Collected: 05/16/13 17:35
Matrix: Water
Date Received: 05/21/13 09:30

Method: 8151A - Herbicides (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	ND		0.50	0.078	ug/L		05/22/13 16:50	05/24/13 20:25	20
Silvex (2,4,5-TP)	ND		1.0	0.11	ug/L		05/22/13 16:50	05/24/13 20:25	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*68*		*32 - 140*	*05/22/13 16:50*	*05/24/13 20:25*	*20*
2,4-Dichlorophenylacetic acid	*67*		*32 - 140*	*05/22/13 16:50*	*05/24/13 20:25*	*20*

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**6.9**	**J**	10	2.7	ug/L		05/22/13 10:10	05/23/13 22:31	1
Barium	**840**		200	0.62	ug/L		05/22/13 10:10	05/23/13 22:31	1
Cadmium	ND		5.0	0.13	ug/L		05/22/13 10:10	05/23/13 22:31	1
Iron	**12000**		100	12	ug/L		05/22/13 10:10	05/23/13 22:31	1
Lead	ND		3.0	1.3	ug/L		05/22/13 10:10	05/23/13 22:31	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.047**	**J B**	0.20	0.038	ug/L		05/23/13 12:15	05/23/13 19:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**44**		1.0	0.20	mg/L			05/24/13 21:53	1
Sulfate	**110**		1.0	0.21	mg/L			05/24/13 21:53	1
Ammonia	**0.31**	**B**	0.10	0.027	mg/L		05/23/13 10:45	05/24/13 12:26	1
Nitrate Nitrite as N	ND		0.10	0.014	mg/L			06/04/13 10:08	1
Alkalinity	**390**	**B**	5.0	0.41	mg/L			05/22/13 12:01	1
Total Dissolved Solids	**520**		10	10	mg/L			05/22/13 10:06	1
Sulfide	ND		3.0	0.22	mg/L			05/23/13 11:29	1

Method: 8081A - Organochlorine Pesticides (GC)

Lab Sample ID: MB 180-72702/1-A
Matrix: Water
Analysis Batch: 72858

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 72702

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		0.050	0.033	ug/L		05/22/13 14:10	05/23/13 13:52	1
alpha-BHC	ND		0.050	0.027	ug/L		05/22/13 14:10	05/23/13 13:52	1
alpha-Chlordane	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:52	1
beta-BHC	ND		0.050	0.040	ug/L		05/22/13 14:10	05/23/13 13:52	1
delta-BHC	ND		0.050	0.017	ug/L		05/22/13 14:10	05/23/13 13:52	1
4,4'-DDD	ND		0.050	0.027	ug/L		05/22/13 14:10	05/23/13 13:52	1
4,4'-DDE	ND		0.050	0.032	ug/L		05/22/13 14:10	05/23/13 13:52	1
4,4'-DDT	ND		0.050	0.030	ug/L		05/22/13 14:10	05/23/13 13:52	1
Dieldrin	ND		0.050	0.033	ug/L		05/22/13 14:10	05/23/13 13:52	1
Endosulfan I	ND		0.050	0.038	ug/L		05/22/13 14:10	05/23/13 13:52	1
Endosulfan II	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:52	1
Endosulfan sulfate	ND		0.050	0.023	ug/L		05/22/13 14:10	05/23/13 13:52	1
Endrin	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:52	1
Endrin aldehyde	ND		0.050	0.036	ug/L		05/22/13 14:10	05/23/13 13:52	1
Heptachlor	ND		0.050	0.040	ug/L		05/22/13 14:10	05/23/13 13:52	1
Heptachlor epoxide	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:52	1
Toxaphene	ND		4.0	0.74	ug/L		05/22/13 14:10	05/23/13 13:52	1
gamma-BHC (Lindane)	ND		0.050	0.032	ug/L		05/22/13 14:10	05/23/13 13:52	1
Endrin ketone	ND		0.050	0.037	ug/L		05/22/13 14:10	05/23/13 13:52	1
gamma-Chlordane	ND		0.050	0.039	ug/L		05/22/13 14:10	05/23/13 13:52	1
Methoxychlor	ND		0.10	0.037	ug/L		05/22/13 14:10	05/23/13 13:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*95*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:52*	*1*
Tetrachloro-m-xylene	*105*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:52*	*1*
DCB Decachlorobiphenyl (Surr)	*85*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:52*	*1*
DCB Decachlorobiphenyl (Surr)	*108*		*45 - 130*	*05/22/13 14:10*	*05/23/13 13:52*	*1*

Lab Sample ID: LCS 180-72702/2-A
Matrix: Water
Analysis Batch: 72858

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 72702

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	1.00	1.07		ug/L		107	69 - 121
alpha-BHC	1.00	1.01		ug/L		101	55 - 133
alpha-Chlordane	1.00	1.04		ug/L		104	67 - 127
beta-BHC	1.00	1.01		ug/L		101	71 - 129
delta-BHC	1.00	0.945		ug/L		94	30 - 137
4,4'-DDD	1.00	0.980		ug/L		98	76 - 128
4,4'-DDE	1.00	0.964		ug/L		96	74 - 125
4,4'-DDT	1.00	1.09		ug/L		109	62 - 120
Dieldrin	1.00	1.02		ug/L		102	76 - 119
Endosulfan I	1.00	1.02		ug/L		102	72 - 123
Endosulfan II	1.00	1.02		ug/L		102	72 - 122
Endosulfan sulfate	1.00	0.990		ug/L		99	58 - 129
Endrin	1.00	0.970		ug/L		97	70 - 125
Endrin aldehyde	1.00	1.05		ug/L		105	61 - 116
Heptachlor	1.00	1.13		ug/L		113	65 - 127

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 180-72702/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72858 — **Prep Batch: 72702**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Heptachlor epoxide	1.00	1.04		ug/L		104	71 - 122
gamma-BHC (Lindane)	1.00	1.00		ug/L		100	63 - 123
Endrin ketone	1.00	1.06		ug/L		106	73 - 123
gamma-Chlordane	1.00	1.05		ug/L		105	65 - 121
Methoxychlor	1.00	1.07		ug/L		107	59 - 143

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*93*		*45 - 130*
Tetrachloro-m-xylene	*101*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*84*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*109*		*45 - 130*

Lab Sample ID: LCSD 180-72702/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72858 — **Prep Batch: 72702**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aldrin	1.00	1.05		ug/L		105	69 - 121	2	22
alpha-BHC	1.00	1.01		ug/L		101	55 - 133	0	20
alpha-Chlordane	1.00	1.01		ug/L		101	67 - 127	3	21
beta-BHC	1.00	0.993		ug/L		99	71 - 129	1	24
delta-BHC	1.00	0.945		ug/L		94	30 - 137	0	26
4,4'-DDD	1.00	0.968		ug/L		97	76 - 128	1	24
4,4'-DDE	1.00	0.949		ug/L		95	74 - 125	2	20
4,4'-DDT	1.00	1.10		ug/L		110	62 - 120	1	24
Dieldrin	1.00	1.01		ug/L		101	76 - 119	1	20
Endosulfan I	1.00	1.01		ug/L		101	72 - 123	1	22
Endosulfan II	1.00	1.01		ug/L		101	72 - 122	1	21
Endosulfan sulfate	1.00	1.03		ug/L		103	58 - 129	4	21
Endrin	1.00	0.957		ug/L		96	70 - 125	1	24
Endrin aldehyde	1.00	1.06		ug/L		106	61 - 116	0	25
Heptachlor	1.00	1.13		ug/L		113	65 - 127	0	25
Heptachlor epoxide	1.00	1.02		ug/L		102	71 - 122	2	20
gamma-BHC (Lindane)	1.00	1.01		ug/L		101	63 - 123	1	21
Endrin ketone	1.00	1.06		ug/L		106	73 - 123	0	20
gamma-Chlordane	1.00	1.02		ug/L		102	65 - 121	3	21
Methoxychlor	1.00	1.05		ug/L		105	59 - 143	1	27

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*88*		*45 - 130*
Tetrachloro-m-xylene	*97*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*81*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*104*		*45 - 130*

QC Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Method: 8141A - Organophosphorous Pesticides (GC)

Lab Sample ID: MB 180-72696/1-A
Matrix: Water
Analysis Batch: 73044

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 72696

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 22:25	1
Bolstar	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 22:25	1
Chlorpyrifos	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 22:25	1
Coumaphos	ND		1.0	0.15	ug/L		05/22/13 14:00	05/25/13 22:25	1
Demeton, Total	ND		2.0	0.16	ug/L		05/22/13 14:00	05/25/13 22:25	1
Demeton-O	ND		1.0	0.094	ug/L		05/22/13 14:00	05/25/13 22:25	1
Demeton-S	ND		1.0	0.071	ug/L		05/22/13 14:00	05/25/13 22:25	1
Diazinon	ND		1.0	0.094	ug/L		05/22/13 14:00	05/25/13 22:25	1
Dichlorvos	ND		1.0	0.085	ug/L		05/22/13 14:00	05/25/13 22:25	1
Dimethoate	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 22:25	1
Disulfoton	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 22:25	1
EPN	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 22:25	1
Famphur	ND		1.0	0.12	ug/L		05/22/13 14:00	05/25/13 22:25	1
Fensulfothion	ND		1.0	0.17	ug/L		05/22/13 14:00	05/25/13 22:25	1
Fenthion	ND		1.0	0.085	ug/L		05/22/13 14:00	05/25/13 22:25	1
Malathion	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 22:25	1
Methyl parathion	ND		1.0	0.11	ug/L		05/22/13 14:00	05/25/13 22:25	1
Mevinphos	ND		1.0	0.098	ug/L		05/22/13 14:00	05/25/13 22:25	1
O,O,O-Triethyl phosphorothioate	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 22:25	1
Parathion	ND		1.0	0.16	ug/L		05/22/13 14:00	05/25/13 22:25	1
Phorate	ND		1.0	0.092	ug/L		05/22/13 14:00	05/25/13 22:25	1
Ronnel	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 22:25	1
Stirophos	ND		1.0	0.096	ug/L		05/22/13 14:00	05/25/13 22:25	1
Sulfotepp	ND		1.0	0.095	ug/L		05/22/13 14:00	05/25/13 22:25	1
Tokuthion	ND		1.0	0.094	ug/L		05/22/13 14:00	05/25/13 22:25	1
Trichloronate	ND		1.0	0.099	ug/L		05/22/13 14:00	05/25/13 22:25	1
Thionazin	ND		1.0	0.10	ug/L		05/22/13 14:00	05/25/13 22:25	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Triphenylphosphate	*97*		*45 - 145*	*05/22/13 14:00*	*05/25/13 22:25*	*1*
Triphenylphosphate	*97*		*45 - 145*	*05/22/13 14:00*	*05/25/13 22:25*	*1*
Tributyl phosphate	*98*		*49 - 122*	*05/22/13 14:00*	*05/25/13 22:25*	*1*
Tributyl phosphate	*83*		*49 - 122*	*05/22/13 14:00*	*05/25/13 22:25*	*1*

Lab Sample ID: LCS 180-72696/2-A
Matrix: Water
Analysis Batch: 73044

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 72696

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Azinphos-methyl	10.0	11.1		ug/L		111	40 - 150
Bolstar	10.0	10.6		ug/L		106	50 - 150
Chlorpyrifos	10.0	10.1		ug/L		101	50 - 130
Coumaphos	10.0	11.0		ug/L		110	50 - 150
Demeton-O	10.0	11.4		ug/L		114	10 - 150
Demeton-S	10.0	10.2		ug/L		102	10 - 150
Diazinon	10.0	10.4		ug/L		104	50 - 150
Dichlorvos	10.0	10.6		ug/L		106	30 - 150
Dimethoate	10.0	12.0		ug/L		120	26 - 136

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Lab Sample ID: LCS 180-72696/2-A
Matrix: Water
Analysis Batch: 73044

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 72696

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Disulfoton	10.0	10.0		ug/L		100	45 - 124
EPN	10.0	11.0		ug/L		110	50 - 150
Famphur	10.0	11.5		ug/L		115	52 - 131
Fensulfothion	10.0	10.0		ug/L		100	38 - 150
Fenthion	10.0	12.7		ug/L		127	10 - 150
Malathion	10.0	10.8		ug/L		108	50 - 150
Methyl parathion	10.0	11.9		ug/L		119	41 - 148
Mevinphos	10.0	11.7		ug/L		117	30 - 150
O,O,O-Triethyl phosphorothioate	10.0	9.39		ug/L		94	31 - 131
Parathion	10.0	10.5	p	ug/L		105	56 - 125
Phorate	10.0	11.4		ug/L		114	41 - 135
Ronnel	10.0	11.1		ug/L		111	50 - 150
Stirophos	10.0	11.9		ug/L		119	50 - 150
Sulfotepp	10.0	10.2		ug/L		102	56 - 128
Tokuthion	10.0	10.6		ug/L		106	50 - 150
Trichloronate	10.0	10.5		ug/L		105	10 - 150
Thionazin	10.0	11.0		ug/L		110	44 - 128

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Triphenylphosphate	*109*		*45 - 145*
Triphenylphosphate	*110*		*45 - 145*
Tributyl phosphate	*119*		*49 - 122*
Tributyl phosphate	*113*		*49 - 122*

Lab Sample ID: LCSD 180-72696/3-A
Matrix: Water
Analysis Batch: 73044

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 72696

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Azinphos-methyl	10.0	11.4		ug/L		114	40 - 150	3	30
Bolstar	10.0	11.0		ug/L		110	50 - 150	4	30
Chlorpyrifos	10.0	10.4		ug/L		104	50 - 130	3	25
Coumaphos	10.0	11.3		ug/L		113	50 - 150	3	30
Demeton-O	10.0	11.8		ug/L		118	10 - 150	3	30
Demeton-S	10.0	10.6		ug/L		106	10 - 150	4	30
Diazinon	10.0	10.6		ug/L		106	50 - 150	2	30
Dichlorvos	10.0	10.9		ug/L		109	30 - 150	3	30
Dimethoate	10.0	12.4		ug/L		124	26 - 136	3	22
Disulfoton	10.0	10.4		ug/L		104	45 - 124	4	30
EPN	10.0	11.5		ug/L		115	50 - 150	4	30
Famphur	10.0	11.8		ug/L		118	52 - 131	3	24
Fensulfothion	10.0	10.2		ug/L		102	38 - 150	2	30
Fenthion	10.0	13.2		ug/L		132	10 - 150	4	30
Malathion	10.0	11.1		ug/L		111	50 - 150	3	30
Methyl parathion	10.0	12.4		ug/L		124	41 - 148	4	30
Mevinphos	10.0	12.2		ug/L		122	30 - 150	4	30
O,O,O-Triethyl phosphorothioate	10.0	9.65		ug/L		96	31 - 131	3	30
Parathion	10.0	10.9	p	ug/L		109	56 - 125	4	21

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Lab Sample ID: LCSD 180-72696/3-A
Matrix: Water
Analysis Batch: 73044

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 72696

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phorate			10.0	11.9		ug/L		119	41 - 135	4	24
Ronnel			10.0	11.6		ug/L		116	50 - 150	4	30
Stirophos			10.0	12.4		ug/L		124	50 - 150	4	30
Sulfotepp			10.0	10.6		ug/L		106	56 - 128	4	23
Tokuthion			10.0	10.8		ug/L		108	50 - 150	2	30
Trichloronate			10.0	10.9		ug/L		109	10 - 150	4	30
Thionazin			10.0	11.4		ug/L		114	44 - 128	4	21

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Triphenylphosphate	*111*		*45 - 145*
Triphenylphosphate	*111*		*45 - 145*
Tributyl phosphate	*121*		*49 - 122*
Tributyl phosphate	*115*		*49 - 122*

Lab Sample ID: MB 180-72812/1-A
Matrix: Water
Analysis Batch: 73044

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 72812

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND		1.0	0.11	ug/L		05/23/13 12:40	05/26/13 04:07	1
Bolstar	ND		1.0	0.11	ug/L		05/23/13 12:40	05/26/13 04:07	1
Chlorpyrifos	ND		1.0	0.10	ug/L		05/23/13 12:40	05/26/13 04:07	1
Coumaphos	ND		1.0	0.15	ug/L		05/23/13 12:40	05/26/13 04:07	1
Demeton, Total	ND		2.0	0.16	ug/L		05/23/13 12:40	05/26/13 04:07	1
Demeton-O	ND		1.0	0.094	ug/L		05/23/13 12:40	05/26/13 04:07	1
Demeton-S	ND		1.0	0.071	ug/L		05/23/13 12:40	05/26/13 04:07	1
Diazinon	ND		1.0	0.094	ug/L		05/23/13 12:40	05/26/13 04:07	1
Dichlorvos	ND		1.0	0.085	ug/L		05/23/13 12:40	05/26/13 04:07	1
Dimethoate	ND		1.0	0.12	ug/L		05/23/13 12:40	05/26/13 04:07	1
Disulfoton	ND		1.0	0.10	ug/L		05/23/13 12:40	05/26/13 04:07	1
EPN	ND		1.0	0.12	ug/L		05/23/13 12:40	05/26/13 04:07	1
Famphur	ND		1.0	0.12	ug/L		05/23/13 12:40	05/26/13 04:07	1
Fensulfothion	ND		1.0	0.17	ug/L		05/23/13 12:40	05/26/13 04:07	1
Fenthion	ND		1.0	0.085	ug/L		05/23/13 12:40	05/26/13 04:07	1
Malathion	ND		1.0	0.11	ug/L		05/23/13 12:40	05/26/13 04:07	1
Methyl parathion	ND		1.0	0.11	ug/L		05/23/13 12:40	05/26/13 04:07	1
Mevinphos	ND		1.0	0.098	ug/L		05/23/13 12:40	05/26/13 04:07	1
O,O,O-Triethyl phosphorothioate	ND		1.0	0.10	ug/L		05/23/13 12:40	05/26/13 04:07	1
Parathion	ND		1.0	0.16	ug/L		05/23/13 12:40	05/26/13 04:07	1
Phorate	ND		1.0	0.092	ug/L		05/23/13 12:40	05/26/13 04:07	1
Ronnel	ND		1.0	0.10	ug/L		05/23/13 12:40	05/26/13 04:07	1
Stirophos	ND		1.0	0.096	ug/L		05/23/13 12:40	05/26/13 04:07	1
Sulfotepp	ND		1.0	0.095	ug/L		05/23/13 12:40	05/26/13 04:07	1
Tokuthion	ND		1.0	0.094	ug/L		05/23/13 12:40	05/26/13 04:07	1
Trichloronate	ND		1.0	0.099	ug/L		05/23/13 12:40	05/26/13 04:07	1
Thionazin	ND		1.0	0.10	ug/L		05/23/13 12:40	05/26/13 04:07	1

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Lab Sample ID: MB 180-72812/1-A
Matrix: Water
Analysis Batch: 73044

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 72812

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Triphenylphosphate	96		45 - 145	05/23/13 12:40	05/26/13 04:07	1
Triphenylphosphate	95		45 - 145	05/23/13 12:40	05/26/13 04:07	1
Tributyl phosphate	98		49 - 122	05/23/13 12:40	05/26/13 04:07	1
Tributyl phosphate	80		49 - 122	05/23/13 12:40	05/26/13 04:07	1

Lab Sample ID: LCS 180-72812/2-A
Matrix: Water
Analysis Batch: 73044

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 72812

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Azinphos-methyl	10.0	11.3		ug/L		113	40 - 150
Bolstar	10.0	11.0		ug/L		110	50 - 150
Chlorpyrifos	10.0	10.4		ug/L		104	50 - 130
Coumaphos	10.0	11.1		ug/L		111	50 - 150
Demeton-O	10.0	11.8		ug/L		118	10 - 150
Demeton-S	10.0	10.5		ug/L		105	10 - 150
Diazinon	10.0	10.6		ug/L		106	50 - 150
Dichlorvos	10.0	10.9		ug/L		109	30 - 150
Dimethoate	10.0	12.2		ug/L		122	26 - 136
Disulfoton	10.0	10.3		ug/L		103	45 - 124
EPN	10.0	11.6		ug/L		116	50 - 150
Famphur	10.0	11.6		ug/L		116	52 - 131
Fensulfothion	10.0	10.3		ug/L		103	38 - 150
Fenthion	10.0	13.0		ug/L		130	10 - 150
Malathion	10.0	11.1		ug/L		111	50 - 150
Methyl parathion	10.0	11.9		ug/L		119	41 - 148
Mevinphos	10.0	12.2		ug/L		122	30 - 150
O,O,O-Triethyl phosphorothioate	10.0	9.67		ug/L		97	31 - 131
Parathion	10.0	10.5	p	ug/L		105	56 - 125
Phorate	10.0	11.8		ug/L		118	41 - 135
Ronnel	10.0	11.1		ug/L		111	50 - 150
Stirophos	10.0	12.1		ug/L		121	50 - 150
Sulfotepp	10.0	10.3		ug/L		103	56 - 128
Tokuthion	10.0	10.6		ug/L		106	50 - 150
Trichloronate	10.0	10.5		ug/L		105	10 - 150
Thionazin	10.0	10.9		ug/L		109	44 - 128

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Triphenylphosphate	112		45 - 145
Triphenylphosphate	110		45 - 145
Tributyl phosphate	122		49 - 122
Tributyl phosphate	111		49 - 122

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Lab Sample ID: LCSD 180-72812/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 73044 — **Prep Batch: 72812**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Azinphos-methyl	10.0	11.3		ug/L		113	40 - 150	0	30
Bolstar	10.0	11.1		ug/L		111	50 - 150	1	30
Chlorpyrifos	10.0	10.6		ug/L		106	50 - 130	2	25
Coumaphos	10.0	11.2		ug/L		112	50 - 150	1	30
Demeton-O	10.0	12.1		ug/L		121	10 - 150	2	30
Demeton-S	10.0	10.7		ug/L		107	10 - 150	2	30
Diazinon	10.0	10.7		ug/L		107	50 - 150	2	30
Dichlorvos	10.0	10.9		ug/L		109	30 - 150	0	30
Dimethoate	10.0	12.5		ug/L		125	26 - 136	2	22
Disulfoton	10.0	10.6		ug/L		106	45 - 124	3	30
EPN	10.0	12.1		ug/L		121	50 - 150	4	30
Famphur	10.0	11.7		ug/L		117	52 - 131	1	24
Fensulfothion	10.0	10.7		ug/L		107	38 - 150	4	30
Fenthion	10.0	13.1		ug/L		131	10 - 150	1	30
Malathion	10.0	11.2		ug/L		112	50 - 150	1	30
Methyl parathion	10.0	12.5		ug/L		125	41 - 148	5	30
Mevinphos	10.0	12.6		ug/L		126	30 - 150	4	30
O,O,O-Triethyl phosphorothioate	10.0	9.67		ug/L		97	31 - 131	0	30
Parathion	10.0	11.0	p	ug/L		110	56 - 125	5	21
Phorate	10.0	12.1		ug/L		121	41 - 135	3	24
Ronnel	10.0	11.4		ug/L		114	50 - 150	2	30
Stirophos	10.0	12.3		ug/L		123	50 - 150	2	30
Sulfotepp	10.0	10.6		ug/L		106	56 - 128	3	23
Tokuthion	10.0	10.9		ug/L		109	50 - 150	3	30
Trichloronate	10.0	11.0		ug/L		110	10 - 150	5	30
Thionazin	10.0	11.1		ug/L		111	44 - 128	2	21

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Triphenylphosphate	*111*		*45 - 145*
Triphenylphosphate	*107*		*45 - 145*
Tributyl phosphate	*122*		*49 - 122*
Tributyl phosphate	*112*		*49 - 122*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-72713/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72978 — **Prep Batch: 72713**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	ND		1.0	0.097	ug/L		05/22/13 16:50	05/24/13 18:01	20
2,4-D	ND		4.0	0.45	ug/L		05/22/13 16:50	05/24/13 18:01	20
2,4-DB	ND		4.0	0.46	ug/L		05/22/13 16:50	05/24/13 18:01	20
Dalapon	ND		5.0	0.69	ug/L		05/22/13 16:50	05/24/13 18:01	20
Dicamba	ND		2.0	0.26	ug/L		05/22/13 16:50	05/24/13 18:01	20
Dichlorprop	ND		4.0	0.54	ug/L		05/22/13 16:50	05/24/13 18:01	20
MCPA	ND		400	51	ug/L		05/22/13 16:50	05/24/13 18:01	20

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: MB 180-72713/1-A
Matrix: Water
Analysis Batch: 72978

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 72713

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
MCPP	ND		400	46	ug/L		05/22/13 16:50	05/24/13 18:01	20
Pentachlorophenol	ND		0.50	0.078	ug/L		05/22/13 16:50	05/24/13 18:01	20
Silvex (2,4,5-TP)	ND		1.0	0.11	ug/L		05/22/13 16:50	05/24/13 18:01	20

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*72*		*32 - 140*	*05/22/13 16:50*	*05/24/13 18:01*	*20*
2,4-Dichlorophenylacetic acid	*69*		*32 - 140*	*05/22/13 16:50*	*05/24/13 18:01*	*20*

Lab Sample ID: LCS 180-72713/2-A
Matrix: Water
Analysis Batch: 72978

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 72713

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-T	8.00	5.99		ug/L		75	32 - 140
2,4-D	32.0	22.9		ug/L		72	32 - 140
2,4-DB	32.0	25.3		ug/L		79	30 - 140
Dalapon	16.0	9.77		ug/L		61	32 - 140
Dicamba	16.0	11.6		ug/L		73	32 - 140
Dichlorprop	32.0	24.5		ug/L		77	32 - 140
MCPA	3200	2550		ug/L		80	32 - 140
MCPP	3200	2380		ug/L		74	32 - 140
Pentachlorophenol	4.00	2.95		ug/L		74	40 - 140
Silvex (2,4,5-TP)	8.00	5.60		ug/L		70	32 - 140

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*68*		*32 - 140*
2,4-Dichlorophenylacetic acid	*67*		*32 - 140*

Lab Sample ID: LCSD 180-72713/3-A
Matrix: Water
Analysis Batch: 72978

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 72713

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,4,5-T	4.00	2.62	*	ug/L		66	32 - 140	78	30
2,4-D	16.0	11.1	*	ug/L		69	32 - 140	70	30
2,4-DB	16.0	13.0	*	ug/L		81	30 - 140	64	30
Dalapon	8.00	4.56	J *	ug/L		57	32 - 140	73	30
Dicamba	8.00	6.35	*	ug/L		79	32 - 140	59	30
Dichlorprop	16.0	11.7	*	ug/L		73	32 - 140	71	30
MCPA	1600	1080	*	ug/L		68	32 - 140	81	30
MCPP	1600	1240	*	ug/L		78	32 - 140	63	30
Pentachlorophenol	2.00	1.67	*	ug/L		83	40 - 140	56	30
Silvex (2,4,5-TP)	4.00	2.60	*	ug/L		65	32 - 140	73	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*79*		*32 - 140*
2,4-Dichlorophenylacetic acid	*77*		*32 - 140*

QC Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 180-72637/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 72846 — **Prep Batch: 72637**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		10	2.7	ug/L		05/22/13 10:10	05/23/13 21:02	1
Barium	ND		200	0.62	ug/L		05/22/13 10:10	05/23/13 21:02	1
Cadmium	ND		5.0	0.13	ug/L		05/22/13 10:10	05/23/13 21:02	1
Iron	ND		100	12	ug/L		05/22/13 10:10	05/23/13 21:02	1
Lead	ND		3.0	1.3	ug/L		05/22/13 10:10	05/23/13 21:02	1

Lab Sample ID: LCS 180-72637/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 72846 — **Prep Batch: 72637**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	500	545		ug/L		109	80 - 120
Barium	2000	2150		ug/L		107	80 - 120
Cadmium	50.0	51.6		ug/L		103	80 - 120
Iron	1000	1130		ug/L		113	80 - 120
Lead	500	526		ug/L		105	80 - 120

Lab Sample ID: MB 180-73068/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 73205 — **Prep Batch: 73068**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		10	2.7	ug/L		05/28/13 11:57	05/29/13 09:36	1
Barium	ND		200	0.62	ug/L		05/28/13 11:57	05/29/13 09:36	1
Cadmium	ND		5.0	0.13	ug/L		05/28/13 11:57	05/29/13 09:36	1
Lead	ND		3.0	1.3	ug/L		05/28/13 11:57	05/29/13 09:36	1

Lab Sample ID: MB 180-73068/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 73200 — **Prep Batch: 73068**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	43.4	J	100	12	ug/L		05/28/13 11:57	05/29/13 10:03	1

Lab Sample ID: LCS 180-73068/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 73205 — **Prep Batch: 73068**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	500	522		ug/L		104	80 - 120
Barium	2000	2010		ug/L		100	80 - 120
Cadmium	50.0	50.2		ug/L		100	80 - 120
Lead	500	503		ug/L		101	80 - 120

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCS 180-73068/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 73200 — **Prep Batch: 73068**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	1000	1080		ug/L		108	80 - 120

Lab Sample ID: 180-21414-2 MS — **Client Sample ID: WG-051613-NL-002**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 72846 — **Prep Batch: 72637**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	8.8	J	500	552		ug/L		109	75 - 125
Barium	650		2000	2830		ug/L		109	75 - 125
Cadmium	ND		50.0	50.4		ug/L		101	75 - 125
Iron	3600		1000	4760		ug/L		121	75 - 125
Lead	ND		500	514		ug/L		103	75 - 125

Lab Sample ID: 180-21414-2 MSD — **Client Sample ID: WG-051613-NL-002**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 72846 — **Prep Batch: 72637**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	8.8	J	500	545		ug/L		107	75 - 125	1	20
Barium	650		2000	2810		ug/L		108	75 - 125	1	20
Cadmium	ND		50.0	49.4		ug/L		99	75 - 125	2	20
Iron	3600		1000	4610		ug/L		105	75 - 125	3	20
Lead	ND		500	508		ug/L		102	75 - 125	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-72772/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72839 — **Prep Batch: 72772**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0480	J	0.20	0.038	ug/L		05/23/13 12:15	05/23/13 18:16	1

Lab Sample ID: LCS 180-72772/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72839 — **Prep Batch: 72772**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.50	2.40		ug/L		96	80 - 120

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 180-72981/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72981

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.20	mg/L			05/24/13 10:55	1
Sulfate	ND		1.0	0.21	mg/L			05/24/13 10:55	1

Lab Sample ID: LCS 180-72981/5 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72981

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	50.8		mg/L		102	90 - 110
Sulfate	50.0	51.2		mg/L		102	90 - 110

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 180-72650/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72922 — **Prep Batch: 72650**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	0.0650	J	0.10	0.027	mg/L		05/23/13 10:45	05/24/13 11:49	1

Lab Sample ID: LCS 180-72650/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72922 — **Prep Batch: 72650**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	2.00	1.86		mg/L		93	90 - 110

Lab Sample ID: 180-21414-1 MS — **Client Sample ID: WG-051613-NL-001**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72922 — **Prep Batch: 72650**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	0.42	B	2.00	2.22		mg/L		90	90 - 110

Lab Sample ID: 180-21414-1 MSD — **Client Sample ID: WG-051613-NL-001**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72922 — **Prep Batch: 72650**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	0.42	B	2.00	2.41		mg/L		100	90 - 110	8	20

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 180-73800/16 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 73800

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.10	0.014	mg/L			06/04/13 09:32	1

Lab Sample ID: LCS 180-73800/15 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 73800

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	4.00	4.30		mg/L		107	90 - 110

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: 180-21414-3 MS — **Client Sample ID: WG-051613-NL-003**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 73800

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	ND		2.00	2.07		mg/L		104	90 - 110

Lab Sample ID: 180-21414-3 MSD — **Client Sample ID: WG-051613-NL-003**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 73800

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	ND		2.00	2.08		mg/L		104	90 - 110	0	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 180-72726/19 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72726

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	0.840	J	5.0	0.41	mg/L			05/22/13 12:20	1

Lab Sample ID: MB 180-72726/3 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72726

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	2.99	J	5.0	0.41	mg/L			05/22/13 09:42	1

Lab Sample ID: LCS 180-72726/18 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72726

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	250	216		mg/L		86	80 - 120

Lab Sample ID: LCS 180-72726/2 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72726

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	250	207		mg/L		83	80 - 120

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 180-72629/2 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72629

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	10	mg/L			05/22/13 10:06	1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 180-72629/1 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72629

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	266	274		mg/L		103	80 - 120

Method: SM 4500 S2 F - Sulfide, Total

Lab Sample ID: MB 180-72828/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72828

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3.0	0.22	mg/L			05/23/13 11:07	1

Lab Sample ID: LCS 180-72828/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72828

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	4.81	4.57		mg/L		95	85 - 115

Lab Sample ID: LCSD 180-72828/4 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 72828

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	4.81	4.62		mg/L		96	85 - 115	1	20

QC Association Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-21414-1

GC Semi VOA

Prep Batch: 72696

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-2	WG-051613-NL-002	Total/NA	Water	3510C	
180-21414-3	WG-051613-NL-003	Total/NA	Water	3510C	
180-21414-4	WG-051613-NL-004	Total/NA	Water	3510C	
180-21414-5	WG-051613-NL-005	Total/NA	Water	3510C	
LCS 180-72696/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 180-72696/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	
MB 180-72696/1-A	Method Blank	Total/NA	Water	3510C	

Prep Batch: 72702

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	3510C	
180-21414-2	WG-051613-NL-002	Total/NA	Water	3510C	
180-21414-3	WG-051613-NL-003	Total/NA	Water	3510C	
180-21414-4	WG-051613-NL-004	Total/NA	Water	3510C	
180-21414-5	WG-051613-NL-005	Total/NA	Water	3510C	
LCS 180-72702/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 180-72702/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	
MB 180-72702/1-A	Method Blank	Total/NA	Water	3510C	

Prep Batch: 72713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	8151A	
180-21414-2	WG-051613-NL-002	Total/NA	Water	8151A	
180-21414-3	WG-051613-NL-003	Total/NA	Water	8151A	
180-21414-4	WG-051613-NL-004	Total/NA	Water	8151A	
180-21414-5	WG-051613-NL-005	Total/NA	Water	8151A	
LCS 180-72713/2-A	Lab Control Sample	Total/NA	Water	8151A	
LCSD 180-72713/3-A	Lab Control Sample Dup	Total/NA	Water	8151A	
MB 180-72713/1-A	Method Blank	Total/NA	Water	8151A	

Prep Batch: 72812

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	3510C	
LCS 180-72812/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 180-72812/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	
MB 180-72812/1-A	Method Blank	Total/NA	Water	3510C	

Analysis Batch: 72858

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	8081A	72702
180-21414-2	WG-051613-NL-002	Total/NA	Water	8081A	72702
180-21414-3	WG-051613-NL-003	Total/NA	Water	8081A	72702
180-21414-4	WG-051613-NL-004	Total/NA	Water	8081A	72702
180-21414-5	WG-051613-NL-005	Total/NA	Water	8081A	72702
LCS 180-72702/2-A	Lab Control Sample	Total/NA	Water	8081A	72702
LCSD 180-72702/3-A	Lab Control Sample Dup	Total/NA	Water	8081A	72702
MB 180-72702/1-A	Method Blank	Total/NA	Water	8081A	72702

Analysis Batch: 72978

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	8151A	72713

GC Semi VOA (Continued)

Analysis Batch: 72978 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-2	WG-051613-NL-002	Total/NA	Water	8151A	72713
180-21414-3	WG-051613-NL-003	Total/NA	Water	8151A	72713
180-21414-4	WG-051613-NL-004	Total/NA	Water	8151A	72713
180-21414-5	WG-051613-NL-005	Total/NA	Water	8151A	72713
LCS 180-72713/2-A	Lab Control Sample	Total/NA	Water	8151A	72713
LCSD 180-72713/3-A	Lab Control Sample Dup	Total/NA	Water	8151A	72713
MB 180-72713/1-A	Method Blank	Total/NA	Water	8151A	72713

Analysis Batch: 73044

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	8141A	72812
180-21414-2	WG-051613-NL-002	Total/NA	Water	8141A	72696
180-21414-3	WG-051613-NL-003	Total/NA	Water	8141A	72696
180-21414-4	WG-051613-NL-004	Total/NA	Water	8141A	72696
180-21414-5	WG-051613-NL-005	Total/NA	Water	8141A	72696
LCS 180-72696/2-A	Lab Control Sample	Total/NA	Water	8141A	72696
LCS 180-72812/2-A	Lab Control Sample	Total/NA	Water	8141A	72812
LCSD 180-72696/3-A	Lab Control Sample Dup	Total/NA	Water	8141A	72696
LCSD 180-72812/3-A	Lab Control Sample Dup	Total/NA	Water	8141A	72812
MB 180-72696/1-A	Method Blank	Total/NA	Water	8141A	72696
MB 180-72812/1-A	Method Blank	Total/NA	Water	8141A	72812

Metals

Prep Batch: 72637

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-2	WG-051613-NL-002	Dissolved	Water	3005A	
180-21414-2 MS	WG-051613-NL-002	Dissolved	Water	3005A	
180-21414-2 MSD	WG-051613-NL-002	Dissolved	Water	3005A	
180-21414-3	WG-051613-NL-003	Dissolved	Water	3005A	
180-21414-4	WG-051613-NL-004	Dissolved	Water	3005A	
180-21414-5	WG-051613-NL-005	Dissolved	Water	3005A	
LCS 180-72637/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 180-72637/1-A	Method Blank	Total Recoverable	Water	3005A	

Prep Batch: 72772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Dissolved	Water	7470A	
180-21414-2	WG-051613-NL-002	Dissolved	Water	7470A	
180-21414-3	WG-051613-NL-003	Dissolved	Water	7470A	
180-21414-4	WG-051613-NL-004	Dissolved	Water	7470A	
180-21414-5	WG-051613-NL-005	Dissolved	Water	7470A	
LCS 180-72772/2-A	Lab Control Sample	Total/NA	Water	7470A	
MB 180-72772/1-A	Method Blank	Total/NA	Water	7470A	

Analysis Batch: 72839

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Dissolved	Water	7470A	72772
180-21414-2	WG-051613-NL-002	Dissolved	Water	7470A	72772
180-21414-3	WG-051613-NL-003	Dissolved	Water	7470A	72772

Metals (Continued)

Analysis Batch: 72839 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-4	WG-051613-NL-004	Dissolved	Water	7470A	72772
180-21414-5	WG-051613-NL-005	Dissolved	Water	7470A	72772
LCS 180-72772/2-A	Lab Control Sample	Total/NA	Water	7470A	72772
MB 180-72772/1-A	Method Blank	Total/NA	Water	7470A	72772

Analysis Batch: 72846

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-2	WG-051613-NL-002	Dissolved	Water	6010B	72637
180-21414-2 MS	WG-051613-NL-002	Dissolved	Water	6010B	72637
180-21414-2 MSD	WG-051613-NL-002	Dissolved	Water	6010B	72637
180-21414-3	WG-051613-NL-003	Dissolved	Water	6010B	72637
180-21414-4	WG-051613-NL-004	Dissolved	Water	6010B	72637
180-21414-5	WG-051613-NL-005	Dissolved	Water	6010B	72637
LCS 180-72637/2-A	Lab Control Sample	Total Recoverable	Water	6010B	72637
MB 180-72637/1-A	Method Blank	Total Recoverable	Water	6010B	72637

Prep Batch: 73068

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Dissolved	Water	3005A	
LCS 180-73068/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 180-73068/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 73200

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Dissolved	Water	6010B	73068
LCS 180-73068/2-A	Lab Control Sample	Total Recoverable	Water	6010B	73068
MB 180-73068/1-A	Method Blank	Total Recoverable	Water	6010B	73068

Analysis Batch: 73205

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Dissolved	Water	6010B	73068
LCS 180-73068/2-A	Lab Control Sample	Total Recoverable	Water	6010B	73068
MB 180-73068/1-A	Method Blank	Total Recoverable	Water	6010B	73068

General Chemistry

Analysis Batch: 72629

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	SM 2540C	
180-21414-2	WG-051613-NL-002	Total/NA	Water	SM 2540C	
180-21414-3	WG-051613-NL-003	Total/NA	Water	SM 2540C	
180-21414-4	WG-051613-NL-004	Total/NA	Water	SM 2540C	
180-21414-5	WG-051613-NL-005	Total/NA	Water	SM 2540C	
LCS 180-72629/1	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 180-72629/2	Method Blank	Total/NA	Water	SM 2540C	

Prep Batch: 72650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	Distill/Ammonia	
180-21414-1 MS	WG-051613-NL-001	Total/NA	Water	Distill/Ammonia	

General Chemistry (Continued)

Prep Batch: 72650 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1 MSD	WG-051613-NL-001	Total/NA	Water	Distill/Ammonia	
180-21414-2	WG-051613-NL-002	Total/NA	Water	Distill/Ammonia	
180-21414-3	WG-051613-NL-003	Total/NA	Water	Distill/Ammonia	
180-21414-4	WG-051613-NL-004	Total/NA	Water	Distill/Ammonia	
180-21414-5	WG-051613-NL-005	Total/NA	Water	Distill/Ammonia	
LCS 180-72650/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 180-72650/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 72726

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	SM 2320B	
180-21414-2	WG-051613-NL-002	Total/NA	Water	SM 2320B	
180-21414-3	WG-051613-NL-003	Total/NA	Water	SM 2320B	
180-21414-4	WG-051613-NL-004	Total/NA	Water	SM 2320B	
180-21414-5	WG-051613-NL-005	Total/NA	Water	SM 2320B	
LCS 180-72726/18	Lab Control Sample	Total/NA	Water	SM 2320B	
LCS 180-72726/2	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 180-72726/19	Method Blank	Total/NA	Water	SM 2320B	
MB 180-72726/3	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 72828

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	SM 4500 S2 F	
180-21414-2	WG-051613-NL-002	Total/NA	Water	SM 4500 S2 F	
180-21414-3	WG-051613-NL-003	Total/NA	Water	SM 4500 S2 F	
180-21414-4	WG-051613-NL-004	Total/NA	Water	SM 4500 S2 F	
180-21414-5	WG-051613-NL-005	Total/NA	Water	SM 4500 S2 F	
LCS 180-72828/3	Lab Control Sample	Total/NA	Water	SM 4500 S2 F	
LCSD 180-72828/4	Lab Control Sample Dup	Total/NA	Water	SM 4500 S2 F	
MB 180-72828/5	Method Blank	Total/NA	Water	SM 4500 S2 F	

Analysis Batch: 72922

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	350.1	72650
180-21414-1 MS	WG-051613-NL-001	Total/NA	Water	350.1	72650
180-21414-1 MSD	WG-051613-NL-001	Total/NA	Water	350.1	72650
180-21414-2	WG-051613-NL-002	Total/NA	Water	350.1	72650
180-21414-3	WG-051613-NL-003	Total/NA	Water	350.1	72650
180-21414-4	WG-051613-NL-004	Total/NA	Water	350.1	72650
180-21414-5	WG-051613-NL-005	Total/NA	Water	350.1	72650
LCS 180-72650/2-A	Lab Control Sample	Total/NA	Water	350.1	72650
MB 180-72650/1-A	Method Blank	Total/NA	Water	350.1	72650

Analysis Batch: 72981

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	300.0	
180-21414-2	WG-051613-NL-002	Total/NA	Water	300.0	
180-21414-3	WG-051613-NL-003	Total/NA	Water	300.0	
180-21414-4	WG-051613-NL-004	Total/NA	Water	300.0	
180-21414-5	WG-051613-NL-005	Total/NA	Water	300.0	
LCS 180-72981/5	Lab Control Sample	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 72981 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-72981/6	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 73800

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-21414-1	WG-051613-NL-001	Total/NA	Water	353.2	
180-21414-2	WG-051613-NL-002	Total/NA	Water	353.2	
180-21414-3	WG-051613-NL-003	Total/NA	Water	353.2	
180-21414-3 MS	WG-051613-NL-003	Total/NA	Water	353.2	
180-21414-3 MSD	WG-051613-NL-003	Total/NA	Water	353.2	
180-21414-4	WG-051613-NL-004	Total/NA	Water	353.2	
180-21414-5	WG-051613-NL-005	Total/NA	Water	353.2	
LCS 180-73800/15	Lab Control Sample	Total/NA	Water	353.2	
MB 180-73800/16	Method Blank	Total/NA	Water	353.2	

CONESTOGA-ROVERS & ASSOCIATES

CHAIN OF CUSTODY RECORD

3-8, 3-5, 3-1 #2

COC NO.: 38033

PAGE 1 OF 1

(See Reverse Side for Instructions)

Address: 1502 SW 41st St. Topeka, KS

Phone: 785-723-9992 Fax:

Project No/ Phase/Task Code: 080649	Laboratory Name: Test America	Lab Location: Pittsburg, PA
Project Name: Douglas County Public Works	Lab Contact: Jill Colussy	Lab Quote No:
Project Location: Lawrence, KS		
Chemistry Contact: Angie Bown		
Sampler(s): Kirk Hoeffner / Nick Laskares		

SSOW ID:

Cooler No:

Carrier:

Airbill No:

Date Shipped:

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Unpreserved	Hydrochloric Acid (HCl)	Nitric Acid (HNO_3)	Sulfuric Acid (H_2SO_4)	Sodium Hydroxide (NaOH) / Zinc	Methanol/Water (Soil VOC)	EnCores 3x5-g, 1x25-g	Other: Ambers	Total Containers/Sample	Nitrate/Nitrite	Alkalinity	Hg	Pesticides/Herb	TDS	Sulfide	Ammonia	PCBs			MS/MSD Request	Comments/ Special Instructions:
1	WG-051613-NL-001	5/16/13	11:00	WG	G	2		1	1	1			5	10	X	X	X	X	X	X	X	X				Metals are
2	WG-051613-NL-002	5/16/13	13:10	WG	G	2		1	1	1			4	9	X	X	X	X	X	X	X	X				field filtered
3	WG-051613-NL-003	5/16/13	14:45	WG	G	2		1	1	1			6	11	X	X	X	X	X	X	X	X				
4	WG-051613-NL-004	5/16/13	16:10	WG	G	2		1	1	1			3	8	X	X	X	X	X	X	X	X				
5	WG-051613-NL-005	5/16/13	17:35	WG	G	2		1	1	1			3	8	X	X	X	X	X	X	X	X				
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										

180-21414 Chain of Custody

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☐ 2 Week ☐ Other:

Total Number of Containers: 56

All Samples in Cooler must be on COC

Notes/ Special Requirements: Some ambers partially full

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1. Kirk Hoeffner	CRA	5/20/13	18:45	1. FedEx			
2.				2. [illegible]	TAPIT	5-21-13	930
3.				3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

CRA Form: COC-10B (20110804)

Login Sample Receipt Checklist

Client: Conestoga-Rovers & Associates, Inc.

Job Number: 180-21414-1

Login Number: 21414

List Source: TestAmerica Pittsburgh

List Number: 1

Creator: O'Donnell, Brandon R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Continental Analytical Services, Inc.

Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date and Time Received: 06/21/2013 0930
Continental File No.: 8421
Continental Order No.: 111882
P.O./Project No: 080649
Project ID: Douglas CO PW

Dear Mr. Hoeffner:

This laboratory report, containing the samples indicated below, includes 10 pages for the analytical report, 1 page(s) for the chain of custody and/or analysis request, and 1 page(s) for the sample receipt form.

CAS LAB ID #	SAMPLE DESCRIPTION	SAMPLE TYPE	DATE SAMPLED
13061952	WG-062013-KH-001	Liquid	6/20/2013
13061953	WG-062013-KH-002	Liquid	6/20/2013
13061954	WG-062013-KH-003	Liquid	6/20/2013
13061955	WG-062013-KH-004	Liquid	6/20/2013
13061956	WG-062013-KH-005	Liquid	6/20/2013
13061957	WG-062013-KH-006	Liquid	6/20/2013
13061958	WG-062013-KH-007	Liquid	6/20/2013
13061959	WG-062013-KH-008	Liquid	6/20/2013

The Appendix and Quality Control sections are integral parts of this laboratory report and may contain important data qualifiers.

All results are reported on a wet weight basis unless otherwise stated.

Samples will be retained for thirty days unless Continental is otherwise notified.

Continental is accredited by the State of Kansas through the National Environmental Laboratory Accreditation Program (NELAP). The results contained in this report were obtained using Continental's Standard Operating Procedures. These procedures are in substantial compliance with the approved methods referenced and the standards published by NELAP unless otherwise noted in the Appendix and Quality Control sections of this report.

This report may not be reproduced, except in full, without written approval from Continental Analytical Services, Inc.

Thank you for choosing Continental for this project.

525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737
785-827-1273 800-535-3076 Fax 785-823-7830
KDHE Environmental Laboratory Accreditation No. E-10146

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Technical Manager

Petra M. Craddock
Project Manager

525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737
785-827-1273 800-535-3076 Fax 785-823-7830

KDHE Environmental Laboratory Accreditation No. E-10146

Sample Results

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/26/2013
Date Received: 06/21/2013
Continental File No: 8421
Continental Order No: 111882

Lab Number: 13061952
Sample Description: WG-062013-KH-001

Date Sampled: 06/20/2013
Time Sampled: 1215

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/609
E. Coli Bacteria	Absent		7055/609

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/21/13 1315	130621-1	130621-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13061952

Lab Number: 13061953
Sample Description: WG-062013-KH-002

Date Sampled: 06/20/2013
Time Sampled: 1430

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/609
E. Coli Bacteria	Absent		7055/609

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/21/13 1315	130621-1	130621-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13061953

Sample Results

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/26/2013
Date Received: 06/21/2013
Continental File No: 8421
Continental Order No: 111882

Lab Number: 13061954
Sample Description: WG-062013-KH-003

Date Sampled: 06/20/2013
Time Sampled: 1500

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/609
E. Coli Bacteria	Absent		7055/609

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/21/13 1315	130621-1	130621-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13061954

Lab Number: 13061955
Sample Description: WG-062013-KH-004

Date Sampled: 06/20/2013
Time Sampled: 1530

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/609
E. Coli Bacteria	Present		7055/609

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/21/13 1315	130621-1	130621-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13061955

Sample Results

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/26/2013
Date Received: 06/21/2013
Continental File No: 8421
Continental Order No: 111882

Lab Number: 13061956
Sample Description: WG-062013-KH-005

Date Sampled: 06/20/2013
Time Sampled: 1600

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/609
E. Coli Bacteria	Absent		7055/609

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/21/13 1315	130621-1	130621-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13061956

Lab Number: 13061957
Sample Description: WG-062013-KH-006

Date Sampled: 06/20/2013
Time Sampled: 1620

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/609
E. Coli Bacteria	Absent		7055/609

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/21/13 1315	130621-1	130621-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13061957

Sample Results

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/26/2013
Date Received: 06/21/2013
Continental File No: 8421
Continental Order No: 111882

Lab Number: 13061958
Sample Description: WG-062013-KH-007

Date Sampled: 06/20/2013
Time Sampled: 1645

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/609
E. Coli Bacteria	Absent		7055/609

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/21/13 1315	130621-1	130621-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13061958

Lab Number: 13061959
Sample Description: WG-062013-KH-008

Date Sampled: 06/20/2013
Time Sampled: 1715

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/609
E. Coli Bacteria	Absent		7055/609

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/21/13 1315	130621-1	130621-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13061959

Appendix

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/26/2013
Date Received: 06/21/2013
Continental File No: 8421
Continental Order No: 111882

ND(), where reported, indicates the analyte was not detected above the Limit of Quantitation (LOQ). The concentration of the LOQ is inside the parentheses.

All samples which require cooling were received at a temperature of less than 6 degrees Celsius.

The following table presents the date and time sampled, the date and time analyzed, and the total time elapsed for each analysis with an EPA recommended holding time of seventy-two hours or less.

CAS LAB ID #	ANALYSIS	DATE/TIME SAMPLED	DATE/TIME ANALYZED	ELAPSED HRS:MIN
13061952	Tot.Coliform & E.Coli, P-A	06/20/2013 1215		
13061952	Total Coliform Bacteria	06/20/2013 1215	06/21/2013 1315	25:00
13061952	E. Coli Bacteria	06/20/2013 1215	06/21/2013 1315	25:00
13061953	Tot.Coliform & E.Coli, P-A	06/20/2013 1430		
13061953	Total Coliform Bacteria	06/20/2013 1430	06/21/2013 1315	22:45
13061953	E. Coli Bacteria	06/20/2013 1430	06/21/2013 1315	22:45
13061954	Tot.Coliform & E.Coli, P-A	06/20/2013 1500		
13061954	Total Coliform Bacteria	06/20/2013 1500	06/21/2013 1315	22:15
13061954	E. Coli Bacteria	06/20/2013 1500	06/21/2013 1315	22:15
13061955	Tot.Coliform & E.Coli, P-A	06/20/2013 1530		
13061955	Total Coliform Bacteria	06/20/2013 1530	06/21/2013 1315	21:45
13061955	E. Coli Bacteria	06/20/2013 1530	06/21/2013 1315	21:45
13061956	Tot.Coliform & E.Coli, P-A	06/20/2013 1600		
13061956	Total Coliform Bacteria	06/20/2013 1600	06/21/2013 1315	21:15
13061956	E. Coli Bacteria	06/20/2013 1600	06/21/2013 1315	21:15
13061957	Tot.Coliform & E.Coli, P-A	06/20/2013 1620		
13061957	Total Coliform Bacteria	06/20/2013 1620	06/21/2013 1315	20:55
13061957	E. Coli Bacteria	06/20/2013 1620	06/21/2013 1315	20:55
13061958	Tot.Coliform & E.Coli, P-A	06/20/2013 1645		
13061958	Total Coliform Bacteria	06/20/2013 1645	06/21/2013 1315	20:30
13061958	E. Coli Bacteria	06/20/2013 1645	06/21/2013 1315	20:30
13061959	Tot.Coliform & E.Coli, P-A	06/20/2013 1715		
13061959	Total Coliform Bacteria	06/20/2013 1715	06/21/2013 1315	20:00
13061959	E. Coli Bacteria	06/20/2013 1715	06/21/2013 1315	20:00

Accreditation Summary

Client: Conestoga-Rovers & Associates
Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/26/2013
Date Received: 06/21/2013
Continental File No: 8421
Continental Order No: 111882

NELAP accreditation is issued under each EPA regulatory program for a given matrix/analyte/method combination. Continental is NELAP accredited for each matrix/analyte/method and EPA program cited in this Laboratory Report, except for those listed in the table below and for analyses performed in the field. For most of the analyses listed in the table, NELAP accreditation is not offered under the listed EPA program and Continental is NELAP accredited for the analysis, using the same analytical technology, but under a different EPA program. Continental's full NELAP accreditation status may be viewed at www.kdheks.gov/envlab. Note that unless qualified otherwise in the Laboratory Report, Continental performs all analyses, including each analysis listed in the table below, utilizing NELAP protocol.

Test	Analysis	Matrix-Regulatory Program	Method	CAS NELAP Accredited in Other Reg. Program
GL491	Tot.Coliform & E.Coli, P-A	L-NPDES	SM 9223B Colilert	
GL491	Total Coliform Bacteria	L-NPDES	SM 9223B Colilert	Y

Quality Control Report
Batch Summary

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/26/2013
Date Received: 06/21/2013
Continental File No: 8421
Continental Order No: 111882

Test	Testname	QC Batch	Method Blank Date/Time Analyzed	LCS Date/Time Analyzed	MS Lab No. Date/Time Analyzed
GL491	Tot.Coliform & E.Coli, P-A	130621-1	130621BLK1 06/21/13 1315	130621LCS1 06/21/13	13061952MS 06/21/13 1315

Lab numbers associated with this batch:
13061952 13061953 13061954 13061955 13061956 13061957 13061958 13061959

Quality Control Report
Method Blank, LCS, MS/MSD Data

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/26/2013
Date Received: 06/21/2013
Continental File No: 8421
Continental Order No: 111882

Analysis	Blank Data	% Rec LCS	Limits	Spike Level	Units	Spiked Sample (% Recovery) MS	MSD	Limits	Spike Level	Units	Spiked Sample Precision Data RPD	Limit
QC Batch: 130621-1	**For sample analyzed on: 06/21/2013**					**Spiked sample: 13061952**						
Tot.Coliform & E.Coli, P-A		N/A										
Total Coliform Bacteria	Absent	N/A				Present T	Present T	#			**	#
E. Coli Bacteria	Absent	N/A				Absent T	Absent T	#			**	#

Data Qualifiers:

T - MS/MSD cannot be performed for this analysis. The MS result is the same as the sample result. The MSD result is a duplicate of the sample.

- Limits not available.

** - RPD cannot be calculated.

Continental Analytical Services, Inc.

525 N. 8th, Salina, KS 67401
(785) 827-1273 or (800) 535-3076
Fax (785) 823-7830
www.cas-lab.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

Continental Order No.: [Lab to enter Order No.] 111882

Client/Reporting Information	Client Invoice Information
Company Name: CRA	Company Name: Same
Address: 1502 SW 41st. ST.	Address:
City: Topeka State: KS Zip: 66609	City: State: Zip:
Contact:	Contact:
E-mail: Khoeffnere CRAworld.com	E-mail:
Phone: 785-783-8982 Fax:	Phone: Fax:

File No. / Project No.: 080649
Project Name: Douglas County Public Wrks
Purchase Order:
Sampled by (Print): Kirk Hoeffner
Sampled by (Signature): [signature]

Sample Identification (30 characters or less - to appear on lab report)	Matrix (1)	Program (2)	DATE Sampled	TIME Sampled	G - Grab or C - Composite	Total No. of Containers	HCl	NaOH	HNO_3	H_2SO_4	Not Preserved	Other:	Bacteria									Comments
WG-062013-KH-001			6/20/13	12:15	G	1						X	X									Is dry weight required? Write *Dry Wt.* in this column for applicable samples. See (3) below. Is Rush or Emergency TAT required? Write *Rush* or *Emerg* in this column for applicable samples. See (4) below.
WG-062013-KH-002				14:30	G	1						X	X									
WG-062013-KH-003				15:00	G	1						X	X									
WG-062013-KH-004				15:30	G	1						X	X									
WG-062013-KH-005				16:00	G	1						X	X									
WG-062013-KH-006				16:20	G	1						X	X									
WG-062013-KH-007				16:45	G	1						X	X									
WG-062013-KH-008				17:15	G	1						X	X									
			No Entries																			

1. Matrix (sample type): DW = Drinking Water GW = Ground Water WW = Waste Water S = Soil / Solid SL = Sludge OL = Oil / Organic Liquid W = Wipe A = Air O = Other
2. Regulatory Program: D = Drinking Water N = NPDES R = RCRA SL = 503 Sludge O = No program applies If Regulatory Program is "O" or blank, Continental will select the test method.
3. Results will be reported on a wet weight (as received) basis unless dry weight is requested or required (503 regulation, PCB in solid, High level soil VOCs, etc.). Dry weight reporting is subject to an additional charge.
4. Turn around time (TAT): Standard TAT: 15 working days Rush TAT: 5 working days Emergency TAT: 2 - 3 working days Rush TAT and Emergency TAT are subject to an additional charge.

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
[signature]	6/20/13	18:50	FedEx	6/20/13	18:50
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
RECEIVED AT LAB BY:	DATE:	TIME:	SHIPPED VIA:	SEAL #:	
Monica Stafne	6-24-13	9:30	AIR BILL:	SEAL DATE:	

Continental's standard *Terms and Conditions of Sale* will apply to all samples received unless a separate contractual agreement has been made. Please note the enclosed Continental *Sample Acceptance Policy*.

Continental Analytical Services, Inc.
Cooler/Sample Receipt Form (C/S RF)

CAS Order No.: 111882

Client Name: CRA

CAS File No.: 8421

Sample ID's in cooler: See COC

Cooler 1 **of** 1 **for this CAS Order No.**

Cooler Identification: CAS Cooler #: 3475 / Client's Cooler / Box / Letter / Hand-delivered
Other: _____

Date/Time Cooler Received: 6 / 21 / 13 9 : 30

Delivered By: UPS / FedX / AB Express / Field Svcs / Mail / Walk-In / Other: _____

Custody Seal: Present: Intact / Broken Absent: X Seal No: _____
Seal Name: _____ Seal Date: _____
Seal matches Chain of Custody: Yes / No / N/A

Type of Packing Material: Blue Ice / Ice / Melted Ice / Bubble / Foam / Paper / Peanuts / Vermiculite / None / Other: _____

Cooler Temperature (°C): Original Reading (°C) 2.1 Corrected Reading (°C) 2.6
Temp. By: Temp. Blank Cooler Surface: Glass / Plastic /Metal /Other: _____
Thermo. ID No.: 585 Thermo. Correction Factor (°C): 0.5

☐ Evidence of Cooling and date received = date sampled

Sample Receipt Discrepancies: ☒ No ☐ Yes **(See below for discrepancies.)**

Note: If discrepancies are present, CAS will proceed with analyses until/unless directed otherwise by the client.

- ☐ Chain of Custody not present - information taken from:
  - Cover Letter ☐ Container ☐
  - PO ☐ CAS Proj. Mgr. ☐
- ☐ Container label absent
- ☐ Chain of Custody incomplete [see detail below]
- ☐ Chain of Custody missing date/time sampled (excl. TB or Dup.)
- ☐ Date or Time sampled obtained from container label
- ☐ Chain of Custody missing sampler's name
- ☐ Chain of Custody missing matrix (sample type)
- ☐ Missing relinquished information: signature date time
- ☐ Sample excluded from Chain of Custody
- ☐ Sample listed on Chain of Custody, not received
- ☐ Sample description on container and Chain of Custody do not agree
- ☐ Air bubbles in Aqueous VOA vials larger than pea-size [approx. 6 mm]
- ☐ Cooler temperature exceeded 0.1 - 6.0 °C requirement [Do not mark if samples do not require cooling to 0.1 - 6.0 °C.]
- ☐ Broken or leaking containers (detail actions below)
- ☐ Sample container type or labeled chemical preservation inappropriate
- ☐ Other discrepancies: _____

Detail to discrepancies/comments:

Completed by: MWR **Date Completed:** 6/21/13

APPENDIX H

LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY FOR DOMESTIC WELLS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

TestAmerica Job ID: 180-22507-1
Client Project/Site: 080649-02-001 Douglas County Public Work

For:
Conestoga-Rovers & Associates, Inc.
9033 Meridian Way
West Chester, Ohio 45069

Attn: Ms. Angela Bown

Authorized for release by:
7/10/2013 3:31:01 PM

Jill Colussy, Project Manager I
jill.colussy@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Receipt Checklists 23

Job ID: 180-22507-1

Laboratory: TestAmerica Pittsburgh

Narrative

Job Narrative
180-22507-1

Receipt
The samples were received on 6/25/2013 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice.
The temperature of the cooler at receipt was 3.7º C.

The chain of custody did not list sampling dates or times. These were logged in off of the sample containers.

Metals
No analytical or quality issues were noted.

General Chemistry
Sample WG-062013-KH-008 (180-22507-3) was analyzed at a dilution for nitrate nitrite as N. An elevated reporting limit (RL) is provided.
.

Definitions/Glossary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Laboratory: TestAmerica Pittsburgh

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arkansas DEQ	State Program	6	88-0690	06-27-13 *
California	NELAP	9	4224CA	03-31-14
Connecticut	State Program	1	PH-0688	09-30-14
Florida	NELAP	4	E871008	06-30-14
Illinois	NELAP	5	002602	06-30-13 *
Kansas	NELAP	7	E-10350	01-31-14
L-A-B	DoD ELAP		L2314	07-24-13
Louisiana	NELAP	6	04041	06-30-13 *
New Hampshire	NELAP	1	203011	04-05-14
New Jersey	NELAP	2	PA005	06-30-14
New York	NELAP	2	11182	04-01-14
North Carolina DENR	State Program	4	434	12-31-13
Pennsylvania	NELAP	3	02-00416	04-30-14
South Carolina	State Program	4	89014	04-30-13 *
US Fish & Wildlife	Federal		LE94312A-1	11-30-14
USDA	Federal		P-Soil-01	04-16-15
USDA	Federal		P330-10-00139	05-23-16 *
Utah	NELAP	8	STLP	04-30-14
Virginia	NELAP	3	460189	09-14-13
West Virginia DEP	State Program	3	142	01-31-14
Wisconsin	State Program	5	998027800	08-31-13

* Expired certification is currently pending renewal and is considered valid.

Sample Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-22507-1	WG-062013-KH-006	Water	06/20/13 16:20	06/25/13 08:45
180-22507-2	WG-062013-KH-007	Water	06/20/13 16:45	06/25/13 08:45
180-22507-3	WG-062013-KH-008	Water	06/20/13 15:15	06/25/13 08:45
180-22507-4	WG-062413-KH-001	Water	06/24/13 00:00	06/25/13 08:45
180-22507-5	WG-062413-KH-002	Water	06/24/13 15:25	06/25/13 08:45
180-22507-6	WG-062413-KH-003	Water	06/24/13 16:20	06/25/13 08:45

Method Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PIT
7470A	Mercury (CVAA)	SW846	TAL PIT
350.1	Nitrogen, Ammonia	MCAWW	TAL PIT
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL PIT
SM 2320B	Alkalinity	SM	TAL PIT
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PIT
SM 4500 S2 F	Sulfide, Total	SM	TAL PIT

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Client Sample ID: WG-062013-KH-006

Lab Sample ID: 180-22507-1

Date Collected: 06/20/13 16:20

Matrix: Water

Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	75977	06/27/13 08:15	CEH	TAL PIT
Total/NA	Analysis	6010B		1			76247	06/29/13 16:00	WTR	TAL PIT
	Instrument ID: T									
Total/NA	Prep	7470A			50.0 mL	50.0 mL	76624	07/05/13 11:11	JWS	TAL PIT
Total/NA	Analysis	7470A		1			76676	07/05/13 16:26	JWS	TAL PIT
	Instrument ID: G									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	75765	06/25/13 13:04	SJK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	75869	06/26/13 07:59	CLL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	75898	06/26/13 10:53	CMR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	75788	06/26/13 10:00	RDH	TAL PIT
Total/NA	Analysis	350.1		1			76035	06/27/13 13:26	CAK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	353.2		1	8 mL	8 mL	76430	07/02/13 11:25	CAK	TAL PIT
	Instrument ID: ALPKEM1									

Client Sample ID: WG-062013-KH-007

Lab Sample ID: 180-22507-2

Date Collected: 06/20/13 16:45

Matrix: Water

Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	75977	06/27/13 08:15	CEH	TAL PIT
Total/NA	Analysis	6010B		1			76247	06/29/13 16:19	WTR	TAL PIT
	Instrument ID: T									
Total/NA	Prep	7470A			50.0 mL	50.0 mL	76624	07/05/13 11:11	JWS	TAL PIT
Total/NA	Analysis	7470A		1			76676	07/05/13 16:28	JWS	TAL PIT
	Instrument ID: G									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	75765	06/25/13 13:04	SJK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	75869	06/26/13 08:10	CLL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	75898	06/26/13 10:57	CMR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	75788	06/26/13 10:00	RDH	TAL PIT
Total/NA	Analysis	350.1		1			76035	06/27/13 13:31	CAK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	353.2		1	8 mL	8 mL	76430	07/02/13 11:30	CAK	TAL PIT
	Instrument ID: ALPKEM1									

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Client Sample ID: WG-062013-KH-008

Lab Sample ID: 180-22507-3

Date Collected: 06/20/13 15:15
Matrix: Water
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	75977	06/27/13 08:15	CEH	TAL PIT
Total/NA	Analysis	6010B		1			76247	06/29/13 16:24	WTR	TAL PIT
	Instrument ID: T									
Total/NA	Prep	7470A			50.0 mL	50.0 mL	76624	07/05/13 11:11	JWS	TAL PIT
Total/NA	Analysis	7470A		1			76676	07/05/13 16:30	JWS	TAL PIT
	Instrument ID: G									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	75765	06/25/13 13:04	SJK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	75869	06/26/13 08:20	CLL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	75898	06/26/13 11:00	CMR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	75788	06/26/13 10:00	RDH	TAL PIT
Total/NA	Analysis	350.1		1			76035	06/27/13 13:32	CAK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	353.2		5	8 mL	8 mL	76430	07/02/13 12:04	CAK	TAL PIT
	Instrument ID: ALPKEM1									

Client Sample ID: WG-062413-KH-001

Lab Sample ID: 180-22507-4

Date Collected: 06/24/13 00:00
Matrix: Water
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	75977	06/27/13 08:15	CEH	TAL PIT
Total/NA	Analysis	6010B		1			76247	06/29/13 16:28	WTR	TAL PIT
	Instrument ID: T									
Total/NA	Prep	7470A			50.0 mL	50.0 mL	76624	07/05/13 11:11	JWS	TAL PIT
Total/NA	Analysis	7470A		1			76676	07/05/13 16:36	JWS	TAL PIT
	Instrument ID: G									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	75765	06/25/13 13:04	SJK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	75869	06/26/13 08:31	CLL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	75788	06/26/13 10:00	RDH	TAL PIT
Total/NA	Analysis	350.1		1			76035	06/27/13 13:34	CAK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	76385	07/01/13 16:35	CMR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	353.2		1	8 mL	8 mL	76430	07/02/13 11:34	CAK	TAL PIT
	Instrument ID: ALPKEM1									

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Client Sample ID: WG-062413-KH-002

Lab Sample ID: 180-22507-5

Date Collected: 06/24/13 15:25
Matrix: Water
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	75977	06/27/13 08:15	CEH	TAL PIT
Total/NA	Analysis	6010B		1			76247	06/29/13 16:43	WTR	TAL PIT
	Instrument ID: T									
Total/NA	Prep	7470A			50.0 mL	50.0 mL	76624	07/05/13 11:11	JWS	TAL PIT
Total/NA	Analysis	7470A		1			76676	07/05/13 16:37	JWS	TAL PIT
	Instrument ID: G									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	75765	06/25/13 13:04	SJK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	75869	06/26/13 08:41	CLL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	75788	06/26/13 10:00	RDH	TAL PIT
Total/NA	Analysis	350.1		1			76035	06/27/13 13:35	CAK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	76385	07/01/13 16:39	CMR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	353.2		1	8 mL	8 mL	76430	07/02/13 11:35	CAK	TAL PIT
	Instrument ID: ALPKEM1									

Client Sample ID: WG-062413-KH-003

Lab Sample ID: 180-22507-6

Date Collected: 06/24/13 16:20
Matrix: Water
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	75977	06/27/13 08:15	CEH	TAL PIT
Total/NA	Analysis	6010B		1			76247	06/29/13 16:47	WTR	TAL PIT
	Instrument ID: T									
Total/NA	Prep	7470A			50.0 mL	50.0 mL	76624	07/05/13 11:11	JWS	TAL PIT
Total/NA	Analysis	7470A		1			76676	07/05/13 16:39	JWS	TAL PIT
	Instrument ID: G									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	75765	06/25/13 13:04	SJK	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2320B		1	50 mL	50 mL	75869	06/26/13 08:52	CLL	TAL PIT
	Instrument ID: TITRAT1									
Total/NA	Prep	Distill/Ammonia			50 mL	50 mL	75788	06/26/13 10:00	RDH	TAL PIT
Total/NA	Analysis	350.1		1			76035	06/27/13 13:41	CAK	TAL PIT
	Instrument ID: ASTORIA1									
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	76385	07/01/13 16:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	353.2		1	8 mL	8 mL	76430	07/02/13 11:37	CAK	TAL PIT
	Instrument ID: ALPKEM1									

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Analyst References:

Lab: TAL PIT

Batch Type: Prep

CEH = Caitlyn Haluck

JWS = Jim Swanson

RDH = Rachael Hartmann

Batch Type: Analysis

CAK = Chuck Kieda

CLL = Cheryl Loheyde

CMR = Carl Reagle

JWS = Jim Swanson

SJK = Sarah Kunkle

WTR = Bill Reinheimer

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Client Sample ID: WG-062013-KH-006

Lab Sample ID: 180-22507-1
Matrix: Water

Date Collected: 06/20/13 16:20
Date Received: 06/25/13 08:45

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		10	2.7	ug/L		06/27/13 08:15	06/29/13 16:00	1
Cadmium	ND		5.0	0.13	ug/L		06/27/13 08:15	06/29/13 16:00	1
Barium	**850**		200	0.62	ug/L		06/27/13 08:15	06/29/13 16:00	1
Lead	**1.6**	**J**	3.0	1.3	ug/L		06/27/13 08:15	06/29/13 16:00	1
Iron	**3600**		100	12	ug/L		06/27/13 08:15	06/29/13 16:00	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.038	ug/L		07/05/13 11:11	07/05/13 16:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.20**	**B**	0.10	0.027	mg/L		06/26/13 10:00	06/27/13 13:26	1
Nitrate Nitrite as N	**0.031**	**J B**	0.10	0.014	mg/L			07/02/13 11:25	1
Alkalinity	**390**	**B**	5.0	0.41	mg/L			06/26/13 07:59	1
Total Dissolved Solids	**400**		10	10	mg/L			06/25/13 13:04	1
Sulfide	ND		3.0	0.22	mg/L			06/26/13 10:53	1

Client Sample ID: WG-062013-KH-007

Lab Sample ID: 180-22507-2
Matrix: Water

Date Collected: 06/20/13 16:45
Date Received: 06/25/13 08:45

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**5.6**	**J**	10	2.7	ug/L		06/27/13 08:15	06/29/13 16:19	1
Cadmium	ND		5.0	0.13	ug/L		06/27/13 08:15	06/29/13 16:19	1
Barium	**830**		200	0.62	ug/L		06/27/13 08:15	06/29/13 16:19	1
Lead	ND		3.0	1.3	ug/L		06/27/13 08:15	06/29/13 16:19	1
Iron	**9100**		100	12	ug/L		06/27/13 08:15	06/29/13 16:19	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.038	ug/L		07/05/13 11:11	07/05/13 16:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.34**	**B**	0.10	0.027	mg/L		06/26/13 10:00	06/27/13 13:31	1
Nitrate Nitrite as N	**0.039**	**J B**	0.10	0.014	mg/L			07/02/13 11:30	1
Alkalinity	**330**	**B**	5.0	0.41	mg/L			06/26/13 08:10	1
Total Dissolved Solids	**360**		10	10	mg/L			06/25/13 13:04	1
Sulfide	ND		3.0	0.22	mg/L			06/26/13 10:57	1

Client Sample ID: WG-062013-KH-008

Lab Sample ID: 180-22507-3
Matrix: Water

Date Collected: 06/20/13 15:15
Date Received: 06/25/13 08:45

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		10	2.7	ug/L		06/27/13 08:15	06/29/13 16:24	1
Cadmium	ND		5.0	0.13	ug/L		06/27/13 08:15	06/29/13 16:24	1
Barium	**140**	**J**	200	0.62	ug/L		06/27/13 08:15	06/29/13 16:24	1

Client Sample ID: WG-062013-KH-008

Lab Sample ID: 180-22507-3

Date Collected: 06/20/13 15:15

Matrix: Water

Date Received: 06/25/13 08:45

Method: 6010B - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		3.0	1.3	ug/L		06/27/13 08:15	06/29/13 16:24	1
Iron	**150**		100	12	ug/L		06/27/13 08:15	06/29/13 16:24	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.038	ug/L		07/05/13 11:11	07/05/13 16:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.18**	**B**	0.10	0.027	mg/L		06/26/13 10:00	06/27/13 13:32	1
Nitrate Nitrite as N	**21**	**B**	0.50	0.070	mg/L			07/02/13 12:04	5
Alkalinity	**330**	**B**	5.0	0.41	mg/L			06/26/13 08:20	1
Total Dissolved Solids	**500**		10	10	mg/L			06/25/13 13:04	1
Sulfide	ND		3.0	0.22	mg/L			06/26/13 11:00	1

Client Sample ID: WG-062413-KH-001

Lab Sample ID: 180-22507-4

Date Collected: 06/24/13 00:00

Matrix: Water

Date Received: 06/25/13 08:45

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.2**	**J**	10	2.7	ug/L		06/27/13 08:15	06/29/13 16:28	1
Cadmium	**0.32**	**J**	5.0	0.13	ug/L		06/27/13 08:15	06/29/13 16:28	1
Barium	**310**		200	0.62	ug/L		06/27/13 08:15	06/29/13 16:28	1
Lead	ND		3.0	1.3	ug/L		06/27/13 08:15	06/29/13 16:28	1
Iron	**3300**		100	12	ug/L		06/27/13 08:15	06/29/13 16:28	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.038	ug/L		07/05/13 11:11	07/05/13 16:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.18**	**B**	0.10	0.027	mg/L		06/26/13 10:00	06/27/13 13:34	1
Nitrate Nitrite as N	**0.062**	**J B**	0.10	0.014	mg/L			07/02/13 11:34	1
Alkalinity	**370**	**B**	5.0	0.41	mg/L			06/26/13 08:31	1
Total Dissolved Solids	**550**		10	10	mg/L			06/25/13 13:04	1
Sulfide	**0.38**	**J**	3.0	0.22	mg/L			07/01/13 16:35	1

Client Sample ID: WG-062413-KH-002

Lab Sample ID: 180-22507-5

Date Collected: 06/24/13 15:25

Matrix: Water

Date Received: 06/25/13 08:45

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.2**	**J**	10	2.7	ug/L		06/27/13 08:15	06/29/13 16:43	1
Cadmium	ND		5.0	0.13	ug/L		06/27/13 08:15	06/29/13 16:43	1
Barium	**660**		200	0.62	ug/L		06/27/13 08:15	06/29/13 16:43	1
Lead	ND		3.0	1.3	ug/L		06/27/13 08:15	06/29/13 16:43	1
Iron	**13000**		100	12	ug/L		06/27/13 08:15	06/29/13 16:43	1

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Client Sample ID: WG-062413-KH-002

Lab Sample ID: 180-22507-5
Matrix: Water

Date Collected: 06/24/13 15:25
Date Received: 06/25/13 08:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.038	ug/L		07/05/13 11:11	07/05/13 16:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.30**	**B**	0.10	0.027	mg/L		06/26/13 10:00	06/27/13 13:35	1
Nitrate Nitrite as N	**0.040**	**J B**	0.10	0.014	mg/L			07/02/13 11:35	1
Alkalinity	**330**	**B**	5.0	0.41	mg/L			06/26/13 08:41	1
Total Dissolved Solids	**390**		10	10	mg/L			06/25/13 13:04	1
Sulfide	ND		3.0	0.22	mg/L			07/01/13 16:39	1

Client Sample ID: WG-062413-KH-003

Lab Sample ID: 180-22507-6
Matrix: Water

Date Collected: 06/24/13 16:20
Date Received: 06/25/13 08:45

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		10	2.7	ug/L		06/27/13 08:15	06/29/13 16:47	1
Cadmium	ND		5.0	0.13	ug/L		06/27/13 08:15	06/29/13 16:47	1
Barium	**210**		200	0.62	ug/L		06/27/13 08:15	06/29/13 16:47	1
Lead	**4.9**		3.0	1.3	ug/L		06/27/13 08:15	06/29/13 16:47	1
Iron	ND		100	12	ug/L		06/27/13 08:15	06/29/13 16:47	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.038	ug/L		07/05/13 11:11	07/05/13 16:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.10**	**B**	0.10	0.027	mg/L		06/26/13 10:00	06/27/13 13:41	1
Nitrate Nitrite as N	**0.034**	**J B**	0.10	0.014	mg/L			07/02/13 11:37	1
Alkalinity	**330**	**B**	5.0	0.41	mg/L			06/26/13 08:52	1
Total Dissolved Solids	**410**		10	10	mg/L			06/25/13 13:04	1
Sulfide	**0.72**	**J**	3.0	0.22	mg/L			07/01/13 16:43	1

QC Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 180-75977/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76247 — **Prep Batch: 75977**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		10	2.7	ug/L		06/27/13 08:15	06/29/13 15:45	1
Cadmium	ND		5.0	0.13	ug/L		06/27/13 08:15	06/29/13 15:45	1
Barium	ND		200	0.62	ug/L		06/27/13 08:15	06/29/13 15:45	1
Lead	ND		3.0	1.3	ug/L		06/27/13 08:15	06/29/13 15:45	1
Iron	ND		100	12	ug/L		06/27/13 08:15	06/29/13 15:45	1

Lab Sample ID: LCS 180-75977/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76247 — **Prep Batch: 75977**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	500	495		ug/L		99	80 - 120
Cadmium	50.0	48.0		ug/L		96	80 - 120
Barium	2000	2010		ug/L		101	80 - 120
Lead	500	486		ug/L		97	80 - 120
Iron	1000	912		ug/L		91	80 - 120

Lab Sample ID: 180-22507-1 MS — **Client Sample ID: WG-062013-KH-006**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76247 — **Prep Batch: 75977**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	ND		500	516		ug/L		103	75 - 125
Cadmium	ND		50.0	48.4		ug/L		97	75 - 125
Barium	850		2000	2850		ug/L		100	75 - 125
Lead	1.6	J	500	491		ug/L		98	75 - 125
Iron	3600		1000	4380		ug/L		78	75 - 125

Lab Sample ID: 180-22507-1 MSD — **Client Sample ID: WG-062013-KH-006**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76247 — **Prep Batch: 75977**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	ND		500	512		ug/L		102	75 - 125	1	20
Cadmium	ND		50.0	47.7		ug/L		95	75 - 125	1	20
Barium	850		2000	2890		ug/L		102	75 - 125	2	20
Lead	1.6	J	500	488		ug/L		97	75 - 125	1	20
Iron	3600		1000	4450		ug/L		85	75 - 125	2	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-76624/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76676 — **Prep Batch: 76624**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.038	ug/L		07/05/13 11:11	07/05/13 16:05	1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 180-76624/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76676 — **Prep Batch: 76624**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.50	2.39		ug/L		96	80 - 120

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 180-75788/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76035 — **Prep Batch: 75788**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	0.0550	J	0.10	0.027	mg/L		06/26/13 10:00	06/27/13 13:24	1

Lab Sample ID: LCS 180-75788/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76035 — **Prep Batch: 75788**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	2.00	2.01		mg/L		101	90 - 110

Lab Sample ID: 180-22507-1 MS — **Client Sample ID: WG-062013-KH-006**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76035 — **Prep Batch: 75788**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	0.20	B	2.00	2.33		mg/L		107	90 - 110

Lab Sample ID: 180-22507-1 MSD — **Client Sample ID: WG-062013-KH-006**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76035 — **Prep Batch: 75788**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	0.20	B	2.00	2.36		mg/L		108	90 - 110	1	20

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 180-76430/88 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76430

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	0.0220	J	0.10	0.014	mg/L			07/02/13 11:22	1

Lab Sample ID: LCS 180-76430/87 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76430

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	4.00	3.92		mg/L		98	90 - 110

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: 180-22507-1 MS — **Client Sample ID: WG-062013-KH-006**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76430

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate Nitrite as N	0.031	J B	2.00	2.06		mg/L		102	90 - 110		

Lab Sample ID: 180-22507-1 MSD — **Client Sample ID: WG-062013-KH-006**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76430

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	0.031	J B	2.00	2.14		mg/L		106	90 - 110	4	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 180-75869/3 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 75869

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	2.38	J	5.0	0.41	mg/L			06/26/13 06:47	1

Lab Sample ID: LCS 180-75869/2 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 75869

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Alkalinity	250	225		mg/L		90	80 - 120		

Lab Sample ID: 180-22507-6 DU — **Client Sample ID: WG-062413-KH-003**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 75869

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Alkalinity	330	B		333		mg/L				0.1	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 180-75765/2 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 75765

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	10	mg/L			06/25/13 12:20	1

Lab Sample ID: LCS 180-75765/1 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 75765

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids	476	502		mg/L		105	80 - 120		

Method: SM 4500 S2 F - Sulfide, Total

Lab Sample ID: MB 180-75898/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 75898

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3.0	0.22	mg/L			06/26/13 09:42	1

Lab Sample ID: LCS 180-75898/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 75898

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			4.81	4.41		mg/L		92	85 - 115		

Lab Sample ID: LCSD 180-75898/4 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 75898

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide			4.81	4.43		mg/L		92	85 - 115	0	20

Lab Sample ID: MB 180-76385/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76385

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3.0	0.22	mg/L			07/01/13 16:31	1

Lab Sample ID: LCS 180-76385/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76385

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			4.81	5.32		mg/L		111	85 - 115		

Lab Sample ID: LCSD 180-76385/4 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 76385

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide			4.81	5.28		mg/L		110	85 - 115	1	20

QC Association Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

Metals

Prep Batch: 75977

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	3010A	
180-22507-1 MS	WG-062013-KH-006	Total/NA	Water	3010A	
180-22507-1 MSD	WG-062013-KH-006	Total/NA	Water	3010A	
180-22507-2	WG-062013-KH-007	Total/NA	Water	3010A	
180-22507-3	WG-062013-KH-008	Total/NA	Water	3010A	
180-22507-4	WG-062413-KH-001	Total/NA	Water	3010A	
180-22507-5	WG-062413-KH-002	Total/NA	Water	3010A	
180-22507-6	WG-062413-KH-003	Total/NA	Water	3010A	
LCS 180-75977/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 180-75977/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 76247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	6010B	75977
180-22507-1 MS	WG-062013-KH-006	Total/NA	Water	6010B	75977
180-22507-1 MSD	WG-062013-KH-006	Total/NA	Water	6010B	75977
180-22507-2	WG-062013-KH-007	Total/NA	Water	6010B	75977
180-22507-3	WG-062013-KH-008	Total/NA	Water	6010B	75977
180-22507-4	WG-062413-KH-001	Total/NA	Water	6010B	75977
180-22507-5	WG-062413-KH-002	Total/NA	Water	6010B	75977
180-22507-6	WG-062413-KH-003	Total/NA	Water	6010B	75977
LCS 180-75977/2-A	Lab Control Sample	Total/NA	Water	6010B	75977
MB 180-75977/1-A	Method Blank	Total/NA	Water	6010B	75977

Prep Batch: 76624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	7470A	
180-22507-2	WG-062013-KH-007	Total/NA	Water	7470A	
180-22507-3	WG-062013-KH-008	Total/NA	Water	7470A	
180-22507-4	WG-062413-KH-001	Total/NA	Water	7470A	
180-22507-5	WG-062413-KH-002	Total/NA	Water	7470A	
180-22507-6	WG-062413-KH-003	Total/NA	Water	7470A	
LCS 180-76624/2-A	Lab Control Sample	Total/NA	Water	7470A	
MB 180-76624/1-A	Method Blank	Total/NA	Water	7470A	

Analysis Batch: 76676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	7470A	76624
180-22507-2	WG-062013-KH-007	Total/NA	Water	7470A	76624
180-22507-3	WG-062013-KH-008	Total/NA	Water	7470A	76624
180-22507-4	WG-062413-KH-001	Total/NA	Water	7470A	76624
180-22507-5	WG-062413-KH-002	Total/NA	Water	7470A	76624
180-22507-6	WG-062413-KH-003	Total/NA	Water	7470A	76624
LCS 180-76624/2-A	Lab Control Sample	Total/NA	Water	7470A	76624
MB 180-76624/1-A	Method Blank	Total/NA	Water	7470A	76624

QC Association Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-1

General Chemistry

Analysis Batch: 75765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	SM 2540C	
180-22507-2	WG-062013-KH-007	Total/NA	Water	SM 2540C	
180-22507-3	WG-062013-KH-008	Total/NA	Water	SM 2540C	
180-22507-4	WG-062413-KH-001	Total/NA	Water	SM 2540C	
180-22507-5	WG-062413-KH-002	Total/NA	Water	SM 2540C	
180-22507-6	WG-062413-KH-003	Total/NA	Water	SM 2540C	
LCS 180-75765/1	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 180-75765/2	Method Blank	Total/NA	Water	SM 2540C	

Prep Batch: 75788

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	Distill/Ammonia	
180-22507-1 MS	WG-062013-KH-006	Total/NA	Water	Distill/Ammonia	
180-22507-1 MSD	WG-062013-KH-006	Total/NA	Water	Distill/Ammonia	
180-22507-2	WG-062013-KH-007	Total/NA	Water	Distill/Ammonia	
180-22507-3	WG-062013-KH-008	Total/NA	Water	Distill/Ammonia	
180-22507-4	WG-062413-KH-001	Total/NA	Water	Distill/Ammonia	
180-22507-5	WG-062413-KH-002	Total/NA	Water	Distill/Ammonia	
180-22507-6	WG-062413-KH-003	Total/NA	Water	Distill/Ammonia	
LCS 180-75788/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 180-75788/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 75869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	SM 2320B	
180-22507-2	WG-062013-KH-007	Total/NA	Water	SM 2320B	
180-22507-3	WG-062013-KH-008	Total/NA	Water	SM 2320B	
180-22507-4	WG-062413-KH-001	Total/NA	Water	SM 2320B	
180-22507-5	WG-062413-KH-002	Total/NA	Water	SM 2320B	
180-22507-6	WG-062413-KH-003	Total/NA	Water	SM 2320B	
180-22507-6 DU	WG-062413-KH-003	Total/NA	Water	SM 2320B	
LCS 180-75869/2	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 180-75869/3	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 75898

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	SM 4500 S2 F	
180-22507-2	WG-062013-KH-007	Total/NA	Water	SM 4500 S2 F	
180-22507-3	WG-062013-KH-008	Total/NA	Water	SM 4500 S2 F	
LCS 180-75898/3	Lab Control Sample	Total/NA	Water	SM 4500 S2 F	
LCSD 180-75898/4	Lab Control Sample Dup	Total/NA	Water	SM 4500 S2 F	
MB 180-75898/5	Method Blank	Total/NA	Water	SM 4500 S2 F	

Analysis Batch: 76035

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	350.1	75788
180-22507-1 MS	WG-062013-KH-006	Total/NA	Water	350.1	75788
180-22507-1 MSD	WG-062013-KH-006	Total/NA	Water	350.1	75788
180-22507-2	WG-062013-KH-007	Total/NA	Water	350.1	75788
180-22507-3	WG-062013-KH-008	Total/NA	Water	350.1	75788
180-22507-4	WG-062413-KH-001	Total/NA	Water	350.1	75788

General Chemistry (Continued)

Analysis Batch: 76035 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-5	WG-062413-KH-002	Total/NA	Water	350.1	75788
180-22507-6	WG-062413-KH-003	Total/NA	Water	350.1	75788
LCS 180-75788/2-A	Lab Control Sample	Total/NA	Water	350.1	75788
MB 180-75788/1-A	Method Blank	Total/NA	Water	350.1	75788

Analysis Batch: 76385

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-4	WG-062413-KH-001	Total/NA	Water	SM 4500 S2 F	
180-22507-5	WG-062413-KH-002	Total/NA	Water	SM 4500 S2 F	
180-22507-6	WG-062413-KH-003	Total/NA	Water	SM 4500 S2 F	
LCS 180-76385/3	Lab Control Sample	Total/NA	Water	SM 4500 S2 F	
LCSD 180-76385/4	Lab Control Sample Dup	Total/NA	Water	SM 4500 S2 F	
MB 180-76385/5	Method Blank	Total/NA	Water	SM 4500 S2 F	

Analysis Batch: 76430

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	353.2	
180-22507-1 MS	WG-062013-KH-006	Total/NA	Water	353.2	
180-22507-1 MSD	WG-062013-KH-006	Total/NA	Water	353.2	
180-22507-2	WG-062013-KH-007	Total/NA	Water	353.2	
180-22507-3	WG-062013-KH-008	Total/NA	Water	353.2	
180-22507-4	WG-062413-KH-001	Total/NA	Water	353.2	
180-22507-5	WG-062413-KH-002	Total/NA	Water	353.2	
180-22507-6	WG-062413-KH-003	Total/NA	Water	353.2	
LCS 180-76430/87	Lab Control Sample	Total/NA	Water	353.2	
MB 180-76430/88	Method Blank	Total/NA	Water	353.2	

CONESTOGA-ROVERS & ASSOCIATES

CHAIN OF CUSTODY RECORD 3.7 #2

COC NO.: 38040

PAGE 1 OF 1

(See Reverse Side for Instructions)

Address: 1502 SW 41st. St.

Phone: 785-793-8982 Fax:

7/10/2013

Project No/ Phase/Task Code: 080649-02	Laboratory Name: Test America	Lab Location: Pittsburgh, PA	SSOW ID:
Project Name: Douglas County Public Works	Lab Contact:	Lab Quote No:	Cooler No: 1
Project Location: Lawrence, KS.			Carrier: Fed Ex
Chemistry Contact:			Airbill No:
Sampler(s): Kirk Hoeffner			Date Shipped: 6/24/13

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Unpreserved	Hydrochloric Acid (HCl)	Nitric Acid (HNO_3)	Sulfuric Acid (H_2SO_4)	Sodium Hydroxide (NaOH)	Methanol/Water (Soil VOC)	EnCores 3x5-g, 1x25-g	Other: Zinc Acetate	Total Containers/Sample	Nitrate/Nitrite	Alkalinity	Mercury	TDS	Sulfide	Ammonia	Select Metals				MS/MSD Request	Comments/ Special Instructions:
1	WG-062013-KH-006					2		1	1				1	5	X	X	X	X	X	X	X					See SSOW for
2	WG-062013-KH-007					2		1	1				1	5	X	X	X	X	X	X	X					Select Metals
3	WG-062013-KH-008					2		1	1				1	5	X	X	X	X	X	X	X					
4	WG-062413-KH-001					2		1	1				1	5	X	X	X	X	X	X	X					
5	WG-062413-KH-002					2		1	1				1	5	X	X	X	X	X	X	X					
6	WG-062413-KH-003					2		1	1				1	5	X	X	X	X	X	X	X					
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										

No Entries

180-22507 Chain of Custody

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☐ 2 Week ☐ Other:

Total Number of Containers: 30

All Samples in Cooler must be on COC

Notes/ Special Requirements:

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1. Kirk Hoeffner	CRA	6/24/13	18:50	1. Fed Ex	Fed Ex	6/24/13	18:50
2. [signature]				2. [signature]	TA Pitts	6-25-13	845
3.				3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

CRA Form: COC-10B (20110804)

Login Sample Receipt Checklist

Client: Conestoga-Rovers & Associates, Inc.

Job Number: 180-22507-1

Login Number: 22507

List Source: TestAmerica Pittsburgh

List Number: 1

Creator: O'Donnell, Brandon R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	False	No date or time on COC, logged in per container labels.
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

TestAmerica Job ID: 180-22507-2
Client Project/Site: 080649-02-001 Douglas County Public Work

For:
Conestoga-Rovers & Associates, Inc.
9033 Meridian Way
West Chester, Ohio 45069

Attn: Ms. Angela Bown

Authorized for release by:
7/18/2013 5:06:18 PM

Jill Colussy, Project Manager I
jill.colussy@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Job ID: 180-22507-2

Laboratory: TestAmerica Pittsburgh

Narrative

Job Narrative
180-22507-2

Receipt
The samples were received on 6/25/2013 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice.
The temperature of the cooler at receipt was 3.7º C.

The chain of custody did not list sampling dates or times. These were logged in off of the sample containers.

General Chemistry
No analytical or quality issues were noted.

Definitions/Glossary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Qualifiers

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Laboratory: TestAmerica Pittsburgh

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arkansas DEQ	State Program	6	88-0690	06-27-13 *
California	NELAP	9	4224CA	03-31-14
Connecticut	State Program	1	PH-0688	09-30-14
Florida	NELAP	4	E871008	06-30-14
Illinois	NELAP	5	002602	06-30-13 *
Kansas	NELAP	7	E-10350	01-31-14
L-A-B	DoD ELAP		L2314	07-16-16
Louisiana	NELAP	6	04041	06-30-13 *
New Hampshire	NELAP	1	203011	04-05-14
New Jersey	NELAP	2	PA005	06-30-14
New York	NELAP	2	11182	04-01-14
North Carolina DENR	State Program	4	434	12-31-13
Pennsylvania	NELAP	3	02-00416	04-30-14
South Carolina	State Program	4	89014	04-30-13 *
US Fish & Wildlife	Federal		LE94312A-1	11-30-14
USDA	Federal		P-Soil-01	04-16-15
USDA	Federal		P330-10-00139	05-23-16 *
Utah	NELAP	8	STLP	04-30-14
Virginia	NELAP	3	460189	09-14-13
West Virginia DEP	State Program	3	142	01-31-14
Wisconsin	State Program	5	998027800	08-31-13 *

* Expired certification is currently pending renewal and is considered valid.

Sample Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-22507-1	WG-062013-KH-006	Water	06/20/13 16:20	06/25/13 08:45
180-22507-2	WG-062013-KH-007	Water	06/20/13 16:45	06/25/13 08:45
180-22507-3	WG-062013-KH-008	Water	06/20/13 15:15	06/25/13 08:45
180-22507-4	WG-062413-KH-001	Water	06/24/13 00:00	06/25/13 08:45
180-22507-5	WG-062413-KH-002	Water	06/24/13 15:25	06/25/13 08:45
180-22507-6	WG-062413-KH-003	Water	06/24/13 16:20	06/25/13 08:45

Method Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PIT

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Client Sample ID: WG-062013-KH-006 — Lab Sample ID: 180-22507-1

Date Collected: 06/20/13 16:20 — **Matrix: Water**
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			77757	07/17/13 11:11	MJH	TAL PIT
	Instrument ID:	ICS2000								

Client Sample ID: WG-062013-KH-007 — Lab Sample ID: 180-22507-2

Date Collected: 06/20/13 16:45 — **Matrix: Water**
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			77757	07/17/13 11:29	MJH	TAL PIT
	Instrument ID:	ICS2000								

Client Sample ID: WG-062013-KH-008 — Lab Sample ID: 180-22507-3

Date Collected: 06/20/13 15:15 — **Matrix: Water**
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			77757	07/17/13 11:48	MJH	TAL PIT
	Instrument ID:	ICS2000								

Client Sample ID: WG-062413-KH-001 — Lab Sample ID: 180-22507-4

Date Collected: 06/24/13 00:00 — **Matrix: Water**
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			77757	07/17/13 12:06	MJH	TAL PIT
	Instrument ID:	ICS2000								

Client Sample ID: WG-062413-KH-002 — Lab Sample ID: 180-22507-5

Date Collected: 06/24/13 15:25 — **Matrix: Water**
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			77757	07/17/13 12:25	MJH	TAL PIT
	Instrument ID:	ICS2000								

Client Sample ID: WG-062413-KH-003 — Lab Sample ID: 180-22507-6

Date Collected: 06/24/13 16:20 — **Matrix: Water**
Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			77757	07/17/13 14:16	MJH	TAL PIT
	Instrument ID:	ICS2000								

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Client Sample ID: WG-062413-KH-003

Lab Sample ID: 180-22507-6

Date Collected: 06/24/13 16:20

Matrix: Water

Date Received: 06/25/13 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			77805	07/18/13 15:15	MJH	TAL PIT
	Instrument ID: IC25									

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Analysis

MJH = Matthew Hartman

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Client Sample ID: WG-062013-KH-006

Lab Sample ID: 180-22507-1
Date Collected: 06/20/13 16:20
Matrix: Water
Date Received: 06/25/13 08:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.7	B	1.0	0.20	mg/L			07/17/13 11:11	1
Sulfate	9.3	B	1.0	0.21	mg/L			07/17/13 11:11	1

Client Sample ID: WG-062013-KH-007

Lab Sample ID: 180-22507-2
Date Collected: 06/20/13 16:45
Matrix: Water
Date Received: 06/25/13 08:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.8	B	1.0	0.20	mg/L			07/17/13 11:29	1
Sulfate	47	B	1.0	0.21	mg/L			07/17/13 11:29	1

Client Sample ID: WG-062013-KH-008

Lab Sample ID: 180-22507-3
Date Collected: 06/20/13 15:15
Matrix: Water
Date Received: 06/25/13 08:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	8.9	B	1.0	0.20	mg/L			07/17/13 11:48	1
Sulfate	88	B	1.0	0.21	mg/L			07/17/13 11:48	1

Client Sample ID: WG-062413-KH-001

Lab Sample ID: 180-22507-4
Date Collected: 06/24/13 00:00
Matrix: Water
Date Received: 06/25/13 08:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	15	B	1.0	0.20	mg/L			07/17/13 12:06	1
Sulfate	190	B	1.0	0.21	mg/L			07/17/13 12:06	1

Client Sample ID: WG-062413-KH-002

Lab Sample ID: 180-22507-5
Date Collected: 06/24/13 15:25
Matrix: Water
Date Received: 06/25/13 08:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.4	B	1.0	0.20	mg/L			07/17/13 12:25	1
Sulfate	44	B	1.0	0.21	mg/L			07/17/13 12:25	1

Client Sample ID: WG-062413-KH-003

Lab Sample ID: 180-22507-6
Date Collected: 06/24/13 16:20
Matrix: Water
Date Received: 06/25/13 08:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11		1.0	0.20	mg/L			07/18/13 15:15	1
Sulfate	78	B	1.0	0.21	mg/L			07/17/13 14:16	1

QC Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 180-77757/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 77757

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.331	J	1.0	0.20	mg/L			07/17/13 10:40	1
Sulfate	0.343	J	1.0	0.21	mg/L			07/17/13 10:40	1

Lab Sample ID: LCS 180-77757/5 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 77757

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	50.5		mg/L		101	90 - 110
Sulfate	50.0	50.9		mg/L		102	90 - 110

Lab Sample ID: 180-22507-3 MS — **Client Sample ID: WG-062013-KH-008**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 77757

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	8.9	B	25.0	34.6		mg/L		103	80 - 120
Sulfate	88	B	25.0	114		mg/L		107	80 - 120

Lab Sample ID: 180-22507-3 MSD — **Client Sample ID: WG-062013-KH-008**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 77757

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	8.9	B	25.0	33.7		mg/L		99	80 - 120	3	20
Sulfate	88	B	25.0	111		mg/L		96	80 - 120	2	20

Lab Sample ID: MB 180-77805/12 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 77805

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.20	mg/L			07/18/13 15:40	1

Lab Sample ID: LCS 180-77805/11 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 77805

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	49.5		mg/L		99	90 - 110

QC Association Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22507-2

General Chemistry

Analysis Batch: 77757

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-1	WG-062013-KH-006	Total/NA	Water	300.0	
180-22507-2	WG-062013-KH-007	Total/NA	Water	300.0	
180-22507-3	WG-062013-KH-008	Total/NA	Water	300.0	
180-22507-3 MS	WG-062013-KH-008	Total/NA	Water	300.0	
180-22507-3 MSD	WG-062013-KH-008	Total/NA	Water	300.0	
180-22507-4	WG-062413-KH-001	Total/NA	Water	300.0	
180-22507-5	WG-062413-KH-002	Total/NA	Water	300.0	
180-22507-6	WG-062413-KH-003	Total/NA	Water	300.0	
LCS 180-77757/5	Lab Control Sample	Total/NA	Water	300.0	
MB 180-77757/6	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 77805

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22507-6	WG-062413-KH-003	Total/NA	Water	300.0	
LCS 180-77805/11	Lab Control Sample	Total/NA	Water	300.0	
MB 180-77805/12	Method Blank	Total/NA	Water	300.0	

CONESTOGA-ROVERS & ASSOCIATES

CHAIN OF CUSTODY RECORD 3.7 ~~82~~

COC NO.: 38040

PAGE 1 OF 1

(See Reverse Side for Instructions)

Address: 1502 SW 41st. St.

Phone: 785-783-8982 Fax:

7/18/2013

Project No/ Phase/Task Code: 080649-02	Laboratory Name: Test America	Lab Location: Pittsburgh, PA	SSOW ID:
Project Name: Douglas County Public Works	Lab Contact:	Lab Quote No:	Cooler No: 1
Project Location: Lawrence, KS.			Carrier: Fed Ex
Chemistry Contact:			Airbill No:
Sampler(s): Kirk Hoeffner			Date Shipped: 6/24/13

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Unpreserved	Hydrochloric Acid (HCl)	Nitric Acid (HNO_3)	Sulfuric Acid (H_2SO_4)	Sodium Hydroxide (NaOH)	Methanol/Water (Soil VOC)	EnCores 5x5-g, 1x25-g	Other: Zinc Acetate NaOH	Total Containers/Sample	Nitrate/Nitrite	Alkalinity	Mercury	TDS	Sulfide	Ammonia	Select Metals				MS/MSD Request	Comments/ Special Instructions:
1	WG-062013-KH-006					2		1	1				1	5	X	X	X	X	X	X	X					See SSOW for Select Metals
2	WG-062013-KH-007					2		1	1				1	5	X	X	X	X	X	X	X					
3	WG-062013-KH-008					2		1	1				1	5	X	X	X	X	X	X	X					
4	WG-062413-KH-001					2		1	1				1	5	X	X	X	X	X	X	X					
5	WG-062413-KH-002					2		1	1				1	5	X	X	X	X	X	X	X					
6	WG-062413-KH-003					2		1	1				1	5	X	X	X	X	X	X	X					
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										

No Entries

180-22507 Chain of Custody

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☐ 2 Week ☐ Other:

Total Number of Containers: 30

All Samples in Cooler must be on COC

Notes/ Special Requirements:

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1. Kirk Hoeffner	CRA	6/24/13	18:50	1. Fed Ex	Fed Ex	6/24/13	18:50
2. [signature]				2. [signature]	TA Nix	6-25-13	845
3.				3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT — ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE — Fully Executed Copy (CRA) YELLOW — Receiving Laboratory Copy PINK — Shipper GOLDENROD — Sampling Crew

CRA Form: COC-10B (20110804)

Login Sample Receipt Checklist

Client: Conestoga-Rovers & Associates, Inc.

Job Number: 180-22507-2

Login Number: 22507

List Source: TestAmerica Pittsburgh

List Number: 1

Creator: O'Donnell, Brandon R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	False	No date or time on COC, logged in per container labels.
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Continental Analytical Services, Inc.

Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date and Time Received: 06/25/2013 1154
Continental File No.: 8421
Continental Order No.: 111941
Project ID: Douglas Co PW

Dear Mr. Hoeffner:

This laboratory report, containing the samples indicated below, includes 7 pages for the analytical report, 1 page(s) for the chain of custody and/or analysis request, and 1 page(s) for the sample receipt form.

CAS LAB ID #	SAMPLE DESCRIPTION	SAMPLE TYPE	DATE SAMPLED
13062126	WG-062413-KH-001	Liquid	6/24/2013
13062127	WG-062413-KH-002	Liquid	6/24/2013
13062128	WG-062413-KH-003	Liquid	6/24/2013

The Appendix and Quality Control sections are integral parts of this laboratory report and may contain important data qualifiers.

All results are reported on a wet weight basis unless otherwise stated.

Samples will be retained for thirty days unless Continental is otherwise notified.

Continental is accredited by the State of Kansas through the National Environmental Laboratory Accreditation Program (NELAP). The results contained in this report were obtained using Continental's Standard Operating Procedures. These procedures are in substantial compliance with the approved methods referenced and the standards published by NELAP unless otherwise noted in the Appendix and Quality Control sections of this report.

This report may not be reproduced, except in full, without written approval from Continental Analytical Services, Inc.

Thank you for choosing Continental for this project.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Technical Manager

Petra M. Craddock
Project Manager

525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737
785-827-1273 800-535-3076 Fax 785-823-7830

KDHE Environmental Laboratory Accreditation No. E-10146

Sample Results

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/27/2013
Date Received: 06/25/2013
Continental File No: 8421
Continental Order No: 111941

Lab Number: 13062126
Sample Description: WG-062413-KH-001

Date Sampled: 06/24/2013
Time Sampled: 1510

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/613
E. Coli Bacteria	Absent		7055/613

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/25/13 1400	130625-1	130625-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13062126

Lab Number: 13062127
Sample Description: WG-062413-KH-002

Date Sampled: 06/24/2013
Time Sampled: 1525

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/613
E. Coli Bacteria	Absent		7055/613

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/25/13 1400	130625-1	130625-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13062127

Sample Results

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/27/2013
Date Received: 06/25/2013
Continental File No: 8421
Continental Order No: 111941

Lab Number: 13062128
Sample Description: WG-062413-KH-003

Date Sampled: 06/24/2013
Time Sampled: 1620

Analysis	Concentration	Units	Book/Page
Tot.Coliform & E.Coli, P-A			
Total Coliform Bacteria	Present		7055/613
E. Coli Bacteria	Absent		7055/613

Analysis	Date/Time Prepared	Date/Time Analyzed	QC Batch	Inst. Batch	Analyst	Method(s)
Tot.Coliform & E.Coli, P-	N/A	06/25/13 1400	130625-1	130625-1	ASK	SM 9223B Colilert

Conclusion of Lab Number: 13062128

Appendix

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/27/2013
Date Received: 06/25/2013
Continental File No: 8421
Continental Order No: 111941

ND(), where reported, indicates the analyte was not detected above the Limit of Quantitation (LOQ). The concentration of the LOQ is inside the parentheses.

Not all samples were received at a temperature of less than 6 degrees Celsius. Refer to the enclosed Cooler/Sample Receipt Form(s) for the affected cooler(s) and sample(s).

The following table presents the date and time sampled, the date and time analyzed, and the total time elapsed for each analysis with an EPA recommended holding time of seventy-two hours or less.

CAS LAB ID #	ANALYSIS	DATE/TIME SAMPLED	DATE/TIME ANALYZED	ELAPSED HRS:MIN
13062126	Tot.Coliform & E.Coli, P-A	06/24/2013 1510		
13062126	Total Coliform Bacteria	06/24/2013 1510	06/25/2013 1400	22:50
13062126	E. Coli Bacteria	06/24/2013 1510	06/25/2013 1400	22:50
13062127	Tot.Coliform & E.Coli, P-A	06/24/2013 1525		
13062127	Total Coliform Bacteria	06/24/2013 1525	06/25/2013 1400	22:35
13062127	E. Coli Bacteria	06/24/2013 1525	06/25/2013 1400	22:35
13062128	Tot.Coliform & E.Coli, P-A	06/24/2013 1620		
13062128	Total Coliform Bacteria	06/24/2013 1620	06/25/2013 1400	21:40
13062128	E. Coli Bacteria	06/24/2013 1620	06/25/2013 1400	21:40

Accreditation Summary

Client: Conestoga-Rovers & Associates
Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/27/2013
Date Received: 06/25/2013
Continental File No: 8421
Continental Order No: 111941

NELAP accreditation is issued under each EPA regulatory program for a given matrix/analyte/method combination. Continental is NELAP accredited for each matrix/analyte/method and EPA program cited in this Laboratory Report, except for those listed in the table below and for analyses performed in the field. For most of the analyses listed in the table, NELAP accreditation is not offered under the listed EPA program and Continental is NELAP accredited for the analysis, using the same analytical technology, but under a different EPA program. Continental's full NELAP accreditation status may be viewed at www.kdheks.gov/envlab. Note that unless qualified otherwise in the Laboratory Report, Continental performs all analyses, including each analysis listed in the table below, utilizing NELAP protocol.

Test	Analysis	Matrix-Regulatory Program	Method	CAS NELAP Accredited in Other Reg. Program

CAS is accredited for all analytes.

Quality Control Report
Batch Summary

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/27/2013
Date Received: 06/25/2013
Continental File No: 8421
Continental Order No: 111941

Test	Testname	QC Batch	Method Blank Date/Time Analyzed	LCS Date/Time Analyzed	MS Lab No. Date/Time Analyzed
GL491	Tot.Coliform & E.Coli, P-A	130625-1	130625BLK1 06/25/13 1400	130625LCS1 06/25/13	13062126MS 06/25/13 1400

Lab numbers associated with this batch:
13062126 13062127 13062128

Quality Control Report
Method Blank, LCS, MS/MSD Data

Client: Conestoga-Rovers & Associates
Attn: Kirk Hoeffner
1502 SW 41st St.
Topeka, KS 66609

Date Reported: 06/27/2013
Date Received: 06/25/2013
Continental File No: 8421
Continental Order No: 111941

Analysis	Blank Data	% Rec LCS	Limits	Spike Level	Units	Spiked Sample (% Recovery) MS	MSD	Limits	Spike Level	Units	Spiked Sample Precision Data RPD	Limit
QC Batch: 130625-1	**For sample analyzed on: 06/25/2013**					**Spiked sample: 13062126**						
Tot.Coliform & E.Coli, P-A		N/A										
Total Coliform Bacteria	Absent	N/A				Present T	Present T	#			**	#
E. Coli Bacteria	Absent	N/A				Absent T	Absent T	#			**	#

Data Qualifiers:

T - MS/MSD cannot be performed for this analysis. The MS result is the same as the sample result. The MSD result is a duplicate of the sample.

- Limits not available.

** - RPD cannot be calculated.

CONESTOGA-ROVERS & ASSOCIATES

CHAIN OF CUSTODY RECORD

CAS ORDER NO: 11194 COC NO.: 38037

Address: 1502 SW 41st St.

Phone: 785-783-8982 Fax:

Discrepancies See C/S RF

PAGE 1 OF 1

(See Reverse Side for Instructions)

Project No/ Phase/Task Code: ~~0999~~ 080649-2	Laboratory Name: Continental Analytical	Lab Location: Salina, KS	SSOW ID:
Project Name: Douglas Co. Public Works	Lab Contact: Petra Craddock	Lab Quote No:	Cooler No: 1
Project Location: Lawrence, KS			Carrier: FedEx
Chemistry Contact: Angie Bown			Airbill No:
Sampler(s): Kirk Hoeffner			Date Shipped: 6/24/13

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Unpreserved	Hydrochloric Acid (HCl)	Nitric Acid (HNO_3)	Sulfuric Acid (H_2SO_4)	Sodium Hydroxide (NaOH)	Methanol/Water (Soil VOC)	EnCores 3x5-g, 1x25-g	Other:	Total Containers/Sample	Bacteria										MS/MSD Request	Comments/ Special Instructions:
1	WG-062413-KH-001	6/24/13	15:10												X											
2	WG-062413-KH-002	6/24/13	15:25												X											
3	WG-062413-KH-003	6/24/13	16:20												X											
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☐ 2 Week ☐ Other:

Total Number of Containers:

All Samples in Cooler must be on COC

Notes/ Special Requirements:

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1. Kirk Hoeffner	CRA	6/24/13		1.			
2. [illegible]	CRA	6/25/13	11:54 A.	2. [illegible]	CRA	6-25-13	1154
3.				3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

CRA Form: COC-10B (20110804)

Continental Analytical Services, Inc.
Cooler/Sample Receipt Form (C/S RF)

CAS Order No.:

Client Name: CKA **CAS File No.:** 8121

Sample ID's in cooler: See COC

Cooler 1 **of** 1 **for this CAS Order No.**

Cooler Identification: CAS Cooler #: _____ / Client's Cooler / Box / Letter / Hand-delivered
Other: _____

Date/Time Cooler Received: 6 / 25 / 13 11 : 54

Delivered By: UPS / FedX / AB Express / Field Svcs / Mail / Walk-In / Other: _____

Custody Seal: Present: Intact / Broken Absent: ✓ Seal No: _____
Seal Name: _____ Seal Date: _____
Seal matches Chain of Custody: Yes / No / N/A

Type of Packing Material: Blue Ice / Ice / Melted Ice / Bubble / Foam / Paper / Peanuts / Vermiculite / None / Other: _____

Cooler Temperature (°C): Original Reading (°C) 12.3 Corrected Reading (°C) 12.8
Temp. By: Temp. Blank Cooler Surface: Glass / Plastic /Metal /Other: _____
Thermo. ID No.: 585 Thermo. Correction Factor (°C): 0.5

☐ Evidence of Cooling and date received = date sampled

Sample Receipt Discrepancies: ☐ **No** ☒ **Yes** **(See below for discrepancies.)**

Note: If discrepancies are present, CAS will proceed with analyses until/unless directed otherwise by the client.

- ☐ Chain of Custody not present - information taken from:
  - Cover Letter ☐ Container ☐
  - PO ☐ CAS Proj. Mgr. ☐
- ☐ Container label absent
- ☐ Chain of Custody incomplete [see detail below]
- ☐ Chain of Custody missing date/time sampled (excl. TB or Dup.)
- ☐ Date or Time sampled obtained from container label
- ☐ Chain of Custody missing sampler's name
- ☐ Chain of Custody missing matrix (sample type)
- ☐ Missing relinquished information: signature date time
- ☐ Sample excluded from Chain of Custody
- ☐ Sample listed on Chain of Custody, not received
- ☐ Sample description on container and Chain of Custody do not agree
- ☐ Air bubbles in Aqueous VOA vials larger than pea-size [approx. 6 mm]
- ☒ Cooler temperature exceeded 0.1 - 6.0 °C requirement [Do not mark if samples do not require cooling to 0.1 - 6.0 °C.]
- ☐ Broken or leaking containers (detail actions below)
- ☐ Sample container type or labeled chemical preservation inappropriate
- ☐ Other discrepancies: _____

Detail to discrepancies/comments:

Completed by: _____ **Date Completed:** 6/25/13

APPENDIX I

PHASE I ESA REPORT

TRANSACTION SCREEN SITE ASSESSMENT

DOUGLAS COUNTY PUBLIC WORKS
LAWRENCE, DOUGLAS COUNTY, KANSAS

Prepared for:
Douglas County Public Works

DISCLAIMER:
SOME FORMATTING CHANGES MAY HAVE OCCURRED WHEN THE ORIGINAL DOCUMENT WAS PRINTED TO PDF; HOWEVER, THE ORIGINAL CONTENT REMAINS UNCHANGED.

JULY 2013
REF. NO. 080649

Prepared by:
Conestoga-Rovers & Associates

1801 Old Highway 8
Suite 114
St. Paul, Minnesota 55112

Office: (651) 639-0913
Fax: (651) 639-0923

web: http:\\www.CRAworld.com

TRANSACTION SCREEN SITE ASSESSMENT

DOUGLAS COUNTY PUBLIC WORKS
LAWRENCE, DOUGLAS COUNTY, KANSAS

Prepared for:
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web: http:\\www.CRAworld.com

JULY 2013
REF. NO. 080649
This report is printed on recycled paper.

TRANSACTION SCREEN SITE INSPECTION SUMMARY
DOUGLAS COUNTY PUBLIC WORKS
LAWRENCE, DOUGLAS COUNTY, KANSAS

1.0 SITE SUMMARY

On May 16, 2013 a Site visit was completed by Kirk Hoeffner of Conestoga-Rovers & Associates at a parcel of cultivated farmland located in Eudora, Douglas County, Kansas. At the time of the review, no documents regarding the Site were available. CRA interviewed Ms. Melanie Lorenzo of Van LLC, the owner of the property, who has been familiar with the Site for approximately 9 years. Based on information provided in the Environmental Lien Report, Van LLC purchased the Site from Penny's Concrete Inc. in September 2004. An environmental database search was reviewed subsequent to the Site inspection.

The Site consists of approximately 166 acres of vacant, cultivated farmland. The Site is located in a mixed agricultural and industrial area at the eastern end of Lawrence, Douglas County, Kansas. There are no buildings or structures located on the Site. Van LLC currently leases the property for agricultural purposes.

Adjacent properties include:

- Penny's Concrete, Inc. to the north and beyond is the Kansas River
- A farmstead and cultivated farmland to the east
- Cultivated farmland to the south
- Farmsteads and cultivated farmland to the west

No evidence of adverse impact to the Site from the adjacent properties was observed during the Site inspection.

2.0 ENVIRONMENTAL REVIEW

- Database Review: The Site and immediately adjacent properties were not listed in any of the regulatory databases reviewed.
- Aerial Photographs: CRA reviewed aerial photographs for the years 1948, 1967, 1970, 1977, 1981, 1985, 1991, 1996, 2002, 2006, and 2012. Based on the review of the aerial photographs, the Site has always been cultivated farmland. A small water filled depression was visible on the western portion of the Site in the 1948 and 1991 aerial photographs.
- Historical Topographic Maps: CRA reviewed topographic maps for the years 1885, 1950, 1967, and 1978. Based on the review of the topographic maps, the Site has always been vacant land with no buildings present. A small creek that feeds into the Kansas River is visible on the northern portion of the Site.
- City Directories: There is no street address associated with the Site. Therefore, no city directory search was conducted.
- Sanborn Maps: No Sanborn maps were reported to be available for the Site in the EDR Sanborn map library.
- Environmental Lien Search: Based on the environmental lien search conducted for the property, no environmental lines were recorded for the Site in the Douglas county property records. The Site was not listed in the database search as having any environmental liens or activity and use limitations (AULs).
- Water Supply: No water is currently supplied to the Site. No evidence of water wells was observed by CRA during the Site inspection.
- USTs: No evidence of USTs was observed by CRA during the Site inspection. According to Site personnel, no USTs were present at the Site.
- ASTs: No ASTs are located at the Site at this time.
- Chemical Use and Storage: No liquid chemicals are stored at the Site. Based on the current and historical use of the Site as cultivated farmland, agricultural chemicals such as pesticides, herbicides and fertilizer are and likely have been used on the Site. Information regarding historical use, storage or application rates was not available. If the chemicals are applied in accordance with manufacturer recommendations, residuals remaining in Site soils are expected to be similar to other area properties. No information was available to determine whether residual concentrations exceeded government use or exposure criteria.
- Wastewater/Stormwater: No process wastewater is generated at the Site. All stormwater drains to a ditch along the east side of the property and then to the Kansas River.
- Solid Waste: No solid waste is generated at the Site. Site personnel were unaware of any on-Site waste disposal. No evidence of on-Site waste disposal was observed by CRA.
- Hazardous Waste: No hazardous wastes are generated at the Site.
- Air Emissions: No air emissions are currently generated.
- CERCLA Issues: According to Mr. Schaake, Van LLC has not received any notices of involvement or requests for information for use of an off-Site waste handling/disposal facility.

- Spills/Releases: No areas of staining, distressed vegetation, pools of unknown liquid or other evidence of surficial hazardous materials releases was observed during the Site inspection.
- Asbestos: No potential asbestos-containing materials (ACM) were observed at the Site.
- PCBs: No potential PCB-containing equipment was observed at the Site during the Site inspection.
- Pavement Patches: No pavement patches were observed on Site.
- Railroad Tracks: No railroad tracks are located in proximity of the Site.

3.0 SUMMARY

Based on the Site inspection and historical document review, no evidence of recognized environmental conditions was identified at the Site. Based on the current and historical use of the Site as cultivated farmland, residuals of agricultural chemicals such as pesticides, herbicides and fertilizer are expected to be present on Site, similar to other area properties.

DRAFT

LEVEL II TRANSACTION SCREEN INSPECTION QUESTIONNAIRE

Facility Name: Douglas County Public Works	**Firm/Auditor: CRA/Kirk Hoeffner**	
Address: Lawrence, Douglas County, Kansas		
Date of Site Visit: May 16, 2013	**Project #: 080649**	**Field Verif of Location: Yes**
Person Interviewed: Melanie Lorenzo	**Position: Van LLC/Penny's Concrete**	**Years at Site: 9 years**
Approximate Lot Size: 166 acres	**Building Size (sq. ft.) N/A**	**Amount Leased: N/A**
Building Ownership: N/A	**Years Owned: N/A**	
Year of Building Construction: N/A	**Leasee: Douglas County Public Works**	
General Observations:	**Comments**	
Current Site Use	**Cultivated farmland**	
Prior Site Use	**Undeveloped**	
Structures	**None**	
Outdoor Areas	**Cultivated farmland**	
Roads	**Access to Site is from East 1900 Road.**	
Other Building Tenants: N/A		
Adjacent Properties:		
North: Perry's Sand Plant		
South: Cultivated farmland		
East: Farmstead and cultivated farmland		
West: Farmsteads and cultivated farmland		

Utilities: **Electric: N/A**	**Water: N/A**	**Sewage: N/A**	**Heat: N/A**
Fire Protection: N/A			

Potential or Recognized Concerns	**Observed**	**Not Observed**	**Comments**
Hazardous chemical and petroleum storage:			
Aboveground storage tanks		x	
Underground storage tanks		x	
Drums/Containers		x	
Unidentified substance containers		X	
Chemical use	X		**Agricultural chemicals (none stored on Site)**
Hazardous waste storage		X	
Odors		X	
Pools of Liquid		X	
Vehicle Fueling/Maintenance		X	
Waste oil		X	
Parts washers		X	
Transformers (PCB)/Capacitors		X	

Transformers – Labeled		X	
Pits, ponds or lagoons		X	
Soil staining		X	
Pavement patches		X	
Stressed vegetation		X	
Solid waste		X	
Burned or buried debris		X	
Possible fill material/on-Site waste disposal		X	
Wastewater		X	
Water supply wells		X	
Water monitoring wells		X	
Dry wells		X	
Surface storm ditches/basins	X		**Drainage ditch along east side of property drains to the Kansas River**
Storm drains		X	
Drains and sumps (interior)		X	
Septic system/ drainfield		X	
Loading and unloading areas		X	
Potential Asbestos		X	
Asbestos survey conducted		X	
Wetland		X	
Air emissions		X	
Railroad tracks nearby		X	
List all current permits/registrations: None			
Any CERCLA Site requests: None			
Other:			
Auditor Signature:			**Date:**

080649 - Eudora Township, KS
Between East 1850 Road and East 1900 Road
Eudora Township, KS 66046

Inquiry Number: 3617977.7s
May 28, 2013

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

BETWEEN EAST 1850 ROAD AND EAST 1900 ROAD
EUDORA TOWNSHIP, KS 66046

COORDINATES

Latitude (North):	38.9666000 - 38˚ 57' 59.76''
Longitude (West):	95.1537000 - 95˚ 9' 13.32''
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	313405.6
UTM Y (Meters):	4315068.5
Elevation:	814 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	38095-H2 LAWRENCE EAST, KS
Most Recent Revision:	1978

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2012
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List

EXECUTIVE SUMMARY

Proposed NPL ..... Proposed National Priority List Sites
NPL LIENS ..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ..... National Priority List Deletions

Federal CERCLIS list

CERCLIS ..... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ..... CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ..... RCRA - Large Quantity Generators
RCRA-SQG ..... RCRA - Small Quantity Generators
RCRA-CESQG ..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ..... Engineering Controls Sites List
US INST CONTROL ..... Sites with Institutional Controls
LUCIS ..... Land Use Control Information System

Federal ERNS list

ERNS ..... Emergency Response Notification System

State- and tribal - equivalent CERCLIS

SHWS ..... Identified Sites List

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ..... Directory of Sanitary Landfills, Solid Waste Transfer Stations and Collector in Kansas

State and tribal leaking storage tank lists

LUST ..... Leaking Underground Storage Tank Data
LAST ..... Leaking Aboveground Storage Tanks
INDIAN LUST ..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST ..... Underground Storage Tank Data

EXECUTIVE SUMMARY

AST ..... Aboveground Storage Tank Data
INDIAN UST ..... Underground Storage Tanks on Indian Land
FEMA UST ..... Underground Storage Tank Listing

State and tribal institutional control / engineering control registries

INST CONTROL ..... Institutional Controls Information

State and tribal voluntary cleanup sites

INDIAN VCP ..... Voluntary Cleanup Priority Listing
VCP ..... Identified Sites List

State and tribal Brownfields sites

BROWNFIELDS ..... Identified Sites List

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

ODI ..... Open Dump Inventory
DEBRIS REGION 9 ..... Torres Martinez Reservation Illegal Dump Site Locations
INDIAN ODI ..... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL ..... Clandestine Drug Labs
AOCONCERN ..... Area of Concern
CDL ..... Clandestine Laboratory Data
US HIST CDL ..... National Clandestine Laboratory Register

Local Land Records

LIENS 2 ..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ..... Hazardous Materials Information Reporting System
SPILLS ..... Kansas Spills Database

Other Ascertainable Records

RCRA NonGen / NLR ..... RCRA - Non Generators
DOT OPS ..... Incident and Accident Data
DOD ..... Department of Defense Sites
FUDS ..... Formerly Used Defense Sites
CONSENT ..... Superfund (CERCLA) Consent Decrees
ROD ..... Records Of Decision
UMTRA ..... Uranium Mill Tailings Sites

EXECUTIVE SUMMARY

US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
UIC	Underground Injection Wells Database Listing
DRYCLEANERS	Registered Drycleaning Facilities
AIRS	Title V Source Information
TIER 2	Tier 2 Information Listing
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
EPA WATCH LIST	EPA WATCH LIST
LEAD SMELTERS	Lead Smelter Sites
Financial Assurance	Financial Assurance Information Listing
US FIN ASSUR	Financial Assurance Information
PCB TRANSFORMER	PCB Transformer Registration Database
COAL ASH DOE	Steam-Electric Plant Operation Data
2020 COR ACTION	2020 Corrective Action Program List
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
US AIRS	Aerometric Information Retrieval System Facility Subsystem
PRP	Potentially Responsible Parties
COAL ASH	Coal Ash Disposal Site Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat	EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners	EDR Exclusive Historic Dry Cleaners

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

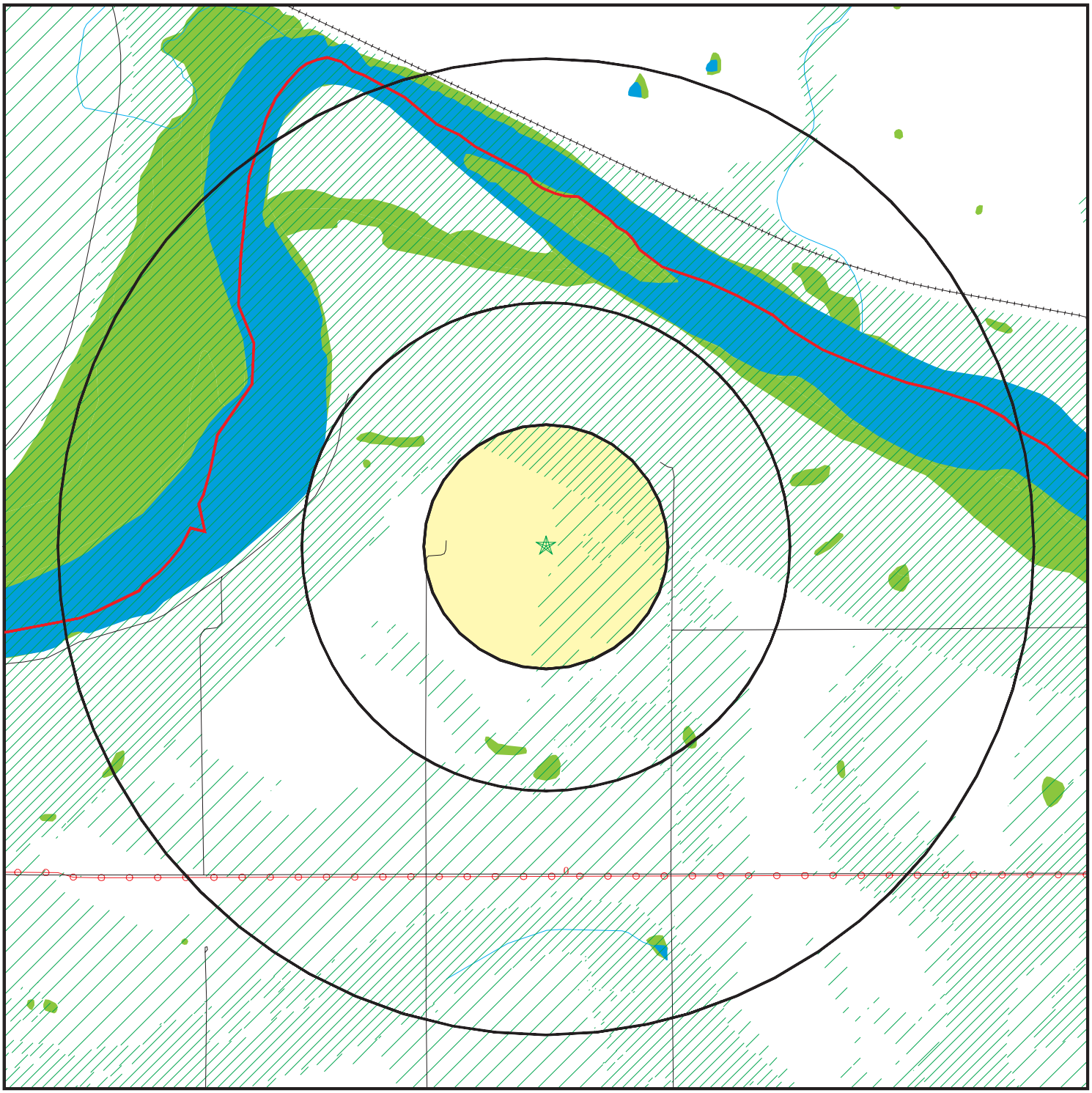
Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 35 records.

Site Name	Database(s)
JB PEARL - LAWRENCE FACILITY	RMP
TEXKAN - GLENN KALB	TIER 2
TEXKAN - JOHN BELL SOUTH	TIER 2
COLT ENERGY - WOODHEAD LEASE	TIER 2
COLT ENERGY - WINEGAR	TIER 2
COLT ENERGY - VESECKY LEASE	TIER 2
COLT ENERGY - SHEPHARD LEASE	TIER 2
COLT ENERGY - NORTH SCHULTZ LEAS	TIER 2
COLT ENERGY - JOHNSON LEASE	TIER 2
COLT ENERGY - BROWN LEASE	TIER 2
D E EXPLORATION - MADL (RALPH)	TIER 2
TEXKAN - CAYLOR	TIER 2
TEXKAN - LESTER KALB	TIER 2
AT&T/SWB - K55009	TIER 2
AT&T - EUDORA	TIER 2
LRM IND - ASPHALT DIVISION	TIER 2
KS DEPT OF TRANSPORTATION	UST, Financial Assurance
	LUST, SPILLS
8TH & PENNSYLVANIA	SHWS
EUDORA PWS WELL #2	CERC-NFRAP
FARMLAND INDUSTRIES INC - LAWRENCE	CERC-NFRAP
CITY OF LAWRENCE	FINDS, SWF/LF
WESTAR ENERGY, INC.	SWF/LF
KDOT	LUST
PARK HETZEL III	UST
WILSON TRANSP	RCRA-CESQG, FINDS
EUDORA MUNI ELEC	PADS, FINDS
AT&T - EUDORA	FINDS
KANSAS PUBLIC SERVICES - MERCURY	FINDS
EZ GO #70 - LAWRENCE SERVICE A	FINDS
WESTAR ENERGY, INC - LAWRENCE ENER	TSCA
FMC CORPORATION - LAWRENCE PLANT	TSCA
FMC CORP - LAWRENCE PLT	TSCA
EUDORA MUNI ELEC	ICIS
EUDORA FEED & GRAIN	SSTS

OVERVIEW MAP - 3617977.7s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

0 1/4 1/2 1 Miles

- Indian Reservations BIA
- County Boundary
- Power transmission lines
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 080649 - Eudora Township, KS ADDRESS: Between East 1850 Road and East 1900 Road Eudora Township KS 66046 LAT/LONG: 38.9666 / 95.1537	CLIENT: Conestoga-Rovers & Associates CONTACT: Sean Armbrust INQUIRY #: 3617977.7s DATE: May 28, 2013 4:49 pm

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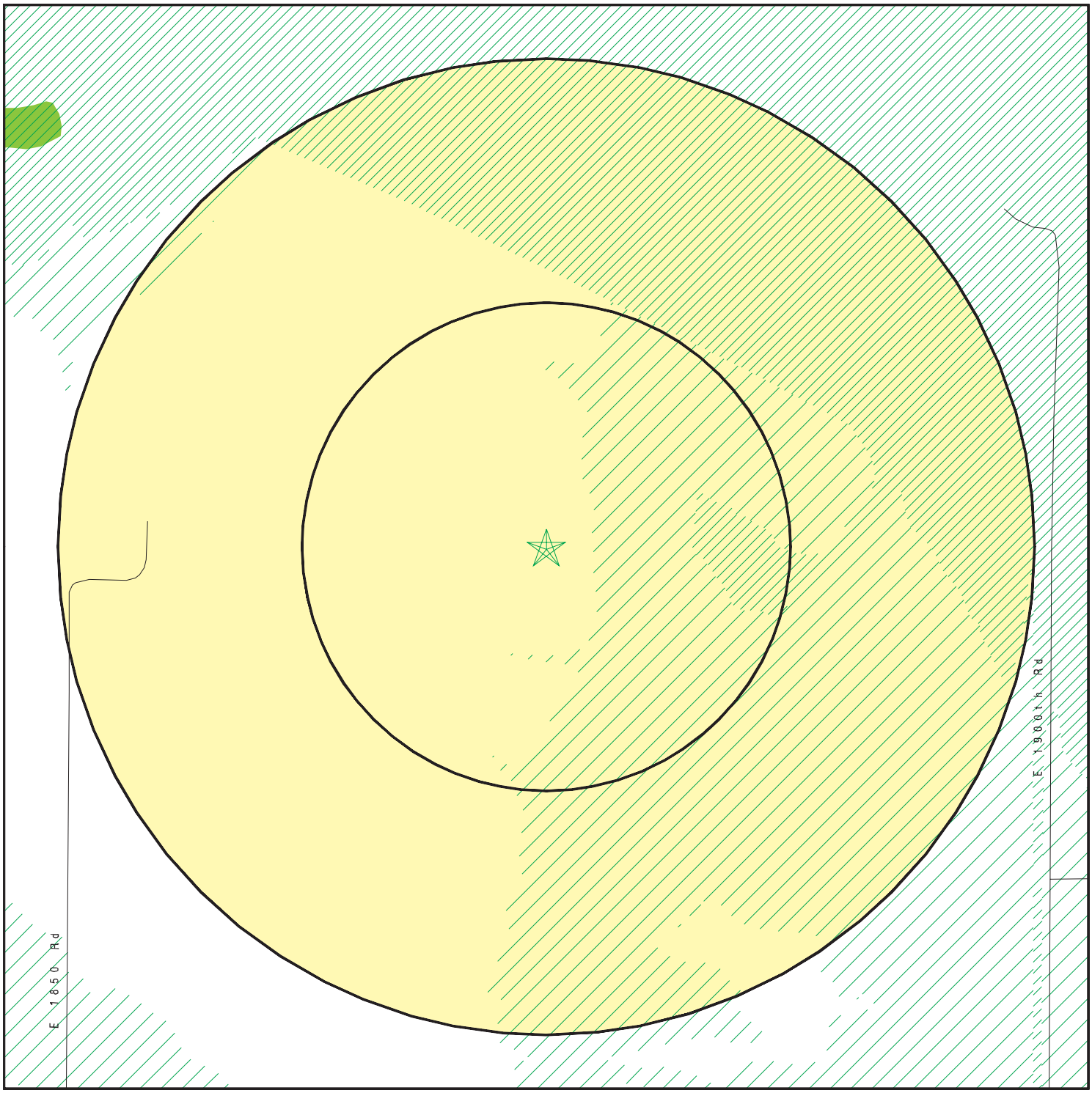
DETAIL MAP - 3617977.7s



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 080649 - Eudora Township, KS	CLIENT: Conestoga-Rovers & Associates
ADDRESS: Between East 1850 Road and East 1900 Road Eudora Township KS 66046	CONTACT: Sean Armbrust INQUIRY #: 3617977.7s
LAT/LONG: 38.9666 / 95.1537	DATE: May 28, 2013 4:50 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0
LAST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	NR	NR	NR	NR	0
AOCONCERN	1.000		0	0	0	0	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
AIRS	TP		NR	NR	NR	NR	NR	0
TIER 2	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		0	0	NR	NR	NR	0
EDR US Hist Cleaners	0.250		0	0	NR	NR	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 35 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
BALDWIN	U004126776	KS DEPT OF TRANSPORTATION	RT 2	66046	UST, Financial Assurance
DOUGLAS COUNTY	S112189542	TEXKAN - GLENN KALB	W/2 NE/4 SEC 1-T15S-R20E		TIER 2
DOUGLAS COUNTY	S112189543	TEXKAN - JOHN BELL SOUTH	SE4 OF SEC 36E		TIER 2
DOUGLAS COUNTY	S109900922	COLT ENERGY - WOODHEAD LEASE	SEC 14-T14S-R20E		TIER 2
DOUGLAS COUNTY	S109900920	COLT ENERGY - WINEGAR	SEC 14-T14S-R20E		TIER 2
DOUGLAS COUNTY	S109900917	COLT ENERGY - VESECKY LEASE	SEC 14-T14S-R20E		TIER 2
DOUGLAS COUNTY	S109900913	COLT ENERGY - SHEPHARD LEASE	SEC 13-T14S-R20E		TIER 2
DOUGLAS COUNTY	S109900908	COLT ENERGY - NORTH SCHULTZ LEAS	SEC 12-T14S-R20E		TIER 2
DOUGLAS COUNTY	S109900897	COLT ENERGY - JOHNSON LEASE	SEC 14-T14S-R20E		TIER 2
DOUGLAS COUNTY	S109900888	COLT ENERGY - BROWN LEASE	SEC 14-T14S-R20E		TIER 2
DOUGLAS COUNTY	S112189177	D E EXPLORATION - MADL (RALPH)	NE4 SEC 25-T14S-R20E		TIER 2
DOUGLAS COUNTY	S112189546	TEXKAN - CAYLOR	SEC 36-17S-21E		TIER 2
DOUGLAS COUNTY	S112189545	TEXKAN - LESTER KALB	SE/4 SEC 1-T15S-R20E		TIER 2
EUDORA	S111420273	AT&T/SWB - K55009	11	66025	TIER 2
EUDORA	1004502988	EUDORA MUNI ELEC	5TH & OAK	66025	PADS, FINDS
EUDORA	1011510648	EUDORA MUNI ELEC	5TH & OAK EUDORA KS 66025	66025	ICIS
EUDORA	1009416949	AT&T - EUDORA	KANSAS CITY FT2 WEST	66025	FINDS
EUDORA	S109898210	AT&T - EUDORA	W KANSAS CITY FT2	66025	TIER 2
EUDORA	1012051232	EUDORA FEED & GRAIN	530 MAIN	66025	SSTS
EUDORA	1000384810	WILSON TRANSP	ROAD 1061 EXIT HWY & 4 M E	66025	RCRA-CESQG, FINDS
EUDORA	1003876335	EUDORA PWS WELL #2	SEC 5	66025	CERC-NFRAP
LAWRENCE	1007479017	KANSAS PUBLIC SERVICES - MERCURY	E 11TH ST AT DELAWARE ST	66044	FINDS
LAWRENCE	1007480436	CITY OF LAWRENCE	1420 E 11TH ST	66044	FINDS, SWF/LF
LAWRENCE	1012041856	JB PEARL - LAWRENCE FACILITY	1685 E 1600TH RD	66044	RMP
LAWRENCE	S108408714	WESTAR ENERGY, INC.	1302 N 1800 RD	66044	SWF/LF
LAWRENCE	1014201180	WESTAR ENERGY, INC - LAWRENCE ENER	1250 N 1800TH RD	66044	TSCA
LAWRENCE	S109904304	LRM IND - ASPHALT DIVISION	3701 E 23RD	66046	TIER 2
LAWRENCE	S106782124	KDOT	HWY 24 & HWY	66044	LUST
LAWRENCE	U000198262	PARK HETZEL III	HWY 59 & LEARY RD	66046	UST
LAWRENCE	S110840238	8TH & PENNSYLVANIA	8TH & PENNSYLVANIA	66044	SHWS
LAWRENCE	1005928606	FMC CORPORATION - LAWRENCE PLANT	9TH AND MAPLE	66044	TSCA
LAWRENCE	1005928585	FMC CORP - LAWRENCE PLT	9TH AND MAPLE	66044	TSCA
LAWRENCE	1007477198	EZ GO #70 - LAWRENCE SERVICE A	MILEPOST 209, I-70	66044	FINDS
LAWRENCE	S105434865		140 NUCLEAR REACTOR CTR	66044	LUST, SPILLS
LAWRENCE	1003876225	FARMLAND INDUSTRIES INC - LAWRENCE	E OF	66044	CERC-NFRAP

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: N/A
Last EDR Contact: 05/09/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: N/A
Last EDR Contact: 05/09/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: N/A
Last EDR Contact: 05/09/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 04/05/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 10/09/2012
Date Made Active in Reports: 12/20/2012
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/10/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 04/05/2013
Next Scheduled EDR Contact: 03/11/2013
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/21/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 6

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/14/2013
Date Data Arrived at EDR: 03/29/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/14/2013
Date Data Arrived at EDR: 03/29/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 29

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 04/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

State- and tribal - equivalent CERCLIS

SHWS: Identified Sites List

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 03/14/2013
Number of Days to Update: 36

Source: Department of Health and Environment
Telephone: 785-296-1660
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: Directory of Sanitary Landfills, Solid Waste Transfer Stations and Collector in Kansas
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 04/02/2013
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 9

Source: Department of Health and Environment
Telephone: 785-296-1590
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Annually

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank Data
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 40

Source: Department of Health and Environment
Telephone: 785-296-1685
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

LAST: Leaking Aboveground Storage Tanks
Leaking aboveground storage tank site locations.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 40

Source: Department of Health & Environment
Telephone: 785-296-1685
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 11/01/2012
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 162

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/01/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Semi-Annually

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

State and tribal registered storage tank lists

UST: Underground Storage Tank Data
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 01/15/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 40

Source: Department of Health and Environment
Telephone: 785-296-1685
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

AST: Aboveground Storage Tank Data
Registered Aboveground Storage Tanks.

Date of Government Version: 01/15/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 40

Source: Department of Health and Environment
Telephone: 785-296-1685
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 11/07/2012
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 156

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 08/02/2012
Date Data Arrived at EDR: 08/03/2012
Date Made Active in Reports: 11/05/2012
Number of Days to Update: 94

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/10/2011
Date Data Arrived at EDR: 05/11/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/21/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 45

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/18/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

INST CONTROL: Institutional Controls Information

Sites that have institutional control information entered into the Identified Sites List database.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 03/14/2013
Number of Days to Update: 36

Source: Department of Health & Environment
Telephone: 785-296-8049
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

VCP: Identified Sites List

Sites included in the Identified Sites List that are identified as Voluntary Cleanup sites.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 03/14/2013
Number of Days to Update: 36

Source: Department of Health & Environment
Telephone: 785-296-8049
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 10/02/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 14

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/05/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Identified Sites List
Sites included in the Identified Sites List that are identified as Brownfields sites.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 03/14/2013
Number of Days to Update: 36

Source: Department of Health & Environment
Telephone: 785-296-8049
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/10/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 12/20/2012
Number of Days to Update: 9

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/26/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/03/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/12/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 59

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Quarterly

AOCONCERN: Area of Concern
The City of Wichita has taken the lead for the investigation and remediation efforts with the Kansas Department of Health & Environment, Bureau of Remediation. The primary contaminates of concern are chlorinated solvents and their degradation products.

Date of Government Version: N/A
Date Data Arrived at EDR: 04/25/2002
Date Made Active in Reports: 06/28/2002
Number of Days to Update: 64

Source: Department of Environmental Health
Telephone: 315-268-8351
Last EDR Contact: 03/13/2007
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CDL: Clandestine Laboratory Data
Clandestine meth lab location

Date of Government Version: 09/29/2009
Date Data Arrived at EDR: 10/02/2009
Date Made Active in Reports: 10/20/2009
Number of Days to Update: 18

Source: Department of Health and Environment
Telephone: 785-368-7301
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 04/25/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 55

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

SPILLS: Kansas Spills Database

All spills reported under the regulatory authority of the Department of Health & Environment and the Kansas Corporation Commission.

Date of Government Version: 02/11/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 03/14/2013
Number of Days to Update: 27

Source: Department of Health and Environment
Telephone: 785-296-1660
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/07/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 15

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 57

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 03/13/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 30

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/13/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 04/18/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 22

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/06/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 09/01/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 131

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/26/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/28/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/20/2011
Date Data Arrived at EDR: 11/10/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/01/2012
Date Data Arrived at EDR: 01/16/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 114

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 06/21/2011
Date Data Arrived at EDR: 07/15/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 60

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/09/2013
Date Data Arrived at EDR: 04/11/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 29

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/11/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/23/2011
Date Data Arrived at EDR: 12/13/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 79

Source: EPA
Telephone: (913) 551-7003
Last EDR Contact: 03/12/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 05/08/2012
Date Data Arrived at EDR: 05/25/2012
Date Made Active in Reports: 07/10/2012
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/26/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Biennially

UIC: Underground Injection Wells Database Listing

A listing of underground injection wells.

Date of Government Version: 01/31/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 40

Source: Department of Health & Environment
Telephone: 785-296-1367
Last EDR Contact: 05/13/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DRYCLEANERS: Registered Drycleaning Facilities
A listing of registered drycleaners.

Date of Government Version: 03/05/2013
Date Data Arrived at EDR: 03/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 37

Source: Department of Health & Environment
Telephone: 785-291-3250
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Varies

AIRS: Title V Source Information
A listing of title V sources, including emissions information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 01/02/2013
Date Made Active in Reports: 01/09/2013
Number of Days to Update: 7

Source: Department of Health & Environment
Telephone: 785-296-6427
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

TIER 2: Tier 2 Information Listing
A listing of facilities which store or manufacture hazardous materials and submit a chemical inventory report.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 01/08/2013
Date Made Active in Reports: 01/17/2013
Number of Days to Update: 9

Source: Department of Health & Environment
Telephone: 785-296-1688
Last EDR Contact: 03/25/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Annually

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/06/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/17/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Varies

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/30/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/30/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 12/02/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 04/04/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: N/A

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Quarterly

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/29/2013
Date Data Arrived at EDR: 02/14/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Varies

Financial Assurance: Financial Assurance Information Listing

A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 01/15/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/14/2013
Number of Days to Update: 41

Source: Department of Health & Environment
Telephone: 785-296-1685
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

COAL ASH: Coal Ash Disposal Site Listing

A listing of coal combustion waste landfills.

Date of Government Version: 01/20/2009
Date Data Arrived at EDR: 06/26/2009
Date Made Active in Reports: 07/08/2009
Number of Days to Update: 12

Source: Department of Health & Environment
Telephone: 785-296-1600
Last EDR Contact: 04/23/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/03/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/18/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/15/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Proprietary Historic Dry Cleaners - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Auto Stat: EDR Proprietary Historic Gas Stations - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 02/18/2013
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 03/21/2013
Number of Days to Update: 31

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/21/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 02/07/2013
Date Made Active in Reports: 03/15/2013
Number of Days to Update: 36

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/09/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 06/22/2012
Date Made Active in Reports: 07/31/2012
Number of Days to Update: 39

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 09/27/2012
Number of Days to Update: 70

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

080649 - EUDORA TOWNSHIP, KS
BETWEEN EAST 1850 ROAD AND EAST 1900 ROAD
EUDORA TOWNSHIP, KS 66046

TARGET PROPERTY COORDINATES

Latitude (North):	38.9666 - 38˚ 57' 59.76''
Longitude (West):	95.1537 - 95˚ 9' 13.32''
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	313405.6
UTM Y (Meters):	4315068.5
Elevation:	814 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	38095-H2 LAWRENCE EAST, KS
Most Recent Revision:	1978

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

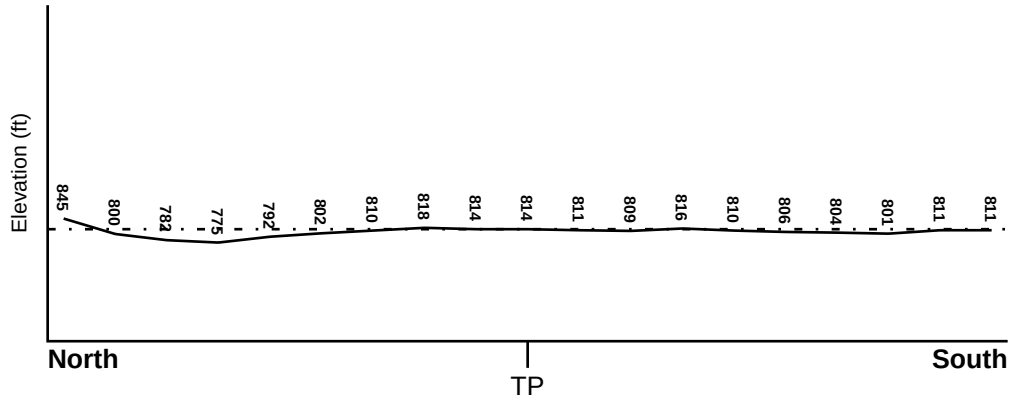
TOPOGRAPHIC INFORMATION

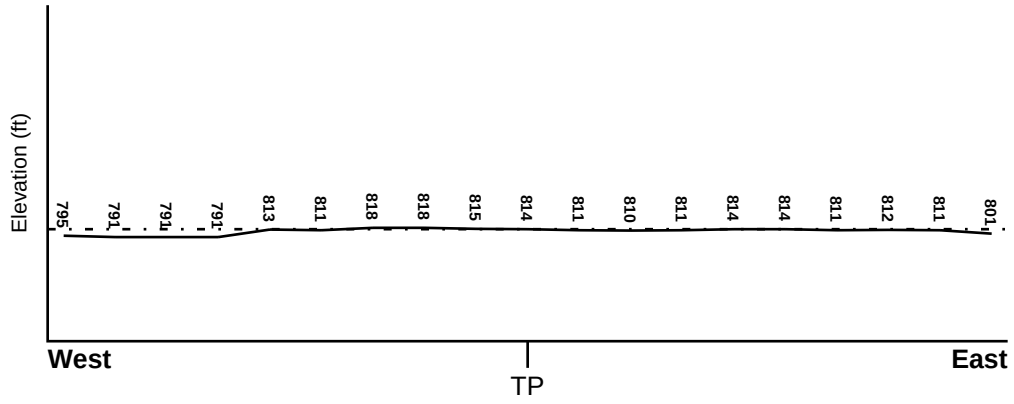
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 814 ft.

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
DOUGLAS, KS	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property:	20045C - FEMA DFIRM Flood data
Additional Panels in search area:	20103C - FEMA DFIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
LAWRENCE EAST	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

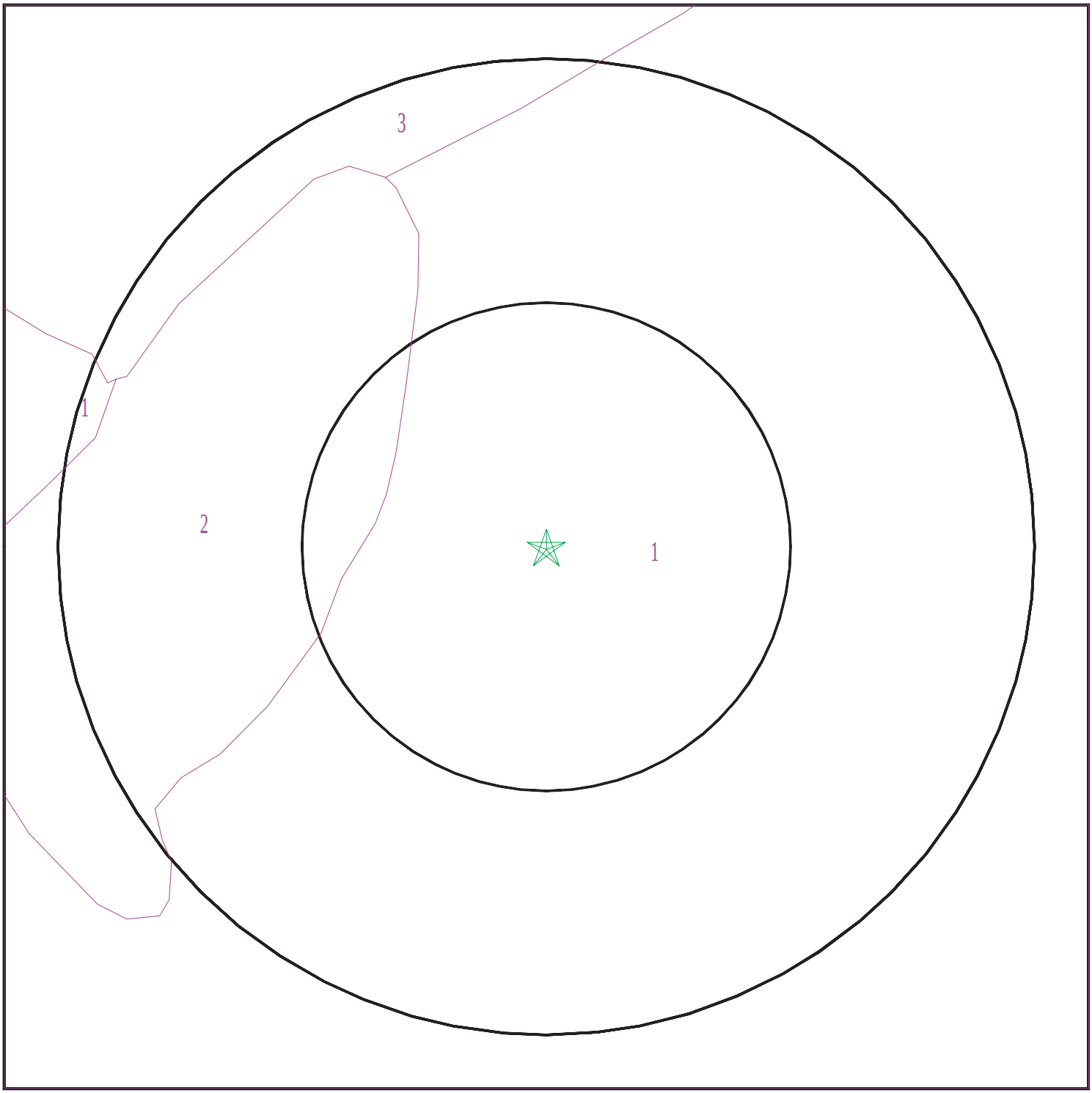
Era:	Paleozoic
System:	Pennsylvanian
Series:	Virgilian Series
Code:	PP4 *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 3617977.7s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	080649 - Eudora Township, KS	CLIENT:	Conestoga-Rovers & Associates
ADDRESS:	Between East 1850 Road and East 1900 Road Eudora Township KS 66046	CONTACT:	Sean Armbrust
		INQUIRY #:	3617977.7s
LAT/LONG:	38.9666 / 95.1537	DATE:	May 28, 2013 4:50 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Eudora

Soil Surface Texture: silt loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 61 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14.11 Min: 4.233	Max: 8.4 Min: 6.6
2	11 inches	72 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14.11 Min: 4.233	Max: 8.4 Min: 6.6

Soil Map ID: 2

Soil Component Name: Eudora

Soil Surface Texture: silt loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14.11 Min: 4.233	Max: 8.4 Min: 6.6
2	11 inches	72 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14.11 Min: 4.233	Max: 8.4 Min: 6.6

Soil Map ID: 3

Soil Component Name: Eudora

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 61 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14.11 Min: 4.233	Max: 8.4 Min: 6.6
2	11 inches	72 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14.11 Min: 4.233	Max: 8.4 Min: 6.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS40000361475	1/8 - 1/4 Mile SE
7	USGS40000361443	1/4 - 1/2 Mile SSE
8	USGS40000361465	1/4 - 1/2 Mile WSW
9	USGS40000361436	1/4 - 1/2 Mile SSW
11	USGS40000361425	1/4 - 1/2 Mile SSE
12	USGS40000361444	1/2 - 1 Mile SW
13	USGS40000361426	1/2 - 1 Mile SW
15	USGS40000361376	1/2 - 1 Mile South
C16	USGS40000361377	1/2 - 1 Mile SSW
17	USGS40000361480	1/2 - 1 Mile West
20	USGS40000361466	1/2 - 1 Mile WSW
23	USGS40000361378	1/2 - 1 Mile SSW
26	USGS40000361445	1/2 - 1 Mile WSW
30	USGS40000361379	1/2 - 1 Mile SW
31	USGS40000361427	1/2 - 1 Mile WSW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	KS6000000168265	1/8 - 1/4 Mile West
A3	KS6000000168266	1/8 - 1/4 Mile West
B4	KS6000000168403	1/8 - 1/4 Mile NE
B5	KS6000000168404	1/8 - 1/4 Mile NE
6	KS6000000168618	1/4 - 1/2 Mile NE
10	KS6000000168169	1/4 - 1/2 Mile ESE
14	KS6000000168170	1/2 - 1 Mile East
D18	KS6000000168052	1/2 - 1 Mile WSW
D19	KS6000000168051	1/2 - 1 Mile WSW
C21	KS6000000167670	1/2 - 1 Mile SSW
22	KS6000000167671	1/2 - 1 Mile SSE
E24	KS6000000167832	1/2 - 1 Mile SW
E25	KS6000000167833	1/2 - 1 Mile SW
27	KS6000000168171	1/2 - 1 Mile East
F28	KS6000000167838	1/2 - 1 Mile SE
F29	KS6000000167840	1/2 - 1 Mile SE
G32	KS6000000167667	1/2 - 1 Mile SW
G33	KS6000000167668	1/2 - 1 Mile SW
G34	KS6000000167669	1/2 - 1 Mile SW

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

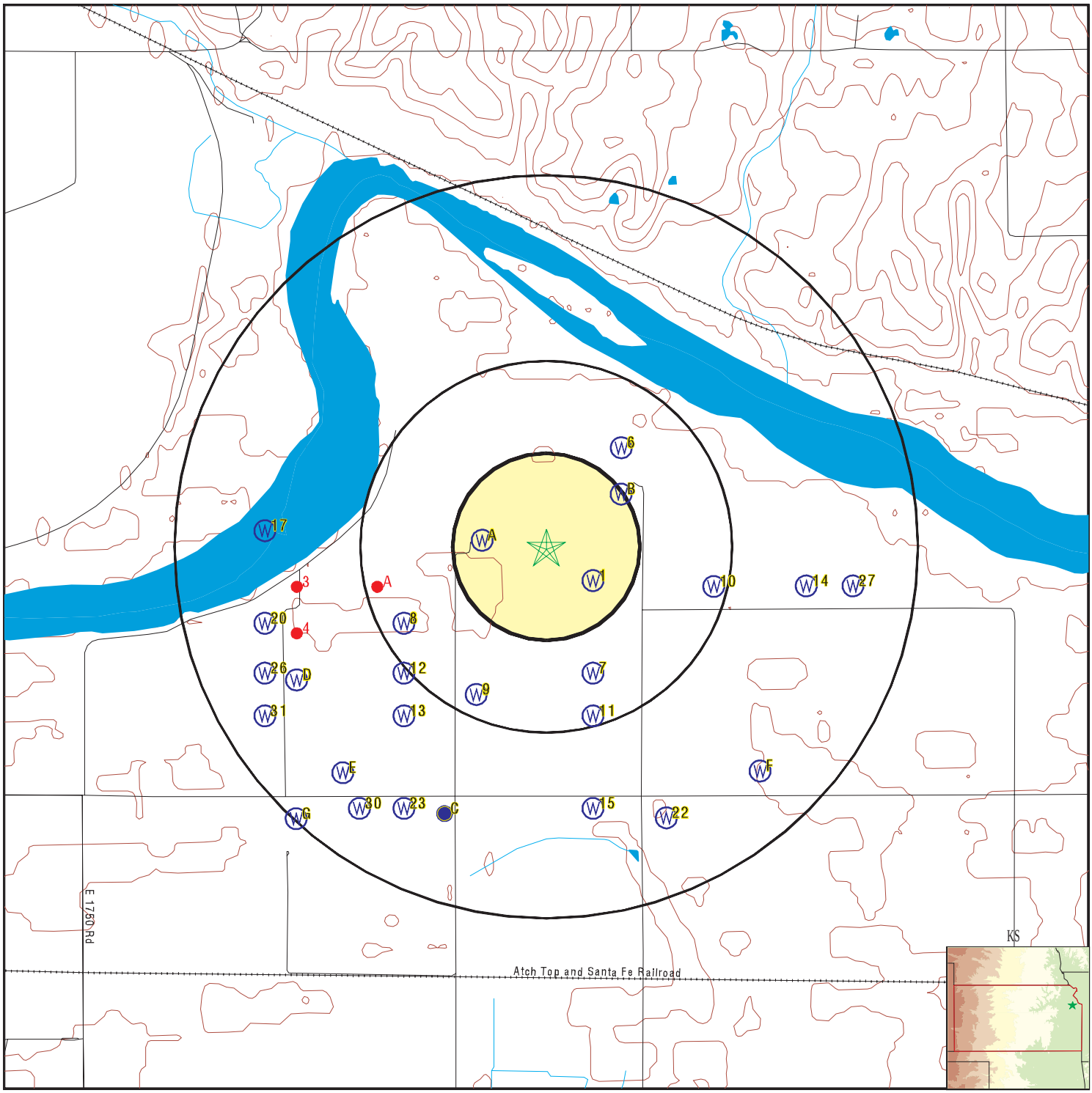
MAP ID	WELL ID	LOCATION FROM TP
A1	KSOG90000395102	1/4 - 1/2 Mile WSW

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	KSOG90000395100	1/4 - 1/2 Mile WSW
3	KSOG90000395101	1/2 - 1 Mile West
4	KSOG90000394917	1/2 - 1 Mile WSW

PHYSICAL SETTING SOURCE MAP - 3617977.7s



County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

0 1/4 1/2 1 Miles

Groundwater Flow Direction
Indeterminate Groundwater Flow at Location
Groundwater Flow Varies at Location
Oil, gas or related wells

N

SITE NAME:	080649 - Eudora Township, KS	CLIENT:	Conestoga-Rovers & Associates
ADDRESS:	Between East 1850 Road and East 1900 Road Eudora Township KS 66046	CONTACT:	Sean Armbrust
		INQUIRY #:	3617977.7s
LAT/LONG:	38.9666 / 95.1537	DATE:	May 28, 2013 4:50 pm

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Map ID Direction Distance Elevation	Database	EDR ID Number
1 **SE** **1/8 - 1/4 Mile** **Lower**	**FED USGS**	**USGS40000361475**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385755095090401		
Monloc name:	12S 20E 35ADA 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9652808
Longitude:	-95.1513597	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	810.70
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	47
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1969-09-01	18.60	

A2 **West** **1/8 - 1/4 Mile** **Higher**	**KS WELLS**	**KS6000000168265**

Well id:	345873	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	NW SW NE
Longitude:	-95.15665	Latitude:	38.96685
Long lat t:	From PLSS	Owner:	McElwee, Carl
Well use:	Domestic		
Comple dat:	07-Apr-2004		
Status:	PLUGGED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Lawrence: 5 mi W		
Well depth:	61.5	Elev:	Not Reported

Static dep:	31.5	Est yield:	Not Reported
Driller:	Carl McElwee		

A3
West
1/8 - 1/4 Mile
Higher

KS WELLS **KS6000000168266**

Well id:	347227	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	NW SW NE
Longitude:	-95.15665	Latitude:	38.96685
Long lat t:	From PLSS	Owner:	McElwee, Carl
Well use:	Domestic		
Comple dat:	16-Apr-2004		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Lawrence: 3.5 mi E		
Well depth:	48	Elev:	Not Reported
Static dep:	29	Est yield:	37
Driller:	Strader Drilling Co., Inc.		

B4
NE
1/8 - 1/4 Mile
Lower

KS WELLS **KS6000000168403**

Well id:	12297	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	SE NE NE
Longitude:	-95.14971	Latitude:	38.96865
Long lat t:	From PLSS	Owner:	Alterburn, E.C.
Well use:	Domestic		
Comple dat:	25-Aug-1977		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Lawrence: 3 mi E		
Well depth:	51	Elev:	Not Reported
Static dep:	12	Est yield:	100
Driller:	Strader Drilling Co., Inc.		

B5
NE
1/8 - 1/4 Mile
Lower

KS WELLS **KS6000000168404**

Well id:	12300	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	SE NE NE
Longitude:	-95.14971	Latitude:	38.96865
Long lat t:	From PLSS	Owner:	Altenburn, E.C.
Well use:	Irrigation		
Comple dat:	15-Nov-1977		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Eudora: 2 mi W, 1.25 mi N		
Well depth:	51	Elev:	Not Reported

Static dep:	28	Est yield:	400
Driller:	Jungmann Bros Drilling Co.		

6
NE **KS WELLS** **KS6000000168618**
1/4 - 1/2 Mile
Lower

Well id:	12299	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	NE NE NE
Longitude:	-95.1497	Latitude:	38.97046
Long lat t:	From PLSS	Owner:	Altenburn, E.C.
Well use:	Irrigation		
Comple dat:	15-Nov-1977		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Eudora: 2 mi W, 1.25 mi N		
Well depth:	47	Elev:	811
Static dep:	23.8	Est yield:	300
Driller:	Jungmann Bros Drilling Co.		

7
SSE **FED USGS** **USGS40000361443**
1/4 - 1/2 Mile
Lower

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385742095090401		
Monloc name:	12S 20E 35DAA 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9616698
Longitude:	-95.1513597	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	815.00
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	68
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
8 **WSW** **1/4 - 1/2 Mile** **Higher**	**FED USGS**	**USGS40000361465**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385749095093801		
Monloc name:	12S 20E 35BDD 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9636141
Longitude:	-95.1608043	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	819.40
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	79
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

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9 **SSW** **1/4 - 1/2 Mile** **Lower**	**FED USGS**	**USGS40000361436**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385739095092501		
Monloc name:	12S 20E 35DB 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9608364
Longitude:	-95.1571931	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	minutes
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	812.00
Vert measure units:	feet	Vertacc measure val:	1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Quaternary Alluvium		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	27
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1952-11-01	18.2	

10
ESE
1/4 - 1/2 Mile
Lower

KS WELLS **KS6000000168169**

Well id:	12301	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	36	Spot:	SE SW NW
Longitude:	-95.14508	Latitude:	38.96505
Long lat t:	From PLSS	Owner:	Coover, Terry
Well use:	Domestic		
Comple dat:	08-Sep-1986		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Eudora: 2 mi W, 1.5 mi N		
Well depth:	50	Elev:	Not Reported
Static dep:	24	Est yield:	50
Driller:	Strader Drilling Co., Inc.		

11
SSE
1/4 - 1/2 Mile
Lower

FED USGS **USGS40000361425**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385736095090401		
Monloc name:	12S 20E 35DAD 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9600031
Longitude:	-95.1513597	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	810.60
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	50
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

12
SW
1/2 - 1 Mile
Higher

FED USGS **USGS40000361444**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385742095093801		
Monloc name:	12S 20E 35CAA 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9616697
Longitude:	-95.1608043	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	816.90
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	73
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

13
SW
1/2 - 1 Mile
Higher

FED USGS **USGS40000361426**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385736095093801		
Monloc name:	12S 20E 35CAD 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.960003
Longitude:	-95.1608043	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	815.10
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	71
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

14
East
1/2 - 1 Mile
Lower

KS WELLS **KS6000000168170**

Well id:	325298	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	36	Spot:	SE SE NW
Longitude:	-95.14046	Latitude:	38.96507
Long lat t:	From PLSS	Owner:	Perkins, Kathryn and Bruce
Well use:	Domestic		
Comple dat:	31-Oct-2001		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Eudora: 2 mi W, 1.5 mi N		
Well depth:	46	Elev:	Not Reported
Static dep:	23	Est yield:	20
Driller:	Strader Drilling Co., Inc.		

15
South
1/2 - 1 Mile
Lower

FED USGS **USGS40000361376**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385723095090401		
Monloc name:	12S 20E 35DDD 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9563921
Longitude:	-95.1513597	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	810.40
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	55
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
C16 **SSW** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40000361377**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385723095092901		
Monloc name:	12S 20E 35DCC 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.956392
Longitude:	-95.1583042	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	810.00
Vert measure units:	feet	Vertacc measure val:	1.
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	66
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

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17 **West** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40000361480**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385802095100301		
Monloc name:	12S 20E 35BBC 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9672251
Longitude:	-95.1677489	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	813.00
Vert measure units:	feet	Vertacc measure val:	1.
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	71
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1963-04-01	17.20	

D18
WSW
1/2 - 1 Mile
Lower

KS WELLS **KS6000000168052**

Well id:	96013	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	SW NW SW
Longitude:	-95.16592	Latitude:	38.9614
Long lat t:	From PLSS	Owner:	Farmland Industries Inc.
Well use:	(unstated)/abandoned		
Comple dat:	01-Dec-1994		
Status:	PLUGGED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Lawrence: 2 mi E		
Well depth:	76	Elev:	Not Reported
Static dep:	25	Est yield:	Not Reported
Driller:	Layne-Christensen Co.		

D19
WSW
1/2 - 1 Mile
Lower

KS WELLS **KS6000000168051**

Well id:	94978	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	SW NW SW
Longitude:	-95.16592	Latitude:	38.9614
Long lat t:	From PLSS	Owner:	Farmland Industries Inc.
Well use:	Industrial		
Comple dat:	10-Oct-1994		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Lawrence: 2 mi E		
Well depth:	77.75	Elev:	Not Reported
Static dep:	26	Est yield:	500
Driller:	Layne-Christensen Co.		

20
WSW
1/2 - 1 Mile
Lower

FED USGS **USGS40000361466**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385749095100301		
Monloc name:	12S 20E 35BCC 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.963614
Longitude:	-95.1677489	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	812.40
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	65
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 6

Date	Feet below Surface	Feet to Sealevel	Date	Feet below Surface	Feet to Sealevel
1972-09-29	23.03		1970-03-30	22.68	
1969-11-26	21.36		1969-10-27	21.28	
1969-09-04	20.60		1969-09-01	20.60	

C21
SSW
1/2 - 1 Mile
Lower

KS WELLS **KS6000000167670**

Well id:	347730	County:	Douglas
Township:	13	Twn dir:	S
Range:	20	Range dir:	E
Section:	2	Spot:	NE NE NW
Longitude:	-95.159	Latitude:	38.95599
Long lat t:	From PLSS	Owner:	Wallace, Jeff
Well use:	Domestic		
Comple dat:	24-Feb-1998		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	1837 N 1500 Rd - from Lawrence: 2 mi E		
Well depth:	52	Elev:	Not Reported
Static dep:	30	Est yield:	50
Driller:	Strader Drilling Co., Inc.		

22
SSE
1/2 - 1 Mile
Lower

KS WELLS **KS6000000167671**

Well id:	321626	County:	Douglas
Township:	13	Twn dir:	S
Range:	20	Range dir:	E
Section:	1	Spot:	NW NW NW
Longitude:	-95.14745	Latitude:	38.95602
Long lat t:	From PLSS	Owner:	Strong, Virginia
Well use:	Domestic		
Comple dat:	21-Jun-2001		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	1919 N 1500 Rd - from Eudora: 1 mi N, 2.5 mi W		
Well depth:	52	Elev:	Not Reported
Static dep:	27	Est yield:	50
Driller:	Strader Drilling Co., Inc.		

23
SSW **FED USGS** **USGS40000361378**
1/2 - 1 Mile
Lower

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385723095093801		
Monloc name:	12S 20E 35CDD 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.956392
Longitude:	-95.1608043	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	812.10
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	65
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 91

Date	Feet below Surface	Feet to Sealevel	Date	Feet below Surface	Feet to Sealevel
1993-08-05	16.99		1993-04-23	24.49	
1993-01-22	26.30		1992-10-16	27.08	
1992-07-20	28.14		1992-04-15	28.60	
1992-01-17	28.77		1991-10-22	28.48	
1991-07-18	27.85		1991-04-22	28.24	
1991-01-22	27.80		1990-10-19	27.26	
1990-07-20	27.17		1990-04-20	28.26	
1990-01-19	27.90		1989-10-25	27.70	
1989-07-26	28.39		1989-04-21	27.68	
1989-01-20	26.73		1988-10-20	26.16	

Ground-water levels, continued.

Date	Feet below Surface	Feet to Sealevel
1988-07-20	25.01	
1988-01-20	22.05	
1987-08-25	18.22	
1987-03-19	19.79	
1987-02-23	19.51	
1986-10-22	17.88	
1986-04-22	20.75	
1985-12-20	18.60	
1985-06-20	21.91	
1984-12-26	22.34	
1984-06-21	21.17	
1984-01-24	22.31	
1983-06-20	22.66	
1982-12-20	23.35	
1982-06-18	25.64	
1981-12-23	27.30	
1981-06-19	29.21	
1980-12-19	28.30	
1980-03-20	27.19	
1979-06-20	26.88	
1978-08-22	25.82	
1978-01-27	26.54	
1977-10-21	27.15	
1977-04-18	30.14	
1976-10-19	28.94	
1976-04-26	28.46	
1975-10-23	26.78	
1975-04-17	25.79	
1974-10-17	23.03	
1974-04-17	20.07	
1973-10-19	21.21	
1973-04-20	24.39	
1972-12-20	27.30	
1972-10-24	27.44	
1970-03-30	23.21	
1969-09-01	20.20	

Date	Feet below Surface	Feet to Sealevel
1988-04-20	23.40	
1987-10-20	20.08	
1987-04-21	18.72	
1987-03-02	19.66	
1987-01-20	18.63	
1986-07-24	19.63	
1986-01-23	18.90	
1985-09-23	20.67	
1985-05-03	22.85	
1984-09-20	24.15	
1984-03-20	22.98	
1983-09-20	20.95	
1983-03-21	23.24	
1982-09-20	22.02	
1982-03-18	26.84	
1981-09-21	26.80	
1981-03-23	28.88	
1980-06-20	26.64	
1979-09-20	27.00	
1979-03-22	27.23	
1978-04-11	26.04	
1977-11-22	26.48	
1977-07-15	28.80	
1977-01-18	29.7	
1976-07-20	28.89	
1976-01-20	27.47	
1975-07-21	25.91	
1975-01-15	24.42	
1974-07-18	21.54	
1974-01-18	19.17	
1973-09-28	22.41	
1973-01-24	26.97	
1972-11-16	27.40	
1972-09-29	27.23	
1969-09-04	20.20	

E24
SW
1/2 - 1 Mile
Lower

KS WELLS **KS6000000167832**

Well id:	12296	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	SE SW SW
Longitude:	-95.16361	Latitude:	38.95778
Long lat t:	From PLSS	Owner:	Farmland Industries Inc.
Well use:	Industrial		
Comple dat:	29-Apr-1992		
Status:	CONSTRUCTED	Other id:	Well 7R
Dwr number:	Not Reported		
Directions:	from Lawrence: 2 mi E		
Well depth:	71.13	Elev:	Not Reported

Static dep:	31	Est yield:	400
Driller:	Layne-Christensen Co.		

E25
SW
1/2 - 1 Mile
Lower

KS WELLS **KS6000000167833**

Well id:	12298	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	35	Spot:	SE SW SW
Longitude:	-95.16361	Latitude:	38.95778
Long lat t:	From PLSS	Owner:	Farmland Industries Inc.
Well use:	Industrial		
Comple dat:	08-Jan-1993		
Status:	PLUGGED	Other id:	Well 7
Dwr number:	Not Reported		
Directions:	from Lawrence: 2 mi E		
Well depth:	68.5	Elev:	Not Reported
Static dep:	29	Est yield:	Not Reported
Driller:	Layne-Christensen Co.		

26
WSW
1/2 - 1 Mile
Lower

FED USGS **USGS40000361445**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385742095100301		
Monloc name:	12S 20E 35CBB 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.9616696
Longitude:	-95.1677489	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	812.00
Vert measure units:	feet	Vertacc measure val:	1.
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	72
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1963-04-01	19.00	

Map ID Direction Distance Elevation	Database	EDR ID Number
27 **East** **1/2 - 1 Mile** **Lower**	**KS WELLS**	**KS6000000168171**

Well id:	108540	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	36	Spot:	SW SW NE
Longitude:	-95.13813	Latitude:	38.96507
Long lat t:	From PLSS	Owner:	Waller, James
Well use:	Domestic		
Comple dat:	06-Sep-1996		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Eudora: 1.5 mi W, 1.5 mi N		
Well depth:	40	Elev:	Not Reported
Static dep:	24	Est yield:	40
Driller:	Strader Drilling Co., Inc.		

F28 **SE** **1/2 - 1 Mile** **Lower**	**KS WELLS**	**KS6000000167838**

Well id:	421685	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	36	Spot:	SW SE SW
Longitude:	-95.142773	Latitude:	38.957845
Long lat t:	From PLSS	Owner:	Schaake, Shari
Well use:	Domestic		
Comple dat:	07-Jul-2008		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	1794 N 1500 Rd, Lawrence - from Lawrence: 2.75 mi E		
Well depth:	45	Elev:	Not Reported
Static dep:	26	Est yield:	30
Driller:	Strader Drilling Co., Inc.		

F29 **SE** **1/2 - 1 Mile** **Lower**	**KS WELLS**	**KS6000000167840**

Well id:	332666	County:	Douglas
Township:	12	Twn dir:	S
Range:	20	Range dir:	E
Section:	36	Spot:	SW SE SW
Longitude:	-95.14276	Latitude:	38.95785
Long lat t:	From PLSS	Owner:	Crow, P.J.
Well use:	Domestic		
Comple dat:	26-Jun-2002		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Eudora: 1.5 mi W, .5 mi N		
Well depth:	40	Elev:	Not Reported

Static dep:	27	Est yield:	15
Driller:	Strader Drilling Co., Inc.		

30
SW
1/2 - 1 Mile
Lower

FED USGS **USGS40000361379**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385723095094601		
Monloc name:	12S 20E 35CDC 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.956392
Longitude:	-95.1630265	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	810.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	68
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

31
WSW
1/2 - 1 Mile
Higher

FED USGS **USGS40000361427**

Org. Identifier:	USGS-KS		
Formal name:	USGS Kansas Water Science Center		
Monloc Identifier:	USGS-385736095100301		
Monloc name:	12S 20E 35CBC 01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10270104	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	38.960003
Longitude:	-95.1677489	Sourcemap scale:	24000
Horiz Acc measure:	10	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	815.50
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Alluvial aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	77
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

G32
SW
1/2 - 1 Mile
Lower

KS WELLS **KS6000000167667**

Well id:	12386	County:	Douglas
Township:	13	Twn dir:	S
Range:	20	Range dir:	E
Section:	2	Spot:	NW NW NW
Longitude:	-95.16594	Latitude:	38.95599
Long lat t:	From PLSS	Owner:	Pendleton, Al
Well use:	Domestic		
Comple dat:	11-Mar-1980		
Status:	CONSTRUCTED	Other id:	Not Reported
Dwr number:	Not Reported		
Directions:	from Lawrence: 2.1 mi E		
Well depth:	55	Elev:	Not Reported
Static dep:	21	Est yield:	30
Driller:	Strader Drilling Co., Inc.		

G33
SW
1/2 - 1 Mile
Lower

KS WELLS **KS6000000167668**

Well id:	12388	County:	Douglas
Township:	13	Twn dir:	S
Range:	20	Range dir:	E
Section:	2	Spot:	NW NW NW
Longitude:	-95.16594	Latitude:	38.95599
Long lat t:	From PLSS	Owner:	Farmland Industries Inc.
Well use:	Industrial		
Comple dat:	08-Jan-1993		
Status:	PLUGGED	Other id:	Well 8
Dwr number:	Not Reported		
Directions:	from Lawrence: 2 mi E		
Well depth:	77.16	Elev:	Not Reported
Static dep:	35	Est yield:	Not Reported
Driller:	Layne-Christensen Co.		

G34
SW
1/2 - 1 Mile
Lower

KS WELLS **KS6000000167669**

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well id:	12389	County:	Douglas
Township:	13	Twn dir:	S
Range:	20	Range dir:	E
Section:	2	Spot:	NW NW NW
Longitude:	-95.16594	Latitude:	38.95599
Long lat t:	From PLSS	Owner:	Farmland Industries Inc.
Well use:	Industrial		
Comple dat:	05-May-1992		
Status:	CONSTRUCTED	Other id:	Well 8R
Dwr number:	Not Reported		
Directions:	from Lawrence: 2 mi E		
Well depth:	76.92	Elev:	Not Reported
Static dep:	47	Est yield:	400
Driller:	Layne-Christensen Co.		

Map ID Direction Distance		Database	EDR ID Number

A1
WSW
1/4 - 1/2 Mile

OIL_GAS **KSOG90000395102**

Kid:	1006732414		
State code:	15	County cod:	45
Api well n:	70031	Api workov:	Not Reported
Field name:	Not Reported		
Field kid:	0		
Lease name:	ALTENBERND	Well name:	1
Well class:	Plugged and Abandoned		
Operator n:	JOHN S. HOLMES		
Operator k:	0		
Principal :	6	Township:	12
Township d:	S	Range :	20
Range dire:	E	Section:	35
Subdivisio:	NW	Subdivis 1:	SE
Subdivis 2:	SW	Subdivis 3:	Not Reported
Spot:	Not Reported	Feet north:	0
Feet east :	0	Reference :	Not Reported
Rotary tot:	689	Status :	D&A
Spud date:	12/30/1899	Permit dat:	12/30/1899
Completion:	12/30/1899	Api number:	15-045-70031
Plug date:	06/01/1953		
Elevation :	0		
Elevation1:	0		
Elevatio 1:	0		
Producing :	Not Reported		
Nad27 lati:	38.9650373		
Nad27 long:	-95.1612866		
Nad83 lati:	38.9650403		
Nad83 long:	-95.1615354		
Completi 1:	Not Reported	Site id:	KSOG90000395102

A2
WSW
1/4 - 1/2 Mile

OIL_GAS **KSOG90000395100**

Kid:	1002907003		
State code:	15	County cod:	45
Api well n:	7	Api workov:	Not Reported
Field name:	WILDCAT		
Field kid:	0		
Lease name:	ALTENBERND	Well name:	1
Well class:	Not Reported		
Operator n:	FORRESTER S W ETAL		
Operator k:	0		
Principal :	6	Township:	12
Township d:	S	Range :	20
Range dire:	E	Section:	35
Subdivisio:	NW	Subdivis 1:	SW
Subdivis 2:	SE	Subdivis 3:	Not Reported
Spot:	C	Feet north:	2970
Feet east :	-3960	Reference :	SE
Rotary tot:	1605	Status :	OTHER-P&A
Spud date:	06/02/1940	Permit dat:	12/30/1899
Completion:	12/04/1940	Api number:	15-045-00007
Plug date:	01/01/1942		

Elevation :	0		
Elevation1:	819		
Elevatio 1:	0		
Producing :	Not Reported		
Nad27 lati:	38.9650325		
Nad27 long:	-95.162495		
Nad83 lati:	38.9650354		
Nad83 long:	-95.1627439		
Completi 1:	1940	Site id:	KSOG90000395100

3
West **OIL_GAS** **KSOG90000395101**
1/2 - 1 Mile

Kid:	1005693848		
State code:	15	County cod:	45
Api well n:	70033	Api workov:	Not Reported
Field name:	Not Reported		
Field kid:	0		
Lease name:	SCHAAKE	Well name:	1
Well class:	Plugged and Abandoned		
Operator n:	GALLOWAY ASSOC.		
Operator k:	0		
Principal :	6	Township:	12
Township d:	S	Range :	20
Range dire:	E	Section:	35
Subdivisio:	NW	Subdivis 1:	SW
Subdivis 2:	SW	Subdivis 3:	Not Reported
Spot:	Not Reported	Feet north:	0
Feet east :	0	Reference :	Not Reported
Rotary tot:	1855	Status :	D&A
Spud date:	12/30/1899	Permit dat:	12/30/1899
Completion:	12/30/1899	Api number:	15-045-70033
Plug date:	06/01/1953		
Elevation :	0		
Elevation1:	0		
Elevatio 1:	0		
Producing :	Not Reported		
Nad27 lati:	38.965035		
Nad27 long:	-95.1659106		
Nad83 lati:	38.9650379		
Nad83 long:	-95.1661594		
Completi 1:	Not Reported	Site id:	KSOG90000395101

4
WSW **OIL_GAS** **KSOG90000394917**
1/2 - 1 Mile

Kid:	1006732415		
State code:	15	County cod:	45
Api well n:	70032	Api workov:	Not Reported
Field name:	Not Reported		
Field kid:	0		
Lease name:	PERKINS	Well name:	1
Well class:	Plugged and Abandoned		
Operator n:	JOHN S. HOLMES		
Operator k:	0		
Principal :	6	Township:	12

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Township d:	S	Range :	20
Range dire:	E	Section:	35
Subdivisio:	SW	Subdivis 1:	NW
Subdivis 2:	NW	Subdivis 3:	Not Reported
Spot:	Not Reported	Feet north:	0
Feet east :	0	Reference :	Not Reported
Rotary tot:	691	Status :	D&A
Spud date:	12/30/1899	Permit dat:	12/30/1899
Completion:	12/30/1899	Api number:	15-045-70032
Plug date:	06/01/1953		
Elevation :	0		
Elevation1:	0		
Elevatio 1:	0		
Producing :	Not Reported		
Nad27 lati:	38.9632199		
Nad27 long:	-95.1659147		
Nad83 lati:	38.9632228		
Nad83 long:	-95.1661635		
Completi 1:	Not Reported	Site id:	KSOG90000394917

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: KS Radon

Radon Test Results

Zipcode	Avg Radon	Max Radon	Num Tests
66046	3.0	30.9	301

Federal EPA Radon Zone for DOUGLAS County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 66046

Number of sites tested: 6

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.625 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	2.017 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Kansas Water Well Completion Records Database
Source: Kansas Geological Survey
Telephone: 913-864-3965

OTHER STATE DATABASE INFORMATION

Oil and Gas Well Location Database Listing
Source: Kansas Geological Survey
Telephone: 785-864-3965

RADON

State Database: KS Radon
Source: Department of Health & Environment
Telephone: 785-296-1500
Kansas Indoor Radon Measurements

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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Photo 1 – Southwest corner of site looking towards northeast. Farmhouse in background.

Photo 2 – Southeast corner of Site looking towards northwest. Farmhouses are in background.

SITE PHOTOGRAPHS

Photo 3 – North portion of Site looking southwest. Farmhouse on SW corner of Site is visible.

Photo 4 – View of northern portion of Site from east side of Site. Penny's Sand Plant is visible.

SITE PHOTOGRAPHS

APPENDIX J

STRATIGRAPHIC AN DINSTRUMENTATION LOGS FOR TEST PITS

TEST PIT STRATIGRAPHIC LOG

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: TP1
DATE COMPLETED: 13 June 2013
TEST PIT METHOD: BACKHOE
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	CL-CLAY, silty, soft, no plasticity, medium brown, damp, organic material (topsoil)	1.00			
2	ML-SILT, trace of clay, soft, non-plastic, light brown-tan, moist	2.00	1	1.5 - 2.0	0.8
	END OF TEST PIT @ 2.0ft BGS				
4					
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
32					
34					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

TEST PIT STRATIGRAPHIC LOG

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: TP2
DATE COMPLETED: 13 June 2013
TEST PIT METHOD: BACKHOE
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	ML-SILT, with clay, soft, no plasticity, trace organic material, light medium brown, damp - trace of clay, soft, light brown-tan, moist at 1.0ft BGS	2.00	1	☒ 1.5 - 2.0	0.7
2	END OF TEST PIT @ 2.0ft BGS				
4					
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
32					
34					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

TEST PIT STRATIGRAPHIC LOG

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: TP3
DATE COMPLETED: 13 June 2013
TEST PIT METHOD: BACKHOE
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	CL-CLAY, very silty, with organic material throughout, soft, no plasticity, dark brown, damp	1.00			
2	ML-SILT, trace clay, no plasticity, soft, light brown-tan, moist	3.00	1	1.5 - 2.0	0.9
	END OF TEST PIT @ 3.0ft BGS				
4					
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
32					
34					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

TEST PIT STRATIGRAPHIC LOG

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: TP4
DATE COMPLETED: 13 June 2013
TEST PIT METHOD: BACKHOE
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	CL-CLAY, silty, soft, slight plasticity, with organic material throughout, medium brown, damp	1.00			
2	ML-SILT, trace of clay, soft, no plasticity, light brown-tan, moist	3.00	1	☒ 1.5 - 2.0	0.9
	END OF TEST PIT @ 3.0ft BGS				
4					
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
32					
34					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

TEST PIT STRATIGRAPHIC LOG

PROJECT NAME: DOUGLAS CO. PUBLIC WORKS
PROJECT NUMBER: 080649
CLIENT: DOUGLAS CO. PUBLIC WORKS
LOCATION: LAWRENCE, KS (PENNY'S)

HOLE DESIGNATION: TP5
DATE COMPLETED: 13 June 2013
TEST PIT METHOD: BACKHOE
FIELD PERSONNEL: K. HOEFFNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
2	CL-CLAY, silty, soft, slight plasticity, organic material throughout, black to very dark brown, damp to moist		1	☒ 1.5 - 2.0	1.2
	ML-SILT, trace of clay, no plasticity, soft, moist	2.50			
4	END OF TEST PIT @ 3.0ft BGS	3.00			
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
32					
34					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

APPENDIX K

PHOTO LOG OF TEST PIT INSTALLATION

Photo 1 – Test Pit #1 located in northeast corner of Site.

Photo 2 – Backfilled Test Pit #1, McElwee residence is visible in background.

SITE PHOTOGRAPHS

Photo 3 – Test Pit #2 located on northwest portion of Site.

Photo 4 – Backfilled Test Pit #2, Penny's Sand Plant is visible in background.

SITE PHOTOGRAPHS

Photo 5 – Test Pit #3 located in approximately the center of the Site.

Photo 6 – Backfilled Test Pit #3, southern edge of McElwee property in background.

SITE PHOTOGRAPHS

Photo 7 – Test Pit #4 located in southwest portion of Site.

Photo 8 – Backfilled Test Pit #4with view of road bounding Site to the west.

SITE PHOTOGRAPHS

Photo 9 – Test Pit #5 located in southeast corner of property.

Photo 10 – Test Pit #5 with view of old stone farm house on east side of property in background.

SITE PHOTOGRAPHS

APPENDIX L

LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY FOR SOIL SAMPLING

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

TestAmerica Job ID: 180-22270-1
Client Project/Site: 080649-02-001 Douglas County Public Work

For:
Conestoga-Rovers & Associates, Inc.
9033 Meridian Way
West Chester, Ohio 45069

Attn: Ms. Angela Bown

Authorized for release by:
7/1/2013 3:52:37 PM

Jill Colussy, Project Manager I
jill.colussy@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Receipt Checklists 24

Job ID: 180-22270-1

Laboratory: TestAmerica Pittsburgh

Narrative

Job Narrative
180-22270-1

Receipt
The sample was received on 6/18/2013 9:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8º C.

Pesticides
The matrix spike and matrix spike duplicate recovered outside of the control limits for serveral compounds. The relative percent differnece between the matrix spike and the matrix spike duplicate was outside of the control limitsf or delta-BHC and endosulfan sulfate.

Herbicides
The matrix spike and matrix spike duplicate recovered outside of the control limits for serveral compounds. The realtive percent differnece between the matrix spike and the matrix spike duplicate was outside of control limits for several compounds.

Metals
No analytical or quality issues were noted.

General Chemistry
The matrix spike duplicate recovered outside of the control limits for ammonia.

Definitions/Glossary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
F	MS or MSD exceeds the control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F	RPD of the MS and MSD exceeds the control limits

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F	MS or MSD exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Laboratory: TestAmerica Pittsburgh

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	NELAP	9	4224CA	03-31-14
Connecticut	State Program	1	PH-0688	09-30-14
Kansas	NELAP	7	E-10350	01-31-14
L-A-B	DoD ELAP		L2314	07-24-13
New Hampshire	NELAP	1	203011	04-05-14
New York	NELAP	2	11182	04-01-14
North Carolina DENR	State Program	4	434	12-31-13
Pennsylvania	NELAP	3	02-00416	04-30-14
South Carolina	State Program	4	89014	04-30-13 *
US Fish & Wildlife	Federal		LE94312A-1	11-30-14
USDA	Federal		P-Soil-01	04-16-15
USDA	Federal		P330-10-00139	05-23-16 *
Utah	NELAP	8	STLP	04-30-14
Virginia	NELAP	3	460189	09-14-13
West Virginia DEP	State Program	3	142	01-31-14
Wisconsin	State Program	5	998027800	08-31-13

* Expired certification is currently pending renewal and is considered valid.

Sample Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-22270-1	SO-061313-KH-001	Solid	06/13/13 10:30	06/18/13 09:00

Method Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Method	Method Description	Protocol	Laboratory
8081A	Organochlorine Pesticides (GC)	SW846	TAL PIT
8151A	Herbicides (GC)	SW846	TAL PIT
6010B	Metals (ICP)	SW846	TAL PIT
7471A	Mercury (CVAA)	SW846	TAL PIT
2540G	SM 2540G	SM22	TAL PIT
350.1	Nitrogen, Ammonia	MCAWW	TAL PIT
9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	TAL PIT
9056A	Anions, Ion Chromatography	SW846	TAL PIT

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM22 = SM22

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Client Sample ID: SO-061313-KH-001

Date Collected: 06/13/13 10:30
Date Received: 06/18/13 09:00

Lab Sample ID: 180-22270-1

Matrix: Solid
Percent Solids: 84.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3541			15.0 g	20.0 mL	75431	06/21/13 04:20	KG	TAL PIT
Total/NA	Analysis	8081A		1			75708	06/22/13 11:31	JMO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	3541			15.0 g	20.0 mL	75431	06/21/13 04:20	KG	TAL PIT
Total/NA	Analysis	8081A		1			75708	06/22/13 11:31	JMO	TAL PIT
	Instrument ID: GC15									
Total/NA	Prep	8151A			50.0 g	10.0 mL	75432	06/21/13 05:38	KG	TAL PIT
Total/NA	Analysis	8151A		20			75983	06/26/13 13:19	LKW	TAL PIT
	Instrument ID: GC1									
Total/NA	Prep	3050B			00001.04 g	100 mL	75617	06/24/13 09:44	CH	TAL PIT
Total/NA	Analysis	6010B		1			75770	06/25/13 09:12	RG	TAL PIT
	Instrument ID: T									
Total/NA	Prep	7471A			00000.60 g	100 mL	75815	06/26/13 04:28	WAH	TAL PIT
Total/NA	Analysis	7471A		1			75881	06/26/13 09:26	WAH	TAL PIT
	Instrument ID: G									
Total/NA	Analysis	2540G		1			75147	06/18/13 12:55	CLL	TAL PIT
	Instrument ID: NOEQUIP									
Soluble	Leach	DI Leach			009.9981 g	100 mL	75250	06/19/13 11:11	MJH	TAL PIT
Soluble	Analysis	9056A		1			75295	06/19/13 14:48	MJH	TAL PIT
	Instrument ID: ICS2000									
Total/NA	Prep	9030B			4.99 g	50 mL	75336	06/20/13 10:30	CR	TAL PIT
Total/NA	Analysis	9034		1			75398	06/20/13 13:46	CR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Prep	Distill/Ammonia			0.99 mL	50 mL	75520	06/22/13 13:00	RDH	TAL PIT
Total/NA	Analysis	350.1		1			75891	06/26/13 09:56	CAK	TAL PIT
	Instrument ID: ASTORIA1									

Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Analyst References:

Lab: TAL PIT

Batch Type: Leach

MJH = Matthew Hartman

Batch Type: Prep

CH = Caitlyn Haluck

CR = Carl Reagle

KG = Kevin Geehring

RDH = Rachael Hartmann

WAH = William Hoyle

Batch Type: Analysis

CAK = Chuck Kieda

CLL = Cheryl Loheyde

CR = Carl Reagle

JMO = John Oravec

LKW = Linx Waclaski

MJH = Matthew Hartman

RG = Rob Good

WAH = William Hoyle

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Client Sample ID: SO-061313-KH-001
Date Collected: 06/13/13 10:30
Date Received: 06/18/13 09:00

Lab Sample ID: 180-22270-1
Matrix: Solid
Percent Solids: 84.2

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		2.0	0.35	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
alpha-BHC	ND		2.0	0.32	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
alpha-Chlordane	ND		2.0	0.39	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
beta-BHC	ND		2.0	0.51	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
delta-BHC	ND		2.0	0.30	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
4,4'-DDD	ND		2.0	0.26	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
4,4'-DDE	ND		2.0	0.30	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
4,4'-DDT	ND		2.0	0.30	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Dieldrin	ND		2.0	0.33	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Endosulfan I	ND		2.0	0.37	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Endosulfan II	ND		2.0	0.35	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Endosulfan sulfate	ND		2.0	0.21	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Endrin	ND		2.0	0.38	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Endrin aldehyde	ND		2.0	0.38	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Heptachlor	ND		2.0	0.44	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Heptachlor epoxide	ND		2.0	0.39	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Toxaphene	ND		80	13	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
gamma-BHC (Lindane)	ND		2.0	0.35	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Endrin ketone	ND		2.0	0.31	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
gamma-Chlordane	ND		2.0	0.39	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1
Methoxychlor	ND		3.9	0.41	ug/Kg	☼	06/21/13 04:20	06/22/13 11:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*79*		*45 - 130*	*06/21/13 04:20*	*06/22/13 11:31*	*1*
Tetrachloro-m-xylene	*80*		*45 - 130*	*06/21/13 04:20*	*06/22/13 11:31*	*1*
DCB Decachlorobiphenyl (Surr)	*70*		*45 - 130*	*06/21/13 04:20*	*06/22/13 11:31*	*1*
DCB Decachlorobiphenyl (Surr)	*69*		*45 - 130*	*06/21/13 04:20*	*06/22/13 11:31*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	ND		24	3.0	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
2,4-D	ND		95	6.5	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
2,4-DB	ND		95	7.3	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
Dalapon	ND		110	8.4	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
Dicamba	ND		48	5.7	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
Dichlorprop	ND		95	11	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
MCPA	ND		9500	2000	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
MCPP	ND		9500	1900	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
Pentachlorophenol	ND		13	1.3	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20
Silvex (2,4,5-TP)	ND		24	2.5	ug/Kg	☼	06/21/13 05:38	06/26/13 13:19	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*62*		*42 - 140*	*06/21/13 05:38*	*06/26/13 13:19*	*20*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.9**		1.1	0.25	mg/Kg	☼	06/24/13 09:44	06/25/13 09:12	1
Barium	**82**	**B**	23	0.057	mg/Kg	☼	06/24/13 09:44	06/25/13 09:12	1
Cadmium	**0.081**	**J**	0.57	0.027	mg/Kg	☼	06/24/13 09:44	06/25/13 09:12	1
Iron	**7700**		11	3.4	mg/Kg	☼	06/24/13 09:44	06/25/13 09:12	1

Client Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Client Sample ID: SO-061313-KH-001

Date Collected: 06/13/13 10:30
Date Received: 06/18/13 09:00

Lab Sample ID: 180-22270-1

Matrix: Solid
Percent Solids: 84.2

Method: 6010B - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	6.2		0.34	0.17	mg/Kg	☼	06/24/13 09:44	06/25/13 09:12	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.039	0.013	mg/Kg	☼	06/26/13 04:28	06/26/13 09:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16		0.10	0.10	%			06/18/13 12:55	1
Percent Solids	84		0.10	0.10	%			06/18/13 12:55	1
Ammonia	7.4	B	6.0	0.81	mg/Kg	☼	06/22/13 13:00	06/26/13 09:56	1
Sulfide	ND		36	7.1	mg/Kg	☼	06/20/13 10:30	06/20/13 13:46	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.74		0.59	0.18	mg/Kg	☼		06/19/13 14:48	1
Chloride	2.7	J B	12	2.6	mg/Kg	☼		06/19/13 14:48	1
Nitrite as N	ND		0.59	0.19	mg/Kg	☼		06/19/13 14:48	1
Sulfate	2.6	J B	12	1.4	mg/Kg	☼		06/19/13 14:48	1

QC Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Method: 8081A - Organochlorine Pesticides (GC)

Lab Sample ID: MB 180-75431/1-A
Matrix: Solid
Analysis Batch: 75708

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 75431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		1.7	0.30	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
alpha-BHC	ND		1.7	0.27	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
alpha-Chlordane	ND		1.7	0.33	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
beta-BHC	ND		1.7	0.43	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
delta-BHC	ND		1.7	0.26	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
4,4'-DDD	ND		1.7	0.22	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
4,4'-DDE	ND		1.7	0.25	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
4,4'-DDT	ND		1.7	0.25	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Dieldrin	ND		1.7	0.28	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Endosulfan I	ND		1.7	0.31	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Endosulfan II	ND		1.7	0.29	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Endosulfan sulfate	ND		1.7	0.17	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Endrin	ND		1.7	0.32	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Endrin aldehyde	ND		1.7	0.32	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Heptachlor	ND		1.7	0.37	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Heptachlor epoxide	ND		1.7	0.32	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Toxaphene	ND		67	11	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
gamma-BHC (Lindane)	ND		1.7	0.29	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Endrin ketone	ND		1.7	0.26	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
gamma-Chlordane	ND		1.7	0.33	ug/Kg		06/21/13 04:20	06/22/13 12:19	1
Methoxychlor	ND		3.3	0.35	ug/Kg		06/21/13 04:20	06/22/13 12:19	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*93*		*45 - 130*	*06/21/13 04:20*	*06/22/13 12:19*	*1*
Tetrachloro-m-xylene	*93*		*45 - 130*	*06/21/13 04:20*	*06/22/13 12:19*	*1*
DCB Decachlorobiphenyl (Surr)	*89*		*45 - 130*	*06/21/13 04:20*	*06/22/13 12:19*	*1*
DCB Decachlorobiphenyl (Surr)	*87*		*45 - 130*	*06/21/13 04:20*	*06/22/13 12:19*	*1*

Lab Sample ID: LCS 180-75431/2-A
Matrix: Solid
Analysis Batch: 75708

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 75431

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	33.3	30.5		ug/Kg		91	70 - 123
alpha-BHC	33.3	28.9		ug/Kg		87	59 - 127
alpha-Chlordane	33.3	29.4		ug/Kg		88	71 - 130
beta-BHC	33.3	29.4		ug/Kg		88	70 - 138
delta-BHC	33.3	17.4		ug/Kg		52	40 - 124
4,4'-DDD	33.3	29.8		ug/Kg		89	65 - 135
4,4'-DDE	33.3	29.4		ug/Kg		88	70 - 133
4,4'-DDT	33.3	30.5		ug/Kg		91	10 - 140
Dieldrin	33.3	31.7		ug/Kg		95	70 - 123
Endosulfan I	33.3	29.2		ug/Kg		88	62 - 126
Endosulfan II	33.3	29.4		ug/Kg		88	65 - 128
Endosulfan sulfate	33.3	27.2		ug/Kg		82	55 - 140
Endrin	33.3	30.2		ug/Kg		91	70 - 127
Endrin aldehyde	33.3	30.2		ug/Kg		91	65 - 122
Heptachlor	33.3	30.7		ug/Kg		92	70 - 128

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 180-75431/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75708 — **Prep Batch: 75431**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Heptachlor epoxide	33.3	29.6		ug/Kg		89	69 - 131
gamma-BHC (Lindane)	33.3	28.8		ug/Kg		86	66 - 124
Endrin ketone	33.3	30.2		ug/Kg		90	59 - 132
gamma-Chlordane	33.3	29.2		ug/Kg		88	68 - 123
Methoxychlor	33.3	31.1		ug/Kg		93	10 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*99*		*45 - 130*
Tetrachloro-m-xylene	*94*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*94*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*93*		*45 - 130*

Lab Sample ID: 180-22270-1 MS — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75708 — **Prep Batch: 75431**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	ND		39.6	20.8	F	ug/Kg	☼	53	70 - 123
alpha-BHC	ND		39.6	20.1	F	ug/Kg	☼	51	59 - 127
alpha-Chlordane	ND		39.6	20.1	F	ug/Kg	☼	51	71 - 130
beta-BHC	ND		39.6	20.3	F	ug/Kg	☼	51	70 - 138
delta-BHC	ND		39.6	7.91	F	ug/Kg	☼	20	40 - 124
4,4'-DDD	ND		39.6	18.0	F	ug/Kg	☼	46	65 - 135
4,4'-DDE	ND		39.6	20.2	F	ug/Kg	☼	51	70 - 133
4,4'-DDT	ND		39.6	17.7		ug/Kg	☼	45	10 - 140
Dieldrin	ND		39.6	20.5	F	ug/Kg	☼	52	70 - 123
Endosulfan I	ND		39.6	19.9	F	ug/Kg	☼	50	62 - 126
Endosulfan II	ND		39.6	17.3	F	ug/Kg	☼	44	65 - 128
Endosulfan sulfate	ND		39.6	9.58	F	ug/Kg	☼	24	55 - 140
Endrin	ND		39.6	21.8	F	ug/Kg	☼	55	70 - 127
Endrin aldehyde	ND		39.6	1.45	J F	ug/Kg	☼	4	65 - 122
Heptachlor	ND		39.6	21.8	F	ug/Kg	☼	55	70 - 128
Heptachlor epoxide	ND		39.6	20.1	F	ug/Kg	☼	51	69 - 131
gamma-BHC (Lindane)	ND		39.6	19.6	F	ug/Kg	☼	50	66 - 124
Endrin ketone	ND		39.6	17.1	F	ug/Kg	☼	43	59 - 132
gamma-Chlordane	ND		39.6	19.5	F	ug/Kg	☼	49	68 - 123
Methoxychlor	ND		39.6	16.1		ug/Kg	☼	41	10 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*57*		*45 - 130*
Tetrachloro-m-xylene	*56*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*51*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*50*		*45 - 130*

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 180-22270-1 MSD — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75708 — **Prep Batch: 75431**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aldrin	ND		39.6	20.8	F	ug/Kg	☼	53	70 - 123	0	20
alpha-BHC	ND		39.6	20.0	F	ug/Kg	☼	51	59 - 127	0	20
alpha-Chlordane	ND		39.6	19.5	F	ug/Kg	☼	49	71 - 130	3	20
beta-BHC	ND		39.6	20.3	F	ug/Kg	☼	51	70 - 138	0	20
delta-BHC	ND		39.6	10.2	F	ug/Kg	☼	26	40 - 124	25	20
4,4'-DDD	ND		39.6	18.8	F	ug/Kg	☼	47	65 - 135	4	20
4,4'-DDE	ND		39.6	19.6	F	ug/Kg	☼	49	70 - 133	3	20
4,4'-DDT	ND		39.6	18.7		ug/Kg	☼	47	10 - 140	5	37
Dieldrin	ND		39.6	20.5	F	ug/Kg	☼	52	70 - 123	0	20
Endosulfan I	ND		39.6	19.4	F	ug/Kg	☼	49	62 - 126	3	23
Endosulfan II	ND		39.6	17.0	F	ug/Kg	☼	43	65 - 128	2	33
Endosulfan sulfate	ND		39.6	12.5	F	ug/Kg	☼	32	55 - 140	26	26
Endrin	ND		39.6	22.4	F	ug/Kg	☼	57	70 - 127	3	20
Endrin aldehyde	ND		39.6	1.48	J F	ug/Kg	☼	4	65 - 122	2	20
Heptachlor	ND		39.6	21.9	F	ug/Kg	☼	55	70 - 128	0	20
Heptachlor epoxide	ND		39.6	20.2	F	ug/Kg	☼	51	69 - 131	0	20
gamma-BHC (Lindane)	ND		39.6	20.3	F	ug/Kg	☼	51	66 - 124	4	20
Endrin ketone	ND		39.6	17.3	F	ug/Kg	☼	44	59 - 132	1	20
gamma-Chlordane	ND		39.6	19.7	F	ug/Kg	☼	50	68 - 123	1	24
Methoxychlor	ND		39.6	16.5		ug/Kg	☼	42	10 - 150	3	26

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*56*		*45 - 130*
Tetrachloro-m-xylene	*54*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*51*		*45 - 130*
DCB Decachlorobiphenyl (Surr)	*50*		*45 - 130*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-75432/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75983 — **Prep Batch: 75432**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	ND		20	2.5	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
2,4-D	ND		80	5.5	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
2,4-DB	ND		80	6.1	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
Dalapon	ND		90	7.1	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
Dicamba	ND		40	4.8	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
Dichlorprop	ND		80	9.5	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
MCPA	ND		8000	1600	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
MCPP	ND		8000	1600	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
Pentachlorophenol	ND		11	1.1	ug/Kg		06/21/13 05:38	06/26/13 14:31	20
Silvex (2,4,5-TP)	ND		20	2.1	ug/Kg		06/21/13 05:38	06/26/13 14:31	20

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*60*		*42 - 140*	*06/21/13 05:38*	*06/26/13 14:31*	*20*

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: LCS 180-75432/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75983 — **Prep Batch: 75432**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-T	80.0	41.9		ug/Kg		52	30 - 140
2,4-D	320	148		ug/Kg		46	30 - 140
2,4-DB	320	181		ug/Kg		57	34 - 140
Dalapon	160	67.7	J	ug/Kg		42	36 - 120
Dicamba	160	107		ug/Kg		67	50 - 140
Dichlorprop	320	209		ug/Kg		65	50 - 130
MCPA	32000	16700		ug/Kg		52	50 - 120
MCPP	32000	20900		ug/Kg		65	50 - 140
Pentachlorophenol	40.0	26.2		ug/Kg		65	60 - 140
Silvex (2,4,5-TP)	80.0	46.1		ug/Kg		58	40 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*71*		*42 - 140*

Lab Sample ID: 180-22270-1 MS — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75983 — **Prep Batch: 75432**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-T	ND		95.0	35.2		ug/Kg	☼	37	30 - 140
2,4-D	ND		380	123		ug/Kg	☼	32	30 - 140
2,4-DB	ND		380	168		ug/Kg	☼	44	34 - 140
Dalapon	ND		190	55.4	J F	ug/Kg	☼	29	36 - 120
Dicamba	ND		190	97.9		ug/Kg	☼	52	50 - 140
Dichlorprop	ND		380	196		ug/Kg	☼	52	50 - 130
MCPA	ND		38000	13500	F	ug/Kg	☼	36	50 - 120
MCPP	ND		38000	19800		ug/Kg	☼	52	50 - 140
Pentachlorophenol	ND		47.5	21.0	F	ug/Kg	☼	44	60 - 140
Silvex (2,4,5-TP)	ND		95.0	44.8		ug/Kg	☼	47	40 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*55*		*42 - 140*

Lab Sample ID: 180-22270-1 MSD — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75983 — **Prep Batch: 75432**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,4,5-T	ND		94.8	49.7	F	ug/Kg	☼	52	30 - 140	34	30
2,4-D	ND		379	171	F	ug/Kg	☼	45	30 - 140	32	30
2,4-DB	ND		379	229	F	ug/Kg	☼	60	34 - 140	31	30
Dalapon	ND		190	105	J F	ug/Kg	☼	55	36 - 120	62	30
Dicamba	ND		190	117		ug/Kg	☼	62	50 - 140	18	30
Dichlorprop	ND		379	253		ug/Kg	☼	67	50 - 130	25	30
MCPA	ND		37900	21300	F	ug/Kg	☼	56	50 - 120	45	30
MCPP	ND		37900	25200		ug/Kg	☼	66	50 - 140	24	30
Pentachlorophenol	ND		47.4	26.8	F	ug/Kg	☼	56	60 - 140	24	30

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: 180-22270-1 MSD — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75983 — **Prep Batch: 75432**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Silvex (2,4,5-TP)	ND		94.8	57.1		ug/Kg	☼	60	40 - 130	24	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*67*		*42 - 140*

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 180-75617/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75770 — **Prep Batch: 75617**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.99	0.22	mg/Kg		06/24/13 09:44	06/25/13 07:47	1
Barium	0.0743	J	20	0.050	mg/Kg		06/24/13 09:44	06/25/13 07:47	1
Cadmium	ND		0.50	0.024	mg/Kg		06/24/13 09:44	06/25/13 07:47	1
Iron	ND		9.9	2.9	mg/Kg		06/24/13 09:44	06/25/13 07:47	1
Lead	ND		0.30	0.14	mg/Kg		06/24/13 09:44	06/25/13 07:47	1

Lab Sample ID: LCS 180-75617/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75770 — **Prep Batch: 75617**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	49.0	47.3		mg/Kg		96	80 - 120
Barium	196	191		mg/Kg		97	80 - 120
Cadmium	4.90	4.63		mg/Kg		94	80 - 120
Iron	98.0	88.6		mg/Kg		90	80 - 120
Lead	49.0	46.9		mg/Kg		96	80 - 120

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 180-75815/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75881 — **Prep Batch: 75815**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.032	0.011	mg/Kg		06/26/13 04:28	06/26/13 09:15	1

Lab Sample ID: LCS 180-75815/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75881 — **Prep Batch: 75815**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.417	0.423		mg/Kg		102	80 - 120

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: 180-22270-1 MS — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75881 — **Prep Batch: 75815**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.195	0.206		mg/Kg	☼	106	75 - 125

Lab Sample ID: 180-22270-1 MSD — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75881 — **Prep Batch: 75815**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.192	0.197		mg/Kg	☼	103	75 - 125	4	20

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 180-75520/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75891 — **Prep Batch: 75520**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	4.22	J	4.9	0.66	mg/Kg		06/22/13 13:00	06/26/13 09:49	1

Lab Sample ID: LCS 180-75520/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75891 — **Prep Batch: 75520**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	99.0	91.6		mg/Kg		92	90 - 110

Lab Sample ID: 180-22270-1 MS — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75891 — **Prep Batch: 75520**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	7.4	B	116	115		mg/Kg	☼	93	90 - 110

Lab Sample ID: 180-22270-1 MSD — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75891 — **Prep Batch: 75520**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	7.4	B	116	108	F	mg/Kg	☼	86	90 - 110	7	20

Method: 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 180-75336/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75398 — **Prep Batch: 75336**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		30	6.0	mg/Kg		06/20/13 10:30	06/20/13 13:40	1

Method: 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric) (Continued)

Lab Sample ID: LCS 180-75336/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75398 — **Prep Batch: 75336**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	192	182		mg/Kg		95	85 - 115

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-75295/6 — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 75295

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.050	0.015	mg/Kg			06/19/13 09:58	1
Chloride	0.223	J	1.0	0.22	mg/Kg			06/19/13 09:58	1
Nitrite as N	ND		0.050	0.016	mg/Kg			06/19/13 09:58	1
Sulfate	ND		1.0	0.12	mg/Kg			06/19/13 09:58	1

Lab Sample ID: LB3 180-75250/1-A LB3 — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Soluble**
Analysis Batch: 75295

Analyte	LB3 Result	LB3 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.50	0.15	mg/Kg			06/19/13 15:42	1
Chloride	ND		10	2.2	mg/Kg			06/19/13 15:42	1
Nitrite as N	ND		0.50	0.16	mg/Kg			06/19/13 15:42	1
Sulfate	1.50	J	10	1.2	mg/Kg			06/19/13 15:42	1

Lab Sample ID: LCS 180-75250/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Soluble**
Analysis Batch: 75295

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	25.0	24.2		mg/Kg		97	80 - 120
Chloride	500	495		mg/Kg		99	80 - 120
Nitrite as N	25.0	23.5		mg/Kg		94	80 - 120
Sulfate	500	502		mg/Kg		100	80 - 120

Lab Sample ID: 180-22270-1 MS — **Client Sample ID: SO-061313-KH-001**
Matrix: Solid — **Prep Type: Soluble**
Analysis Batch: 75295

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	0.74		14.8	15.1		mg/Kg	☼	97	80 - 120
Chloride	2.7	J B	296	280		mg/Kg	☼	94	80 - 120
Nitrite as N	ND		14.8	14.1		mg/Kg	☼	95	80 - 120
Sulfate	2.6	J B	296	288		mg/Kg	☼	96	80 - 120

QC Sample Results

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

Method: 9056A - Anions, Ion Chromatography (Continued)

Lab Sample ID: 180-22270-1 MSD
Matrix: Solid
Analysis Batch: 75295

Client Sample ID: SO-061313-KH-001
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	0.74		14.7	15.5		mg/Kg	☼	101	80 - 120	3	15
Chloride	2.7	J B	294	285		mg/Kg	☼	96	80 - 120	2	15
Nitrite as N	ND		14.7	13.9		mg/Kg	☼	95	80 - 120	1	15
Sulfate	2.6	J B	294	291		mg/Kg	☼	98	80 - 120	1	15

QC Association Summary

Client: Conestoga-Rovers & Associates, Inc.
Project/Site: 080649-02-001 Douglas County Public Work

TestAmerica Job ID: 180-22270-1

GC Semi VOA

Prep Batch: 75431

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	3541	
180-22270-1 MS	SO-061313-KH-001	Total/NA	Solid	3541	
180-22270-1 MSD	SO-061313-KH-001	Total/NA	Solid	3541	
LCS 180-75431/2-A	Lab Control Sample	Total/NA	Solid	3541	
MB 180-75431/1-A	Method Blank	Total/NA	Solid	3541	

Prep Batch: 75432

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	8151A	
180-22270-1 MS	SO-061313-KH-001	Total/NA	Solid	8151A	
180-22270-1 MSD	SO-061313-KH-001	Total/NA	Solid	8151A	
LCS 180-75432/2-A	Lab Control Sample	Total/NA	Solid	8151A	
MB 180-75432/1-A	Method Blank	Total/NA	Solid	8151A	

Analysis Batch: 75708

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	8081A	75431
180-22270-1 MS	SO-061313-KH-001	Total/NA	Solid	8081A	75431
180-22270-1 MSD	SO-061313-KH-001	Total/NA	Solid	8081A	75431
LCS 180-75431/2-A	Lab Control Sample	Total/NA	Solid	8081A	75431
MB 180-75431/1-A	Method Blank	Total/NA	Solid	8081A	75431

Analysis Batch: 75983

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	8151A	75432
180-22270-1 MS	SO-061313-KH-001	Total/NA	Solid	8151A	75432
180-22270-1 MSD	SO-061313-KH-001	Total/NA	Solid	8151A	75432
LCS 180-75432/2-A	Lab Control Sample	Total/NA	Solid	8151A	75432
MB 180-75432/1-A	Method Blank	Total/NA	Solid	8151A	75432

Metals

Prep Batch: 75617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	3050B	
LCS 180-75617/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 180-75617/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 75770

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	6010B	75617
LCS 180-75617/2-A	Lab Control Sample	Total/NA	Solid	6010B	75617
MB 180-75617/1-A	Method Blank	Total/NA	Solid	6010B	75617

Prep Batch: 75815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	7471A	
180-22270-1 MS	SO-061313-KH-001	Total/NA	Solid	7471A	
180-22270-1 MSD	SO-061313-KH-001	Total/NA	Solid	7471A	
LCS 180-75815/2-A	Lab Control Sample	Total/NA	Solid	7471A	

Metals (Continued)

Prep Batch: 75815 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-75815/1-A	Method Blank	Total/NA	Solid	7471A	

Analysis Batch: 75881

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	7471A	75815
180-22270-1 MS	SO-061313-KH-001	Total/NA	Solid	7471A	75815
180-22270-1 MSD	SO-061313-KH-001	Total/NA	Solid	7471A	75815
LCS 180-75815/2-A	Lab Control Sample	Total/NA	Solid	7471A	75815
MB 180-75815/1-A	Method Blank	Total/NA	Solid	7471A	75815

General Chemistry

Analysis Batch: 75147

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	2540G	

Leach Batch: 75250

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Soluble	Solid	DI Leach	
180-22270-1 MS	SO-061313-KH-001	Soluble	Solid	DI Leach	
180-22270-1 MSD	SO-061313-KH-001	Soluble	Solid	DI Leach	
LB3 180-75250/1-A LB3	Method Blank	Soluble	Solid	DI Leach	
LCS 180-75250/2-A	Lab Control Sample	Soluble	Solid	DI Leach	

Analysis Batch: 75295

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Soluble	Solid	9056A	75250
180-22270-1 MS	SO-061313-KH-001	Soluble	Solid	9056A	75250
180-22270-1 MSD	SO-061313-KH-001	Soluble	Solid	9056A	75250
LB3 180-75250/1-A LB3	Method Blank	Soluble	Solid	9056A	75250
LCS 180-75250/2-A	Lab Control Sample	Soluble	Solid	9056A	75250
MB 180-75295/6	Method Blank	Total/NA	Solid	9056A	

Prep Batch: 75336

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	9030B	
LCS 180-75336/2-A	Lab Control Sample	Total/NA	Solid	9030B	
MB 180-75336/1-A	Method Blank	Total/NA	Solid	9030B	

Analysis Batch: 75398

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	9034	75336
LCS 180-75336/2-A	Lab Control Sample	Total/NA	Solid	9034	75336
MB 180-75336/1-A	Method Blank	Total/NA	Solid	9034	75336

Prep Batch: 75520

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	Distill/Ammonia	
180-22270-1 MS	SO-061313-KH-001	Total/NA	Solid	Distill/Ammonia	
180-22270-1 MSD	SO-061313-KH-001	Total/NA	Solid	Distill/Ammonia	

General Chemistry (Continued)

Prep Batch: 75520 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-75520/2-A	Lab Control Sample	Total/NA	Solid	Distill/Ammonia	
MB 180-75520/1-A	Method Blank	Total/NA	Solid	Distill/Ammonia	

Analysis Batch: 75891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-22270-1	SO-061313-KH-001	Total/NA	Solid	350.1	75520
180-22270-1 MS	SO-061313-KH-001	Total/NA	Solid	350.1	75520
180-22270-1 MSD	SO-061313-KH-001	Total/NA	Solid	350.1	75520
LCS 180-75520/2-A	Lab Control Sample	Total/NA	Solid	350.1	75520
MB 180-75520/1-A	Method Blank	Total/NA	Solid	350.1	75520

3.8 #2

CONESTOGA-ROVERS & ASSOCIATES

CHAIN OF CUSTODY RECORD

Address: 1502 SW 41st St. Topeka, KS.
Phone: 785-783-2982 Fax:

COC NO.: 38036
PAGE 1 OF 1
(See Reverse Side for Instructions)

7/1/2013

Project No/ Phase/Task Code: 080649/2	Laboratory Name: Test America	Lab Location: Pittsburgh, PA	SSOW ID: 080649-02-001
Project Name: Douglas County Public Works	Lab Contact: Jill Colussy	Lab Quote No:	Cooler No: 1
Project Location: Lawrence, KS.			Carrier: Fed Ex
Chemistry Contact: Angie Bown			Airbill No:
Sampler(s): Kirk Hoeffner			Date Shipped: 6/17/13

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Unpreserved	Hydrochloric Acid (HCl)	Nitric Acid (HNO_3)	Sulfuric Acid (H_2SO_4)	Sodium Hydroxide (NaOH)	Methanol/Water (Soil VOC)	EnCores 3x5-g, 1x25-g	Other:	Total Containers/Sample	Select Metals	Mercury	Sulfate/Sulfide	Chloride	Nitrate/Nitrite	Ammonia	Pesticides	Herbicides			MS/MSD Request	Comments/ Special Instructions:
1	SO-061313-KH-001	6/13/13	10:30	So	G	X								2	X	X	X	X	X	X	X	X				See ssow for metals
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										

180-22270 Chain of Custody

TAT Required in business days (use separate COCs for different TATs):
☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☐ 2 Week ☐ Other:

Total Number of Containers: 2
All Samples in Cooler must be on COC

Notes/ Special Requirements:

	Relinquished By	Company	Date	Time		Received By	Company	Date	Time
1.	[signature]	CRA	6/17/13	18:30	1.	[signature]	TA Pitt	6-18-13	900
2.					2.				
3.					3.				

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

CRA Form: COC-10B (20110804)

Login Sample Receipt Checklist

Client: Conestoga-Rovers & Associates, Inc.

Job Number: 180-22270-1

Login Number: 22270

List Source: TestAmerica Pittsburgh

List Number: 1

Creator: O'Donnell, Brandon R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX M

GROUNDWATER MODELING REPORT

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1.0 FLOW MODEL CONSTRUCTION

A three-dimensional (3D) numerical groundwater flow model was developed in order to estimate the potential dewatering influence from maximum rate sand and gravel extraction, and net losses from precipitation and evaporation. The numerical modeling approach allows the various effects of pit development, municipal pumping, and the Kansas River to be readily represented.

1.1 MODEL DOMAIN

The model domain is presented on Figure M.1. The model domain is approximately 26,500 feet (ft) wide, 26,000 ft long, and contains two main areas of interest shown on Figure M.1 as the proposed extraction area (and the vicinity) and the City of Eudora Well Field (W-6 to W-9). Figure M.1 also includes grid spacing applied in the model. The sand and gravel extraction will be operated by Penny's Concrete and Sand LLC, (Penny's). The model spans from 7,000 ft to the west of Penny's to the intersection of the Kansas and Wakarusa Rivers, and encompasses the river valley from the Kansas River in the north to the Wakarusa River in the south.

The domain was discretized into variable model cells from 20 ft by 20 ft in the vicinity of the Eudora Well field to a maximum size of 100 ft by 100 ft away from the refined well field area. Model cell sizes are refined in the area of the Eudora Well Field to increase accuracy and numerical stability of the model.

1.2 MODEL LAYER CONSTRUCTION

Three model layers were employed to represent the vertical hydrostratigraphic units. The top model layer (Model Layer 1) represents a semi-confining unit of clay, which ranges in thickness from 0 to 50 ft. Model layers 2 and 3 represent the regional aquifer with a variable thickness from 10 ft to 70 ft in the model domain. The lower portion of the aquifer (Model layer 3) consists of sand and gravel, while the upper portion (Model Layer 2) contains finer sand.

The surfaces of each unit were developed using stratigraphic data including five monitoring wells and 43 water well records from the WWC5 database. Observed geological unit contacts were interpreted using the Universal Kriging Method implemented in Surfer 8.09 (Golden Software, 2008). For these water well records, the

sand unit was halved to approximately represent the upper and lower portion of the unit, respectively (Golden Software, 2008).

1.3 HORIZONTAL AND VERTICAL BOUNDARY CONDITIONS

The model is bounded on the north by the Kansas River, and on the south and southeast by the Wakarusa River. The western boundary is comprised of no flow cells representing bedrock outcrop at surface, and specified head cells which represent lateral flow to the model domain. Boundary conditions applied in the model are provided on Figure M.2.

The rivers are represented in the model using the MODFLOW river package with input parameters of river stage, river bottom, and estimated conductance term based on physical properties of the river cell bedding materials. The conductance term is calculated and results from the combination of the river cell width, length, thickness of river bed, and hydraulic conductivity of the bedding materials.

The conductance term of the river cells was established during model calibration. The calibrated hydraulic conductance of the Kansas River bed ranges from 5 to 142,000 ft^2/day. The calibrated hydraulic conductance of the Wakarusa River bed ranges from 13 to 1900 ft^2/day.

The river stage elevation was determined using measured data from the Kansas River at Penny's (SG-E), from the United States Geological Survey (USGS) De Soto River gauging station, and from the USGS Wakarusa River gauging station at Lawrence. Two staff gauges (western and eastern) were installed as part of the investigation program, but only the eastern staff gauge was used to determine the slope and elevation of the free water surface. The western staff gauge was damaged shortly after installation, and is not deemed reliable for further interpretation. The gradient of the water surfaces were calculated for the Kansas and Wakarusa Rivers based on the measured elevations, and the distances along the rivers between gauging locations. The calculated water surface gradients for the Kansas and Wakarusa Rivers are 1.66 ft/mile and 1.64 ft/mile, respectively. The reach of the Kansas River within the immediate vicinity of the site (upstream of the eastern staff gauge, SG-E) has a reduced gradient of 1.25 ft/mile, and was established during model calibration. The gradient of the reach was approximately matched with observed groundwater elevation contours. The gradients are based upon limited data, and are assumed to be representative of average conditions between the gauging locations.

The river bottom elevation was assigned using a digital elevation model (DEM). Natural and manmade changes of the Kansas River bed may incur discrepancies between the DEM and actual conditions. Small discrepancies will have insignificant effect on the model.

The domain is extended 7,000 ft to the west of Penny's to reduce the potential for interference from the specified head boundary condition to the west. The specified head boundary is applied with a gradient of increasing or decreasing head in the north-south direction, and was adjusted during calibration.

The bottom layer of the model is bounded by bedrock, which is located at approximately 70 ft below ground surface (BGS). Water well records from the Kansas Geological Survey (KGS) Water Well Completion Records Database (WWC5) describe the bedrock as shale, rock, or limestone. The bedrock is conceptualized as a no-flow boundary due to the presence of shale. Therefore the top of bedrock serves as the bottom of the model domain.

Recharge from precipitation infiltration was represented over the top of the model domain. Precipitation data was collected from the Lawrence Weather Station (Weather Underground, 2013), and a ten year average 34.6 inches (in) (880 mm) was calculated. Literature values report annual precipitation in the years 1941-1970 of approximately 38 in/year, and 35-40 in/year in the years 1961-1990 (Sophocleous, 1998). Based on these reported values, an annual precipitation of 35.4 in/year (900 mm/year) was considered to be representative. Recharge was applied in the model at a rate of approximately 2.5 in/year (7 percent of total annual precipitation) following Hansen (1991).

2.0 MODEL SELECTION AND SIMULATION METHOD

MODFLOW-2000 was selected to simulate groundwater flow for this modeling study. MODFLOW-2000 (Harbaugh et al., 2000), developed by the USGS, is capable of simulating steady-state or transient groundwater flow in two or three dimensions. MODFLOW-2000 uses the finite-difference method leading to a numerical approximation that allows for a description and solution of complex groundwater flow problems. The Geometric Multigrid Solver (GMG) (Wilson and Naff, 2004) matrix solution method included in MODFLOW-2000 was employed to solve the groundwater flow equation.

3.0 FLOW MODEL CALIBRATION

The groundwater flow model was calibrated to represent known conditions in the area, including the observed groundwater elevations using qualitative and quantitative comparisons. The model was calibrated qualitatively to represent the hydrogeologic characterization and pattern of groundwater flow. The model calibration was evaluated quantitatively by comparing the simulated water levels to those measured on July 2, 2013 (the most recent data available). The calibration data are presented below and further statistical measures are presented on Figure M.3.

Location	*Observed Groundwater Elevation - July 2, 2013 (ft)*	*Simulated Groundwater Elevation (ft)*	*Calibration Residual Observed-Simulated (ft)*
MW-1	785.84	785.80	0.04
MW-2	786.11	786.03	0.08
MW-3	786.44	786.33	0.11
MW-4	786.96	787.13	-0.17
MW-5	786.36	786.46	-0.10

Figure M.3 presents a scatter plot of the observed versus simulated groundwater elevations, as well as the residual statistics for the model calibration. The calibrated model provides a residual mean of -0.01 ft, an absolute residual mean of 0.10 ft, a residual sum of squares of 0.06 square feet and a normalized standard deviation of 0.096 (or 9.6 percent), which is less than the industry standard of 10 percent, as suggested by Spitz and Moreno (1996).

A second quantitative check of the calibration is the calculated volumetric budget reviewed as the total inflows and outflows. There is no discrepancy in this case, indicating a satisfactory numerical convergence was achieved.

The evaluation of the calibration results indicate that the model provides a reasonable representation of groundwater flow conditions for the area of Penny's.

The calibrated horizontal hydraulic conductivity of the semi-confining clay unit is 2.8×10^{-2} ft/day (1×10^{-5} cm/s), and has an anisotropy in K_x:K_z of 10:1. The calibrated hydraulic conductivity is typical for silt, or silty clay. Silt is often mistaken as clay, and may have been logged improperly in the WWC5 database at the time of drilling.

The calibrated hydraulic conductivity of the upper aquifer is 140 ft/day (5×10^{-2} cm/s), which agrees well with the results from single well response tests performed at five monitoring wells during the investigation program.

The calibrated hydraulic conductivity of the lower aquifer is 1100 ft/day (3.9×10^{-1} cm/s), and is considered a representative value for sand and gravel. The lower aquifer is highly permeable, and is capable of providing more than 500 gallons per minute (gpm) with minimal drawdown. A pumping test at Eudora Well 8 indicates 4 ft of drawdown after 11 hours of pumping at 521 gpm (Kansas Geological Survey, 1998). The calibrated hydraulic conductivity also agrees with the analyses performed by Carl Nuzman (Nuzman, 2012) (transmissivity of 220,000 gpd/ft, saturated thickness of 25 ft, conductivity of 1170 ft/day), and Carl McElwee (McElwee, 2012) (1000 ft/day).

4.0 SUMMARY OF SIMULATED SCENARIOS

The following scenarios were simulated to evaluate the potential dewatering effects. The scenarios are listed as follows:

- Calibrated Model to Observed Data (July 2, 2013)
- Scenario 1: Long Term Representative Conditions (Base Case)
- Scenario 2: Early Stage Extraction
- Scenario 3: Late Stage Extraction
- Scenario 4: Late Stage Extraction and Pond Backfilled in North
- Scenario 5: Rehabilitation Condition

Calibrated Model to Observed Data (July 2, 2013)

Calibration was performed on model parameters including hydraulic conductivity, the Kansas River conductance term, and Kansas River gradient. The stage elevation of the Kansas River was approximately set to the instantaneous elevation measured during the surface and groundwater monitoring event on July 2, 2013. Observed groundwater elevation contours are provided on Figure M.4 for the purpose of comparison.

Scenario 1 (Base Case Condition)

Scenario 1 represents the long term average groundwater flow condition, and was used as a base case for comparison and evaluation of the drawdown effects. The Kansas River stage elevation was changed from the calibrated flow model, and uses a long term average instead of the instantaneous elevations collected on July 2, 2013. Base line modeling indicates groundwater flow at the Site is consistent with the identified northeast groundwater flow direction using the spring 2013 monitoring well data and that there is an overall easterly flow of groundwater in the regional aquifer. Scenarios 2 through 4 use the same long term representative boundary conditions as in the base case condition.

Scenario 2

Scenario 2 simulates the drawdown effect from full rate aggregate extraction and evaporation on a small area of the pit (approximately 50 acres at the north). The open pit is represented by a high hydraulic conductivity zone which simulates an open body of water. Dewatering in the lake is represented by a well which has an extraction rate

equivalent to the sand and gravel removal rate combined with the net precipitation and evaporation effects. Recharge over the pit area was set to zero as the simulated dewatering rate includes the net precipitation and evaporation effects. A description of the annual average dewatering consists of the following components:

- Maximum sand and gravel extraction rates are expected to be 5,000 tons per day, but only the solids volume of sand and gravel contributes to a dewatering effect. The rate of 5,000 tons per day is a conservative estimate based on past extraction rates from the river dredging operation, which was allowed to operate 24 hours per day versus the 12 hour day for the pit mine. In addition, the model conservatively assumes production 365 days per year, which is unlikely.
- Dewatering rate due to extraction is a function of the volume of solids removed.
- The pore water drains back into the pit and most, if any, residual water mined with the sand and gravel will travel through a settling pond, and return to the pit on a continuous basis.
- Surface area of the pond during early stage extraction is approximately 2 X 10^6 ft^2.
- Evaporative losses are calculated using a standard water balance on the proposed pond area, and represent an annual average dewatering rate.

The details of the equivalent groundwater extraction rates are calculated from the following equations:

$$Q_{extraction} = \frac{M_{extraction}}{\delta_s} \qquad \text{Equation 1}$$

$$Q_{extraction} = 5000\,\frac{tons}{day} \times \frac{2000\ lb}{1\ ton} \times \frac{1\ ft^3}{165\ lb} = 60{,}606\ \frac{ft^3}{day} = 315\ gpm$$

Where:

$\boldsymbol{Q_{extraction}}$ is the equivalent dewatering rate due to sand and gravel extraction (ft^3/day or US gpm)

$\boldsymbol{\delta_s}$ is the unit weight of solids = 165 lb/ft^3 (typical)

$$Q_{evaporation} = \left(P - E_{open\ water}\right) \times A \qquad \text{Equation 2}$$

$$Q_{evaporation} = \left(35.4\,\frac{in}{year} - 45\,\frac{in}{year}\right) \times \frac{1\ ft}{12\ in} \times \frac{1\ year}{365\ day} \times 2 \times 10^6\ ft^2 = 4{,}384\ \frac{ft^3}{day} = 23\ gpm$$

Where:

$\boldsymbol{Q_{evaporation}}$	Is the equivalent dewatering rate due to evaporative losses (ft^3/day or US gpm)
$\boldsymbol{P}$	Is the annual precipitation = 35.4 in/year (Sophocleous, 1998)
$\boldsymbol{E_{open\ water}}$	Is the annual free water surface evaporation = 45 in/year (Sophocleous, 1998)
$\boldsymbol{A}$	Is the free water area = $2X10^6$ ft^2

Therefore, the combined dewatering effect of the active extraction and pond evaporation for scenario 2 is 338 gpm.

Scenario 3

Scenario 3 simulates the drawdown effect from full rate aggregate extraction and evaporation on the complete area of the pit (166 acres). The scenario has a higher net dewatering rate due to the increased area and evaporative losses. The dewatering rate for Scenario 3 has the same components as Scenario 2 except:

- Surface area of the pond during late stage extraction is approximately 7.2 x 10^6 ft^2.

Using the above equations and applying the extraction area of 7.2 x 10^6 ft^2, the equivalent dewatering effect is 397 gpm.

Scenario 4

Scenario 4 reflects the effect of lower permeability overburden material being placed in the area of the pit closest to the Kansas River. The estimated horizontal hydraulic conductivity of the backfilled material is 2.8 x 10-1 ft/day (1 x 10-4 cm/s), approximately an order of magnitude higher than its pre-extraction value. This lower permeability material may reduce inflow from the Kansas River, and therefore increase flow from the aquifer. The dewatering rate applied was the same as Scenario 3 (397 gpm), and can be considered conservative since it provided a high groundwater withdrawal rate.

Scenario 5

Scenario 5 simulates the long-term effect of dewatering and drawdown after mining has finished, and the open pit is rehabilitated. Under this condition, the groundwater

withdrawal is only due to evaporation occurring over the full pit area (166 acres). The dewatering component due to evaporation is the same as in Scenarios 3 and 4 (82 gpm).

5.0 SIMULATION RESULTS AND SENSITIVITY ANALYSIS

5.1 PREDICTIVE SCENARIOS

The simulated groundwater elevations are presented on Figures M.5 to M.10 for the calibrated model and Scenarios 1 through 5 (as described in Section 4). The groundwater elevation contours show relatively consistent patterns of groundwater flow with only limited variations resulting from extraction and rehabilitation conditions.

The predicted groundwater drawdowns are compared to the long-term baseline condition (Scenario 1) to identify the predicted changes in groundwater elevations corresponding to each scenario. These changes in groundwater elevation are shown on Figures M.11 to M.14.

The predicted water level changes show drawdown beyond the pond area is limited to 1 ft near the edge of the pond and diminishes to less than ¼ of a foot (3 inches) at a distance of 4,000 to 6,000 ft.

Under rehabilitation conditions the influence is smaller than all active extraction conditions with a maximum drawdown of approximately 0.5 ft near the edges of the pond and to less than ¼ of a foot (3 inches) at a distance of 3,000 to 4,000 ft.

Simulation results for all scenarios indicate drawdown effects due to aggregate extraction will be insignificant.

Simulated steady-state pond elevations vary by less than 1 ft in Scenarios 2 to 5, and have an average long term elevation of 787.19 ft. The steady-state pond elevations for Scenarios 2 through 5 are summarized below.

Predictive Scenario	*Steady-State Pond Elevation (ft NAVD88)*
Scenario 2 - Early Stage Extraction	786.87
Scenario 3 - Late Stage Extraction	787.13
Scenario 4 - Late Stage Extraction and Backfilled Pond in North	787.23
Scenario 5 - Rehabilitation Condition	787.54

5.2 SENSITIVITY ANALYSIS

Sensitivity analyses were performed for recharge, stage elevation of the Kansas River, conductance term for the river cells, and hydraulic conductivity of the clay unit. The parameters were varied by increasing or decreasing the value by a fixed percentage, except the Kansas River stage elevation which was varied by 1 ft. Sensitivity analyses were performed for the calibrated flow model (July 2, 2013 conditions) and Scenario 2 (early stage extraction).

The sensitivity results demonstrate that the calibrated flow model is not sensitive to the selected input parameters within the selected ranges except the change in river stage elevation. The river stage elevation sensitivity analysis shows the model is sensitive to fluctuations in the Kansas River, which agrees with the field observations at Penny's (i.e., changes in the Kansas River stage elevation result in corresponding changes in groundwater elevations). The sensitivity analysis results for the calibrated flow model are provided below.

Parameter	*Adjustment*	*Residual Mean (ft)*	*Absolute Residual Mean (ft)*	*Residual Sum of Squares (ft2)*	*Normalized Standard Deviation*
Calibrated Model	None	-0.01	0.10	0.06	9.6%
Recharge	increase 10%	-0.05	0.09	0.07	9.4%
	decrease 10%	0.03	0.11	0.07	9.9%
Kansas River Stage Elevation	increase 1 ft	-0.62	0.62	2.02	13.1%
	decrease 1 ft	0.61	0.61	2.05	17.1%
Kansas River Bed Conductivity	increase 10%	0.00	0.11	0.06	9.9%
	decrease 10%	0.00	0.11	0.06	9.9%
Clay Unit Hydraulic Conductivity	increase 10%	-0.01	0.10	0.06	9.6%
	decrease 10%	-0.01	0.10	0.06	9.6%
Aquifer Hydraulic Conductivity	increase 20%	0.02	0.10	0.05	9.0%
	decrease 20%	-0.05	0.10	0.08	10.6%

Scenario 2 (early stage extraction) was selected for the sensitivity analysis as it resulted in the greatest drawdown effects (1.42 ft drawdown in the pond) due to aggregate extraction. The Kansas River stage elevation produces the largest change in the steady-state pond elevation, as was previously mentioned. If the Kansas River stage elevation is removed from the analysis, the long term elevation remains consistent around 786.87 ft. The sensitivity analysis results for Scenario 2 are presented below.

Parameter	*Adjustment*	*Steady-State Pond Elevation (ft NAVD88)*
Early Stage Extraction	None	786.87
Recharge	increase 10%	786.90
	decrease 10%	786.83
Kansas River Stage Elevation	increase 1 ft	787.58
	decrease 1 ft	786.16
Kansas River Bed Conductivity	increase 10%	786.87
	decrease 10%	786.87
Clay Unit Hydraulic Conductivity	increase 10%	786.87
	decrease 10%	786.87
Aquifer Hydraulic Conductivity	increase 20%	786.92
	decrease 20%	786.79

Based on the sensitivity simulation results, the following conclusions are evident:

- Aggregate extraction, even under the most conservative scenarios will have minimal, or undetectable influence on the aquifer.
- Aggregate extraction will cause an insignificant drawdown effect in the areas beyond the outer edges of the pond.
- The maximum predicted groundwater level decrease beyond the pond will occur during the early stages of extraction and will be on the order of 1 foot. However, the drawdown will diminish in the area beyond the pond under rehabilitation conditions.
- The maximum predicted groundwater level decrease in the pond will occur during early stages of extraction, and will be within 1 ft of all other stages of extraction.
- Sensitivity simulation results show that even under the assumption of a lower annual recharge rate, the predicted drawdown during early stage extraction will be insignificant.

7.0 REFERENCES

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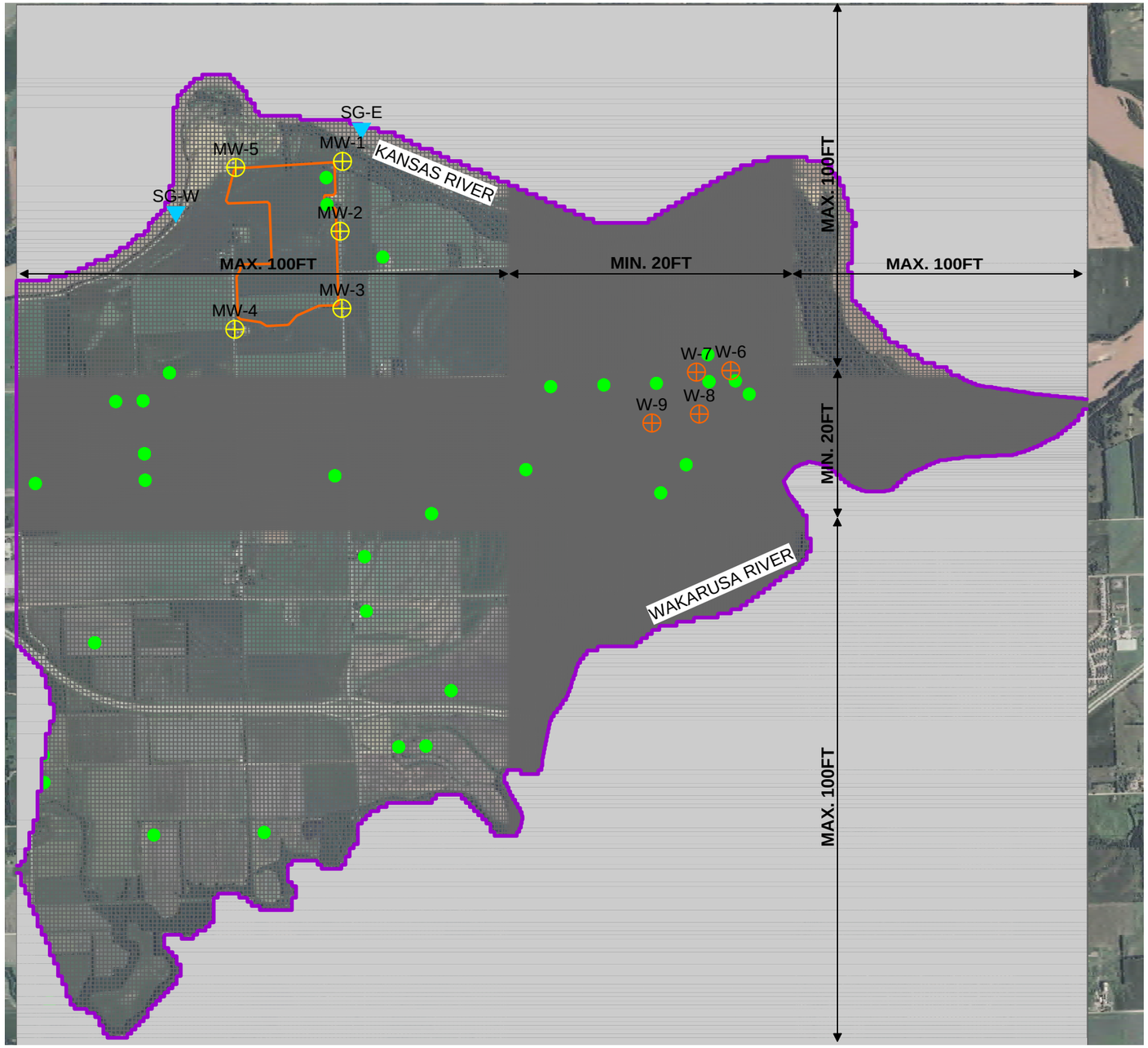
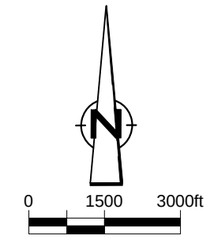




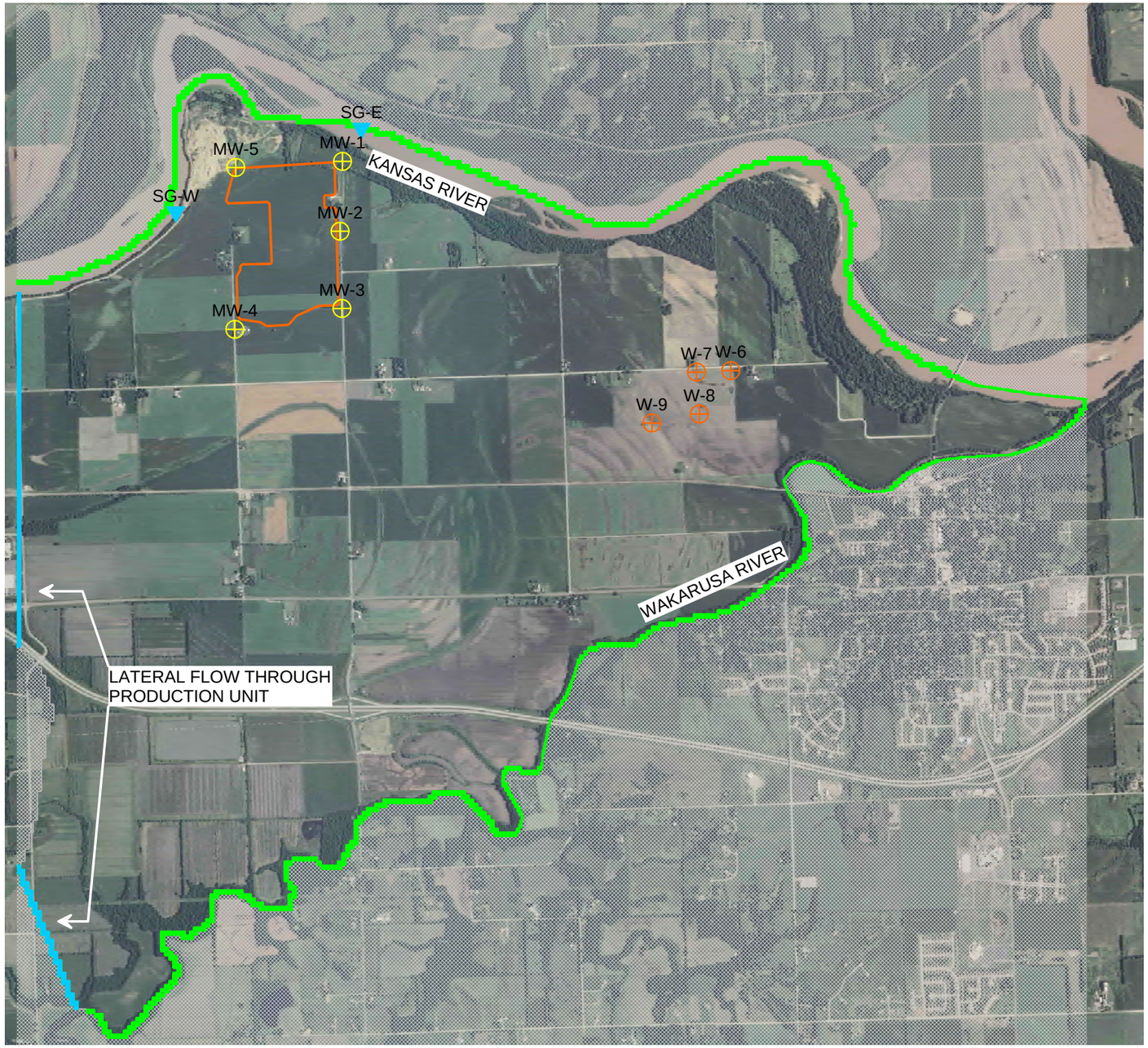
LEGEND

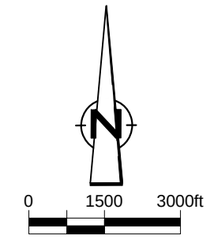
- PROPOSED EXTRACTION
- ACTIVE MODEL DOMAIN LIMIT
- INACTIVE CELLS
- MODEL GRID
- MIN. 20FT — MODEL GRID SPACING
- SG-E — STAFF GAUGES
- MW-3 — MONITORING WELLS
- W-9 — CITY OF EUDORA WELLS
- STRATIGRAPHY DATA FROM WWC5

figure M.1

MODEL DOMAIN
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Boundary Conditions.srf) JUL 3/2013





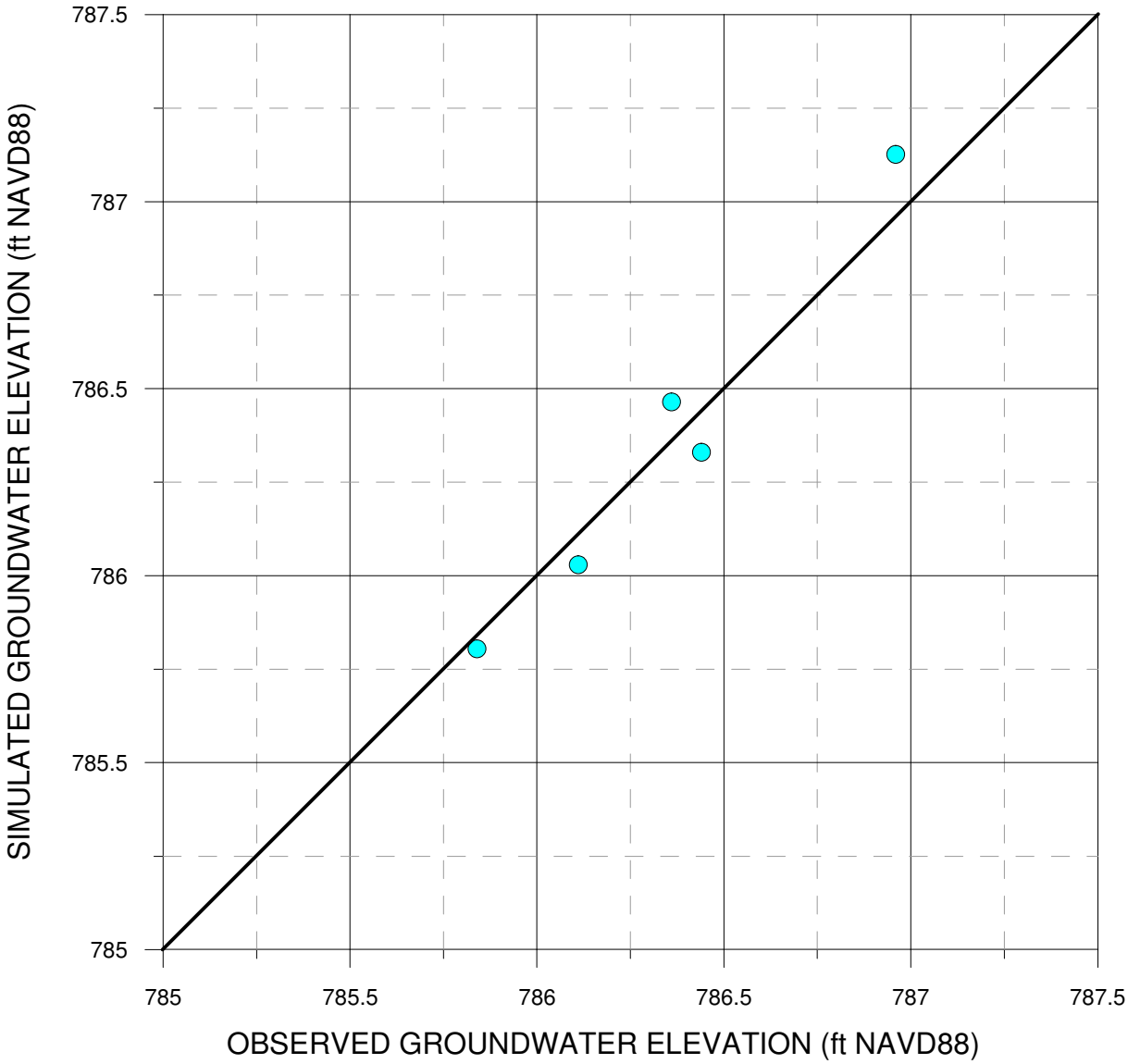
LEGEND

- PROPOSED EXTRACTION
- CONSTANT HEAD BOUNDARY CONDITION
- RIVER BOUNDARY CONDITION
- INACTIVE CELLS
- SG-E — STAFF GAUGES
- MW-3 — MONITORING WELLS
- W-9 — CITY OF EUDORA WELLS

figure M.2

MODEL BOUNDARY CONDITIONS
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Boundary Conditions.srf) JUL 3/2013

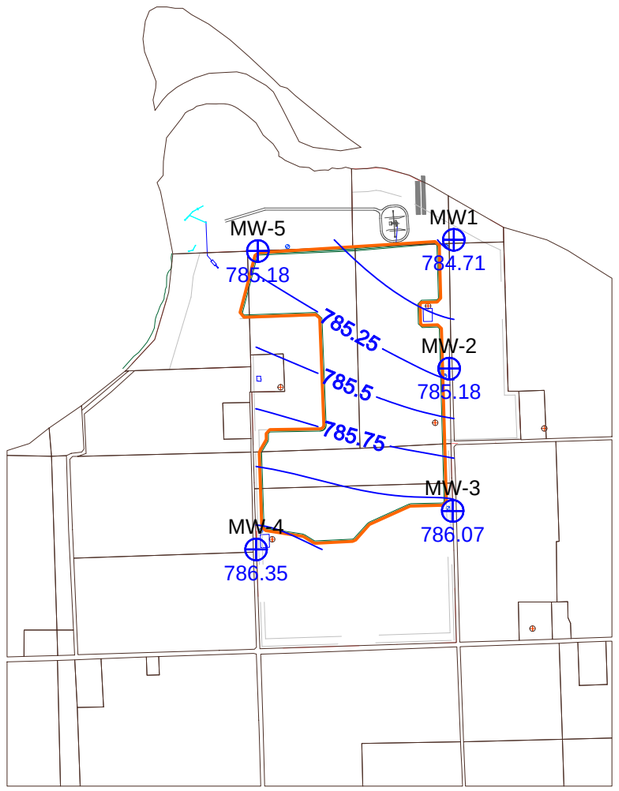


CALIBRATION STATISTICS

NUMBER OF OBSERVATIONS =	5
RESIDUAL MEAN (m) =	-0.008797
ABSOLUTE RESIDUAL MEAN (m) =	0.099442
RESIDUAL STANDARD DEVIATION (m) =	0.107801
RESIDUAL SUM OF SQUARES (m^2) =	0.058492
MINIMUM RESIDUAL (m) =	-0.166516
MAXIMUM RESIDUAL (m) =	0.110229
OBSERVED HEAD RANGE (m) =	1.12
STANDARD DEVIATION/HEAD RANGE =	0.096251

figure M.3

SCATTER PLOT OF SIMULATED VS. OBSERVED GROUNDWATER
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas



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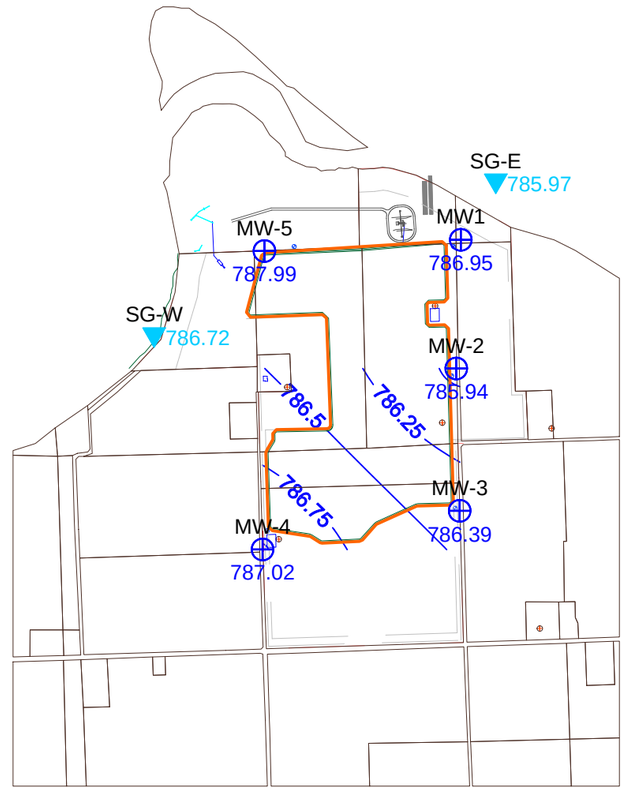

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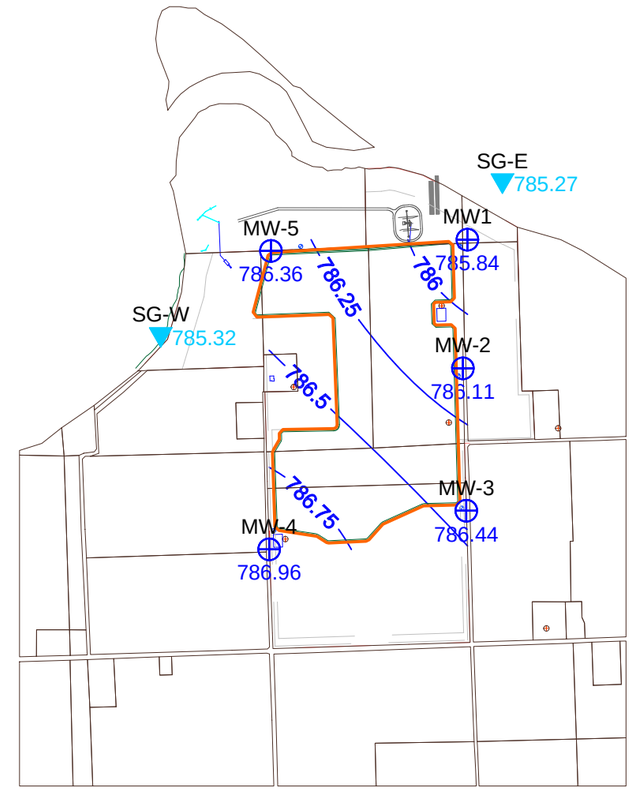
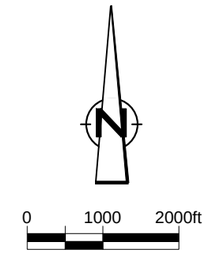


July 2, 2013



Note:
Data from MW-1 and MW-5 exluded from contouring due to interpreted bank storage effect.

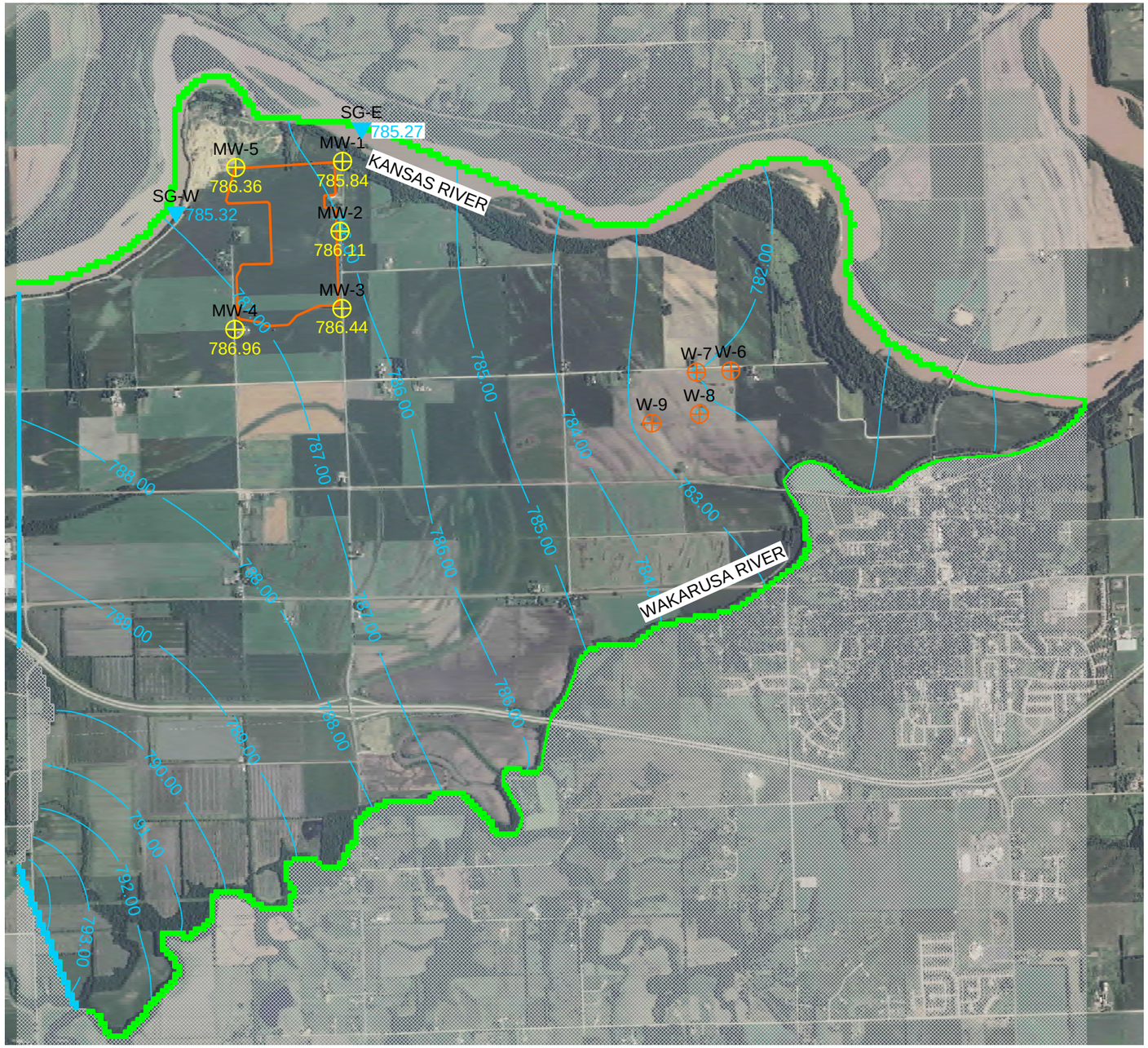
LEGEND

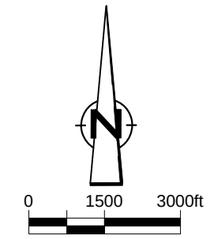
780	GROUNDWATER ELEVATION CONTOURS (FT NAVD88)
	PROPOSED EXTRACTION
SG-E 785.18	STAFF GAUGES
MW-3 785.18	MONITORING WELLS

figure M.4

OBSERVED GROUNDWATER ELEVATION CONTOURS
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

080649-2(003) GN-WA-HYD (N:\HEG\80649 Penny\Model Report\Figures\ObsGWEContours.srf) JUL 4/2013





LEGEND

780 — GROUNDWATER ELEVATION CONTOURS (FT NAVD88)

PROPOSED EXTRACTION

CONSTANT HEAD BOUNDARY CONDITION

RIVER BOUNDARY CONDITION

INACTIVE CELLS

SG-E 785.32 — STAFF GAUGES

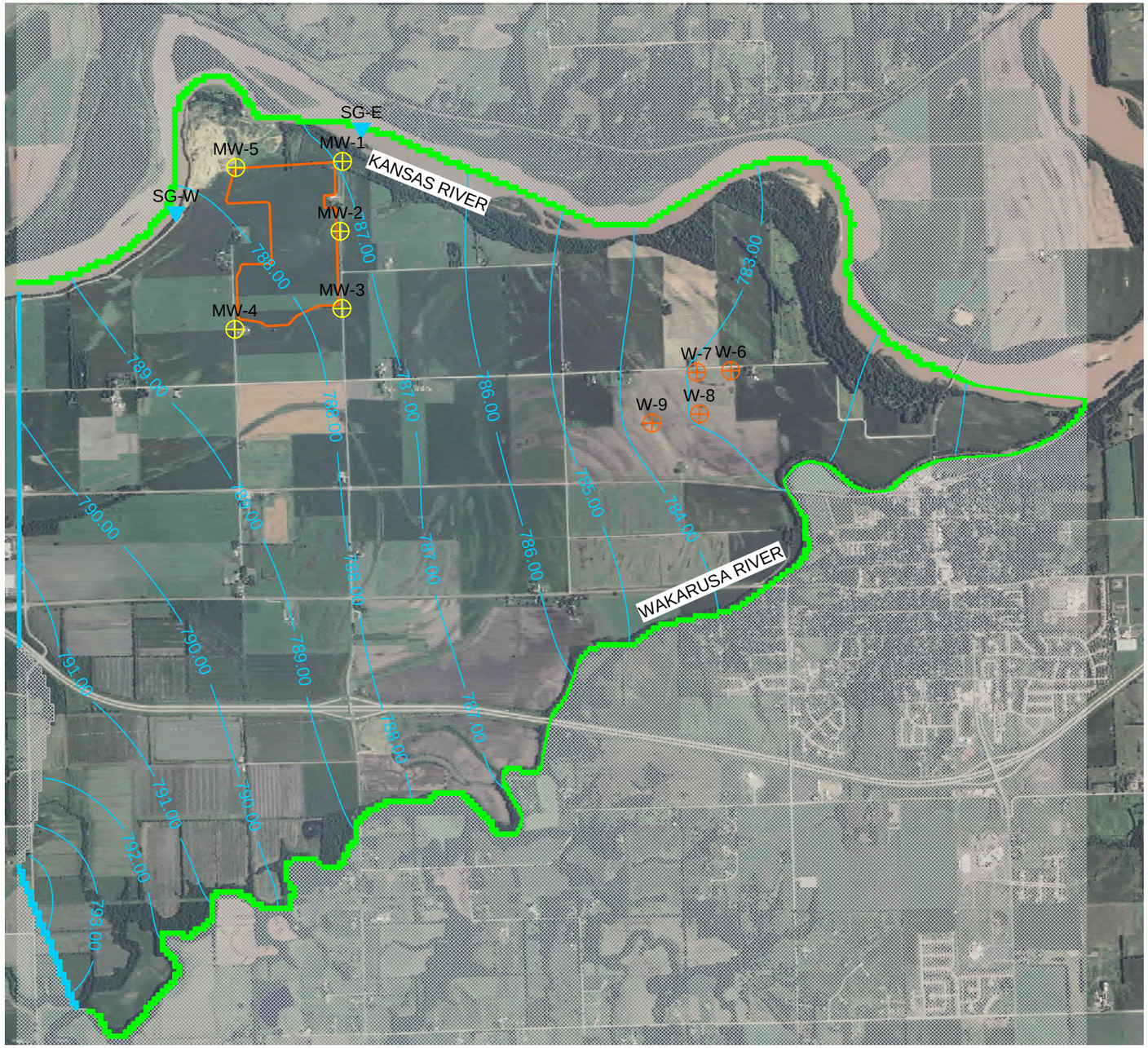
MW-3 786.36 — MONITORING WELLS

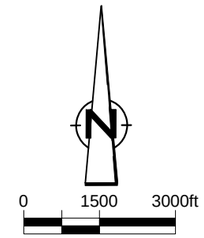
W-9 — CITY OF EUDORA WELLS

figure M.5

SIMULATED GROUNDWATER ELEVATION CONTOURS
CALIBRATED MODEL TO OBSERVED DATA (July 2, 2013)
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Calibrated Model.srf) JUL 9/2013



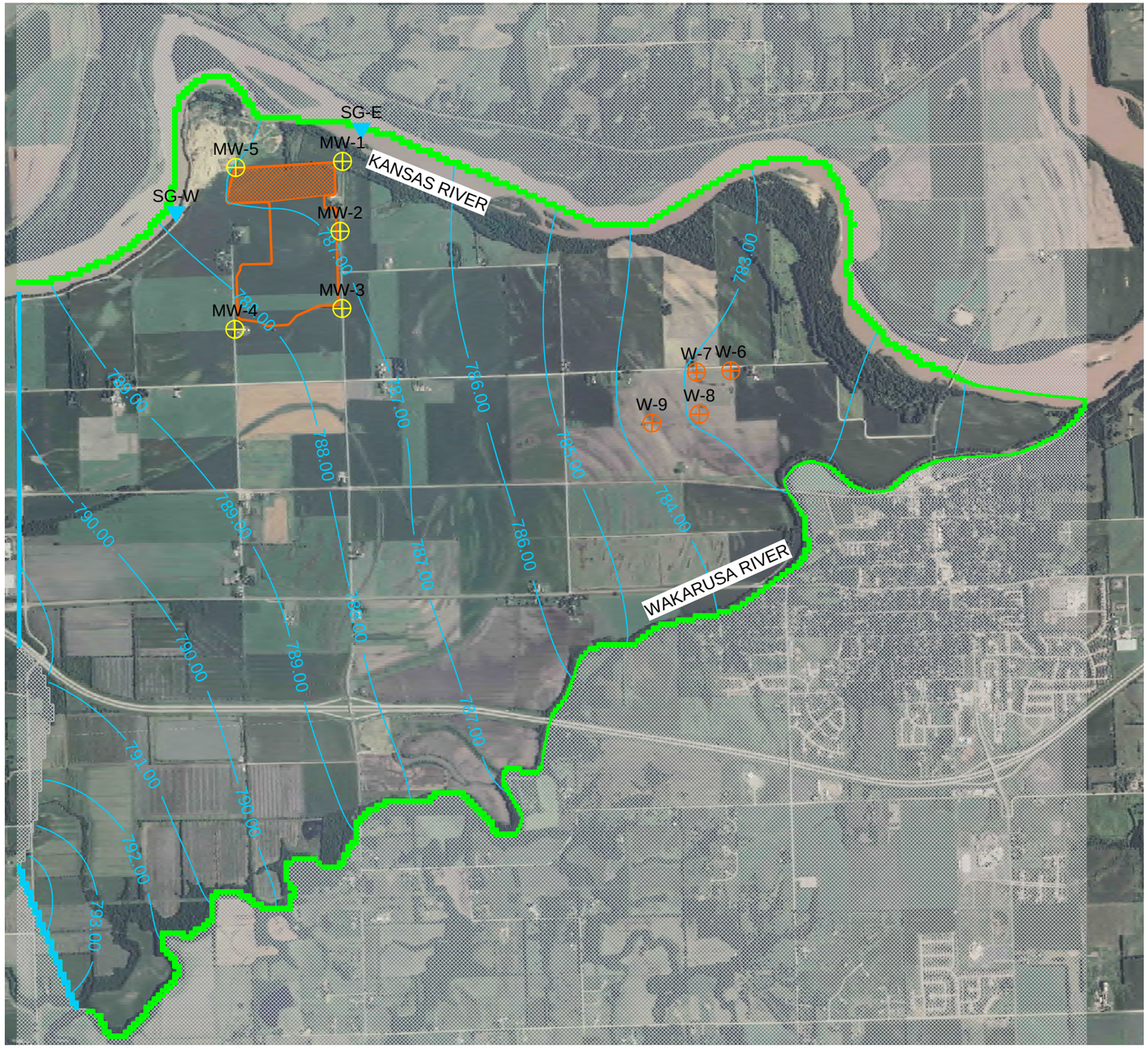


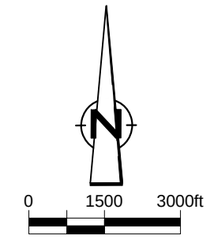
LEGEND

780	GROUNDWATER ELEVATION CONTOURS (FT NAVD88)
	PROPOSED EXTRACTION
	CONSTANT HEAD BOUNDARY CONDITION
	RIVER BOUNDARY CONDITION
	INACTIVE CELLS
SG-E	STAFF GAUGES
MW-3	MONITORING WELLS
W-9	CITY OF EUDORA WELLS

figure M.6

SIMULATED GROUNDWATER ELEVATION CONTOURS
SCENARIO 1: LONG TERM REPRESENTATIVE CONDITIONS (BASE CASE)
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas



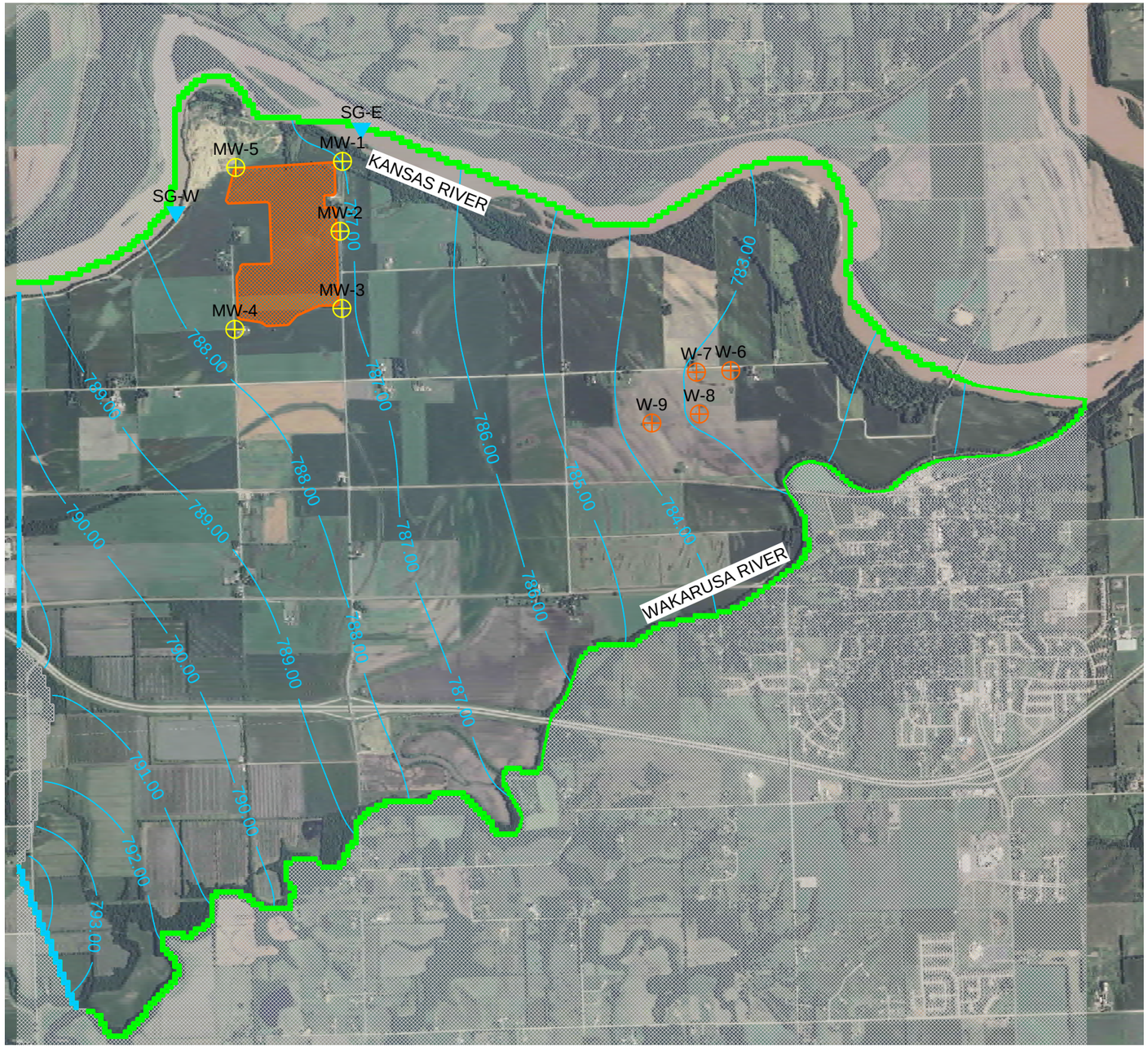


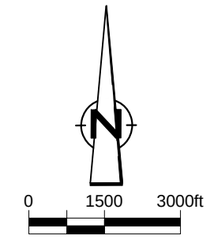
LEGEND

780	GROUNDWATER ELEVATION CONTOURS (FT NAVD88)
	PROPOSED EXTRACTION
	SIMULATED POND AREA
	CONSTANT HEAD BOUNDARY CONDITION
	RIVER BOUNDARY CONDITION
	INACTIVE CELLS
SG-E	STAFF GAUGES
MW-3	MONITORING WELLS
W-9	CITY OF EUDORA WELLS

figure M.7

SIMULATED GROUNDWATER ELEVATION CONTOURS
SCENARIO 2: EARLY STAGE EXTRACTION
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas



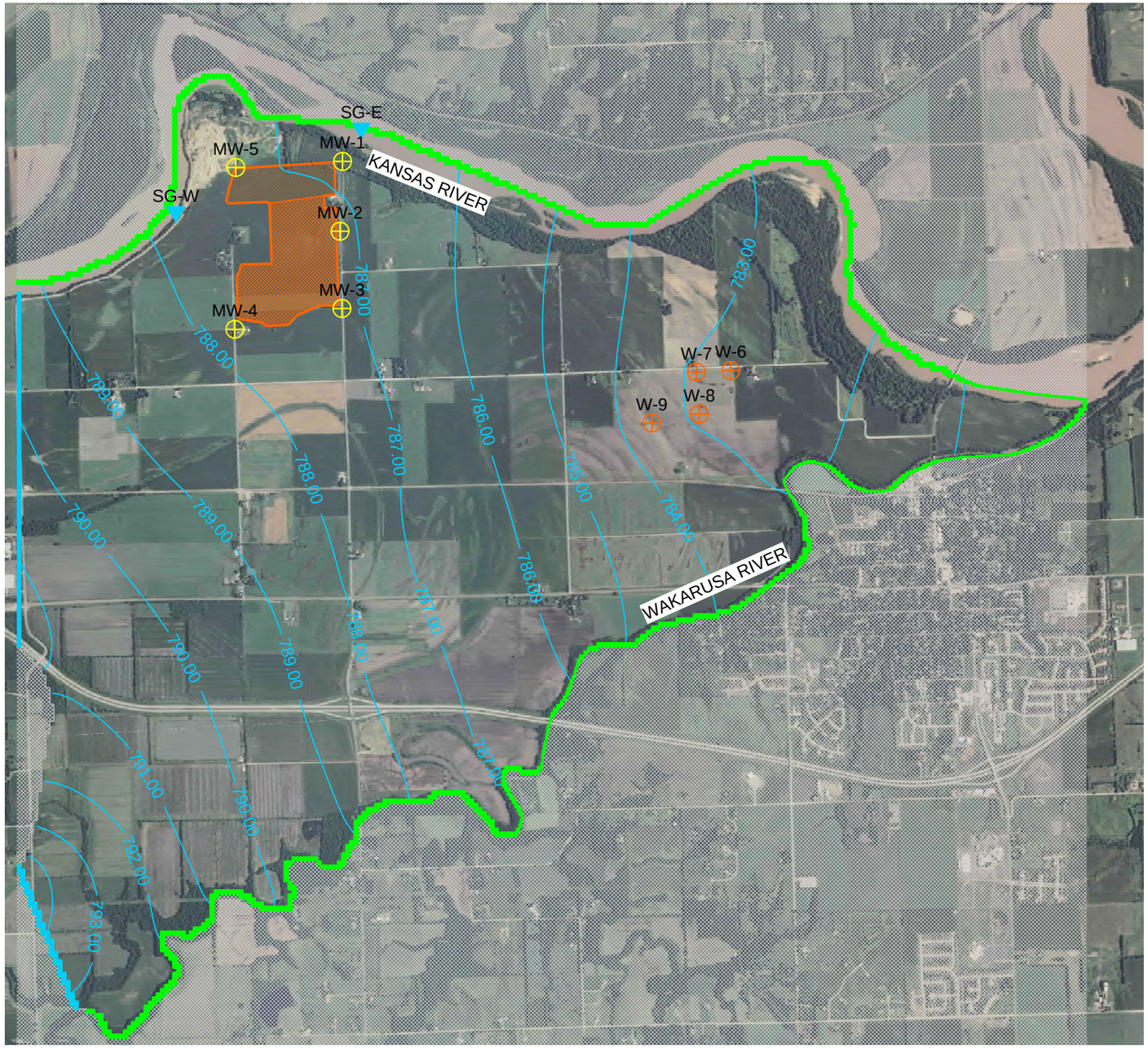


LEGEND

780	GROUNDWATER ELEVATION CONTOURS (FT NAVD88)
	PROPOSED EXTRACTION
	SIMULATED POND AREA
	CONSTANT HEAD BOUNDARY CONDITION
	RIVER BOUNDARY CONDITION
	INACTIVE CELLS
SG-E	STAFF GAUGES
MW-3	MONITORING WELLS
W-9	CITY OF EUDORA WELLS

figure M.8

SIMULATED GROUNDWATER ELEVATION CONTOURS
SCENARIO 3: LATE STAGE EXTRACTION
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas



0 1500 3000ft

LEGEND

780 — GROUNDWATER ELEVATION CONTOURS (FT NAVD88)

PROPOSED EXTRACTION

SIMULATED POND AREA

CONSTANT HEAD BOUNDARY CONDITION

RIVER BOUNDARY CONDITION

INACTIVE CELLS

POND BACKFILLED

SG-E — STAFF GAUGES

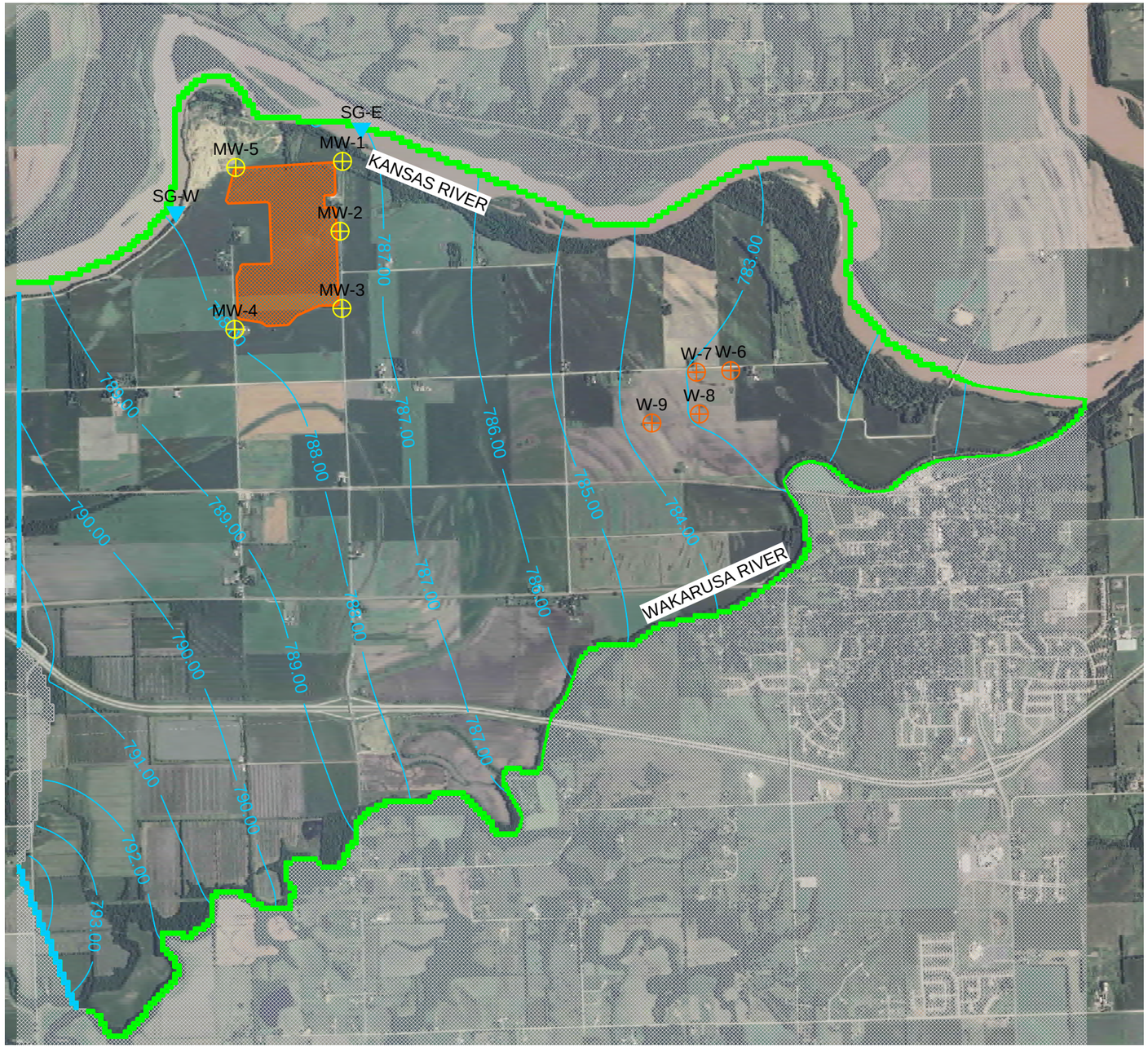
MW-3 — MONITORING WELLS

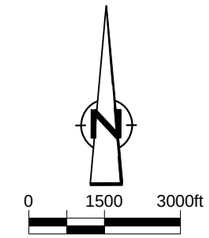
W-9 — CITY OF EUDORA WELLS

figure M.9

SIMULATED GROUNDWATER ELEVATION CONTOURS
SCENARIO 4: LATE STAGE EXTRACTION AND POND BACKFILLED IN NORTH
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Calibrated Model - Scenario 4.srf) JUL 3/2013



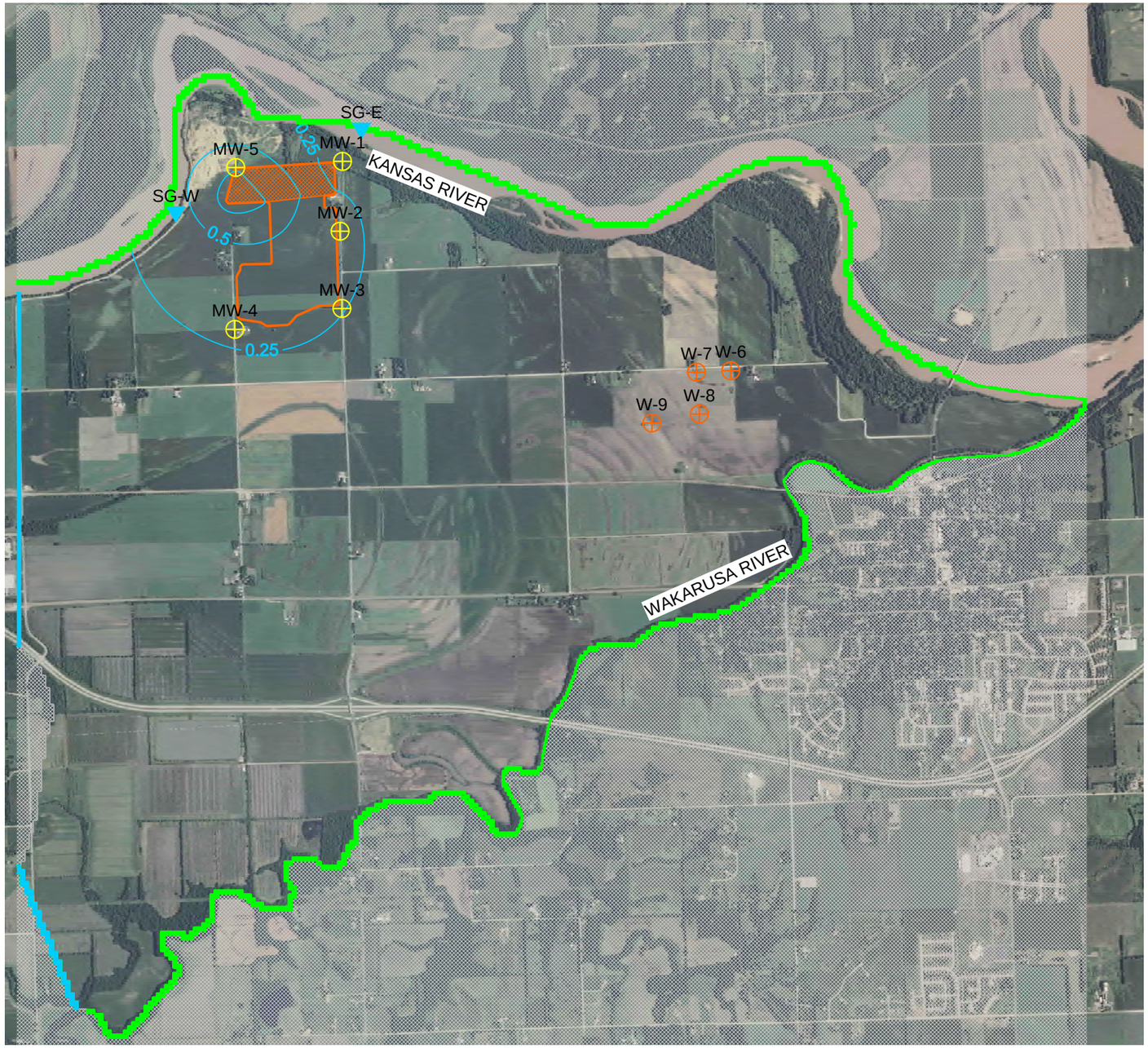


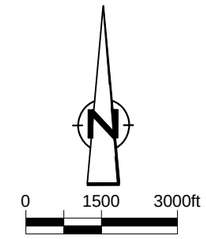
LEGEND

780	GROUNDWATER ELEVATION CONTOURS (FT NAVD88)
	PROPOSED EXTRACTION
	SIMULATED POND AREA
	CONSTANT HEAD BOUNDARY CONDITION
	RIVER BOUNDARY CONDITION
	INACTIVE CELLS
SG-E	STAFF GAUGES
MW-3	MONITORING WELLS
W-9	CITY OF EUDORA WELLS

figure M.10

SIMULATED GROUNDWATER ELEVATION CONTOURS
SCENARIO 5: REHABILITATION CONDITION
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas





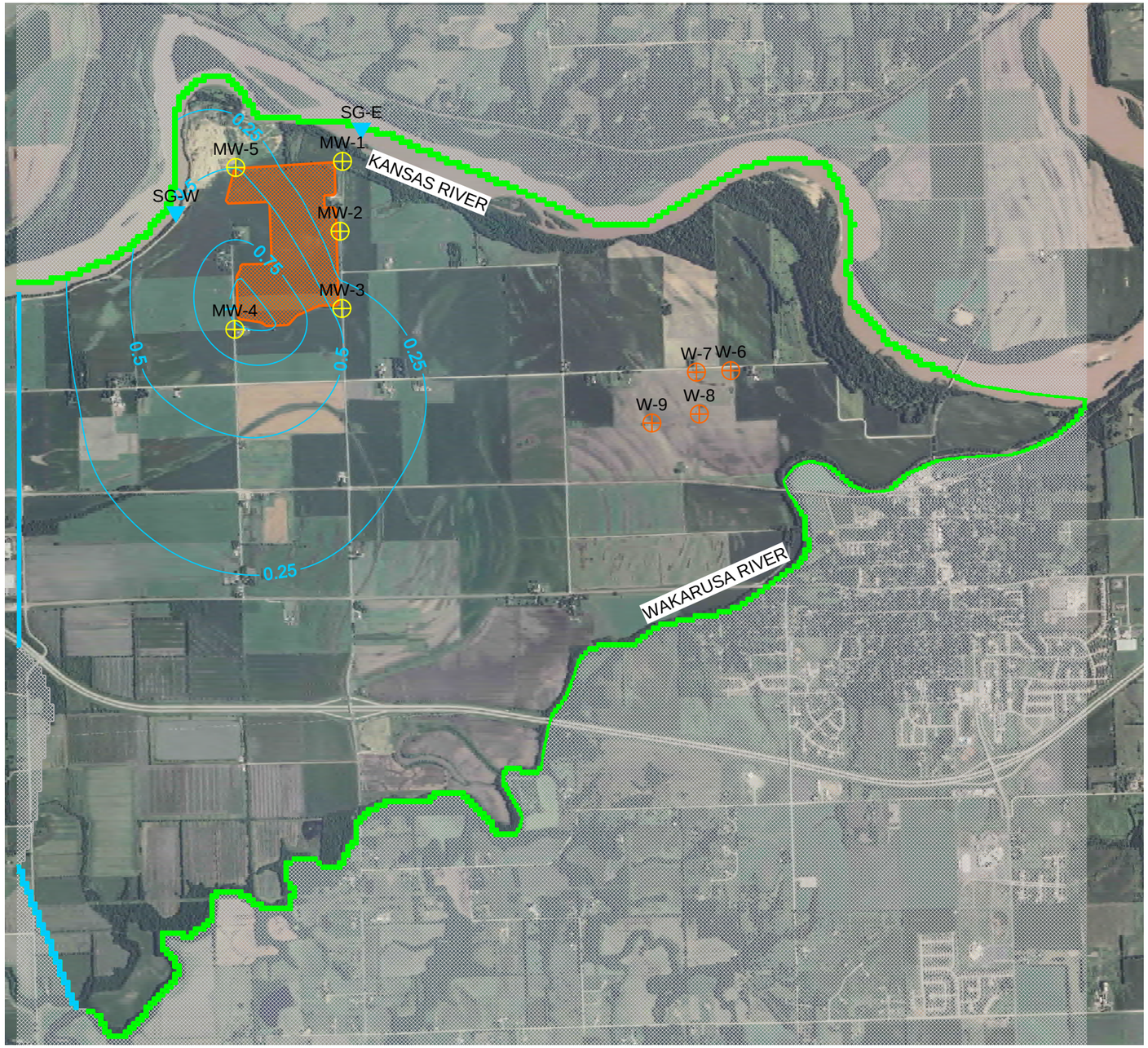
LEGEND

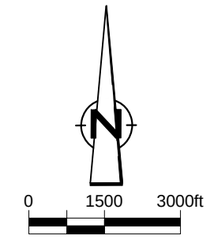
- 0.5 — GROUNDWATER DRAWDOWN CONTOURS (FT)
- PROPOSED EXTRACTION
- SIMULATED POND AREA
- CONSTANT HEAD BOUNDARY CONDITION
- RIVER BOUNDARY CONDITION
- INACTIVE CELLS
- SG-E — STAFF GAUGES
- MW-3 — MONITORING WELLS
- W-9 — CITY OF EUDORA WELLS

figure M.11

SIMULATED GROUNDWATER DRAWDOWN CONTOURS
SCENARIO 2: EARLY STAGE EXTRACTION
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Calibrated Model - Scenario 2 DDN.srf) JUL 3/2013





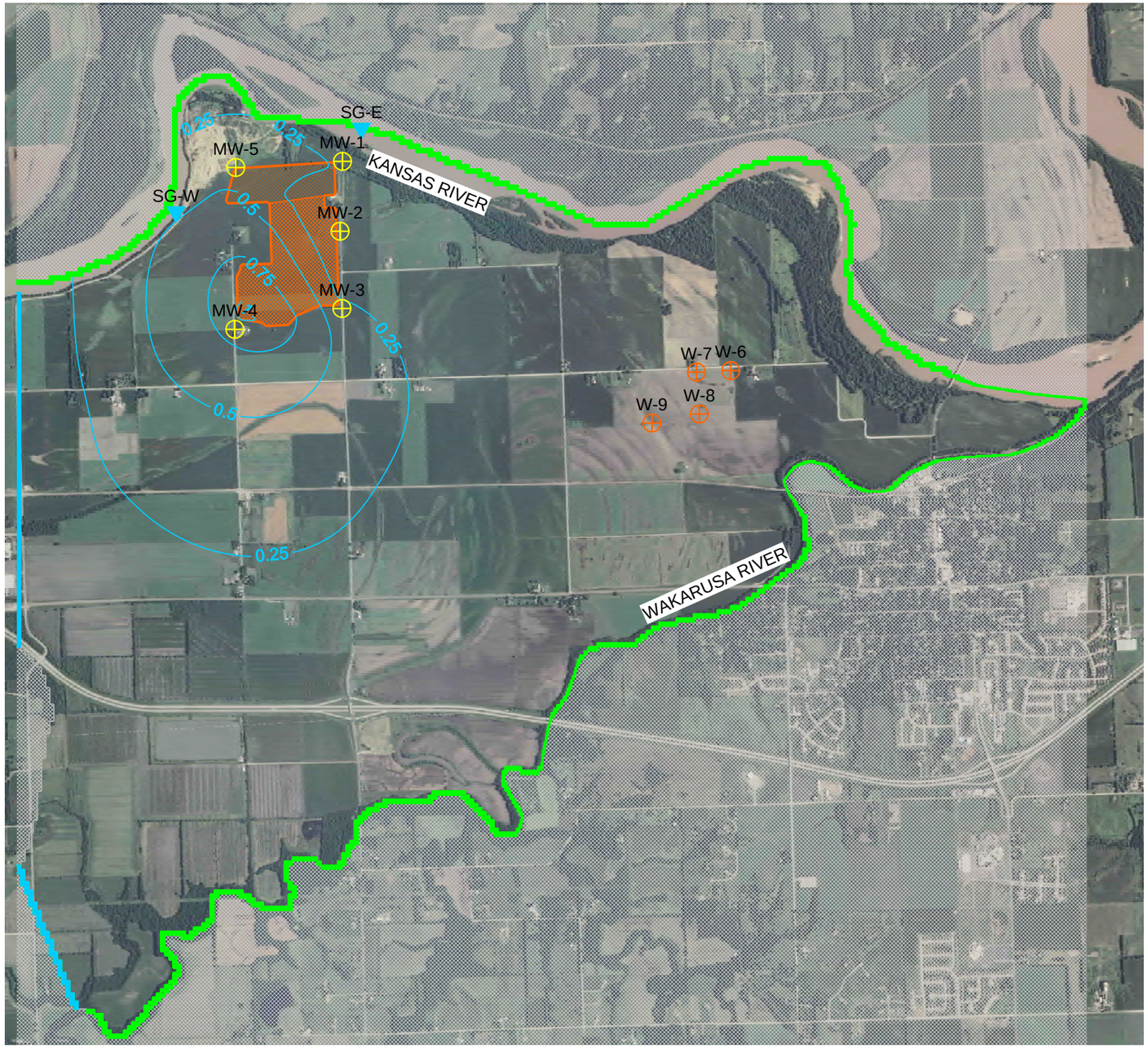
LEGEND

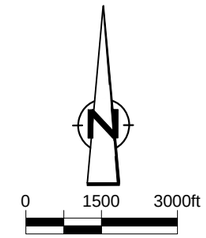
- 0.5 — GROUNDWATER DRAWDOWN CONTOURS (FT)
- PROPOSED EXTRACTION
- SIMULATED POND AREA
- CONSTANT HEAD BOUNDARY CONDITION
- RIVER BOUNDARY CONDITION
- INACTIVE CELLS
- SG-E — STAFF GAUGES
- MW-3 — MONITORING WELLS
- W-9 — CITY OF EUDORA WELLS

figure M.12

SIMULATED GROUNDWATER DRAWDOWN CONTOURS
SCENARIO 3: LATE STAGE EXTRACTION
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Calibrated Model - Scenario 3 DDN.srf) JUL 3/2013





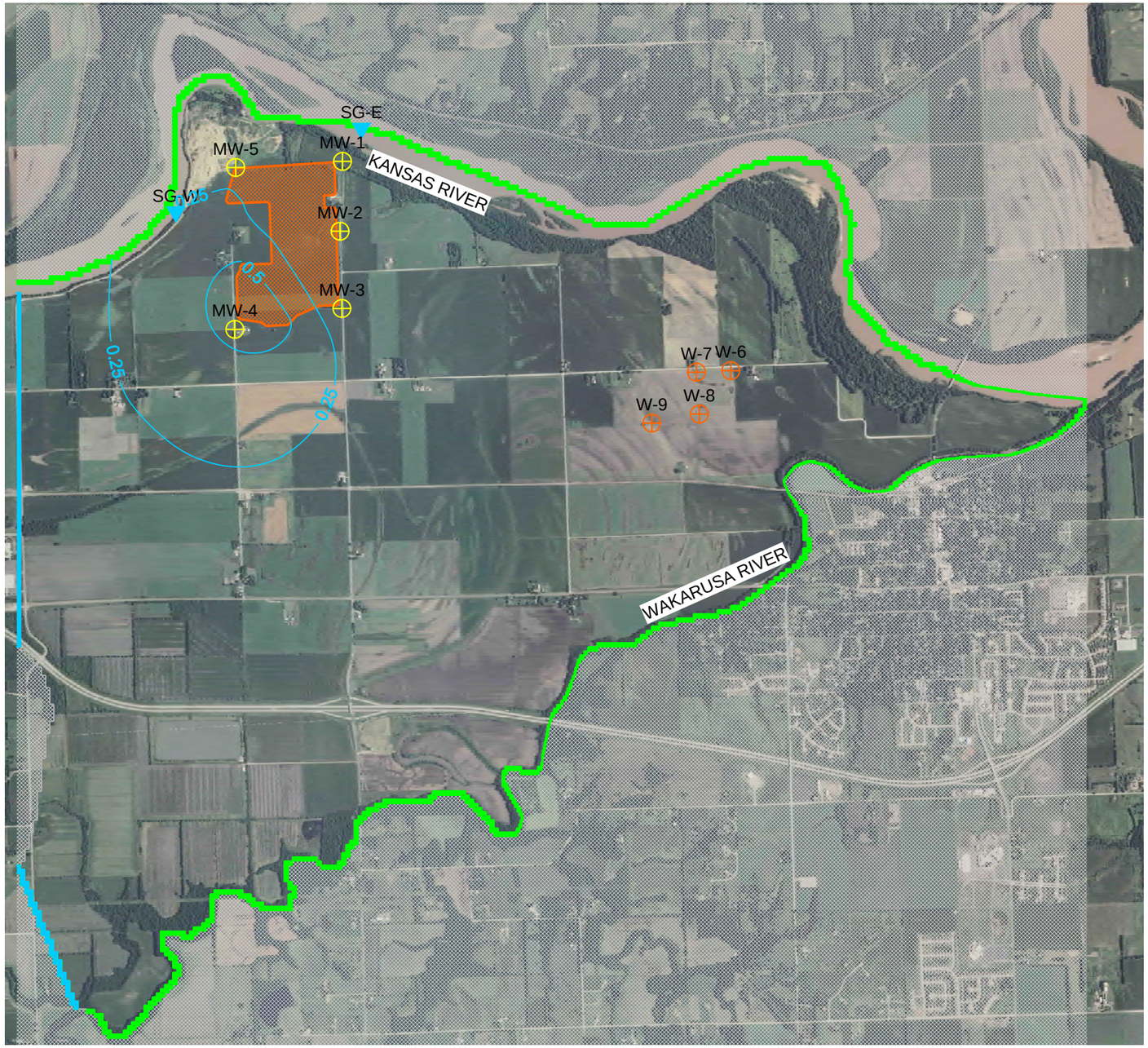
LEGEND

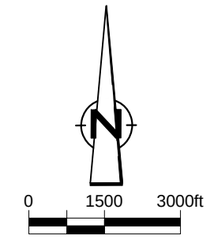
- 0.5 — GROUNDWATER DRAWDOWN CONTOURS (FT)
- PROPOSED EXTRACTION
- SIMULATED POND AREA
- CONSTANT HEAD BOUNDARY CONDITION
- RIVER BOUNDARY CONDITION
- INACTIVE CELLS
- POND BACKFILLED
- SG-E — STAFF GAUGES
- MW-3 — MONITORING WELLS
- W-9 — CITY OF EUDORA WELLS

figure M.13

SIMULATED GROUNDWATER DRAWDOWN CONTOURS
SCENARIO 4: LATE STAGE EXTRACTION AND POND BACKFILLED IN NORTH
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Calibrated Model - Scenario 4 DDN.srf) JUL 3/2013





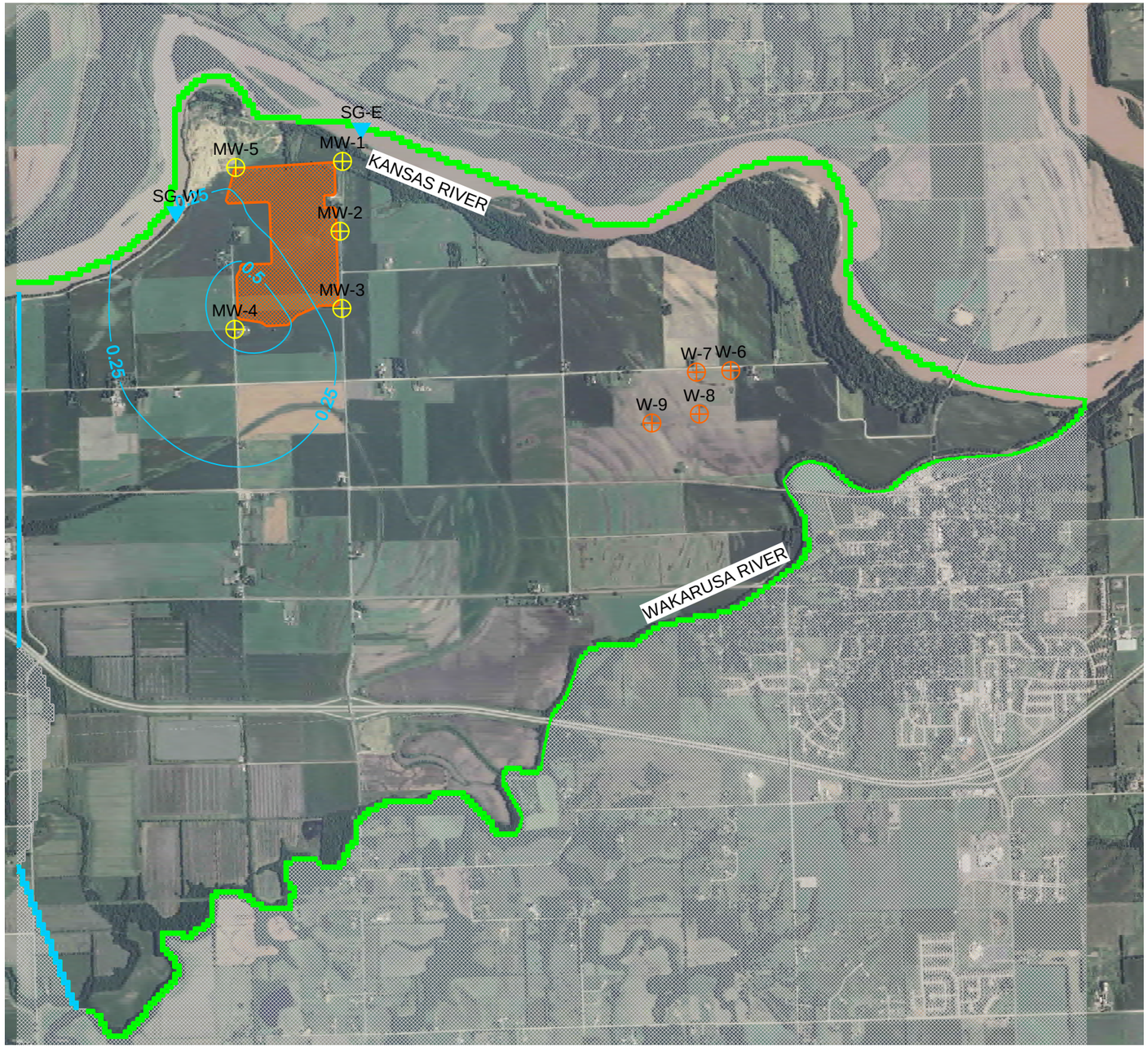
LEGEND

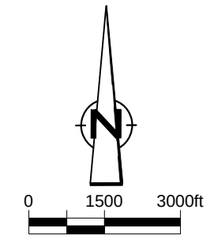
- 0.5 — GROUNDWATER DRAWDOWN CONTOURS (FT)
- PROPOSED EXTRACTION
- SIMULATED POND AREA
- CONSTANT HEAD BOUNDARY CONDITION
- RIVER BOUNDARY CONDITION
- INACTIVE CELLS
- SG-E — STAFF GAUGES
- MW-3 — MONITORING WELLS
- W-9 — CITY OF EUDORA WELLS

figure M.14

SIMULATED GROUNDWATER DRAWDOWN CONTOURS
SCENARIO 5: REHABILITATION CONDITION
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Calibrated Model - Scenario 5 DDN.srf) JUL 3/2013





LEGEND

- 0.5 — GROUNDWATER DRAWDOWN CONTOURS (FT)
- PROPOSED EXTRACTION
- SIMULATED POND AREA
- CONSTANT HEAD BOUNDARY CONDITION
- RIVER BOUNDARY CONDITION
- INACTIVE CELLS
- SG-E — STAFF GAUGES
- MW-3 — MONITORING WELLS
- W-9 — CITY OF EUDORA WELLS

figure M.14

SIMULATED GROUNDWATER DRAWDOWN CONTOURS
SCENARIO 5: REHABILITATION CONDITION
PROPOSED PENNY SAND FACILITY
DOUGLAS COUNTY PUBLIC WORKS
Douglas County, Kansas

80649-02(003) GN-WA-HYD (N:\HEG\80649\Model Report\Figures\080649-Calibrated Model - Scenario 5 DDN.srf) JUL 3/2013