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Kansas Department of Health and Environment

Final Corrective Action Decision

Legg Company, Inc.,
East 10th Street Site
325 E. 10th Street
Halstead, Kansas

Bureau of Environmental Remediation

Final Corrective Action Decision

Legg Company, Inc., East 10th Street Site

325 E. 10th Street, Halstead, Kansas

Prepared by:
Kansas Department of Health and Environment
Bureau of Environmental Remediation
Remedial Section/Site Remediation Unit

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KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
FINAL CORRECTIVE ACTION DECISION
LEGG COMPANY INC., EAST 10TH STREET SITE

DECLARATION OF REMEDIAL ACTION SELECTION

SITE NAME AND LOCATION

Legg Company Inc., East 10th Street Site
Halstead, Kansas

STATEMENT OF BASIS AND PURPOSE

The Final Corrective Action Decision (CAD) document presents the remedy selected to address the contamination at the Legg Company Inc., East 10th Street Site in Halstead, Kansas. Soil and groundwater are contaminated with volatile organic compounds (VOCs). The selected remedy was developed in accordance with guidelines of the State Cooperative Program of the Kansas Department of Health and Environment (KDHE). The Site is a state-lead site managed under state authority. The selection of the remedy was based on documents and information contained within the Administrative Record file for the Site. The Administrative Record file is available for public review at the KDHE central office in Topeka, Kansas.

DESCRIPTION OF THE SELECTED REMEDY

KDHE has determined that the selected remedy, described and evaluated in the draft CAD, satisfies or meets the criteria established by both the State and Federal Programs. The selected remedy will be protective of human health and the environment. The majority of contaminated soil was excavated in 2002 and successfully land treated as an interim remedial measure. No remedy for residual soil contamination was evaluated; however, if future sampling of soil shows that residual contamination persists in soil above the residential Tier 2 Levels, an environmental use control (EUC) will be applied to the impacted property. The selected remedy for groundwater is a combination of two in-situ technologies. Enhanced anaerobic bioremediation has been selected to treat the groundwater plume and aquifer air sparge/soil vapor extraction has been selected to treat groundwater contamination at the source area. Both groundwater treatment technologies were implemented at the site as interim remedial measures. The site-wide selected remedy is summarized below.

Enhanced anaerobic bioremediation (EAB) – EAB is a groundwater remedial strategy in which a biodegradable carbon source is injected into the subsurface to increase the rate of naturally occurring processes to convert the contaminants into harmless compounds. This technology type has already been implemented at the

site as an interim remedial measure and injections were made in six treatment curtains. Additional injections may be necessary in the future to get more coverage within in the plume or to re-inject in places where the substrate has been depleted. Groundwater monitoring will continue to assess the effectiveness of the remediation technology.

Aquifer air sparge/soil vapor extraction (AAS/SVE) - AAS is the process of injecting air into an area of contaminated groundwater and recovering volatilized contaminants through vacuum extraction. AAS/SVE was implemented at the excavated source area as an interim remedial measure to address residual groundwater contamination. Groundwater monitoring and AAS/SVE system performance monitoring data will be collected to assess the effectiveness of the remediation technology.

Groundwater Monitoring – Groundwater monitoring will be conducted to determine whether the EAB and AAS/SVE are effective and to determine if additional nutrient injections into the aquifer and/or AAS/SVE optimization is necessary to achieve cleanup Levels. The groundwater monitoring program will continue until conditions of the Site meet the requirements of KDHE Bureau of Environmental Remediation's (BER) Reclassification Plan (Policy #BER-RS-024).

Environmental Use Controls (EUCs) – The establishment of institutional controls through the EUC Program may be necessary to restrict future use of the property and prevent human exposure if contaminated materials remain on-site above residential Tier 2 Levels. Future sampling of soil and/or groundwater will be required to determine if the EUC is necessary.

Indoor air – As determined necessary by KDHE, Legg may be required to assess the vapor intrusion pathway if conditions change at the Site that would necessitate a formal evaluation. The results of the groundwater monitoring program will be used to determine if an indoor air evaluation is necessary.

Evaluation of the Presence and Use of Water Wells – Legg will periodically assess the presence and use of private water wells in downgradient areas; the frequency of this assessment will be determined in the Site long-term monitoring plan. The results of the groundwater monitoring program will be used to determine if modifying the frequency of these assessments is appropriate.

Effectiveness of the Remedy and Contingency Remedy – Evaluation of the performance of the remedy for soil and groundwater will be based on analytical results. KDHE may re-evaluate the remedial options, specifically if analytical data demonstrate the persistence or increasing concentrations of contaminants in groundwater. Should KDHE determine that EAB and AAS/SVE are not effective and will not achieve the cleanup Levels, KDHE will require that Legg evaluate and implement other remedial alternatives to meet remedial action objectives. KDHE

may require that Legg take additional action to eliminate the threat to groundwater from residual contaminated soil.

DECLARATION:

The selected remedy will be protective of human health and the environment and attain State, Federal and local requirements that are applicable or relevant and appropriate. The selected remedy also actively reduces the toxicity, mobility and volume of contamination identified at the Site. In selecting and declaring this remedy, the KDHE believes implementation of this remedy will have a beneficial effect by reducing the toxicity, mobility and volume of contaminants.

10/08/10
Date

Roderick L. Bremby
Secretary of the Kansas Department of Health and Environment

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1.0 PURPOSE OF DRAFT CORRECTIVE ACTION DECISION

The primary purposes of the Corrective Action Decision (CAD) are to: 1) summarize information from key site documents including the Comprehensive Investigation (CI), Interim Remedial Measure (IRM) and Corrective Action Study (CAS) reports and associated documents; 2) briefly describe the alternatives for site remediation detailed in the IRM and CAS reports; 3) identify and describe KDHE's selected remedy for the soil and groundwater contamination at the Legg Company, Inc., East 10th Street Site (Site); and, 4) document comments and KDHE's responses to public comments received regarding the draft CAD. The public was encouraged to review and comment on the preferred remedy presented in the draft CAD during the public comment period held from June 24, 2010 to July 24, 2010.

Key documents for the Site were prepared by consultants retained by Legg Company Inc. (Legg). Work performed during the CI, IRM and CAS process followed the terms outlined in a June 1995 Consent Order between KDHE and Legg. The public was encouraged to review and comment on the technical information presented in the CI, IRM and CAS reports and other documents contained in the Administrative Record file (AR file). The AR file includes all pertinent documents and site information, which form the basis and rationale for selecting the final remedy. The AR file was made available for public review and copying during normal business hours at the following location:

Kansas Department of Health and Environment
Bureau of Environmental Remediation
1000 SW Jackson St., Suite 410
Topeka, Kansas 66612-1367
CONTACT: Natalie Garven, Environmental Scientist
Telephone Number: (785)-296-6437
E-mail: ngarven@kdheks.gov

For convenience to interested members of the public, copies of the CI, IRM, and CAS reports, as well as the draft CAD, were also made available for review and copying during normal business hours at the following location:

Halstead Public Library
264 Main Street
Halstead, Kansas 67056
Telephone Number: (316)-835-2170

2.0 SITE BACKGROUND

2.1 Site Location and Description

The Legg facility is located at 325 East 10th Street in Halstead, Harvey County, Kansas (Figure 1). The general legal description of the Legg Site is within the South Half of the Southeast Quarter of the Northeast Quarter of Section 2, Township 24 South, Range 2 West, or platted as Tibbot's Third Edition, Lots 1 through 15, Block "X". The facility property encompasses approximately 14 acres in area and is bounded by Tenth Street on the north side, McNair Street (County Road 803) on the east side, and private property on the west and south sides. A tributary to the Little Arkansas River runs along the south side of the property. The surrounding land is used for private residential and agricultural purposes with an assisted living facility located on the north side of East 10th Street. The property was initially developed by Legg in 1951 and is currently used for manufacturing purposes. The facility consists of office space and manufacturing operations, the bulk of which are located on the western half of the property. The eastern portion was previously occupied by the former Beck Corporation, a mobile home manufacturer from 1965-1979, until Legg purchased this portion in 1983. Legg is the current owner/operator of the facility and manufactures industrial rubberized belts and related products.

2.2 Site Discovery

Trichloroethene (TCE) was first detected in groundwater samples collected from the City of Halstead Public Water Supply Well (PWS) #5 at a concentration of 7.4 micrograms per liter (μg/L) in July 1985. This was below the Kansas Action Level (KAL) at that time, which was 18 μg/L in 1985, but by May 1988, TCE had increased in the well to 97 μg/L. KDHE allowed the use of PWS Well #5 due to high water demands with routine monitoring and blending of the water with water from other wells. In addition to TCE, low-level concentrations of benzene were also detected in PWS Well #5. The PWS Well #5 was located on the northwestern portion of the Legg property, but has since been plugged and abandoned as of February 2002.

2.3 Site History

KDHE initiated assessment activities for the "East 10th Street Site" and performed a Preliminary Assessment (PA) and Site Investigation (SI) from 1987 through 1989. Activities included performing a soil gas survey, sampling nearby private wells, and installing/sampling monitoring wells. Preliminary conclusions drawn in the PA/SI at that time were that the data were inconclusive and that the possible source area for TCE was either attributable to PWS Well #5 well maintenance activities or from the operations of Beck Corporation or Legg Company.

Because of the persistence of TCE in PWS Well #5, KDHE required that the City of Halstead discontinue use of the well in October 1991. KDHE conducted an additional assessment at the Site in 1993 through 1994. The conclusion of the assessment indicated that it was not possible to identify a single probable source of contamination. In 1993, KDHE formally requested information from Legg regarding chemical use and storage. Subsequently, Legg and KDHE entered into a Consent Order (Case No. 95-E-0122) on June 9, 1995.

3.0 SUMMARY OF THE COMPREHENSIVE INVESTIGATION

A Comprehensive Investigation (CI) Work Plan was approved by KDHE in August 1996 and investigation activities were conducted at the Site from April 1996 to December 1998. Results of the CI are summarized in the *Comprehensive Investigation Report for the Legg Company Inc. Facility at 325 East Tenth Street, Halstead, Kansas*, dated September 12, 2000. The objectives of the CI were:

- Identification and characterization of all potential source areas, including identification of chemicals of concern, the mechanisms of release, estimating the quantities of release, and determining whether these releases are ongoing or inactive;
- Delineation of the lateral and vertical extent of contamination for each of the impacted environmental media at the Site;
- Characterization of the physical and chemical properties of the contaminants, their mobility and persistence in the environment, and their important fate and transport mechanisms;
- Identification of human and environmental targets that may be threatened or affected by the Site; and
- Development of an initial list of corrective action alternatives.

3.1 Site Geology and Hydrogeology

The Site is located within the Little Arkansas River Basin and the lithology consists of unconsolidated alluvial sediments that are approximately 130 to 150 feet thick below ground surface (bgs) on-site. The alluvium consists of silt, sand, and gravel with interbedded sandy-clays and are considered to be part of the Equus Beds. These sediments overlie the Wellington Formation, which is gray-blue shale that contains thin beds of limestone, gypsum, and anhydrite. Groundwater generally occurs between 16 to 22 feet bgs and appears to be under semi-confining conditions. Three distinct water bearing zones are identified at the Site and are designated as the "shallow", "intermediate," and "deep" aquifer zones. The predominant direction of groundwater flow within all three zones is toward the east/southeast; however, more variability in flow direction exists in the shallow zone. There is likely some degree of communication or connection between these units. A drainage creek is located south of the Legg property and is typically dry except during large rain events; the creek eventually drains to the Little Arkansas River.

3.2 Soil Contamination

Soil core samples were collected using a direct-push rig and were screened in the field with an photoionization detector. Select samples were sent to the laboratory for confirmation analysis. Samples were collected at depths ranging between ground surface and 20 feet bgs both on and off of the Legg property. Geophysical logging was also conducted at the site to characterize the vertical distribution of fine-grained and coarse-grained deposits. TCE was identified in soil in the area of the rod dipping shed at a maximum concentration of 3,900 micrograms per kilogram (µg/kg) within the 15 to 19 feet bgs depth interval. Direct-push soil sample results are presented in Figure 2.

3.3 Groundwater Contamination

Numerous monitoring wells have been installed at the Site in the "shallow upper", "shallow lower", "intermediate", and "deep" aquifer zones both on- and off-site. Contaminants identified in groundwater that exceed federal drinking water maximum contaminant levels (MCLs) are TCE, 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), benzene, and toluene. The highest detectable concentrations of TCE were present near the rod dipping shed at a maximum concentration of 96,000 µg/L. Concentrations higher than 100 µg/L were observed in the area of the former adhesive line located east of Plants 1 and 2. Concentrations lower than 10 µg/L in groundwater were determined to have migrated to areas beyond the Legg property. Impact to the intermediate and deep water bearing zones was not observed in monitoring wells during the CI. The results of the CI indicate that the source for TCE contamination is in the area adjacent to the rod dipping shed and in the area along the adhesives conduit.

The most recent available groundwater elevation map for the Site is shown in Figure 3 for the shallow zone and Figure 4 for the intermediate zone. Figure 5 depicts TCE distribution in groundwater over the period 2004-2009.

4.0 INTERIM REMEDIAL MEASURES

4.1 Source Area Excavation

Legg implemented an interim remedial measure (IRM) that included excavation and landfarm treatment of impacted source area soils followed by backfilling of the excavation area. Upon KDHE approval in 2002, the first five feet of soil were removed and temporarily stored in piles that were eventually used to backfill the first five feet of the excavation since minimal impact was found in this interval above the source area. Volatile organic compound (VOC) impacted soil was excavated from 5 to 15 feet bgs and was landfarmed on-site to allow for biodegradation and volatilization of contaminants. The final size of the excavation was 45 by 60 feet to a depth of approximately 15 feet with a total of approximately 4,440 cubic yards excavated. Off-site laboratory confirmation samples indicated that VOC levels in the excavation side-walls were below the corresponding Tier 2 Levels, as established in KDHE's *Risk-Based Standards for Kansas RSK Manual* for the soil to groundwater pathway. A coarse-grained silica sand/gravel were used to backfill the excavation to approximately five feet below ground surface. Residual contamination above the residential Tier 2 Levels for soil to groundwater remains below the 15 foot deep excavation. The upper five feet of the excavation was backfilled with the first five feet of the excavation and stored soils and backfill clay from an on-site borrow area and compacted. Excavation backfilling activities were completed by October 2002 and landfarming closure was approved in early 2004. A map of the soil excavation IRM with a summary of confirmation soil sampling results is shown in Figure 6.

4.2 Enhanced Anaerobic Bioremediation

A pilot test for an enhanced anaerobic bioremediation (EAB) IRM was completed in September 2005 where a total of 5,100 lbs of CAP18™ carbon source was injected into the aquifer at the

Site to promote anaerobic bioremediation of the chlorinated solvents by microorganisms. The microbial reductive biodegradation of TCE results in a chain of byproducts that eventually results in the production of carbon dioxide, water, chloride and/or ethene. 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride are intermediate byproducts. Full-scale implementation was completed in two injection stages in May and August 2007, where a total of approximately 147,000 pounds or 19,000 gallons of CAP18™ were injected at 265 locations at the Site. The first stage of full-scale implementation (33 injection points) was done to facilitate the expansion of the Legg manufacturing facility and has since been constructed upon. The CAP18™ material was injected from the top of the shallow aquifer (21 ft bgs) in two-foot intervals to the bottom of the shallow aquifer (37 ft bgs). Injections were completed using a direct-push probe pressure-activated injection probe with a grout pump to inject through the rods. In the downgradient reaches of the plume, five additional treatment curtains were completed across the plume and consisted of two rows of injection points installed on 15 foot center spacing. Performance monitoring for the EAB IRM is currently underway and initial results of EAB and other interim measures appear to be effective in reducing concentrations of chlorinated solvents in groundwater. The relative location of all direct-push EAB injections is shown in Figure 7.

4.3 Aquifer Air Sparge and Soil Vapor Extraction

Aquifer air sparge (AAS) is the process of injecting air into an area of contaminated groundwater. Air enters the aquifer through the well screen and migrates up through the groundwater column causing the volatilization (stripping) of contaminants from the dissolved phase to the vapor phase. The vapor then migrates through the unsaturated soil pore spaces where they can be captured using soil vapor extraction (SVE). SVE extracts the vapor phase contaminants from the soil through wells that are screened in the unsaturated zone above the water table by applying a negative pressure to the soil pore spaces. The vapors are then vented to the atmosphere.

In February 2008, a small scale short-term pilot test was conducted with full-scale AAS/SVE IRM operation beginning in March 2009. Six AAS wells and four SVE wells were installed in the source area to treat the impacted groundwater beneath the former source area post-excavation. Two additional groundwater monitoring wells were installed to enhance the performance monitoring network for the AAS/SVE system. A trailer that contains the remediation equipment is on-site and is connected to the AAS/SVE system. Air emissions are analyzed on a routine basis from the SVE system to determine the mass removal rate and relative performance of the system; and, key monitoring wells are sampled on a routine basis to assess overall performance. The system has since operated on a continual basis and large diameter boreholes filled with a coarse grained material were installed through the excavated area in November 2009 to aid in air recovery. Initial results indicate that the technology is removing vapor contaminants from the subsurface. Figure 8 depicts the relative locations of the excavation area with the AAS wells, SVE wells, remediation trailer and locations of the large diameter boreholes.

5.0 SUMMARY OF SITE RISKS

The primary route of exposure to contaminants at the Site is through the possible future use of groundwater contaminated above the maximum contaminant levels (MCLs) established by United States Environmental Protection Agency (EPA) for various substances in drinking water supplies, in this case TCE, 1,1-DCE, cis-1,2-DCE trans-1,2-DCE, benzene, and toluene. The properties within the vicinity of the Site are connected to the public water supply system which reduces the potential for exposure to contaminated ground water and PWS Well #5 has since been plugged and abandoned. The plume extends off-site within an agricultural field, but is not currently located beneath or near any residential structures. However, if the agricultural field were to be re-zoned for residential use and homes constructed, the potential for vapor intrusion from groundwater to indoor air may require assessment at that time. Two private drinking water wells exist near the Site and have been sampled on an annual basis; these wells have remained non-detect for VOCs. Potential exposure could occur in the future if private water wells are installed within or downgradient of the known plume area.

Confirmation samples collected after the source area excavation exhibited TCE concentrations of less than 200 μg/kg. Samples collected previous to the excavation exhibit soil to groundwater pathway exceedances below the 15 foot deep excavation, so residual contamination above the soil to groundwater pathway may still exist below the excavation in the source area.

6.0 REMEDIAL ACTION OBJECTIVES

Based on the information collected during the CI, the following remedial action objectives (RAOs) were developed:

- Prevent human exposure to contaminated groundwater;
- Prevent further degradation of the aquifer;
- Restore the aquifer to its most beneficial use,
- Prevent human exposure to contaminated soil; and
- Prevent leaching of contaminants to the groundwater from contaminated soil.

6.1 Cleanup Levels

For groundwater remediation being conducted at sites with drinking water aquifers, federally promulgated MCLs are used as the cleanup levels. If no MCL is established for a particular contaminant, comparison is made to the KDHE Tier 2 Level for the groundwater pathway.

The results of the CI indicate that soil contaminated with VOCs does not exceed KDHE's Tier 2 Level for the residential soil pathway, and, therefore, does not present a direct human health risk. However, the residual soil contamination has the potential to act as a continuous source of contamination for the groundwater with levels that remain above the Tier 2 residential soil to groundwater pathway; this presents an indirect human health risk. KDHE has calculated risk-based Tier 2 Levels for soil and soil to groundwater pathway for the protection of human health.

The risk-based Tier 2 Levels and methods of calculation are identified in KDHE's *Risk-Based Standards for Kansas, RSK Manual*.

The conclusions of the CI, the formulation of RAOs, and the determination of MCLs as the cleanup levels for groundwater and Tier 2 Levels as the cleanup levels for soil provide the basis for selecting the preferred remedial alternative(s) for the Site. The MCLs and Tier 2 Levels for contaminants in soil and groundwater are provided in Table 1. The preferred remedy for groundwater is expected to eventually lead to unrestricted use of the aquifer; however, the preferred remedy for contaminated soil will necessitate restrictions for future use of the Site if residual contamination levels in the source area soils persist above corresponding Tier 2 Levels.

7.0 SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED

In accordance with KDHE's CI/CAS Scope of Work, several remedial action alternatives were assembled and evaluated in detail. Each remedial alternative was evaluated using the following criteria: 1) overall protection of human health and the environment; 2) compliance with Federal and State applicable or relevant and appropriate requirements (ARARs); 3) long-term effectiveness and permanence; 4) overall reduction of toxicity, mobility and volume through treatment; 5) short-term effectiveness; 6) implementability, and 7) cost. A detailed description of each remedial alternative is presented in the CAS Report.

7.1 Remedial Action Alternative 1: No Action

The "no action" alternative requires that no further action be taken at the Site to remediate soil and groundwater, that no further monitoring, and that institutional controls are not implemented at the Site. The No Action alternative serves as a baseline to which all other remedial alternatives are compared. If no action is taken to remediate soil and groundwater, risks to human health and environment may not be addressed, especially since contaminated groundwater has migrated off-site. There is no anticipated cost associated with the No Action Alternative.

7.2 Remedial Action Alternative 2: Enhanced Bioremediation via Substrate Injection

EAB is a groundwater treatment technology that is implemented by direct-push injection of a biodegradable carbon source. These compounds consist of large hydrogen-rich molecules that are digested by microorganisms to produce acetic acid and hydrogen. Hydrogen can then be utilized by microbes that are capable of breaking down TCE and other chlorinated solvents through reductive dechlorination. Once background demand for hydrogen is met and the relative reducing conditions are present, reductive dechlorination can then occur in the anaerobic environment. TCE will be broken down and ultimately result in the generation of carbon dioxide and water. The short-term effectiveness can result in the relatively quick destruction of chlorinated compounds and the long-term effectiveness includes the removal of groundwater contamination below applicable cleanup levels. This technology type has already been implemented at the site as an IRM and has been injected in six treatment curtains. Additional injections may be necessary in the future to get more coverage within in the plume or to re-inject in places where the substrate has been depleted. The advantage to this remedy is that there would not be a need for routine operation and maintenance (O&M), that the CAP18™ product is a biodegradable food-grade product, and that the technology is relatively less expensive than other technologies. Routine groundwater monitoring would be necessary to evaluate the effectiveness of this technology. The cost estimated for one injection event and quarterly groundwater sampling for a period of five years is $617,000.

7.3 Remedial Action Alternative 3: Aquifer Air Sparge/Soil Vapor Extraction in the Source Area

AAS is the process in which air is injected into groundwater below the contaminated zone. The air then strips the aquifer of volatile organic compounds, which eventually migrate to the zone of aeration in the soil. A negative pressure or vacuum is applied to the soil with SVE, which can then recover these vapors, thus removing the contaminants from the groundwater and soil. AAS/SVE has been initiated on a full-scale target groundwater contamination directly beneath the former source area as an interim measure. The system has been fully operational since March 2009 and large diameter pressure-relieving boreholes were installed through the backfilled excavation in December 2009 to aid in further vapor recovery from the system. The cost estimated to operate the system for one year is $151,000.

7.4 Remedial Action Alternative 4: Pump and Treat (Hydraulic Containment) with Monitored Natural Attenuation

Pump and treat is a generally accepted approach for controlling the migration of contaminants in ground water and is based on the concept that a pumping well or multiple wells create a capture zone of impacted groundwater that prevents dissolved contaminants from leaving this zone. This alternative would consist of installing a groundwater extraction system downgradient of the highest area of concentration along the eastern property line, just west of McNair Street. The pump and treat system would be designed to provide hydraulic containment of as much groundwater with concentrations above the cleanup levels as reasonable practicable while natural attenuation processes work to further reduce contaminant levels. Recovered groundwater would be directed to an air stripper designed to treat the maximum contaminant levels exhibited in the groundwater to below the applicable cleanup levels. The treated groundwater would then be re-injected into the aquifer through a KDHE-approved permit.

Monitored natural attenuation (MNA) would be proposed as a treatment alternative for groundwater contamination both inside and outside of the hydraulic capture zone of the pump and treat system. MNA relies on natural attenuation processes such as physical, chemical and biological processes to further reduce the mass, toxicity, mobility, volume, and/or concentration of contaminants in soil or groundwater. These processes may include dilution for recharge, advection, dispersion, diffusion, volatilization, biodegradation, sorption, and chemical reactions with subsurface materials. A plan to evaluate MNA proposal would be reviewed by KDHE and a detailed monitoring plan would be in place to monitor MNA. An optimistic cost estimate for 15 years of treatment, operation and maintenance, and monitoring is $2,750,000.

8.0 SUMMARY OF THE SELECTED REMEDY

The primary purposes of the CAD are to 1) summarize information from key Site documents; 2) identify and describe the preferred alternative for site remediation detailed in the CAS; and 3) provide an opportunity for the public to comment on KDHE's preferred remedial alternative.

KDHE has determined the preferred remedy for the Site, outlined below, satisfies or meets the criteria established by both State and Federal programs and will be protective of human health and the environment.

The remedial alternatives were evaluated based on the seven criteria discussed in Section 7.0. KDHE has identified the combination of **Remedial Alternative 2** and **Remedial Alternative 3** as the preferred remedy for addressing groundwater contamination at the site.

A remedy to address residual TCE contamination in soil was not presented in the CAS since largely mitigated through the soil excavation IRM; however, KDHE modifies the remedy to address this residual contamination through the establishment of an environmental use control (EUC) on the property where the release occurred, if future soil confirmation sampling indicates that contaminant concentrations in soil remain above the corresponding Tier 2 Level.

Since implementation of Remedial Alternatives 2 and 3 have already commenced as interim remedial measures at the Site, KDHE has elected to continue operation of the AAS/SVE system and to continue performance monitoring for the evaluation of the EAB. Additional injections of CAP18™ in the future may be warranted.

KDHE proposes to modify the remedial alternative to: (1) require the establishment of an EUC on the property if residual contamination remains in the soil and/or groundwater in excess of residential Tier 2 Levels; (2) require periodic indoor air quality assessment of nearby residences and/or assisted living facility if plume conditions change (based on periodic review of groundwater monitoring results); and (3) require periodic re-verification of any new private well installation (e.g. lawn and garden) in nearby agricultural and residential areas. KDHE may require Legg to take additional action to eliminate the threat to groundwater from the contaminated soil if residual contamination levels persist above corresponding residential Tier 2 Levels.

9.0 COMMUNITY INVOLVEMENT

KDHE has encouraged public involvement throughout the CAD review process. On June 24 KDHE issued a public notice in *The Harvey County Independent* announcing the availability of the draft CAD and the public comment period offered from June 24, 2010 to July 24, 2010. The notice included information about the Site and about how the public could access the Administrate Record file. All comments that were received by KDHE prior to the end of the public comment period are addressed in the Response to Comments Summary Section of the Final CAD.

10.0 DOCUMENTATION OF MINOR CHANGES

One written letter and one e-mail question were received by KDHE during the public comment period. In response to the comments received, KDHE has amended the draft CAD document as specified in Section 11.0.

11.0 RESPONSE TO COMMENTS SUMMARY

The purpose of this section is to review and provide responses to comments made by private citizens and other interested parties during the public comment period for the Draft CAD. One comment letter was received and one e-mail comment was received. Comments and KDHE's responses are included below.

Comment 1: *In subpart (1) of the final paragraph of Section 8, the Draft Decision states that KDHE proposes to modify the remedial alternative by requiring the establishment of an EUC if residual soil or groundwater contamination is "at levels disallowing unrestricted use." Legg assumes that this statement is essentially a repetition of an earlier statement in the Draft Decision that KDHE would propose to address residual contamination in excess of Tier 2 Levels by an EUC. As stated above, Legg agrees with this approach. We do suggest modifying subpart (1) of the final paragraph of Section 8 by substituting "in excess of Tier 2 Levels" for "disallowing unrestricted use," so as to improve the consistency and precision of the document and avoid any confusion to the public.*

KDHE Response: KDHE concurs with the suggested change for clarification purposes, but will change the language to state "in excess of residential Tier 2 Levels." The final paragraph of Section 8 is revised to state "in excess of residential Tier 2 Levels" rather than "at levels disallowing unrestricted use." If contaminants remain above any residential Tier 2 Level, this would disallow unrestricted use of the property in the future and an EUC would be required.

Comment 2: *In subpart (2) of the final paragraph of Section 8, the Draft Decision states that KDHE proposes to modify the remedial alternative by requiring periodic indoor air quality assessment if plume conditions change based on periodic groundwater monitoring. Legg does not believe this is an appropriate modification to the remedial alternatives for several reasons. Initially, neither Legg nor KDHE has identified a vapor intrusion pathway risk based on the extent of contamination as currently depicted from available data. In addition, the most recent plume maps depicting the extent of contamination are based on some data, particularly in areas near off-Site buildings, that predates many of the interim remedial measures (IRMs) implemented at the Site. Thus, if anything, the most recent plume maps likely overstate the extent of contamination and provide no reason to expect the plume to expand in the future. Finally, KDHE asserts in the last sentence of Section 8 that it retains the authority to require additional corrective action with regard to the Site, which means there is no reason for KDHE to modify a remedial alternative for a hypothetical issue that may never arise. Including a modification to the remedial alternatives that has no support in the data is inappropriate and unnecessary. Thus, Legg suggests that subpart (2) of the final paragraph of Section 8 be deleted.*

In the alternative, KDHE may wish to delay issuing a final corrective action decision until after the results of the November 2010 semi-annual groundwater monitoring event are available. Legg intends to resample monitoring wells MW-12 s/u, MW-12 s/l, MW-10 s/u, MW-10 s/l, MW-22 s/u, and MW-22 s/l. These monitoring wells are closest to the nearest off-Site buildings. Some of them have not been sampled for several years and the new sampling data is expected to reflect decreases in the aerial extent of contamination due to the operation of IRMs. The results of that sampling should provide additional information supporting the lack of any basis for a vapor intrusion concern.

KDHE Response: KDHE agrees that impact to human health via the vapor intrusion pathway at the Site is unlikely; however, in the interest of being conservative regarding human health, if conditions should change at the site, especially those conditions which are out of the control of Legg or KDHE (i.e., installation of new residential or irrigation wells, construction of homes above the off-site plume), should cause the plume configuration to expand, move, or be located under residential structures, there would likely be the need to assess this pathway.

The corrective action at the Site is evaluated based on performance, so in the future, if corrective action at the site does not meet remedial action objectives for soil and groundwater, KDHE would require that Legg implement an alternative remedial strategy to meet remedial action objectives. Although KDHE does not anticipate the failure of the selected remedial strategy at the site, KDHE prefers to include this provision in the Final CAD to ensure evaluation/implementation of an alternative remedial strategy in the event that the selected remedial method discussed herein does not meet remedial action objectives.

Comment 3: *In subpart (3) of the final paragraph of Section 8, the Draft Decision states that KDHE proposes to modify the remedial alternative by requiring periodic re-verification of any new private well installation in nearby off-Site areas. Legg does not object to the proposed modification but suggests that it should be limited in frequency to no more often than every second year and to areas where groundwater contamination is off-site in excess of the maximum contaminant levels (MCLs). More frequent re-verification is not justified by the cost and re-verification outside the area with groundwater impacted above MCLs is not justified at all.*

KDHE Response: The purpose of this modification is to ensure that new water wells are not installed in areas of impacted groundwater. The frequency of such evaluation will be determined by KDHE post-CAD as part of the long-term monitoring plan.

Comment 4: *In section 3.1, line 8, the Draft Decision refers to the water bearing zones at the Site as being "designated as the 'upper', 'lower', and 'deep' aquifer zones." The reports submitted on Legg's behalf have generally referred to the water bearing zones as the "shallow," "intermediate," and "deep" zones. This is the terminology reflected in Section 3.3 of the Draft Decision. To avoid confusion to the public, Legg suggests changing the language in line 8 of Section 3.1 to state "designated as the 'shallow,' 'intermediate,' and 'deep' aquifer zones.*

KDHE Response: Although the meanings are essentially the same, the CAD is revised as suggested for consistency with earlier documents.

Comment 5: *Section 3.2, lines 6 and 7 describes a sampling result for trichloroethylene (TCE) in soil as being a "concentration of 3,900 micrograms per kilogram (mg/kg)". This abbreviation in the parentheses appears to be a typographical error and should state "(µg/kg)".*

KDHE Response: The abbreviation has been corrected in Section 3.2 to micrograms per kilogram as "µg/kg."

Comment 6: *In Section 3.3, lines 5 and 6, the following sentence appears: "The highest detectable concentrations of TCE are present near the rod dipping shed at a maximum concentration of 96,000 µg/L." Referring to this sample result in the present tense may be misleading to the public since the sample result was obtained during the comprehensive investigation (CI) between 1996 and 1998. Other statements in Sections 3.2 and 3.3 about specific sample results appear in the past tense. So, we suggest revising that sentence to state: "The highest detectable concentrations of TCE were present…."*

KDHE Response: The sentence has been revised as suggested.

Comment 7: *In Section 4.1, lines 4 and 5 from the end of the section discuss the soil excavation interim remedial measure (IRM) and state: "The upper five feet was backfilled with clay from an on-site borrow area and compacted." This is not entirely accurate since the upper five feet was backfilled with both borrow area soils and soils from the first five feet of the excavation, as stated earlier in the same paragraph. We suggest revising this sentence to state: "The upper five feet of the excavation was backfilled with the first five feet of excavated and stored soils and backfill clay from an on-site borrow area and compacted."*

KDHE Response: The sentence has been revised as suggested.

Comment 8: *In Section 4.2, we suggest revising the next to the last sentence by adding the underscored language that follows to improve meaning to the public: "Performance monitoring for the EAB IRM is currently underway and initial results of EAB and other interim measures appear to be effective <u>in reducing concentrations of chlorinated solvents in groundwater</u>."*

KDHE Response: The sentence has been revised as suggested.

Comment 9: *In Section 5, the first sentence states: "The primary route of exposure to contaminants at the Site is through the use of groundwater contaminated above the maximum contaminant levels …." This statement is not accurate because sampling of residential wells near the Site has not detected any contamination in groundwater and the former City of Halstead PWS Well #5 was permanently abandoned in 1991. Thus, there is no current use of contaminated groundwater. We suggest that this sentence be revised, as follows, by adding the underscored language: "The primary route of exposure to contaminants at the Site is through the <u>possible future</u> use of groundwater contaminated above the maximum contaminant levels…."*

KDHE Response: The sentence has been revised as suggested.

Comment 10: *In Section 6.0, we suggest that the first bullet point be revised, as follows, by adding the underscored language and deleting the struck-out language: "Prevent future human exposure to ~~contaminated~~ groundwater with contamination greater than MCLs;" This change is suggested for the same reasons as stated in the previous comment and to be consistent with the first sentence of Section 5.*

KDHE Response: The remedial action objective (RAO) is a general statement and is not meant to suggest that exposure is currently taking place. The general RAO can include exposure to either soil or groundwater through ingestion, inhalation, and/or dermal exposure in the present and future. This general RAO will be included in the Final CAD.

Comment 11: *Section 6.1, final paragraph, line 4, the reference to Table 2 appears that it should be to Table 1.*

KDHE Response: Correction made.

Comment 12: *Table 1, Trichloroethylene is misspelled and should be corrected.*

KDHE Response: Correction made.

Comment 13: *I gave the Harvey County Commissioners a brief summary of the Draft Corrective Action for the Legg Co. in Halstead. They had a question about who will be funding the cleanup.*

KDHE Response: This question was sent via e-mail and a response was sent back via e-mail that indicated that the Legg Company is funding the cleanup and that to date, Legg funded the investigation, interim measures, and corrective action study.

Tables

Table 1: Remedial Action Objectives for Soil and Groundwater[1,2]

Contaminant	Soil Pathway (mg/kg)	Soil to Groundwater Pathway (mg/kg)	Groundwater Pathway (µg/L)
Trichloroethene	41	0.0842	5
cis-1,2-Dichloroethene	115	0.855	70
trans-1,2-Dichloroethene	202	1.2	100
Vinyl Chloride	4.47	0.0205	2
1,1-Dichloroethene	313	0.0859	7
Benzene	15.9	0.168	5
Toluene	4,320	51.2	1,000

[1]from Risk-Based Standards for Kansas RSK Manual - 5th Version (October 2010)

[2]Represents Tier 2 Levels for Residential Standards

mg/kg - milligrams per kilogram

µg/L - micrograms per liter

Figures

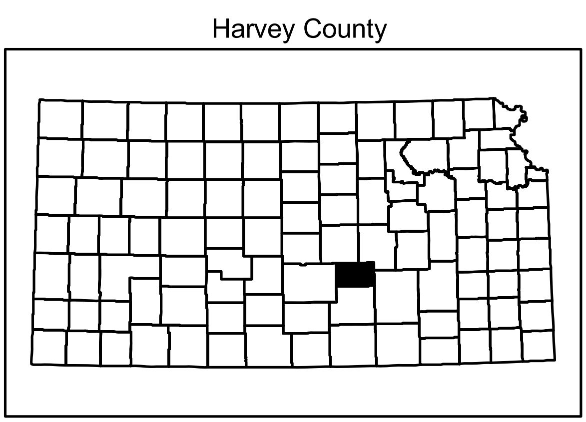
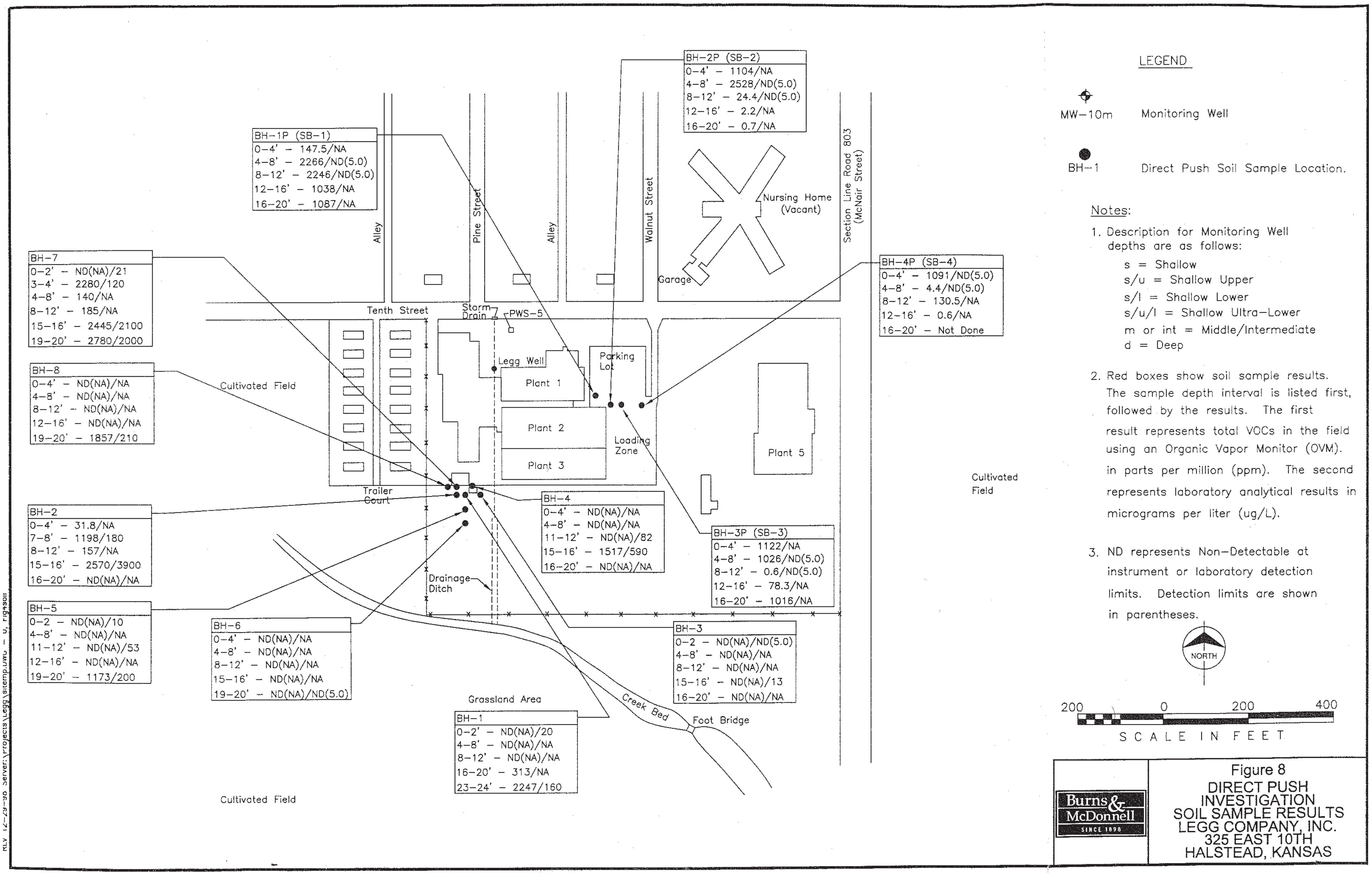


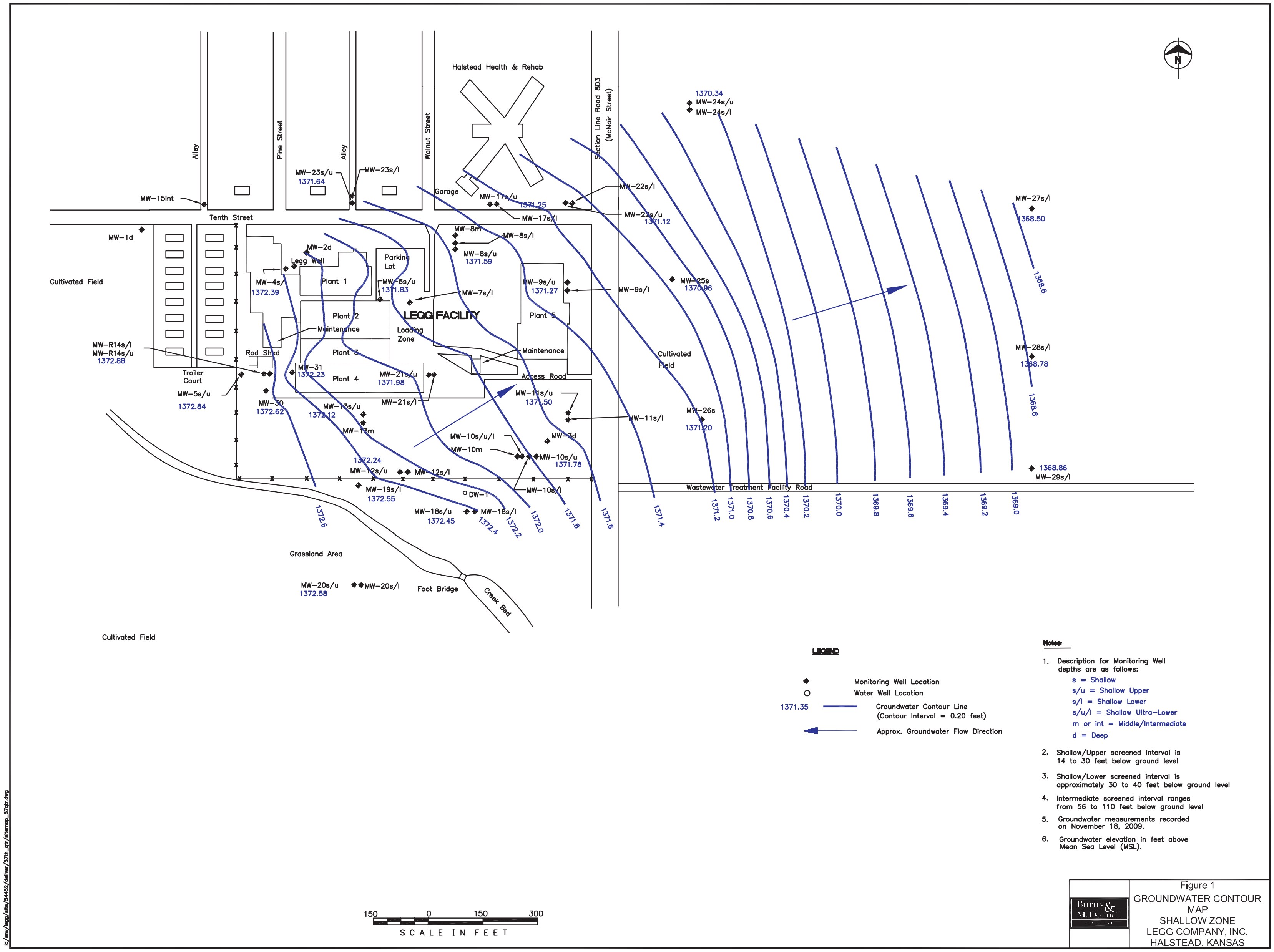
Figure 1
Site Location Map
Legg Company, Inc.
East 10th Street Site
Halstead, KS

FIGURE 2: DIRECT-PUSH SOIL INVESTIGATION RESULTS



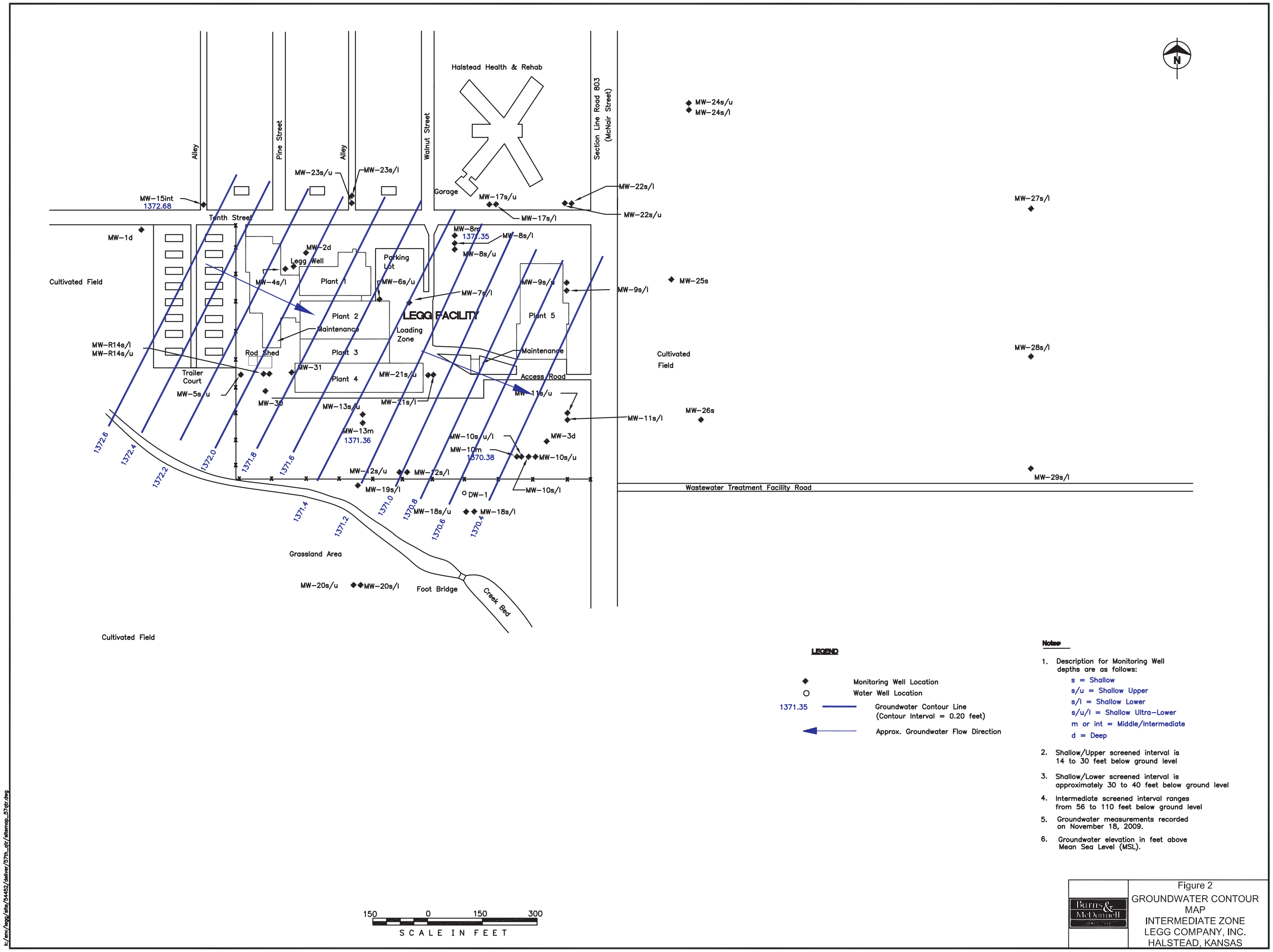
From: Comprehensive Investigation Report for the Legg Company, Inc., Facility at 325 East Tenth Street Halstead, Kansas v. 1. (pub. 2000)

FIGURE 3: GROUNDWATER CONTOUR MAP, SHALLOW ZONE



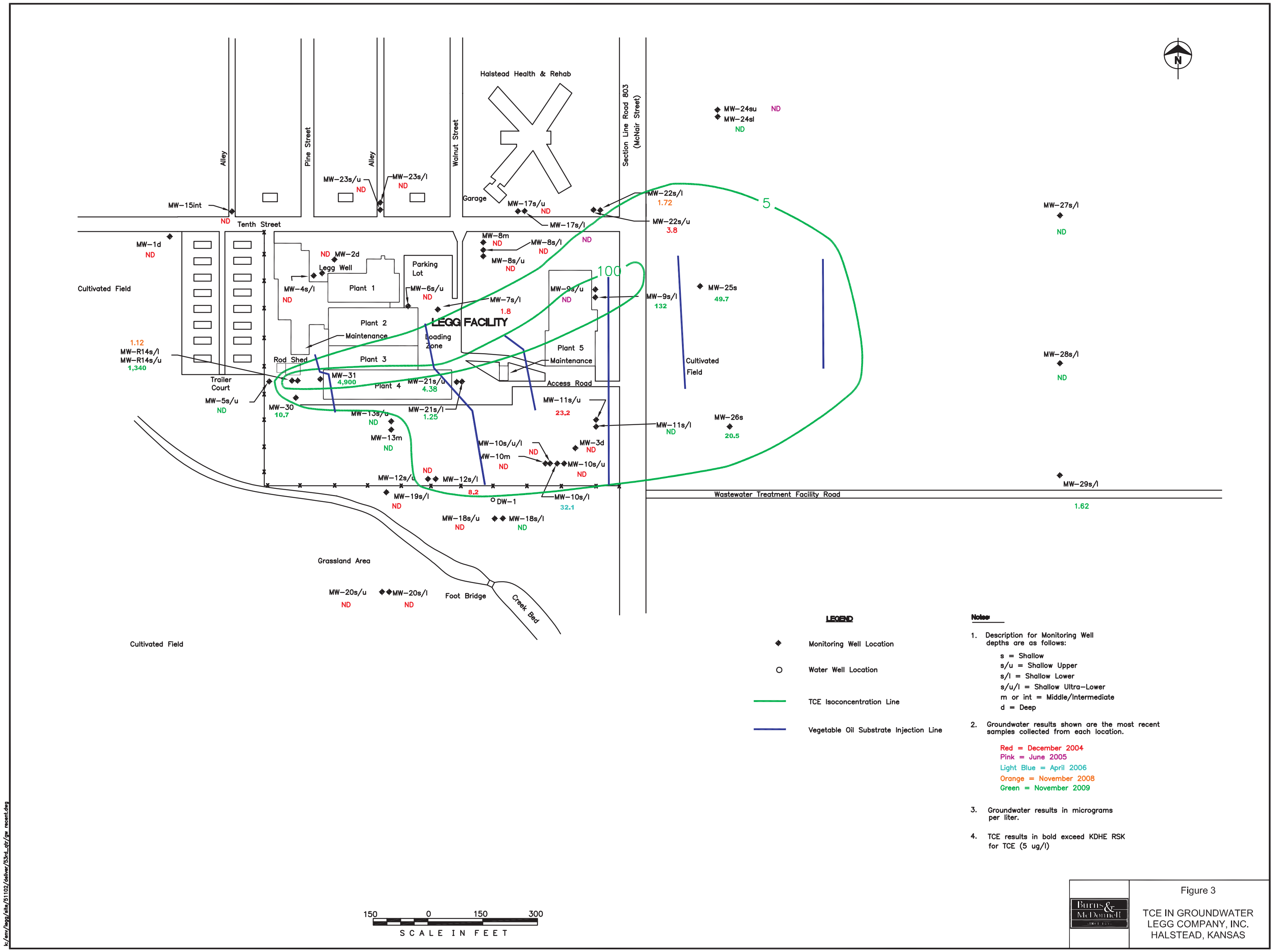
From: Fifty-Seventh Quarterly Progress Report for the Legg Company, Inc., Facility 325 East Tenth Street Halstead, KS. (pub. 2010)

FIGURE 4: GROUNDWATER CONTOUR MAP, INTERMEDIATE ZONE



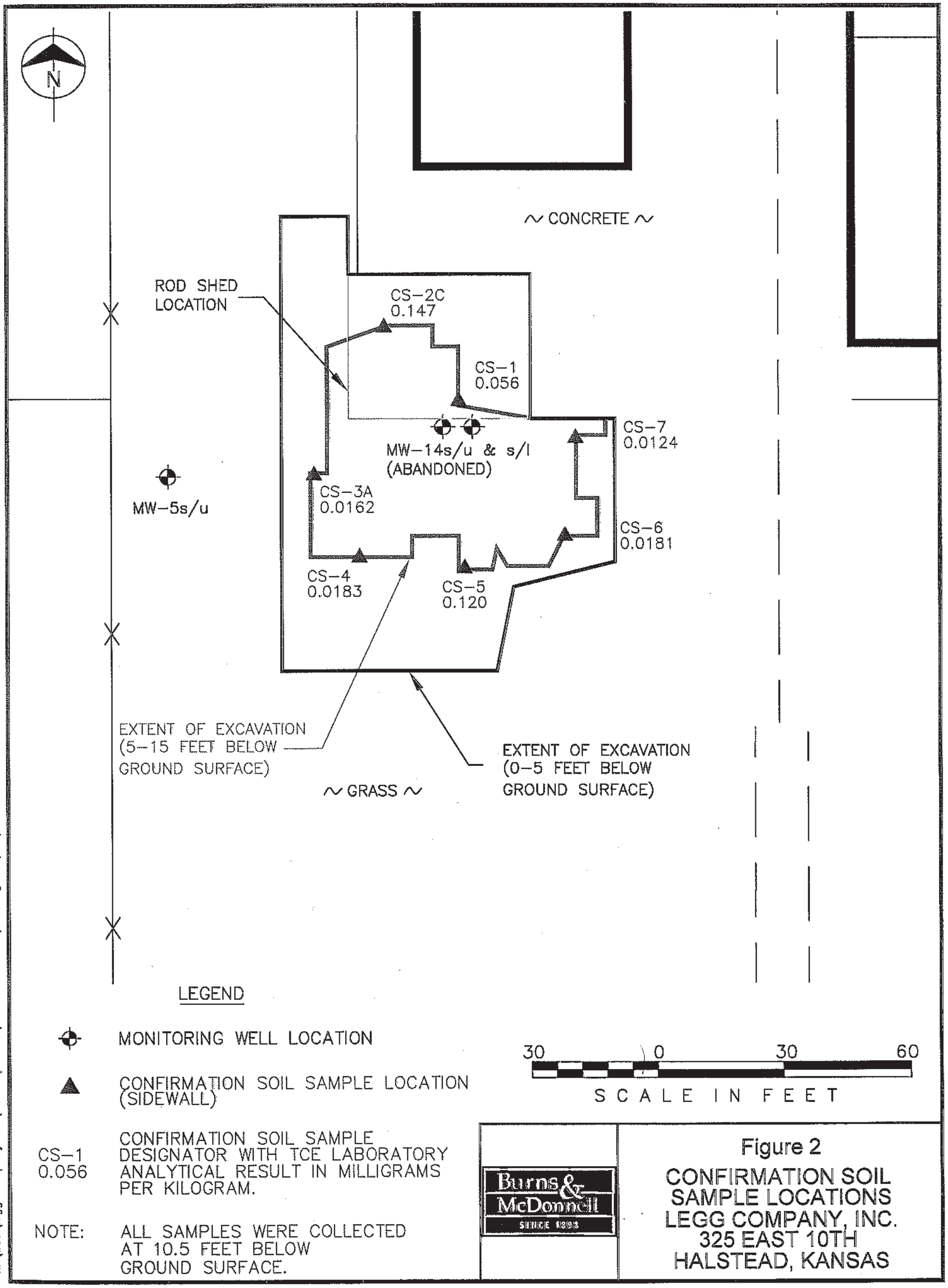
From: Fifty-Seventh Quarterly Progress Report for the Legg Company, Inc., Facility 325 East Tenth Street Halstead, KS. (pub. 2010)

FIGURE 5: TRICHLOROETHENE (TCE) IN GROUNDWATER



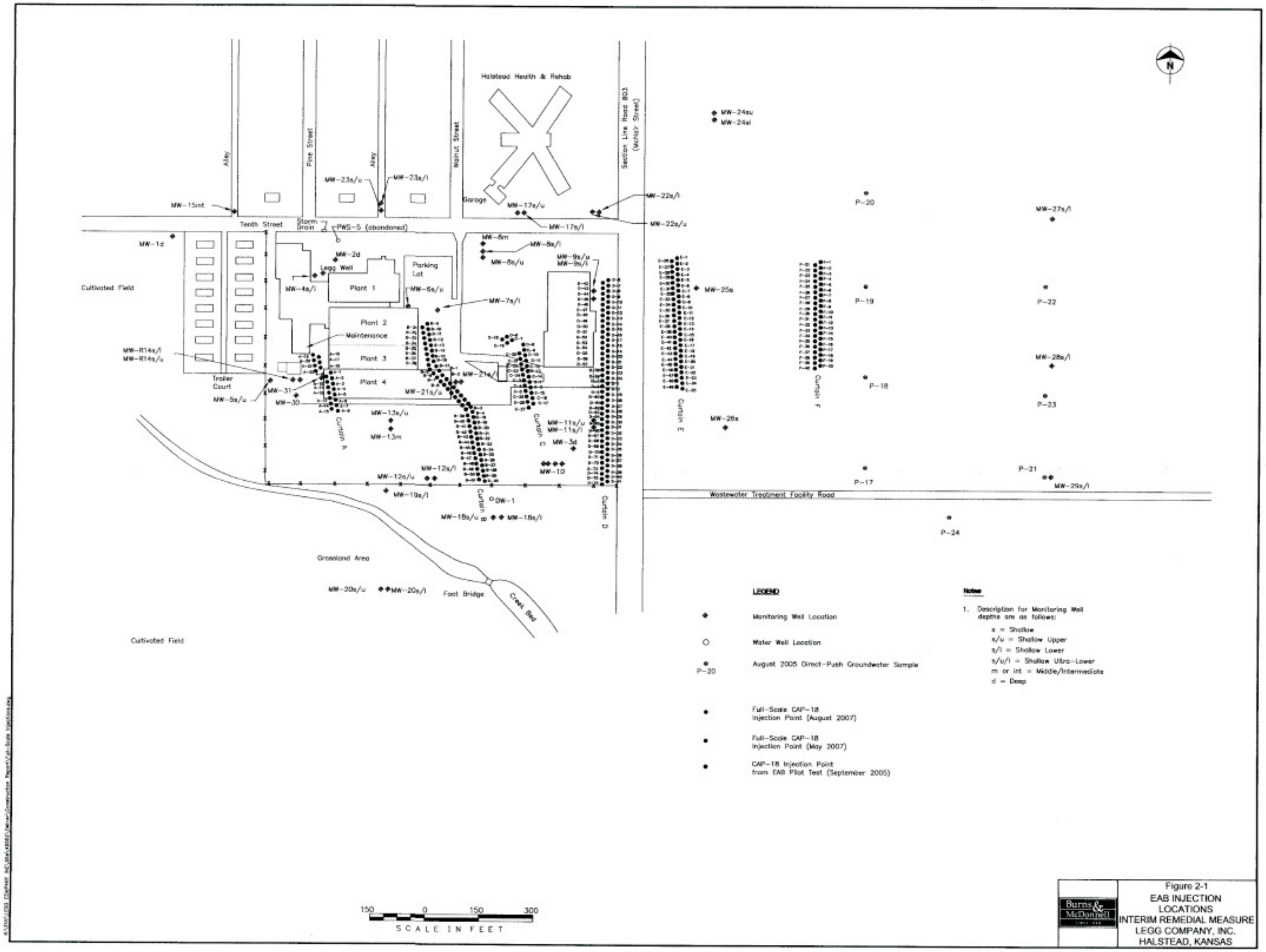
From: Fifty-Seventh Quarterly Progress Report for the Legg Company, Inc., Facility 325 East Tenth Street Halstead, KS. (pub. 2010)

FIGURE 6: FINAL EXCAVATION MAP – CONFIRMATION SOIL SAMPLES LOCATIONS



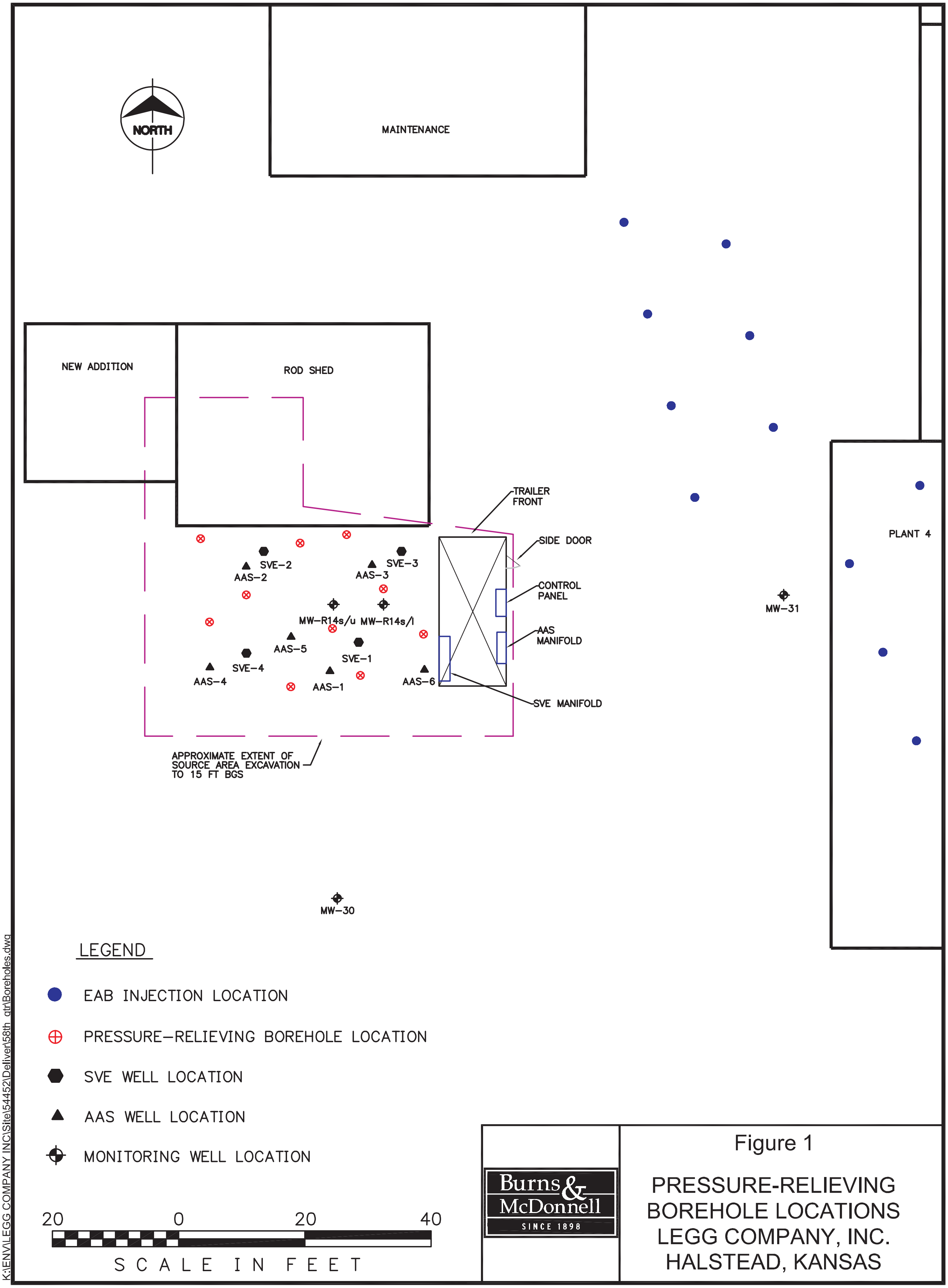
From: Interim Corrective Action Report Report for the Legg Company, Inc., Facility 325 East Tenth Street Halstead, KS. (pub. 2003)

FIGURE 7: ENHANCED ANAEROBIC BIOREMEDIATION (EAB) INJECTION



From Interim Remedial Measure Conforming to Construction Report and Performance Evaluation Monitoring Report (pub. 2009)

FIGURE 8: AQUIFER AIR SPARGE/SOIL VAPOR EXTRACTION (AAS/SVE) LAYOUT



From: Fifty-Eigth Quarterly Progress Report for the Legg Company, Inc., Facility 325 East Tenth Street Halstead, KS. (pub. 2010)