EXECUTIVE SUMMARY

The Schlumberger Well Completion and Productivity (WCP) Ardmore Street property is located in Houston, Harris County, Texas. The site is located close to Highway 288 and approximately 7 miles south of downtown Houston. The property is bounded by Ardmore Street to the east, Alice Street to the south, Grand Blvd. to the west and Yellowstone to the north. The immediate vicinity includes Medistar-owned vacant property to the southwest, City of Houston Water Department and maintenance facility, and Yellowstone Academy to the northeast, Wholesale Furniture Distribution to the west, and commercial properties to the north including a former dry cleaning facility, (currently Associated Testing Laboratories, Inc.) across Yellowstone Boulevard.

The applicant, Schlumberger, Inc., currently operates this facility which is dedicated to supporting the oil field industry. The site consists of 21.6 acres and was initially developed in the 1950's as two separate tracts, the WCP property and the Architectural Woodworking Company (AWC) property. The WCP property was initially developed in 1954 for the manufacturing of oilfield equipment. Current and historical operations at the Schlumberger WCP Ardmore Site include the design and construction of petroleum production equipment (oilfield tools, subsurface safety valves, well blowout preventers), and well completion accessories. The manufacturing operations are restricted to the former WCP property. At the present time, operations at the former AWC property are limited to the temporary storage of manufactured equipment awaiting shipment.

All data presented herein was provided by Schlumberger, Inc. and was derived from investigations completed by Tetra Tech NUS in support of investigation and reporting for this facility on behalf of Schlumberger.

Soil and Groundwater PCLE Zones

Environmental investigation activities have identified chemicals of concern (COCs) in groundwater at concentrations exceeding the Protective Concentration Level (PCL) established by the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP). It is believed that the most likely source of contaminants from the WCP facility is in the vicinity of Buildings 2, 2A and 4, with potential additional source areas within or adjacent to Buildings 16, 17 or 21. Five COCs in groundwater have been identified with Protective Concentration Levels (PCLs) exceedance zones including 1,1-dichloroethene (1-1 DCE), tetrachloroethene (PCE) and daughter products trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2 DCE), and vinyl chloride (VC). Groundwater contaminant plumes are stable or contracting with minor seasonal fluctuations observed. The affected groundwater is approximately 12 to 23 feet (ft) below ground surface (bgs). Local groundwater flow beneath the site is generally toward the north***By implementing an MSD, groundwater analytical results will not exceed the TRRP residential non-ingestion PCLs.***

Tetrachloroethene, TCE, and cis-1,2 DCE were detected in subsurface soil samples; however only PCE concentrations exceeded the respective Tier 1 $^{GW}Soil_{Ing}$ PCL. The highest concentration of PCE detected in soils was 0.19 mg/kg in the sample collected from EB-9 (8 ft bgs) beneath the concrete slab of Building 2A. No surface soil samples collected during the assessment activities contained detectable concentrations of chlorinated volatile organic compounds (VOCs), however semi-volatile compounds benzo(a)pyrene and indeno(1,2,3-cd) pyrene were identified in soil samples collected from boring SB-2. These compounds were not identified by Tetra Tech in any other samples collected from the facility. None of the chlorinated VOC detections in subsurface soil exceeded TRRP inhalation criteria.

There are no municipalities within a ½-mile radius of the property other then the City of Houston. Based on the results of the groundwater monitoring events at the subject property COCs will be allowed to naturally attenuate under the protection of institutional controls.

Appendix B

(TCEQ MSD Reference No. 1, 2, & 4)

A site map showing:

a. *The location of the designated property.*

b. *The topography of the designated property as indicated on publicly available sources, which must note the watershed and whether the designated property is located in a floodplain or floodway, as those terms are defined in Chapter 19 of the Code.*

c. *The detected area of groundwater contamination.*

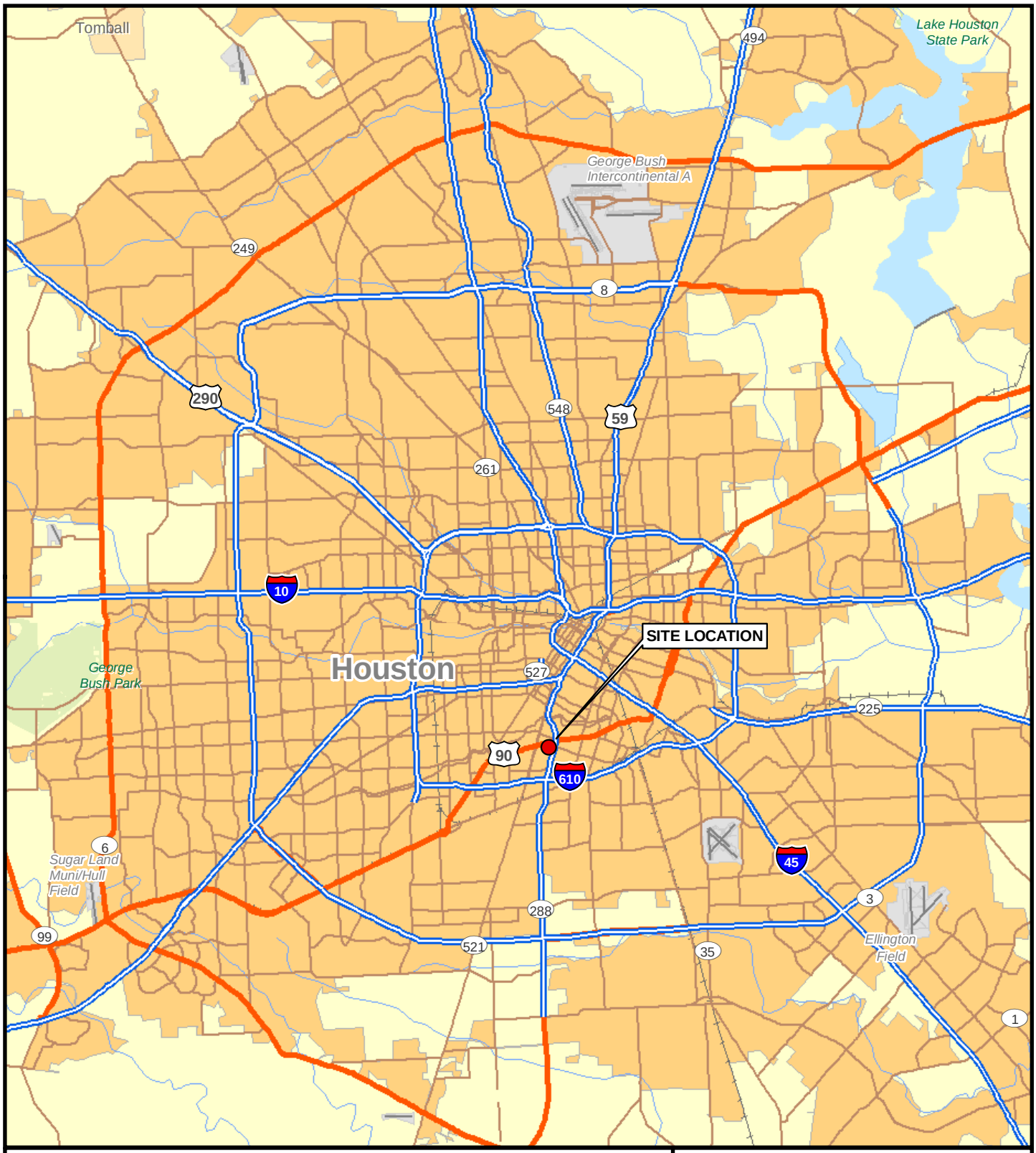
d. *The location of all soil sampling locations and all groundwater monitoring wells.*

e. *Groundwater gradients, to the extent known, and direction of groundwater flow.*

f. *The ingestion protective concentration level exceedance zone (PCLE) for each contaminant of concern, to the extent known.*

Attached Figures

Figure 1-1	Site Location Map
Figure 1-2	Property Map
Figure 2	Topographic Map
Figure 3	Groundwater Quality – Site Layout
Figure 4	Soil Boring and Monitoring Well Location Map
Figure 5	Potentiometric Surface Map
Figure 6	Tetrachloroethene (PCE) Concentration Map
Figure 7	Trichloroethene (TCE) Concentration Map
Figure 8	Cis-1,2 Dichloroethene (Cis-1,2 DCE) Concentration Map
Figure 9	Vinyl Chloride (VC) Concentration Map
Figure 10	1-1 Dichloroethene (DCE) Concentration Map



0 5 10

SCALE IN MILES

N

LEGEND

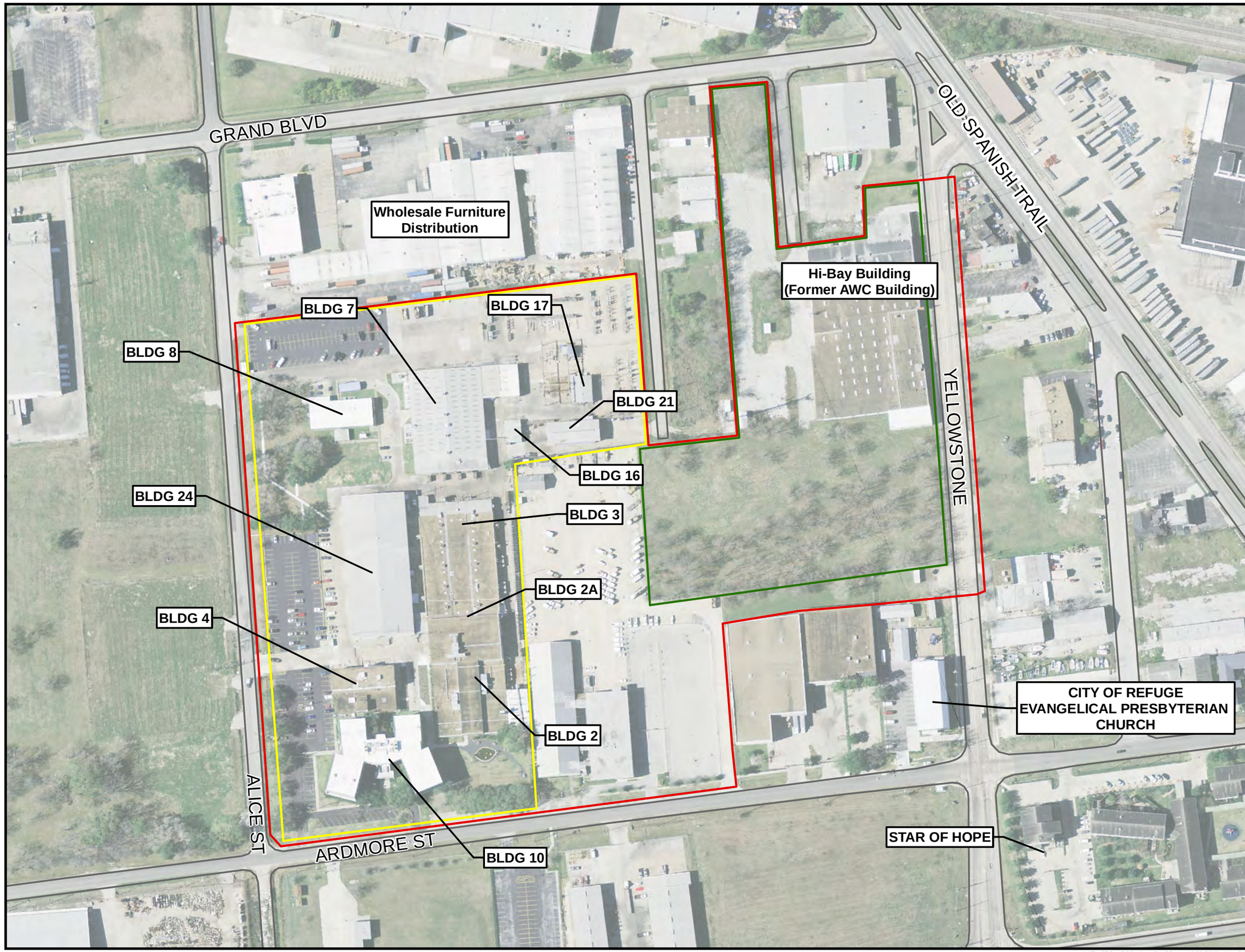
SITE LOCATION

SOURCE: ESRI STREETMAP USA

FIGURE 1-1
SITE LOCATION MAP
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 in = 5 miles

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_1-1_SITE_LOCATION_MAP.mxd, 16-Mar-10 14:13, bondp



LEGEND

- MSD BOUNDARY
- WELL COMPLETION AND PRODUCTIVITY PROPERTY BOUNDARY
- FORMER ARCHITECTURAL WOODWORKING COMPANY PROPERTY BOUNDARY

N

0 175 350

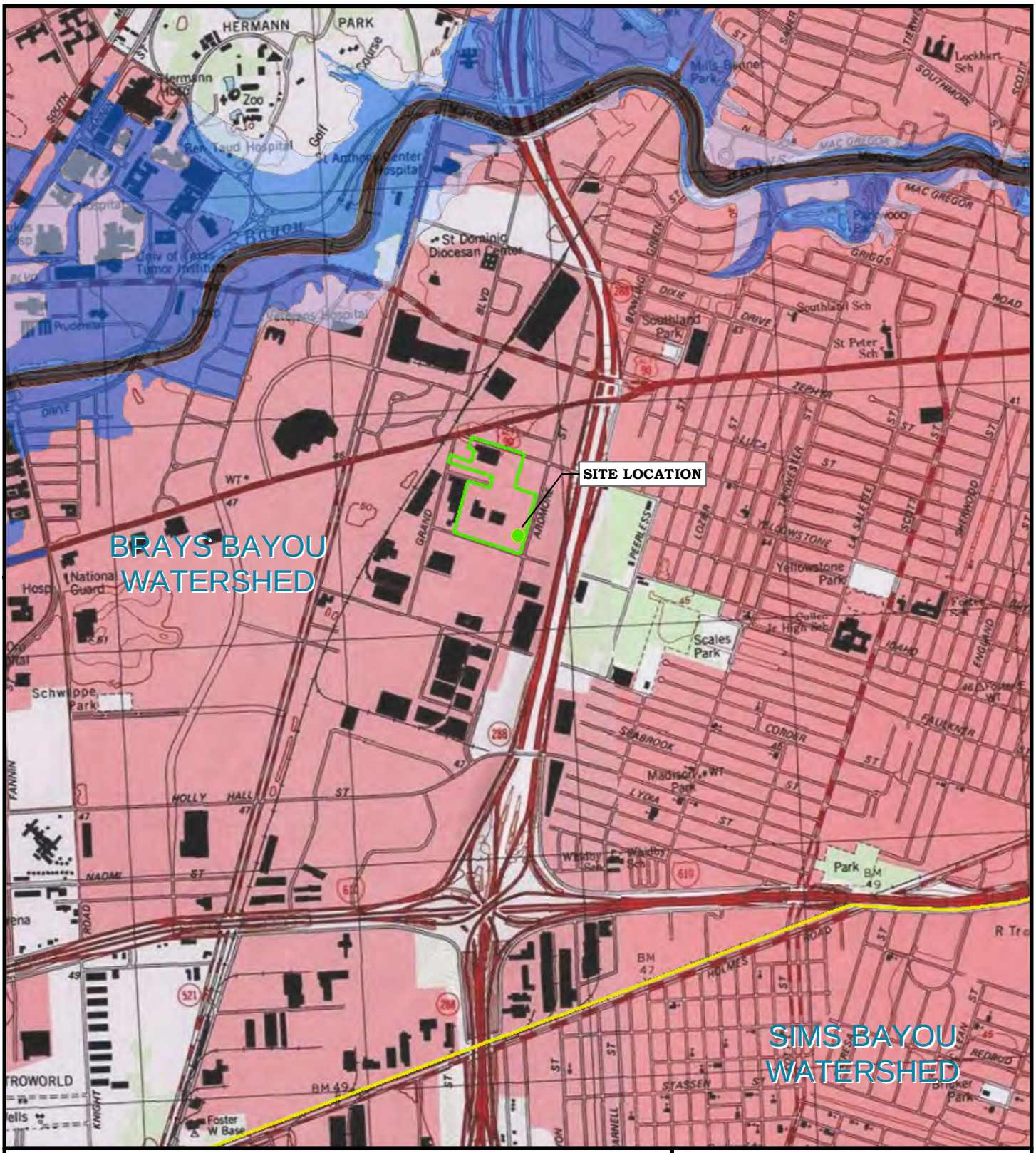
SCALE IN FEET

WESTON SOLUTIONS

FIGURE 1-2
PROPERTY MAP
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_1-2_Schlumberger_Property_Map.mxd, 16-Mar-10 16:34, bondp



LEGEND

- MSD LOCATION
- WATERSHED BOUNDARY
- MSD BOUNDARY

FLOOD ZONE

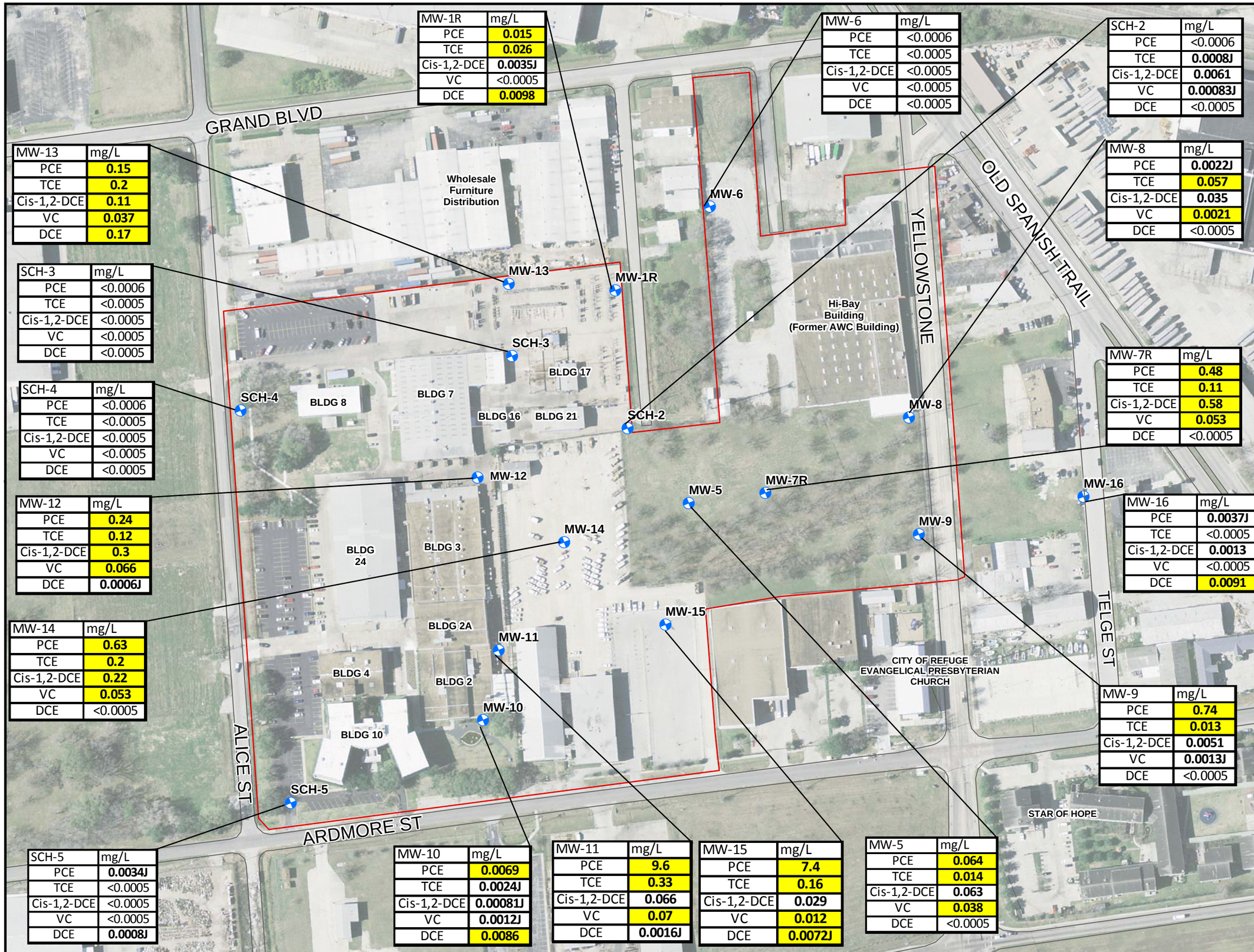
- FLOODWAY
- 100 YEAR FLOOD ZONE
- 500 YEAR FLOOD ZONE

SOURCE: 7.5 MIN USGS TOPO

FIGURE 2
TOPOGRAPHIC MAP
MUNICIPAL SETTING DESIGNATION
SCHLUMBERGER
7030 ARDMORE
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB. 2010	14491.001.001.0020	1 inch = 2,000 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_2_MUNICIPAL_TOPO_MAP.mxd, 16-Mar-10 15:25, bondp



MW-1R	mg/L
PCE	**0.015**
TCE	**0.026**
Cis-1,2-DCE	**0.0035J**
VC	<0.0005
DCE	**0.0098**

MW-6	mg/L
PCE	<0.0006
TCE	<0.0005
Cis-1,2-DCE	<0.0005
VC	<0.0005
DCE	<0.0005

SCH-2	mg/L
PCE	<0.0006
TCE	**0.0008J**
Cis-1,2-DCE	**0.0061**
VC	**0.00083J**
DCE	<0.0005

MW-13	mg/L
PCE	**0.15**
TCE	**0.2**
Cis-1,2-DCE	**0.11**
VC	**0.037**
DCE	**0.17**

MW-8	mg/L
PCE	**0.0022J**
TCE	**0.057**
Cis-1,2-DCE	**0.035**
VC	**0.0021**
DCE	<0.0005

SCH-3	mg/L
PCE	<0.0006
TCE	<0.0005
Cis-1,2-DCE	<0.0005
VC	<0.0005
DCE	<0.0005

MW-7R	mg/L
PCE	**0.48**
TCE	**0.11**
Cis-1,2-DCE	**0.58**
VC	**0.053**
DCE	<0.0005

SCH-4	mg/L
PCE	<0.0006
TCE	<0.0005
Cis-1,2-DCE	<0.0005
VC	<0.0005
DCE	<0.0005

MW-12	mg/L
PCE	**0.24**
TCE	**0.12**
Cis-1,2-DCE	**0.3**
VC	**0.066**
DCE	**0.0006J**

MW-16	mg/L
PCE	**0.0037J**
TCE	<0.0005
Cis-1,2-DCE	**0.0013**
VC	<0.0005
DCE	**0.0091**

MW-14	mg/L
PCE	**0.63**
TCE	**0.2**
Cis-1,2-DCE	**0.22**
VC	**0.053**
DCE	<0.0005

MW-9	mg/L
PCE	**0.74**
TCE	**0.013**
Cis-1,2-DCE	**0.0051**
VC	**0.0013J**
DCE	<0.0005

SCH-5	mg/L
PCE	**0.0034J**
TCE	<0.0005
Cis-1,2-DCE	<0.0005
VC	<0.0005
DCE	**0.0008J**

MW-10	mg/L
PCE	**0.0069**
TCE	**0.0024J**
Cis-1,2-DCE	**0.00081J**
VC	**0.0012J**
DCE	**0.0086**

MW-11	mg/L
PCE	**9.6**
TCE	**0.33**
Cis-1,2-DCE	**0.066**
VC	**0.07**
DCE	**0.0016J**

MW-15	mg/L
PCE	**7.4**
TCE	**0.16**
Cis-1,2-DCE	**0.029**
VC	**0.012**
DCE	**0.0072J**

MW-5	mg/L
PCE	**0.064**
TCE	**0.014**
Cis-1,2-DCE	**0.063**
VC	**0.038**
DCE	<0.0005

LEGEND

MSD BOUNDARY

MONITORING WELLS

NOTE:

1) 7030 ARDMORE DATA COURTESY OF TETRATECH NUS FROM DECEMBER 2009
2) ALL CONCENTRATIONS IN mg/L
3) HIGHLIGHTED CONCENTRATIONS EXCEED CRITICAL PCL
4) BOLD INDICATES REPORTED CONCENTRATIONS
5) 'J' INDICATES ESTIMATED VALUE

CRITICAL PCL:
TETRACHLOROETHYLENE (PCE) = 0.005 mg/L
TRICHLOROETHYLENE (TCE) = 0.005 mg/L
CIS-1,2-DICHLOROETHENE (CIS-1,2) = 0.07 mg/L
VINYL CHLORIDE (VC) = 0.002 mg/L
1,1-DICHLOROETHENE (DCE) = 0.007 mg/L

N

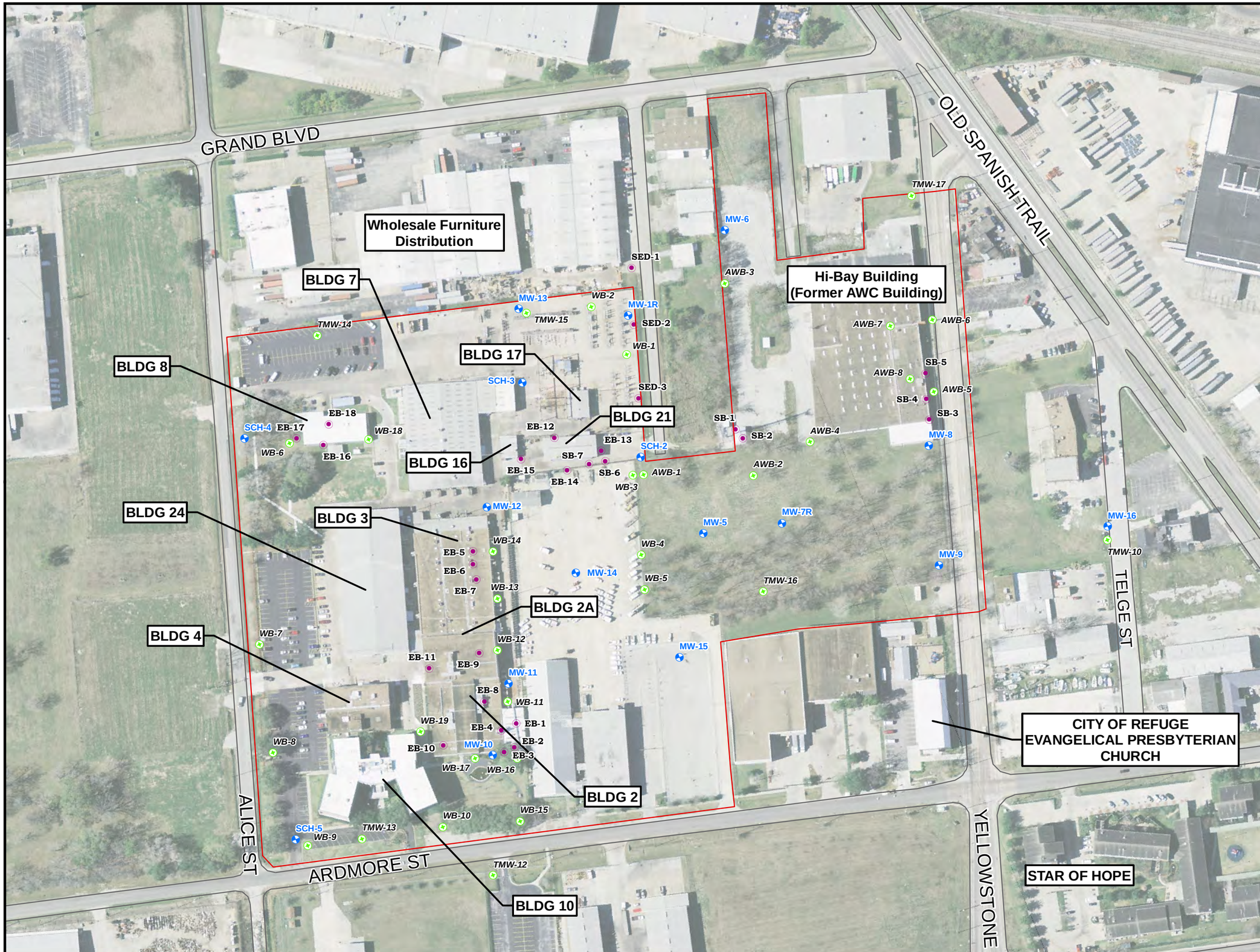
0 175 350
SCALE IN FEET

WESTON SOLUTIONS

FIGURE 3
GROUNDWATER QUALITY
SITE LAYOUT
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_3_DETECTED_GROUNDWATER_CONTAMINATION-SITE_LAYOUT_MAP_DEC2009DATA.mxd, 16-Mar-10 15:54, bondp



LEGEND

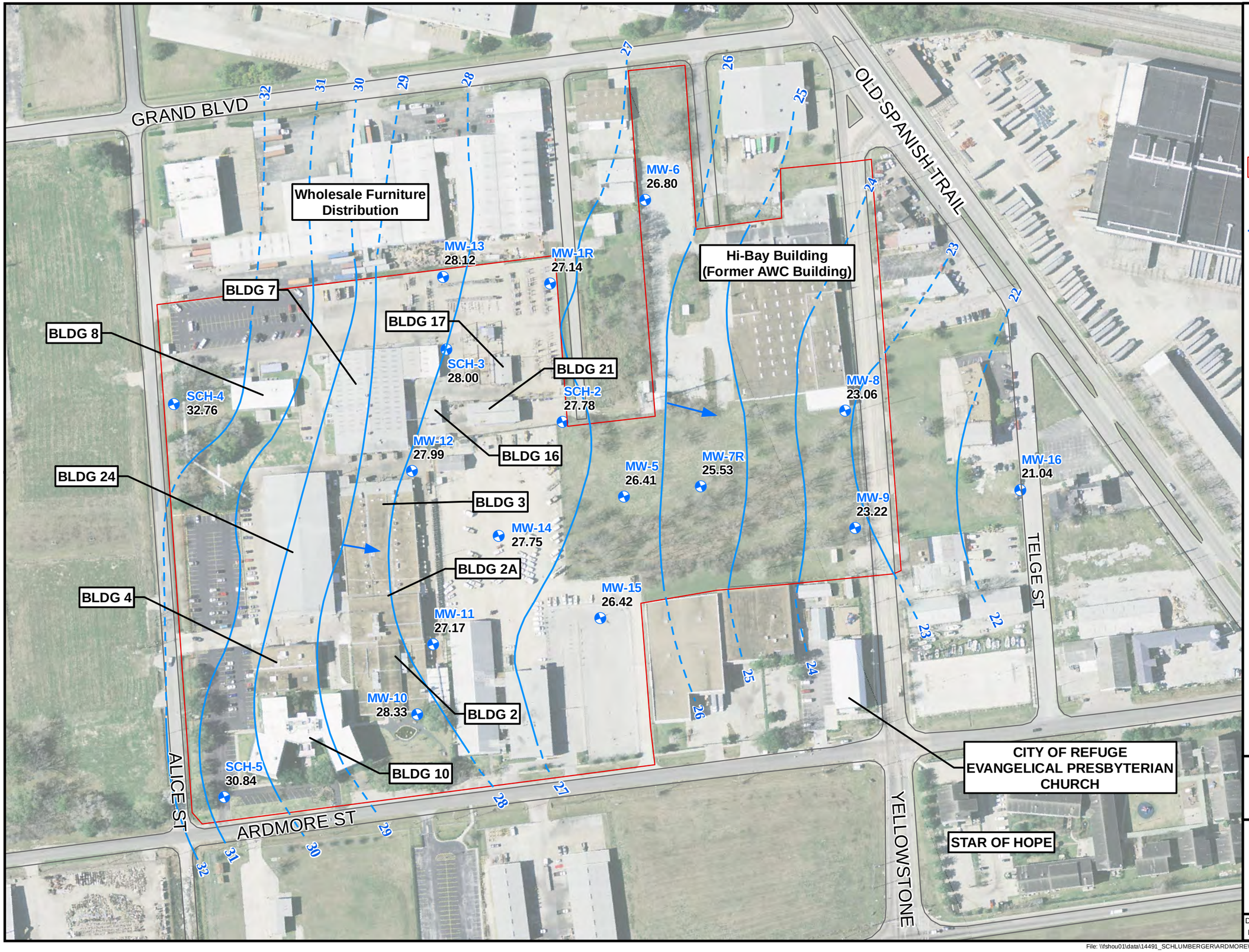
- MSD BOUNDARY
- MONITORING WELL
- TEMPORARY MONITORING WELL
- GEOPROBE/SOIL BORINGS

WESTON SOLUTIONS

FIGURE 4
SOIL BORING AND
GROUNDWATER MONITORING
WELL LOCATION MAP
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_4_Soil_Boring_and_Well_Location_Map.mxd, 16-Mar-10 16:01, bondp



LEGEND

- MSD BOUNDARY
- MONITORING WELLS
- DIRECTION OF GROUNDWATER FLOW
- 23.06 GROUNDWATER ELEVATION

NOTE:
7030 ARDMORE DATA
COUTESY OF TETRATECH
FROM DECEMBER 2009

N

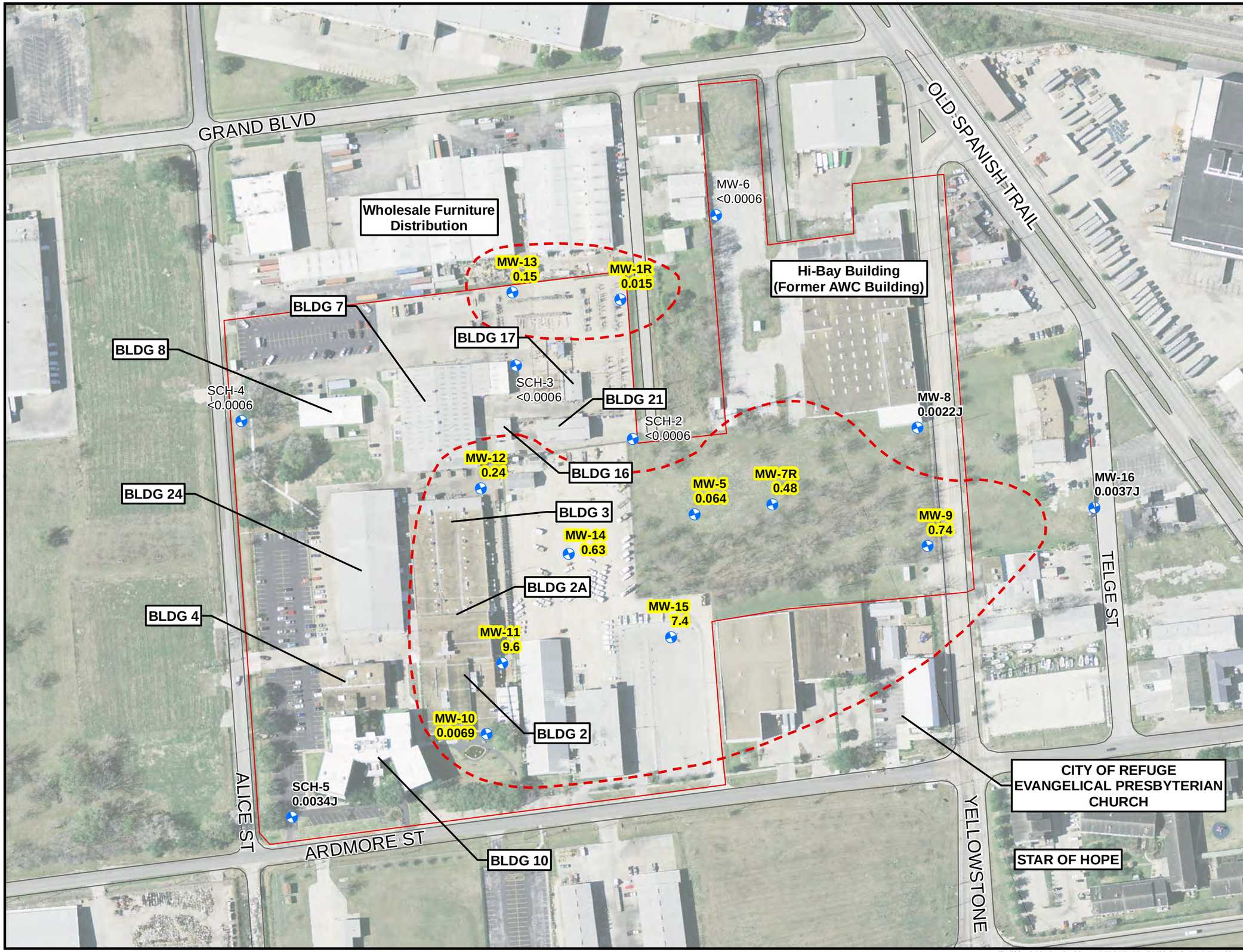
0 175 350
SCALE IN FEET

WESTON SOLUTIONS

FIGURE 5
POTENTIOMETRIC SURFACE MAP
DECEMBER 2009
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_5_Potentiometric_Surface_Map.mxd, 16-Mar-10 16:06, bondp



LEGEND

- MSD BOUNDARY
- INFERRED GROUNDWATER PROTECTIVE CONCENTRATION LEVEL EXCEEDENCE ZONE
- MONITORING WELLS

NOTE:
1) 7030 ARDMORE DATA COURTESY OF TETRATECH NUS FROM DECEMBER 2009
2) ALL CONCENTRATIONS IN mg/L
3) HIGHLIGHTED CONCENTRATIONS EXCEED CRITICAL PCL
4) BOLD INDICATES REPORTED CONCENTRATIONS
5) 'J' INDICATES ESTIMATED VALUE

CRITICAL PCL:
TETRACHLOROETHYLENE (PCE) = 0.005 mg/L

N

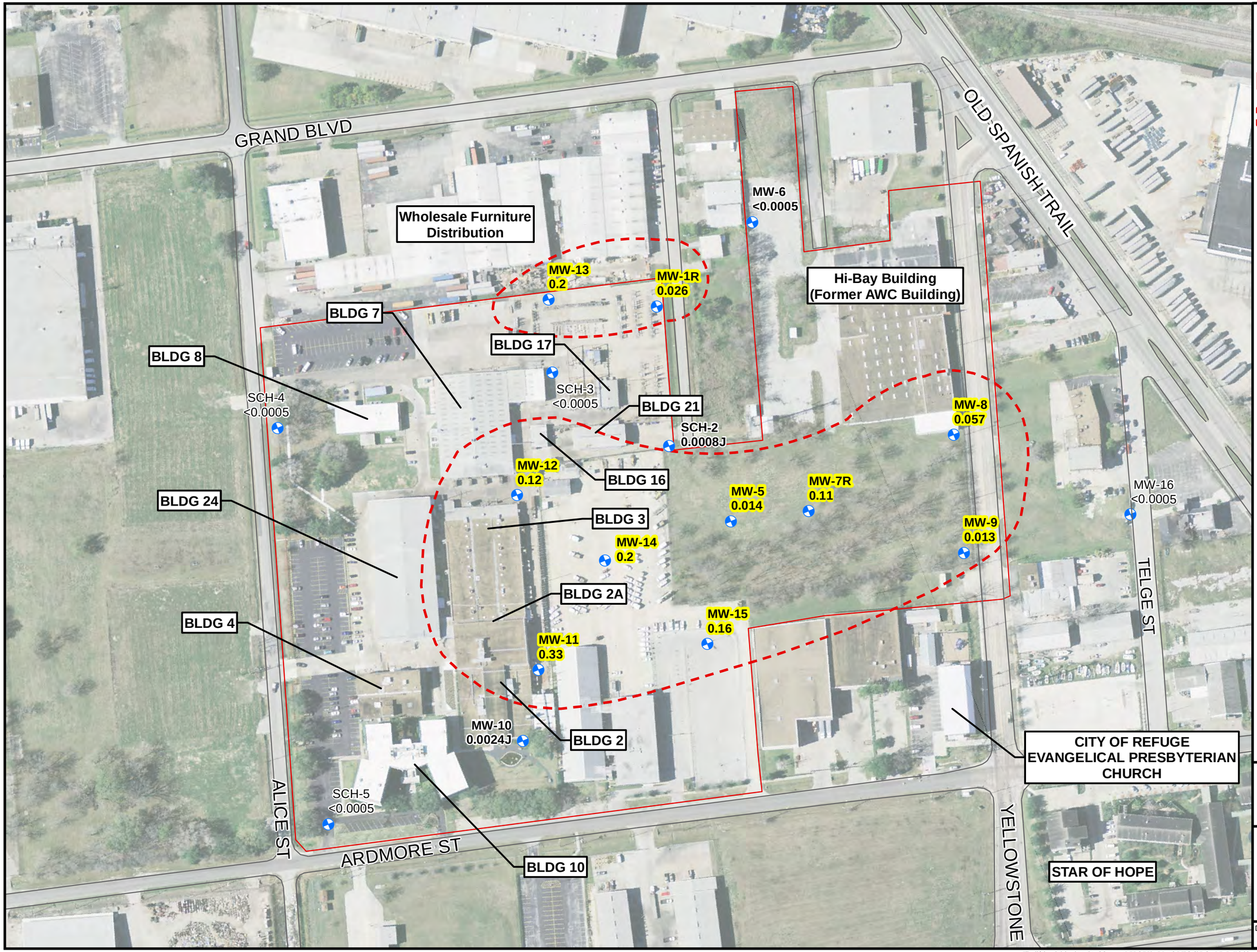
0 175 350
SCALE IN FEET

WESTON SOLUTIONS

FIGURE 6
TETRACHLOROETHYLENE (PCE)
CONCENTRATION MAP
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_6_Tetrachloroethylene(PCE)_Concentration_Map_DEC2009DATA.mxd, 16-Mar-10 16:08, bondp



LEGEND

- MSD BOUNDARY
- INFERRED GROUNDWATER PROTECTIVE CONCENTRATION LEVEL EXCEEDENCE ZONE
- MONITORING WELLS

NOTE:
1) 7030 ARDMORE DATA COURTESY OF TETRATECH NUS FROM DECEMBER 2009
2) ALL CONCENTRATIONS IN mg/L
3) HIGHLIGHTED CONCENTRATIONS EXCEED CRITICAL PCL
4) BOLD INDICATES REPORTED CONCENTRATIONS
5) 'J' INDICATES ESTIMATED VALUES

CRITICAL PCL:
TRICHLOROETHYLENE (TCE) = 0.005 mg/L

N

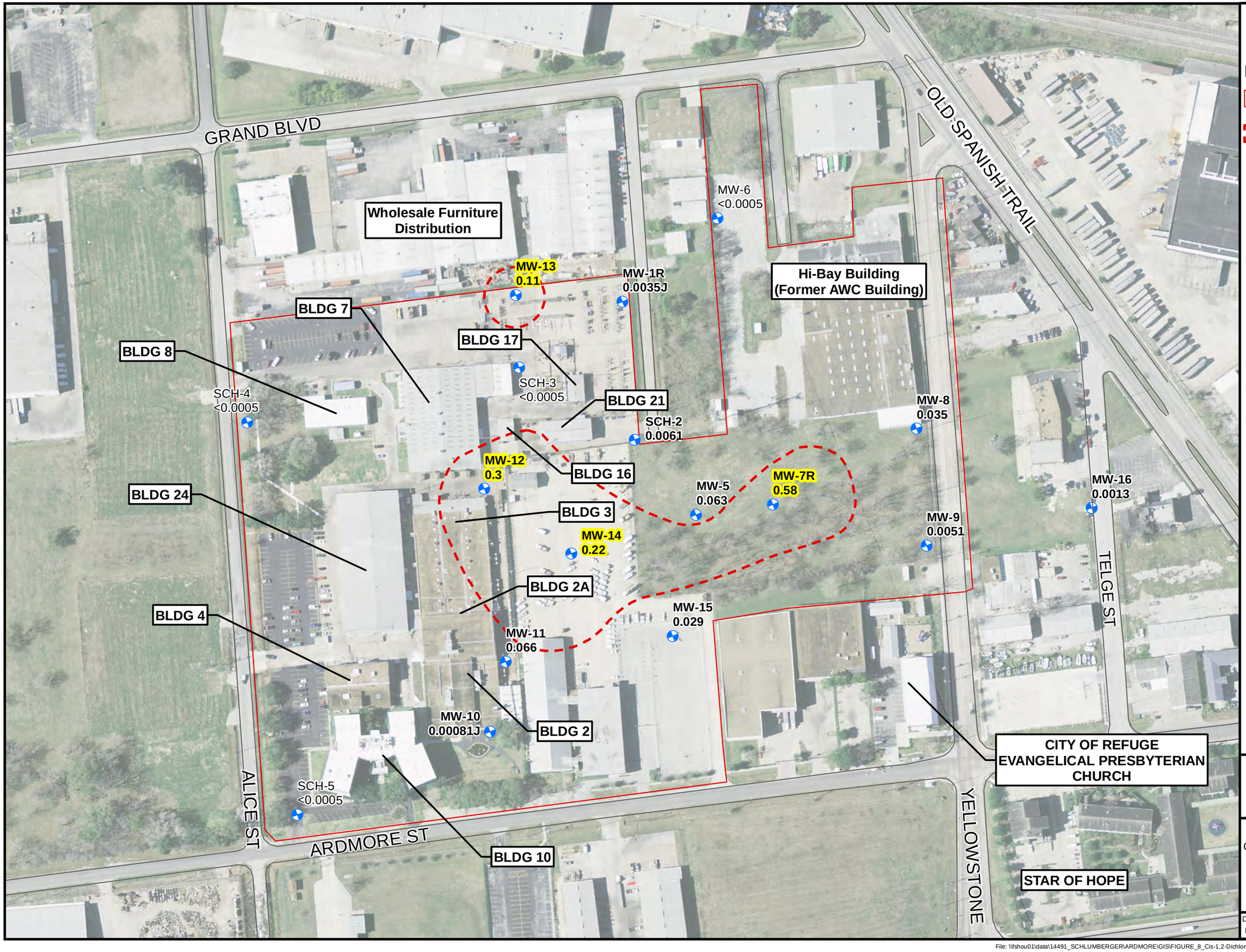
0 175 350
SCALE IN FEET

WESTON SOLUTIONS

FIGURE 7
TRICHLOROETHYLENE (TCE)
CONCENTRATION MAP
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_7_Trichloroethylene_Concentration_Map_DEC2009DATA.mxd, 16-Mar-10 16:41, bondp



LEGEND

- MSD BOUNDARY
- INFERRED GROUNDWATER PROTECTIVE CONCENTRATION LEVEL EXCEEDENCE ZONE
- MONITORING WELLS

NOTE:
1) 7030 ARDMORE DATA COURTESY OF TETRATECH NUS FROM DECEMBER 2009
2) ALL CONCENTRATIONS IN mg/L
3) HIGHLIGHTED CONCENTRATIONS EXCEED CRITICAL PCL
4) BOLD INDICATES REPORTED CONCENTRATIONS
5) 'J' INDICATES ESTIMATED VALUE

CRITICAL PCL:
CIS-1,2-DICHLOROETHENE (CIS-1,2) = 0.07 mg/L

N

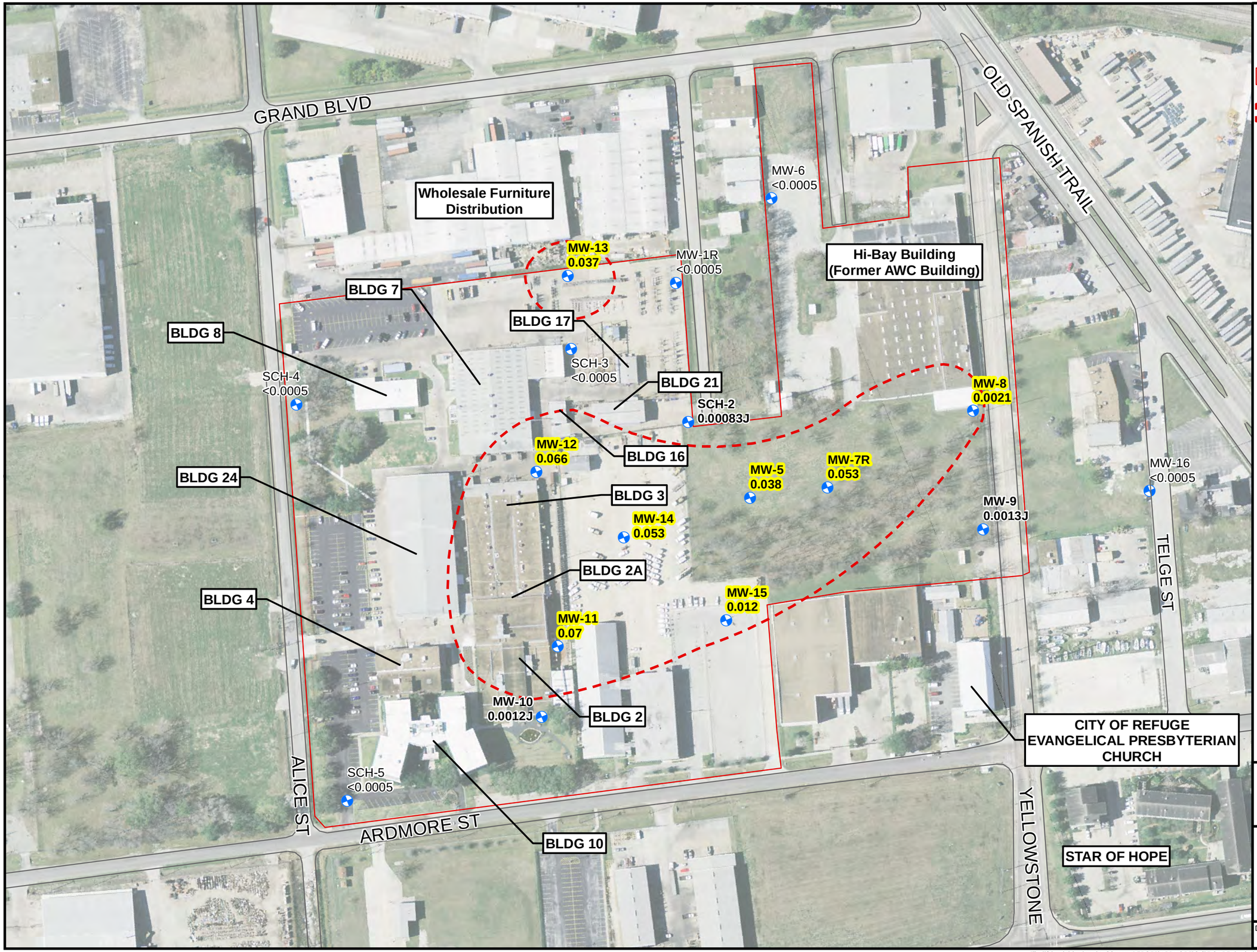
0 175 350
SCALE IN FEET

WESTON SOLUTIONS

FIGURE 8
CIS-1,2-DICHLOROETHENE (CIS-1,2-DCE) CONCENTRATION MAP
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_8_Cis-1,2-Dichloroethene_Concentration_Map_DEC2009DATA.mxd, 16-Mar-10 16:41, bondp



LEGEND

- MSD BOUNDARY
- INFERRED GROUNDWATER PROTECTIVE CONCENTRATION LEVEL EXCEEDENCE ZONE
- MONITORING WELLS

NOTE:
1) 7030 ARDMORE DATA COURTESY OF TETRATECH NUS FROM DECEMBER 2009
2) ALL CONCENTRATIONS IN mg/L
3) HIGHLIGHTED CONCENTRATIONS EXCEED CRITICAL PCL
4) BOLD INDICATES REPORTED CONCENTRATIONS
5) 'J' INDICATES ESTIMATED VALUES

CRITICAL PCL:
VINYL CHLORIDE (VC) = 0.002 mg/L

N

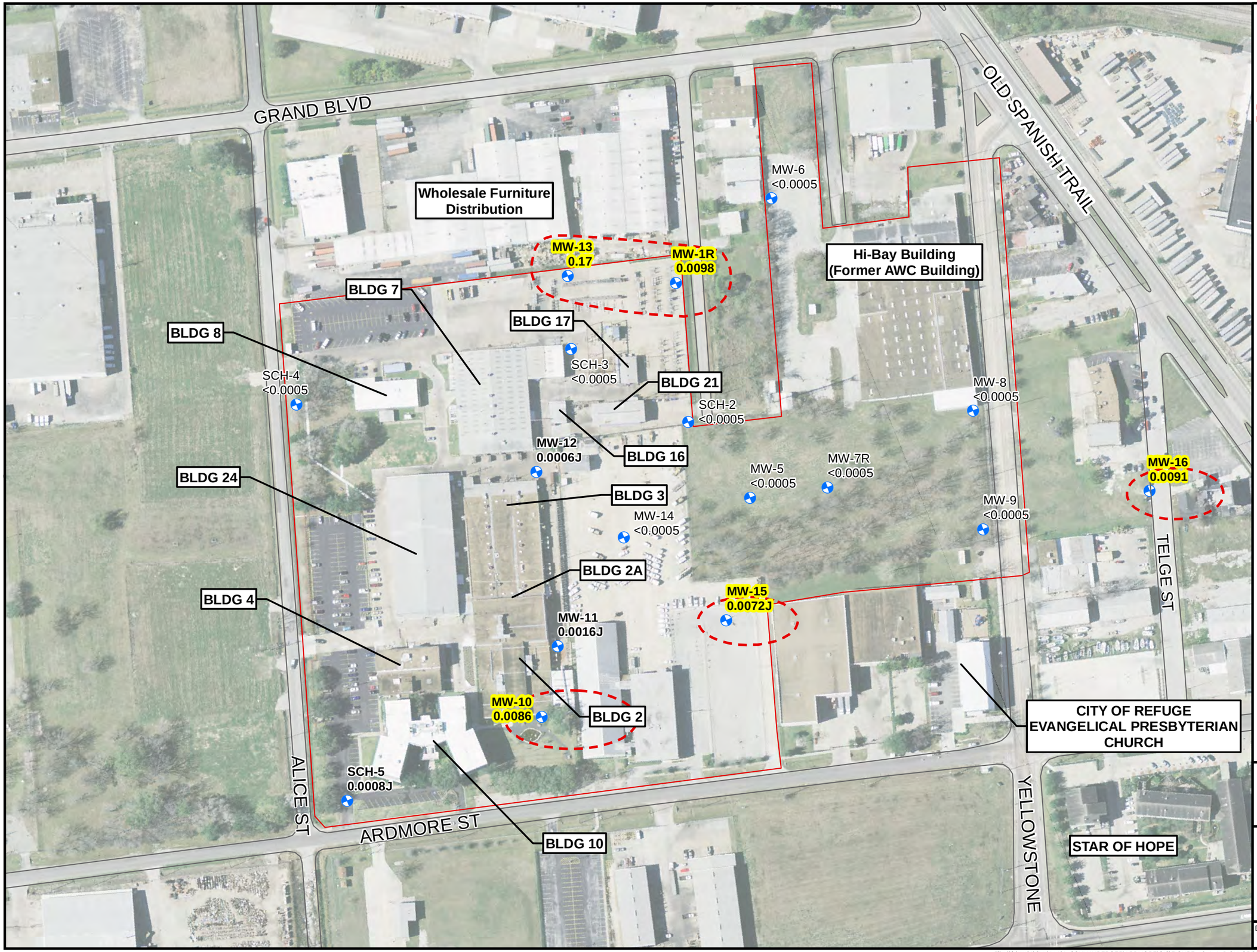
0 175 350
SCALE IN FEET

WESTON SOLUTIONS

FIGURE 9
VINYL CHLORIDE (VC)
CONCENTRATION MAP
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_9_Vinyl_Chloride_Concentration_Map_DEC2009DATA.mxd, 16-Mar-10 16:27, bondp



LEGEND

- MSD BOUNDARY
- INFERRED GROUNDWATER PROTECTIVE CONCENTRATION LEVEL EXCEEDENCE ZONE
- MONITORING WELLS

NOTE:
1) 7030 ARDMORE DATA COURTESY OF TETRATECH NUS FROM DECEMBER 2009
2) ALL CONCENTRATIONS IN mg/L
3) HIGHLIGHTED CONCENTRATIONS EXCEED CRITICAL PCL
4) BOLD INDICATES REPORTED CONCENTRATIONS
5) 'J' INDICATES ESTIMATED VALUE

CRITICAL PCL:
1,1-DICHLOROETHENE = 0.007 mg/L

N

0 175 350
SCALE IN FEET

WESTON SOLUTIONS

FIGURE 10
1,1 DICHLOROETHENE (DCE)
CONCENTRATION MAP
SCHLUMBERGER
7030 ARDMORE STREET
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB 2010	14491.001.001.0020	1 inch = 175 feet

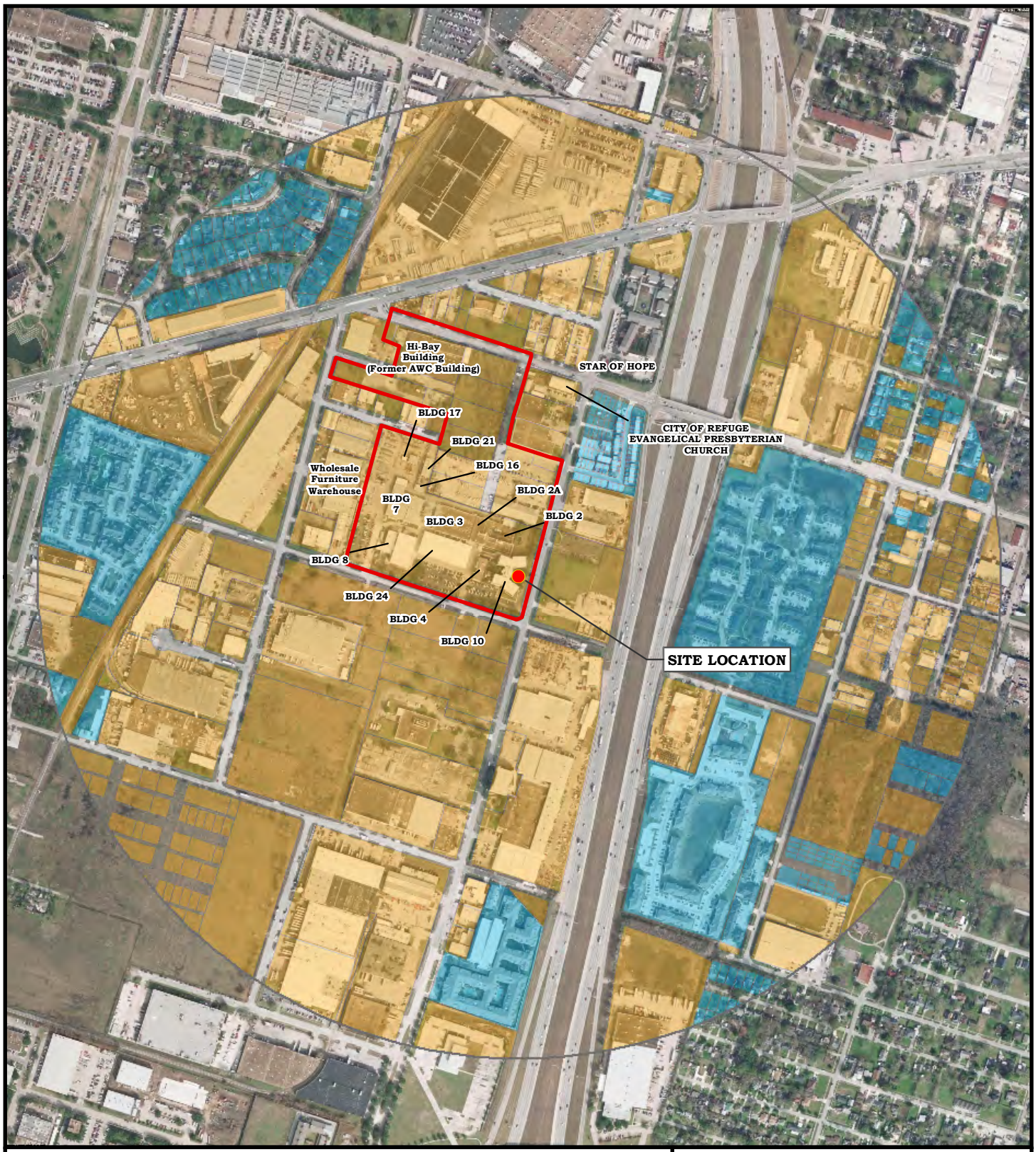
File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\FIGURE_10_1_1_DICHLOROETHENE_Concentration_Map_DEC2009DATA.mxd, 16-Mar-10 16:43, bondp

Appendix C

A description of the current use, and, to the extent known, the anticipated uses, of the designated property and properties within 500 feet of the boundary of the designated property.

Current and historical operations at the Schlumberger Ardmore WCP Site include the design and construction of various petroleum production equipment including oilfield tools, subsurface safety valves, well blowout preventers, and well completion accessories. The manufacturing operations are restricted to the former WCP property. At the present time, operations at the former AWC property are limited to the temporary storage of manufactured equipment while awaiting shipment. Anticipated future use of this property is consistent with current use.

The general land use surrounding the affected property is characterized as residential and commercial/light industrial. The area is well developed with mostly commercial/light industrial properties surrounding it except for residential structures to the east and northwest. The nearest downgradient non-industrial facility is City of Refuge Evangelical Presbyterian Church which includes Yellowstone Academy (a pre-school facility) adjacent to the former AWC property. The nearest residential property is the Star of Hope Transitional Living Center located across from the intersection of Yellowstone Boulevard and Ardmore Street. At this time, no other known residential properties are located within or immediately downgradient of the known groundwater plume. A map of the potential receptors identified within a 0.5-mile radius of the designated property is provided.



0 750 1,500

SCALE IN FEET

LEGEND

- SITE LOCATION
- 0.5 MILE RADIUS
- MSD BOUNDARY
- RESIDENTIAL
- COMMERCIAL

N

SOURCE: CITY OF HOUSTON, HARRIS COUNTY APPRAISAL DISTRICT (HCAD)

WESTON SOLUTIONS

APPENDIX C
POTENTIAL RECEPTORS MAP
MUNICIPAL SETTING DESIGNATION
SCHLUMBERGER
7030 ARDMORE
HOUSTON, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
FEB. 2010	14491.001.001.0020	1 inch = 750 feet

File: \\fshou01\data\14491_SCHLUMBERGER\ARDMORE\GIS\APPENDIX_C_POTENTIAL_RECEPTORS_MAP.mxd, 16-Mar-10 14:31, bondp

Appendix D

(TCEQ MSD Reference No. 5)

For each contaminant of concern within the ingestion protective concentration level exceedance zone, to the extent known, provide the following:

a. *A description of the ingestion protective concentration level exceedance zone and the non-ingestion protective concentration level exceedance zone, including a specification of the horizontal area and the minimum and maximum depth below ground surface.*

b. *The level of contamination, the ingestion protective concentration level, and the non-ingestion protective concentration level, all expressed as mg/L units.*

c. *Its basic geochemical properties (e.g., whether the contaminant of concern migrates with groundwater, floats or is soluble in water).*

Based on historical environmental investigations at the designated property, tetrachloroethene (PCE), tri-chloroethene (TCE), cis-1,2-dichloroethene (cis-1,2 DCE), 1,1 dichloroethene (1,1-DCE), 1,2-dichloroethene (1,2-DCE), and vinyl chloride (VC) have been identified in the shallow groundwater-bearing unit. COCs have only been identified in the shallow groundwater bearing unit and soil sampling has failed to identify significant concentrations of contaminants of concern in soils. Based on the most recent environmental sampling data PCE, TCE, cis-1,2 DCE, trans-1,2 DCE, 1,1-DCE, TCE and VC exceed the TCEQ Tier 1 PCL in groundwater.

A description of each COC, the ingestion and non-ingestion PCLE zone, vertical and horizontal extent, and geochemical properties is provided below.

COC: Tetrachloroethene (PCE)	
Maximum Concentration (* A sample from a temporary well was collected in 2004 and contained 26.9 mg/l)	10 mg/L *
Ingestion-Based PCL (Residential ${}^{GW}GW_{ing}$)	0.005 mg/L
Ingestion-Based PCLE Zone: (Approximate, water bearing unit varies from six to sixteen feet thick and from a depth of 32 feet bgs to 38 ft bgs)	Length: 1300 ft Width: 700ft Total Area: 16.7 acres
Non-Ingestion - Based PCL (${}^{Air}GW_{Inh-V}$)	500 mg/L
Non-Ingestion - Based PCLE Zone	None
Geochemical/Physical Properties	
Molecular Weight	165.8
Specific Gravity	1.62
Solubility in Water	Low solubility (0.02%)
Groundwater Migration	variable
COC: Trichloroethene (TCE)	
Maximum Concentration (* A sample from a temporary well was collected in 2004 and contained 1.49 mg/l)	0.95 * mg/L
Ingestion-Based PCL (Residential ${}^{GW}GW_{ing}$)	0.005 mg/l
Ingestion-Based PCLE Zone: (Approximate)	Length: 1200 ft Width: 575 ft Total Area: 13.01 acres
Non-Ingestion - Based PCL (${}^{Air}GW_{Inh-V}$)	1200 mg/L
Non-Ingestion - Based PCLE Zone	None
Geochemical/Physical Properties	
Molecular Weight	131.4
Density/Specific Gravity	1.46
Solubility in Water	Moderate (0.1%)
Groundwater Migration	variable

COC: cis-1,2-Dichloroethene (Cis-1,2 DCE)	
Maximum Concentration (data from 2001-2009)	0.76 mg/L
Ingestion-Based PCL (Residential $^{GW}GW_{ing}$)	0.007 mg/L
Ingestion-Based PCLE Zone: (Approximate)	Length: 775 ft Width: 425 ft Total Area: 449 acres
Non-Ingestion - Based PCL ($^{Air}GW_{Inh-V}$)	16,000 mg/L
Non-Ingestion - Based PCLE Zone	None
Geochemical/Physical Properties	
Molecular Weight	97
Density/Specific Gravity	1.27
Solubility in Water	Moderate (0.4%)
Groundwater Migration	variable
COC: 1-1 Dichloroethene (1-1 DCE)	
Maximum Concentration (data from 2001-2009)	0.180 mg/L
Ingestion-Based PCL (Residential $^{GW}GW_{ing}$)	0.007 mg/L
Ingestion-Based PCLE Zone: (Approximate)	Length : 400 ft Width: 150 ft Total Area: 2.28 acres
Non-Ingestion - Based PCL ($^{Air}GW_{Inh-V}$)	1700 mg/L
Non-Ingestion - Based PCLE Zone	None
Geochemical/Physical Properties	
Molecular Weight	96.94
Density/Specific Gravity	1.175
Solubility in Water	insoluble
Groundwater Migration	variable
COC: Vinyl Chloride (VC)	
Maximum Concentration (data from 2001-2009)	0.17 mg/L
Ingestion-Based PCL (Residential $^{GW}GW_{ing}$)	0.002 mg/L
Ingestion-Based PCLE Zone: (Approximate)	Length : 1125 Width:500 Total Area: 9.42 acres
Non-Ingestion - Based PCL ($^{Air}GW_{Inh-V}$)	3.8 mg/L
Non-Ingestion - Based PCLE Zone	None
Geochemical/Physical Properties	
Molecular Weight	62.489
Density/Specific Gravity	0.91
Solubility in Water	insoluble
Groundwater Migration	variable

Appendix E

(TCEQ MSD Reference No. 5)

For each contaminant of concern within the designated groundwater, to the extent known:

a. *A description of the ingestion protective concentration level exceedance zone and the non-ingestion protective concentration level exceedance zone, including a specification of the horizontal area and the minimum and maximum depth below ground surface.*

b. *The level of contamination, the ingestion protective concentration level, and the non-ingestion protective concentration level, all expressed as mg/L units.*

c. *Its basic geochemical properties (e.g., whether the contaminant of concern migrates with groundwater, floats or is soluble in water).*

A description of each COC in the groundwater at the designated properties as well as those COCs that are defined by a PCLE zone, along with its basic geochemical properties is presented in Appendix D. A tabular listing of the maximum concentration for each groundwater COC is provided in Appendix F, Table 1 and Table 2.

Appendix F

(TCEQ MSD Reference No. 5)

A table displaying the following information for each contaminant of concern, to the extent known:

a. *The maximum concentration level for soil and groundwater, the ingestion protective concentration level, and the non-ingestion protective concentration level, all expressed as mg/L units.*

b. *The critical protective concentration level without the municipal setting designation, highlighting any exceedances.*

Groundwater

Concentrations of PCE and its daughter products as well as 1,1-DCE were detected at concentrations exceeding their respective Tier 1 PCLs. Based on the proposed response actions, institutional controls such as this MSD will be used to gain closure for the groundwater at the designated property, thus eliminating the groundwater ingestion pathway. Table 1 in Appendix F presents the maximum concentration of each COC in the groundwater at the designated property.

Soils

Tetrachloroethene, TCE and cis-1,2-DCE were detected in subsurface soil at the Schlumberger facility with only PCE concentrations exceeding the Tier 1 PCL. Vinyl Chloride was not detected in any of the soil samples collected. Table 2 in Appendix F depicts the maximum soil concentration for chlorinated compounds at the site.

None of the chlorinated VOC detections in soil or groundwater exceed TRRP inhalation criteria.

Table 1
Appendix F
Groundwater Maximum Concentration
7030 Ardmore
Houston, Texas

Chemical of Concern	${}^{GW}GW_{Ing}$ (w/o MSD) (mg/L)	${}^{Air}GW_{Inh-V}$ (w/ MSD) (mg/L)	Maximum Concentration[2]			
			MW-7R (12/2/2009)	MW-12 (12/2/2009)	MW-13 (12/2/2009)	MW-15 (12/3/2009)
VOCs BY EPA METHOD 8260						
Tetrachloroethene	0.005	330	0.4800	0.24	0.15	7.4
Trichloroethene	0.005	160	0.11	0.12	0.20	0.16
cis-1,2-Dichloroethene	0.07	16,000	0.58	0.3	0.11	0.029
1,1-Dichloroethene	0.007	1,700	<0.00050	0.00060 J	0.17	0.0072 J
Vinyl chloride	0.002	3.6	0.053	0.066	0.037	0.012

Notes:

1. Highlighted concentration levels exceed the TRRP Tier 1 Residential ${}^{GW}GW_{Ing}$ Protective Concentration Level (i.e. without an MSD).

2. Maximum concentration from the December 2009 sampling event.

Table 2
Appendix F
Soil Maximum Concentration Table
7030 Ardmore
Houston Texas

Chemical of Concern	**$^{GW}Soil_{Ing}$ (w/o MSD) (mg/Kg)**	**$^{Air}Soil_{Inh-V}$ (w/ MSD) (mg/Kg)**	**MW-7R (12/2/2009)**
VOCs BY EPA METHOD 8260			
Tetrachloroethene	0.05	940	0.1900
Trichloroethene	0.034	150	0.01
cis-1,2-Dichloroethene	0.25	12,000	0.05

1. Highlighted concentration levels exceed the TRRP Tier 1 Residential $^{GW}Soil_{Ing}$ Protective Concentration Level (i.e. without an MSD).
2. Maximum concentration from the October 2006 sampling event.

Appendix G

A statement as to whether the plume of contamination is stable, expanding, or contracting, with the basis for that statement. If this information is not known, a statement of why the information is not known should be attached.

Groundwater COCs

Based on the historical groundwater monitoring that has been performed, the following conclusions have been drawn for the subject properties:

Groundwater at the facility is impacted by chlorinated hydrocarbons and their daughter products. Tetrachloroethene was the original release source from several locations; however, its use has been discontinued for a number of years. Degradation by reductive dechlorination has resulted in the formation of typical daughter products, trichloroethene, cis-1,2-dichloroethene, trans-1,2 dichloroethene, and vinyl chloride. Additional chlorinated compounds detected at concentrations exceeding TRRP PCLs include 1,1 dichloroethene.

Concentrations of PCE have remained stable and are decreasing in most of the source area monitoring wells. As is expected, concentrations of daughter products such as trichloroethene, cis-1,2-dichloroethene and vinyl chloride are increasing in several wells. With time, it is anticipated that natural attenuation will reduce all compounds to levels meeting TCEQ criteria.

Appendix G
Historical Groundwater Data
7030 Ardmore
Houston Tx
(all concentrations in mg/L)

Well ID	Date Collected	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,2-Dichloropropane	Chloroethane	Chloroform	cis-1,2-Dichloroethene	Tetra-chloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride
TRRP Tier 1 Groundwater PCL $^{GW}GW_{Ing}$ sites		**0.2**	**0.005**	**4.9**	**0.007**	**0.005**	**0.005**	**9.8**	**0.24**	**0.07**	**0.005**	**0.1**	**0.005**	**0.002**
TRRP Tier 1 Groundwater PCL Residential $^{Air}GW_{Inh-V}$ sites		**40,000**	**80**	**7,200**	**1,700**	**33**	**120**	**120,000**	**20**	**16,000**	**500**	**770**	**120**	**3.8**
MW-1	3/28/2003	--	--	--	--	--	--	--	--	0.0230	0.0650	<0.0006	0.0440	0.0030
	2/13/2006	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	0	<0.0006	<0.0005	0.0007 J	<0.0005	<0.0006	<0.0007	<0.0006
	Plugged and Abandoned February 2009													
MW-1R	01/28/2009	<0.00050	<0.00050	<0.00050	0.022	<0.00050	<0.00050	<0.00050	<0.00050	0.0035 J	0.0043 J	<0.00050	0.025	<0.00050
	12/2/2009	<0.00050	<0.00050	<.0.00050	0.0098	<0.00050	<0.00050	<0.00050	<0.00050	0.0035 J	0.015	<0.00050	0.026	<0.00050
MW-2	3/28/2003	--	--	--	--	--	--	--	--	0.0020 J	0.0080	<0.0006	0.0020 J	<0.0004
	2/13/2006	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0006
	2/16/2007	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	0.0005 J	0.0011 J	<0.0006	<0.0005	<0.0006
	Plugged and Abandoned February 2009													
MW-3	3/28/2003	--	--	--	--	--	--	--	--	0.0080	0.0260	<0.0006	0.0040 J	0.0040
	2/13/2006	<0.0006	<0.0005	<0.0005	<0.0006	0.0007 J	--	<0.0006	0.0006 J	<0.0005	<0.0005	<0.0006	<0.0007	<0.0006
	1/25/2007	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0006
	Plugged and Abandoned February 2009													
MW-4	3/28/2003	--	--	--	--	--	--	--	--	0.2800	0.2800	0.0040	0.0660	0.0930
	2/13/2006	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	0.7600	0.2000	0.0120	0.1400	0.1400
	1/29/2007	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0006	<0.0005	0.6000	0.1500	0.0110	0.1200	0.1300
	Plugged and Abandoned February 2009													
MW-5	3/28/2003	--	--	--	--	--	--	--	--	0.2500	0.1600	0.0070	0.0580	0.0160
	2/13/2006	0.0006 U	0.0005 U	0.0005 U	0.0006 U	0.0005 U	0.0007 U	0.0006 U	0.0005 U	0.5800	0.7600	0.0220	0.1700	0.0470
	1/29/2007	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	0.3100	0.1700	0.0012 J	0.4600	0.0520
	01/29/2009	<0.00050	<0.00050	0.0019 J	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.44	0.51	0.029	0.17	0.2
	12/2/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.063	0.064	0.0028 J	0.014	0.038
MW-6	3/28/2003	--	--	--	--	--	--	--	--	0.0030 J	0.0040 J	<0.0006	0.0050	<0.0004
	2/13/2006	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	<0.0005	0.0017 J	<0.0006	<0.0007	<0.0006
	1/29/2007	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	<0.0025	0.0120	<0.0006	0.0010 J	<0.0002
	01/28/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0000	<0.00050	<0.00050	<0.00050	0.0053	<0.00050	0.00084 J	<0.00050
	12/2/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050
MW-7	3/28/2003	--	--	--	--	--	--	--	--	0.2300	0.0660	0.0020 J	0.0180	0.0640
	2/13/2006	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	0.1800 J	0.0820 J	0.0013 J	0.0160	0.0610 J
	2/16/2007	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0006	0.0110	0.0044 J	<0.0006	0.0025 J	0.0078
	Plugged and Abandoned February 2009													
MW-7R	01/29/2009	<0.00050	<0.00050	0.0012 J	0.0049 J	<0.00050	<0.00050	<0.00050	<0.00050	0.27	0.29	0.007	0.056	0.026
	12/2/2009	<0.00050	<0.00050	0.0022 J	<0.00050	<0.00050	<0.00050	<0.00050	0.00078 J	0.58	0.48	0.013	0.11	0.053
MW-8	3/28/2003	--	--	--	--	--	--	--	--	0.0620	0.0830	<0.0006	0.1200	0.0080
	2/9/2006	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0006	0.4200	0.1600	0.0015 J	0.9500	0.0510
	1/29/2007	<0.0006	<0.0005	0.0026 J	<0.0005	<0.0005	--	<0.0006	0.0010 J	0.8600	0.8400	0.0270	0.2000	0.0820
	02/03/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.15	0.036	<0.00050	0.21	0.011
	12/2/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.035	0.0022 J	<0.00050	0.057	0.0021
MW-9	2/4/2005	0.0050 J	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0050	0.0053	0.0077	1.8000	<0.0006	0.0190	<0.0020
	2/13/2006	<0.0006	<0.0005	0.0018 J	<0.0006	<0.0005	--	<0.0006	0.0031 J	0.0083	1.3000	<0.0006	0.0190	<0.0006
	1/29/2007	<0.0006	<0.0005	0.0021 J	<0.0005	<0.0005	--	<0.0006	0.0025 J	0.0078	0.9500	<0.0006	0.0210	0.0021
	02/03/2009	<0.00050	<0.00050	0.0024 J	<0.00050	0.0024	<0.00050	<0.00050	0.002 J	0.0057	0.58	<0.00050	0.011	0.0015 J
	12/2/2009	<0.00050	<0.00050	0.0019 J	<0.00050	<0.00050	<0.00050	<0.00050	0.002 J	0.0051	0.74	<0.00050	0.013	0.0013 J

Appendix G
Historical Groundwater Data
7030 Ardmore
Houston Tx
(all concentrations in mg/L)

Well ID	Date Collected	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,2-Dichloropropane	Chloroethane	Chloroform	cis-1,2-Dichloroethene	Tetra-chloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride
TRRP Tier 1 Groundwater PCL $^{GW}GW_{Ing}$ sites		**0.2**	**0.005**	**4.9**	**0.007**	**0.005**	**0.005**	**9.8**	**0.24**	**0.07**	**0.005**	**0.1**	**0.005**	**0.002**
TRRP Tier 1 Groundwater PCL Residential $^{Air}GW_{Inh-V}$ sites		**40,000**	**80**	**7,200**	**1,700**	**33**	**120**	**120,000**	**20**	**16,000**	**500**	**770**	**120**	**3.8**
MW-10	2/2/2009	<0.00050	<0.00050	0.0037	0.014	<0.00050	<0.00050	<0.00050	<0.00050	0.0016	0.011	<0.00050	0.0036	0.0013
	12/2/2009	<0.00050	<0.00050	0.003	0.0086	<0.00050	<0.00050	<0.00050	<0.00050	0.00081 J	0.0069	<0.00050	0.0024 J	0.0012 J
MW-11	2/2/2009	<0.00050	<0.00050	<0.00050	0.0013	<0.00050	<0.00050	<0.00050	0.056	0.044	10	0.001	0.24	0.041
	12/2/2009	<0.00050	<0.00050	<0.00050	0.0016 J	<0.00050	<0.00050	<0.00050	0.09	0.066	9.6	0.013 J	0.33	0.07
MW-12	2/2/2009	<0.00050	<0.00050	<0.00050	0.0012	<0.00050	<0.00050	<0.00050	<0.00050	0.37	0.28	0.0082	0.15	0.06
	12/2/2009	<0.00050	<0.00050	<0.00050	0.00060 J	<0.00050	<0.00050	<0.00050	<0.00050	0.3	0.24	0.0059	0.12	0.066
MW-13	1/28/2009	<0.00050	0.00099	0.021	0.18	<0.00050	<0.00050	<0.00050	<0.00050	0.041	0.4	0.0024	0.24	0.027
	12/2/2009	<0.00050	0.00056 J	0.028	0.17	<0.00050	<0.00050	<0.00050	<0.00050	0.11	0.15	0.037 J	0.2	0.037
MW-14	2/4/2009	<0.00050	<0.00050	0.0037	<0.00050	<0.00050	<0.00050	<0.00050	0.004	0.15	0.79	0.0016	0.15	0.029
	12/3/2009	<0.00050	<0.00050	0.0058	<0.00050	<0.00050	<0.00050	<0.00050	0.0046 J	0.22	0.63	0.0025 J	0.2	0.053
MW-15	2/3/2009	<0.00050	<0.00050	<0.00050	0.0013 J	<0.00050	<0.00050	<0.00050	0.03	0.048	5	0.0018 J	0.2	0.023
	12/3/2009	<0.00050	<0.00050	<0.00050	0.0072 J	<0.00050	<0.00050	<0.00050	0.031	0.029	7.4	<0.00050	0.16	0.012
MW-16	02/02/2009	<0.00050	<0.00050	0.0011 J	0.0037 J	<0.00050	<0.00050	<0.00050	0.0038 J	0.023	0.093	<0.00050	0.013	0.0042
	12/2/2009	<0.00050	<0.00050	0.0025 J	0.0091	<0.00050	<0.00050	<0.00050	0.0056	0.0013	0.0037 J	<0.00050	<0.00050	<0.00050
	Plugged and Abaondoned Jan 2010													
SCH-1	5/7/2004	<0.0009	<0.0007	<0.0013	<0.0012	<0.0010	--	<0.0030	<0.0010	0.1310	0.7950	<0.0007	0.0619	0.0454
	2/10/2006	<0.0050	<0.0050	<0.0050	<0.0050	<0.0005	--	<0.0006	<0.0005	0.2500	0.3200	0.0046 J	0.1600	0.1200
	1/25/2007	<0.0006	<0.0005	<0.0005	<0.0007	<0.0005	--	<0.0006	<0.0005	0.2700	0.0170	0.0032 J	0.0140	0.1400
	Plugged and Abandoned February 2009													
SCH-2	5/7/2004	<0.0009	<0.0007	<0.0013	<0.0012	<0.0010	--	<0.003	<0.0010	0.4800	0.4810	0.0063 J	0.0622	0.1070
	2/10/2006	<0.0050	<0.0050	<0.0050	<0.0050	<0.0005	--	<0.0006	<0.0005	0.3600	0.2200	0.0038 J	0.0480	0.0990
	1/25/2007	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	0.5200	0.0460	0.0045 J	0.0330	0.1700
	01/28/2009	<0.00050	<0.00050	<0.00050	0.0011 J	<0.00050	<0.00050	<0.00050	<0.00050	0.6	0.04	0.0046 J	0.028	0.16
	12/2/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0061	<0.00060	<0.00050	0.00080 J	0.00083 J
SCH-3	5/7/2004	<0.0002	<0.0001	<0.0003	<0.0002	>0.0002	--	<0.0006	<0.0024	<0.0002	<0.0002	<0.0001	<0.0003	<0.0001
	2/10/2006	<0.0050	<0.0050	<0.0050	<0.0050	<0.0005	--	<0.0006	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0006
	2/16/2007	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0006
	01/27/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00066 J	<0.00060	<0.00050	<0.00050	<0.00050
	12/2/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050
SCH-4	5/7/2004	<0.0002	<0.0001	<0.0003	<0.0002	<0.0002	--	<0.0006	0.0030 J	<0.0002	<0.0002	<0.0001	<0.0003	<0.0001
	2/14/2006	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0006
	1/25/2007	<0.0006	<0.0005	<0.0005	<0.0006	<0.0005	--	<0.0006	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0006
	01/27/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050
	12/3/2009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050
SCH-5	5/10/2004	<0.0005	<0.0001	<0.0003	<0.0002	<0.0002	--	<0.0006	<0.0002	<0.0002	<0.0002	<0.0001	<0.0003	<0.0001
	1/26/2007	<0.0006	<0.0005	0.0120	0.0150	<0.0005	--	<0.0006	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0006
	02/02/2009	<0.00050	<0.00050	0.0043 J	0.0047 J	0.0043 J	<0.00050	<0.00050	<0.00050	<0.00050	0.0013 J	<0.00050	<0.00050	<0.00050
	12/2/2009	<0.00050	<0.00050	0.0018 J	0.00080 J	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0034 J	<0.00050	<0.00050	<0.00050

Notes:

1. Shaded blocks denote exceedance of Tier 1 PCL
2. Organic analytes exceeding Commercial/Industrial Protective Concentration Levels (PCLs), are indicated with blue shading.
3. '<' indicates analyte concentration is below indicated Method Detection Limit.
4. 'J' indicates concentration is below Reporting Limit but above Method Detection Limit.
5. 'b' indicates the associated analyte was also detected in the method blank.
6. Volatile Organic Compounds by Method SW8260B.
7. TRRP: Texas Risk Reduction Program
8. PCL: Protective Concentration Level
9. -- No data was provided

Data is courtesy of TetraTech, NUS