URS

12/13/2003

Mr. Don Hwang
Alameda County Health Care Services
1131 Harbor Bay Parkway, Ste. 250
Alameda, CA 94502-6577

RE: Fuel Leak Case No. RO0000014, BP Station #11132, 3201 35th Ave., Oakland, CA Response to Technical Comments from ACHCS on "Soil and Groundwater Investigation Workplan Amendment," May 28, 2003.

Dear Mr. Hwang,

On behalf of Atlantic Richfield Company (ARCO, an affiliate of BP), URS has prepared this letter report in response to technical comments made by the Alameda County Health Care Services (ACHCS) in a letter dated October 13, 2003. The comments regard the "Soil and Groundwater Investigation Workplan Addendum," submitted by URS on May 28, 2003.

1. Corrective Action Plan – URS will base risk evaluation at the Site on The California Regional Water Quality Control Board, San Francisco Bay Region (SFRWQCB)'s "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater (Interm Final – July 2003)". Environmental Screening Levels (ESLs) for Commercial/Industrial Land Use have been obtained and are included in Attachment D. The Oakland Risk-Based Corrective Action (RBCA)'s, Risk Based Screening Levels (RBSLs) will be used to evaluate risk for Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) (Attachment E). URS will include cleanup goals based on the appropriate site specific ESLs and RBSLs in the Corrective Action Plan, to be submitted following completion of the proposed Soil and Groundwater Investigation.

2. Contaminant Source Characterization – Proposed borings UB-7 and UB-8 have been located closer to the underground tanks, and remain in native soil (Attachment A). However, due to BP/ARCO Utility Clearance Guidelines, URS cannot locate any borings closer than 10 feet from any underground utility. It may be feasible to conduct angle borings if samples closer to the USTs are required, however the borings would still be required to be advanced at least 10 feet below the UST depth.

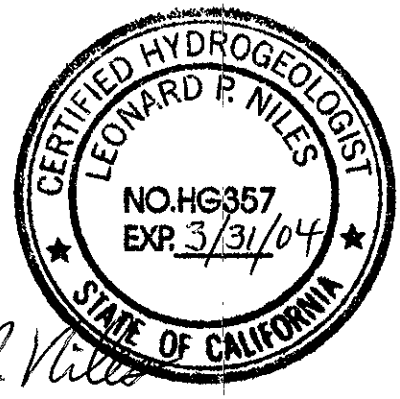
3. Preferential Pathway Survey – URS has prepared an Underground Utility Map (Attachment B) after reviewing various utility maps and plans in order to locate any possible contaminant pathways. The map shows the approximate elevation and location of the sanitary sewer and storm drain lines that underlie 35th Avenue. Other utilities are most likely located no deeper than the sewer and storm lines. The sanitary sewer line is located approximately 6 feet below ground surface (bgs). The storm drain lies approximately 4.5-5.0 feet bgs. Groundwater has historically been found at approximately 14-20 feet bgs and will most likely not intersect the sewer and storm lines.

URS Corporation
500 12th Street, Suite 200
Oakland, CA 94607-4014
Tel 510 893 3600
Fax: 510.874.3268

4. Well Survey – Using the California State Water Control Board program, *Geotracker* , URS conducted a well survey in order to locate any wells within one half mile of the site that could be potential receptors of any contamination. No wells were located and results are shown on a map included in Attachment C. A survey conducted by Alton Geoscience Inc (Alton) in 1990 (Alton, 1990 – attached) found no production water wells within ½ mile of the subject site. A sensitive receptor survey conducted by Alton in 1991 indicated that the nearest residence was 50 feet from the subject site, the nearest school 1000 feet, and the nearest hospital 11,000 feet. Groundwater in the vicinity of the subject site was classified as a Class III aquifer, which is not a potential source for drinking water (Alton, 1991 - attached).

5. Missing Reports
    a. 1986- Tank removal – No report specifically pertaining to the 1986 UST removals was located by URS during a review of the available BP/ARCO files or City of Oakland Fire Department files. However, a summary account of the 1986 UST removals and analytical data is given in the attached EMCON Baseline Assessment Report (1994).
    b. *Supplemental Site Investigation*, Alton Geoscience Inc., September 4, 1990
    c. *Soil Sampling Report*, Kaprealian Engineering Inc., October 11, 1990
    d. *Baseline Assessment Report,* Encon Environmental, December, 27, 1994 (contains info regarding December sampling of THP1-S-4-4.5 in Appendix. A).
    e. *Phase III Supplemental Site Investigation Study*, Alton Geoscience , August 1991

Please feel free to contact either Chris Sheridan (510.874.3125) or Leonard Niles (510.874.1720) with any questions or comments you may have.



Sincerely,

URS Corporation

Christopher Sheridan
Geologist

Leonard P. Niles, R.G. 5774/C.H.G 357
Project Manager

Cc: Mr. Paul Supple: BP/ARCO, Environmental Resources Management, PO Box 6549, Moraga, CA 94549

Ms. Liz Sewell, ConocoPhillips, 75 Broadway, Sacramento, CA 95818

Attachments:
Attachment A: Updated Proposed Soil Boring/Well Location map
Attachment B: Underground Utilities Map
Attachment C: Well Survey Map
Attachment D: *Environmental Screening Levels (ESLs) for Commercial/Industrial Land Use*, The California Regional Water Quality Control Board, San Francisco Bay Region (SFRWQCB)'s "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater
Attachment E: Oakland Risk-Based Corrective Action (RBCA)'s, Risk Based Screening Levels (RBSLs).

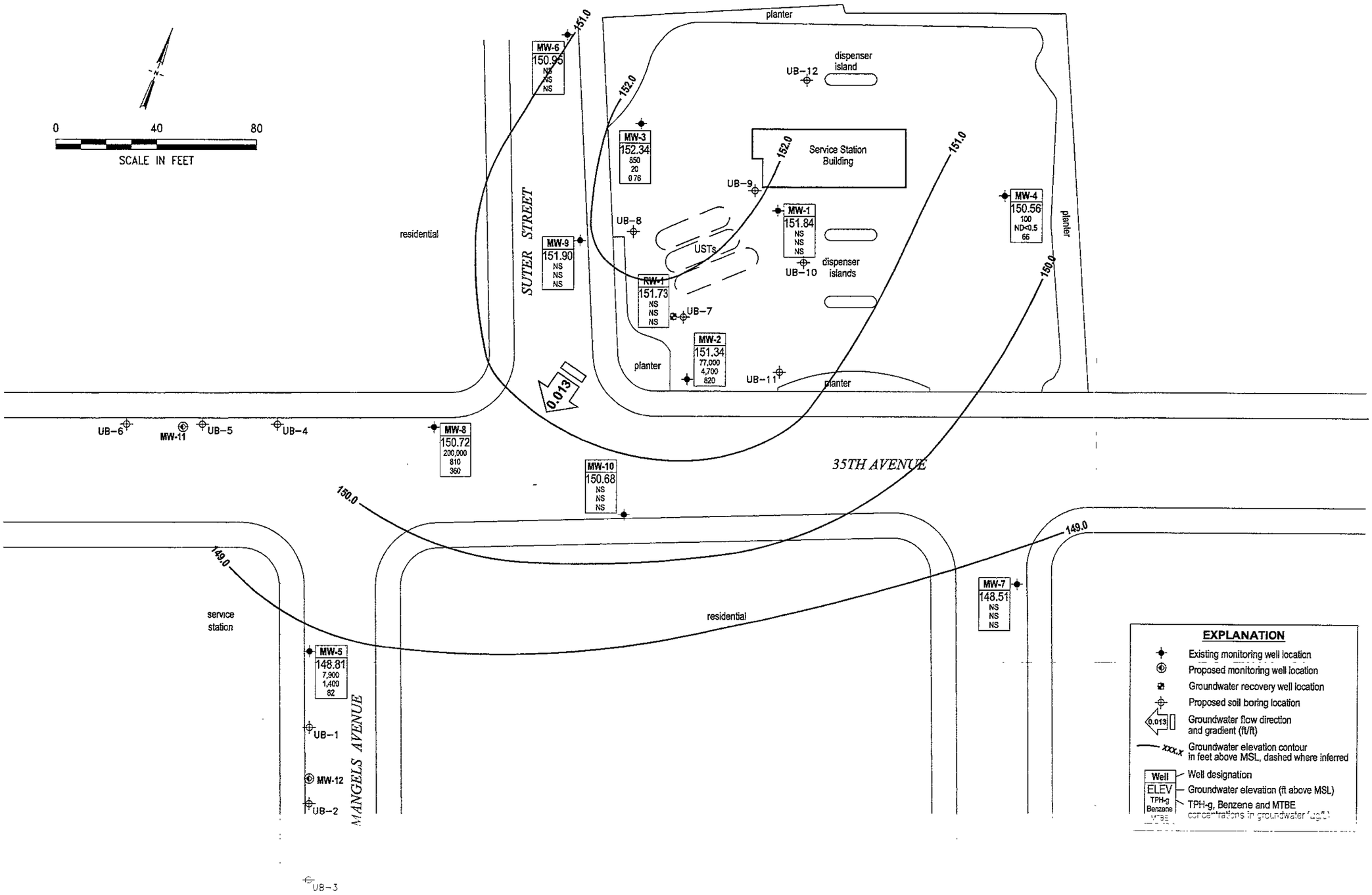
Reports:
A: *Supplemental Site Investigation*, Alton Geoscience Inc., September 4, 1990
B: *Soil Sampling Report*, Kaprealian Engineering Inc., October 11, 1990
C: *Phase III Supplemental Site Investigation Study*, Alton Geoscience Inc, August 1991.
D: *Baseline Assessment Report*, Emcon Environmental, December 24, 1994.

References:

Alton, 1990, *Supplemental Site Investigation*, Alton Geoscience Inc., September 4, 1990

Alton, 1991, *Phase III Supplemental Site Investigation Study*, Alton Geoscience Inc, August 1991.

ATTACHMENT A
Proposed Soil Boring/Well Installation Map



URS	Project No. 38486259 Former BP Service Station #11132 3201 35th Avenue Oakland, California	PROPOSED SOIL BORINGS AND GROUNDWATER ELEVATION CONTOUR AND ANALYTICAL SUMMARY MAP First Quarter 2003 (January 29, 2003)	FIGURE 1

ATTACHMENT B
Underground Utilities Map

EXPLANATION

- Existing monitoring well
- Groundwater recovery well

N

0 15 30 60

Scale (ft)

residential

SUTER STREET

MW-6

planter

dispenser island

MW-3

Service Station Building

MW-4

MW-1

MW-9

USTs

dispenser islands

planter

RW-1

planter

MW-2

planter

MW-8

18" vitrified concrete sanitary drain (6' below ground surface)

35TH AVENUE

12" vitrified or concrete storm drain (5' below ground surface)

10" Shell Oil Co. steel pipeline (6.5' below ground surface)

MW-10

MW-7

residential

service station

MW-5

URS	Project No. 38486259 Former BP Service Station #11132 3201 35th Avenue Oakland, California	UNDERGROUND UTILITY MAP	FIGURE 2

X:\x_cwl_wastewP Gf MSitesLane Imgin figures backup\11132\UTILITY-MAP.dwg, 12/12/2003 03:08:06 PM, JKMT, URS

ATTACHMENT C
Well Survey Map

GeoTracker help

ZoomIn 2X ZoomOut 2X Pan Identify UST Sites

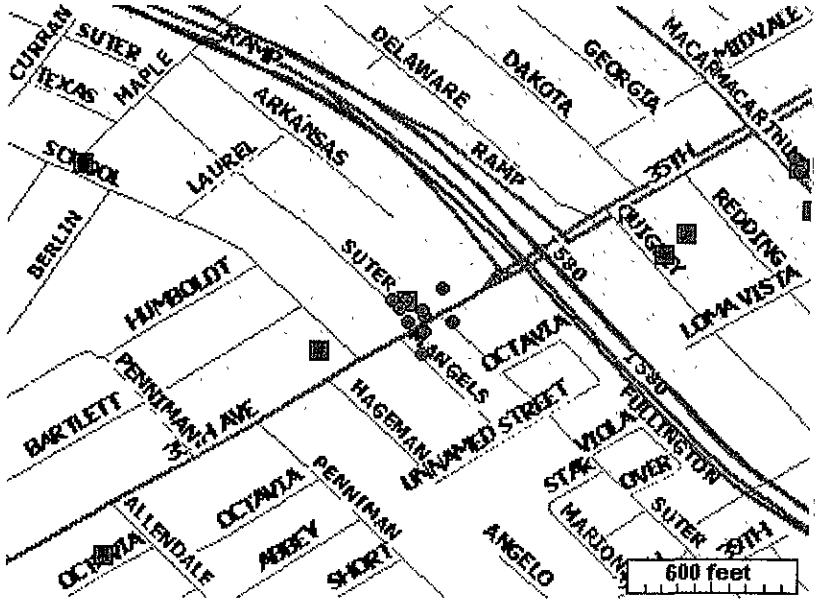
Layers

Show All sites within Any of public wells.

Click on the map to perform the selected action.

- LUFT Sites
- UST Sites
- Public Wells
- Highways
- Major Roads
- Minor Roads
- USGS Quads
- Surface Water
- Watersheds
- GW Basins
- Vulnerability

Map Size: 1X



Redraw

Street:

City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ETAK

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

GeoTracker help

Zoomin 2X ZoomOut 2X Pan Identify UST Sites

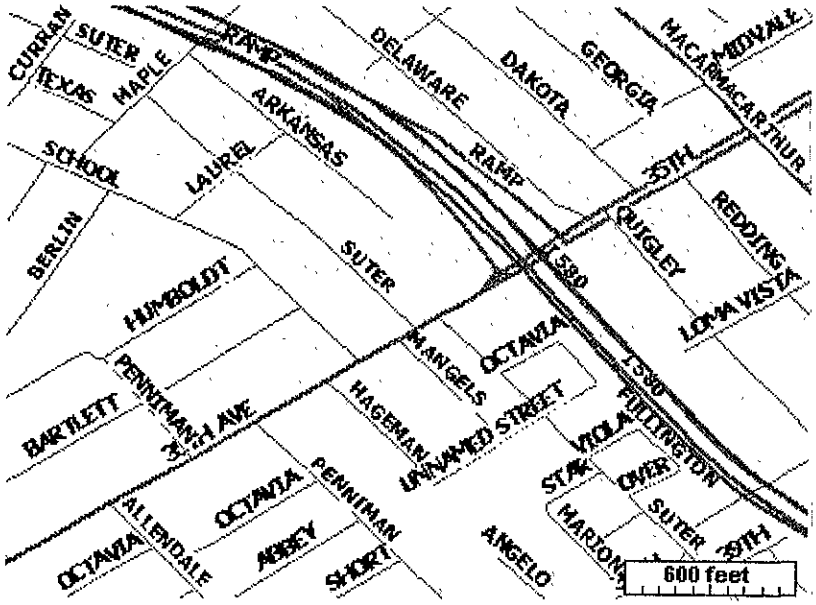
Layers

Show Open sites within 1000' of public wells.

Click on the map to perform the selected action.

- [x] LUFT Sites
- [ ] UST Sites
- [ ] Public Wells
- [x] Highways
- [x] Major Roads
- [x] Minor Roads
- [ ] USGS Quads
- [ ] Surface Water
- [ ] Watersheds
- [ ] GW Basins
- [ ] Vulnerability

Map Size: 1X



Redraw

Street:

City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ETAK

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

GeoTracker help

ZoomIn 2X ZoomOut 2X Pan Identify UST Sites

Layers

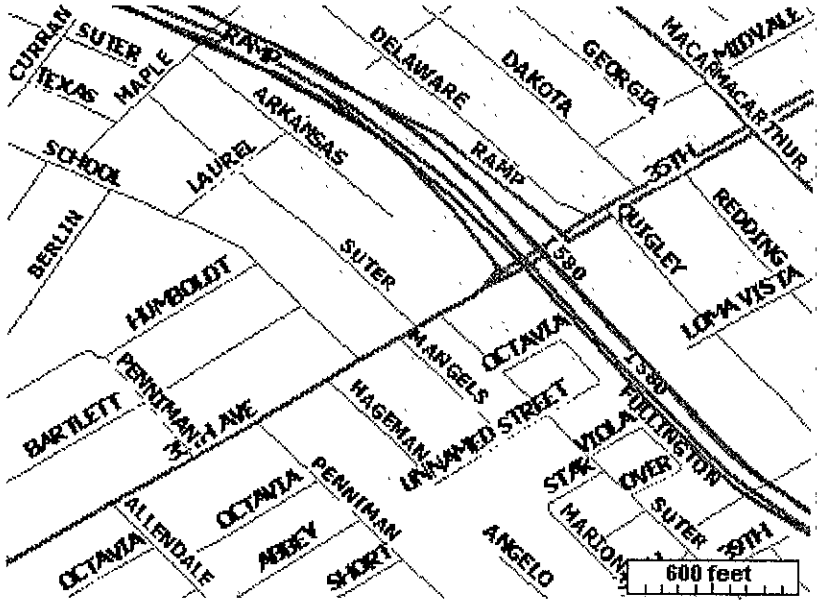
Show Open sites within 2640' of public wells.

- [x] LUFT Sites
- [ ] UST Sites
- [ ] Public Wells
- [x] Highways
- [x] Major Roads
- [x] Minor Roads
- [ ] USGS Quads
- [ ] Surface Water
- [ ] Watersheds
- [ ] GW Basins
- [ ] Vulnerability

Map Size: 1X

Redraw

Click on the map to perform the selected action.



Street:

City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ETAK

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

GeoTracker Help

ZoomIn 2X ZoomOut 2X Pan Identify LUFT Sites

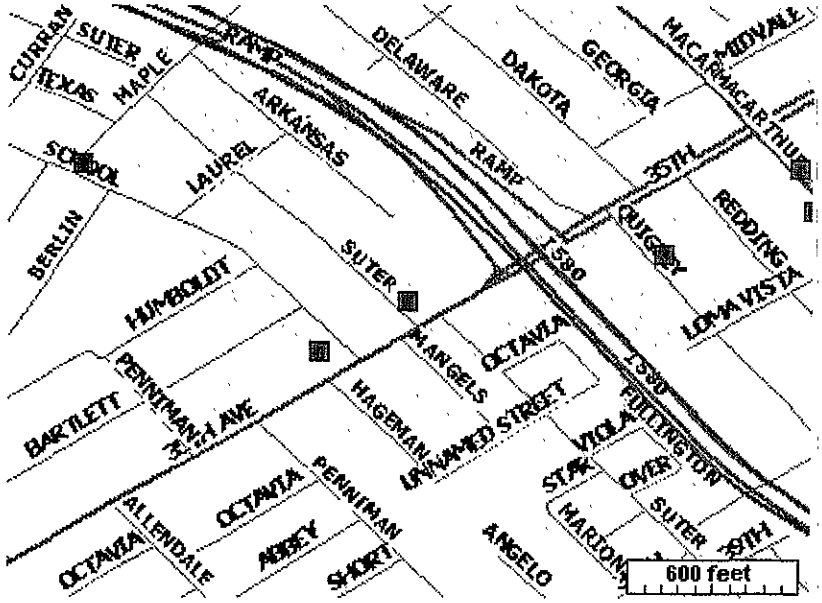
Layers

Show Open sites within Any of public wells.

Click on the map to perform the selected action.

- LUFT Sites
- UST Sites
- Public Wells
- Highways
- Major Roads
- Minor Roads
- USGS Quads
- Surface Water
- Watersheds
- GW Basins
- Vulnerability

Map Size: 1X



Redraw

Street:

City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ETAK

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

GeoTracker help

ZoomIn 2X ZoomOut 2X Pan Identify LUFT Sites

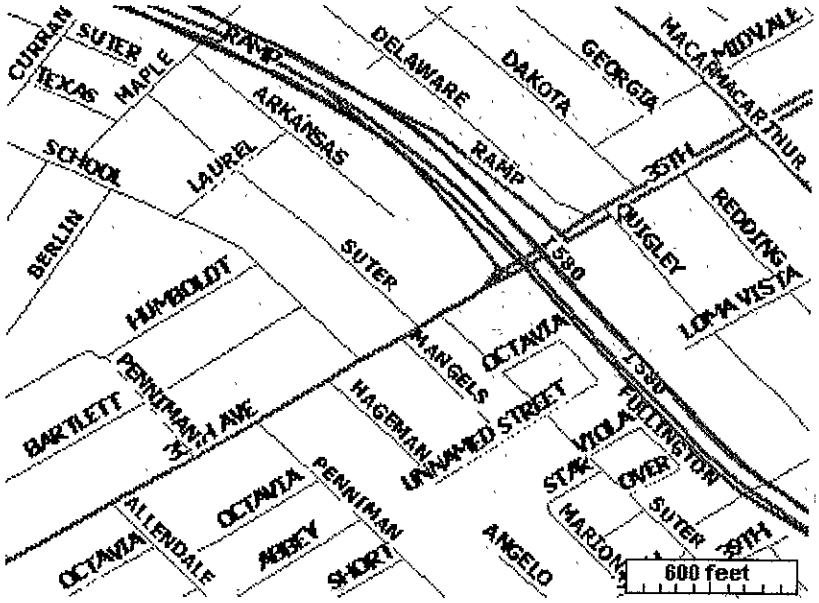
Layers

Show Open sites within 1000' of public wells.

Click on the map to perform the selected action.

- [x] LUFT Sites
- [ ] UST Sites
- [ ] Public Wells
- [x] Highways
- [x] Major Roads
- [x] Minor Roads
- [ ] USGS Quads
- [ ] Surface Water
- [ ] Watersheds
- [ ] GW Basins
- [ ] Vulnerability

Map Size: 1X



Redraw

Street:

City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ETAK

Well and LUFT site positions are approximate Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

GeoTracker Help

ZoomIn 2X ZoomOut 2X Pan Identify LUFT Sites

Layers

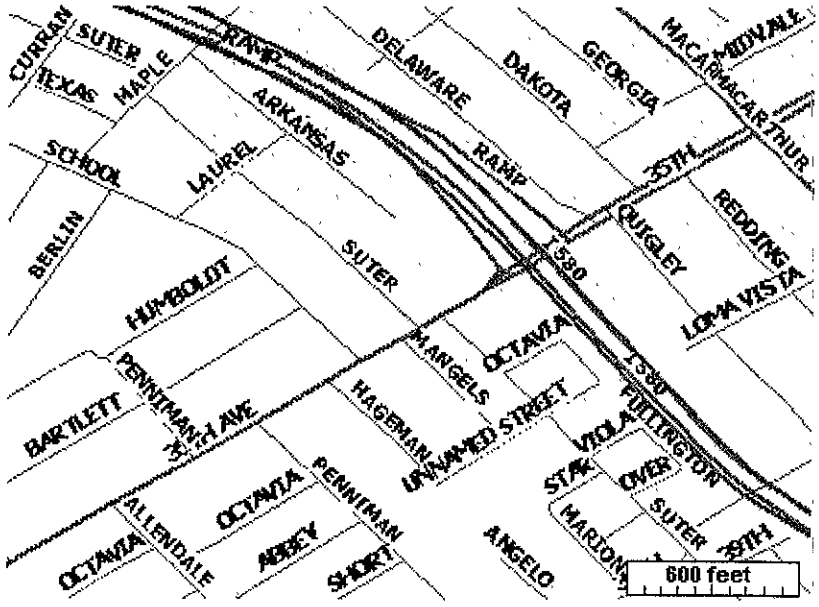
Show Open sites within 2640' of public wells.

- [x] LUFT Sites
- [ ] UST Sites
- [ ] Public Wells
- [x] Highways
- [x] Major Roads
- [x] Minor Roads
- [ ] USGS Quads
- [ ] Surface Water
- [ ] Watersheds
- [ ] GW Basins
- [ ] Vulnerability

Map Size: 1X

Redraw

Click on the map to perform the selected action.



Street:

City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ETAK

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

ATTACHMENT D
Environmental Screening Levels (ESLs)

TABLE A. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS Current or Potential Source of Drinking Water

CHEMICAL PARAMETER	[1]Shallow Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
ACENAPHTHENE	1.6E+01	1.6E+01	2.0E+01
ACENAPHTHYLENE	1.3E+01	1.3E+01	3.0E+01
ACETONE	2.4E-01	2.4E-01	7.0E+02
ALDRIN	2.9E-02	1.0E-01	2.0E-03
ANTHRACENE	2.8E+00	2.8E+00	7.3E-01
ANTIMONY	6.3E+00	4.0E+01	6.0E+00
ARSENIC	5.5E+00	5.5E+00	3.6E+01
BARIUM	7.5E+02	1.5E+03	1.0E+03
BENZENE	4.4E-02	4.4E-02	1.0E+00
BENZO(a)ANTHRACENE	3.8E-01	1.3E+00	2.7E-02
BENZO(b)FLUORANTHENE	3.8E-01	1.3E+00	2.9E-02
BENZO(k)FLUORANTHENE	3.8E-01	1.3E+00	2.9E-02
BENZO(g,h,i)PERYLENE	2.7E+01	2.7E+01	1.0E-01
BENZO(a)PYRENE	3.8E-02	1.3E-01	1.4E-02
BERYLLIUM	4.0E+00	8.0E+00	2.7E+00
BIPHENYL, 1,1-	6.5E-01	6.5E-01	5.0E-01
BIS(2-CHLOROETHYL)ETHER	1.8E-04	1.8E-04	1.4E-02
BIS(2-CHLOROISOPROPYL)ETHER	5.4E-03	5.4E-03	5.0E-01
BIS(2-ETHYLHEXYL)PHTHALATE	1.6E+02	5.7E+02	4.0E+00
BORON	1.6E+00	2.0E+00	1.6E+00
BROMODICHLOROMETHANE	1.2E-02	3.9E-02	1.0E+02
BROMOFORM	2.2E+00	2.2E+00	1.0E+02
BROMOMETHANE	2.2E-01	3.9E-01	9.8E+00
CADMIUM	1.7E+00	7.4E+00	2.2E+00
CARBON TETRACHLORIDE	1.2E-02	3.5E-02	5.0E-01
CHLORDANE	4.4E-01	1.7E+00	4.0E-03
CHLOROANILINE, p-	5.3E-02	5.3E-02	5.0E+00
CHLOROBENZENE	1.5E+00	1.5E+00	2.5E+01
CHLOROETHANE	6.3E-01	8.5E-01	1.2E+01
CHLOROFORM	9.8E-02	2.7E-01	1.0E+02
CHLOROMETHANE	2.9E-01	4.2E-01	2.7E+00
CHLOROPHENOL, 2-	1.2E-02	1.2E-02	1.8E-01
CHROMIUM (Total)	5.8E+01	5.8E+01	5.0E+01
CHROMIUM III	7.5E+02	7.5E+02	1.8E+02
CHROMIUM VI	1.8E+00	1.8E+00	1.1E+01
CHRYSENE	3.8E+00	1.3E+01	2.9E-01
COBALT	4.0E+01	8.0E+01	3.0E+00
COPPER	2.3E+02	2.3E+02	3.1E+00
CYANIDE (Free)	1.0E+02	5.0E+02	1.0E+00
DIBENZO(a,h)ANTHTRACENE	1.1E-01	3.8E-01	8.5E-03
DIBROMOCHLOROMETHANE	1.9E-02	5.8E-02	1.0E+02
1,2-DIBROMO-3-CHLOROPROPANE	1.1E-03	1.1E-03	2.0E-01
DIBROMOETHANE, 1,2-	3.3E-04	3.3E-04	5.0E-02
DICHLOROBENZENE, 1,2-	1.1E+00	1.1E+00	1.0E+01

TABLE A. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS Current or Potential Source of Drinking Water

CHEMICAL PARAMETER	[1]Shallow Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
DICHLOROBENZENE, 1,3-	7.2E-01	7.2E-01	6.3E+00
DICHLOROBENZENE, 1,4-	4.7E-02	1.3E-01	5.0E+00
DICHLOROBENZIDINE, 3,3-	7.7E-03	7.7E-03	2.9E-02
DICHLORODIPHENYLDICHLOROETHANE (DDD)	2.4E+00	1.0E+01	1.0E-03
DICHLORODIPHENYLDICHLOROETHYLENE (DDE)	1.7E+00	4.0E+00	1.0E-03
DICHLORODIPHENYLTRICHLOROETHANE (DDT)	1.7E+00	4.0E+00	1.0E-03
DICHLOROETHANE, 1,1-	2.0E-01	2.0E-01	5.0E+00
DICHLOROETHANE, 1,2-	4.5E-03	4.5E-03	5.0E-01
DICHLOROETHYLENE, 1,1-	1.0E+00	1.0E+00	6.0E+00
DICHLOROETHYLENE, Cis 1,2-	1.9E-01	1.9E-01	6.0E+00
DICHLOROETHYLENE, Trans 1,2-	6.7E-01	6.7E-01	1.0E+01
DICHLOROPHENOL, 2,4-	3.0E-01	3.0E-01	3.0E-01
DICHLOROPROPANE, 1,2-	5.2E-02	1.2E-01	5.0E+00
DICHLOROPROPENE, 1,3-	3.3E-02	5.9E-02	5.0E-01
DIELDRIN	2.3E-03	2.3E-03	1.9E-03
DIETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHENOL, 2,4-	6.7E-01	6.7E-01	1.0E+02
DINITROPHENOL, 2,4-	4.0E-02	4.0E-02	1.4E+01
DINITROTOLUENE, 2,4-	8.5E-04	8.5E-04	1.1E-01
1,4 DIOXANE	1.8E-03	1.8E-03	3.0E+00
DIOXIN (2,3,7,8-TCDD)	4.5E-06	1.8E-05	5.0E-06
ENDOSULFAN	4.6E-03	4.6E-03	8.7E-03
ENDRIN	6.5E-04	6.5E-04	2.3E-03
ETHYLBENZENE	3.3E+00	3.3E+00	3.0E+01
FLUORANTHENE	4.0E+01	4.0E+01	8.0E+00
FLUORENE	8.9E+00	8.9E+00	3.9E+00
HEPTACHLOR	1.4E-02	1.4E-02	3.8E-03
HEPTACHLOR EPOXIDE	1.5E-02	1.5E-02	3.8E-03
HEXACHLOROBENZENE	2.7E-01	9.6E-01	1.0E+00
HEXACHLOROBUTADIENE	1.0E+00	1.0E+00	2.1E-01
HEXACHLOROCYCLOHEXANE (gamma) LINDANE	4.9E-02	4.9E-02	8.0E-02
HEXACHLOROETHANE	2.4E+00	2.4E+00	7.0E-01
INDENO(1,2,3-cd)PYRENE	3.8E-01	1.3E+00	2.9E-02
LEAD	2.0E+02	7.5E+02	2.5E+00
MERCURY	2.5E+00	1.0E+01	1.2E-02
METHOXYCHLOR	1.9E+01	1.9E+01	1.9E-02
METHYLENE CHLORIDE	7.7E-02	7.7E-02	5.0E+00
METHYL ETHYL KETONE	3.9E+00	3.9E+00	4.2E+03
METHYL ISOBUTYL KETONE	2.8E+00	2.8E+00	1.2E+02
METHYL MERCURY	1.2E+00	1.0E+01	3.0E-03
METHYLNAPHTHALENE (total 1- & 2-)	2.5E-01	2.5E-01	2.1E+00
METHYL TERT BUTYL ETHER	2.3E-02	2.3E-02	5.0E+00
MOLYBDENUM	4.0E+01	4.0E+01	3.5E+01

TABLE A. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
NAPHTHALENE	4.2E+00	4.2E+00	2.1E+01
NICKEL	1.5E+02	1.5E+02	8.2E+00
PENTACHLOROPHENOL	4.4E+00	5.0E+00	1.0E+00
PERCHLORATE	1.6E+00	2.0E+01	7.0E-01
PHENANTHRENE	1.1E+01	1.1E+01	4.6E+00
PHENOL	7.6E-02	7.6E-02	5.0E+00
POLYCHLORINATED BIPHENYLS (PCBs)	2.2E-01	7.4E-01	1.4E-02
PYRENE	8.5E+01	8.5E+01	2.0E+00
SELENIUM	1.0E+01	1.0E+01	5.0E+00
SILVER	2.0E+01	4.0E+01	1.9E-01
STYRENE	1.5E+00	1.5E+00	1.0E+01
tert-BUTYL ALCOHOL	7.3E-02	7.3E-02	1.2E+01
TETRACHLOROETHANE, 1,1,1,2-	2.4E-02	2.4E-02	1.3E+00
TETRACHLOROETHANE, 1,1,2,2-	9.0E-03	1.8E-02	1.0E+00
TETRACHLOROETHYLENE	8.8E-02	2.5E-01	5.0E+00
THALLIUM	1.0E+00	1.3E+01	2.0E+00
TOLUENE	2.9E+00	2.9E+00	4.0E+01
TOXAPHENE	4.2E-04	4.2E-04	2.0E-04
TPH (gasolines)	1.0E+02	1.0E+02	1.0E+02
TPH (middle distillates)	1.0E+02	1.0E+02	1.0E+02
TPH (residual fuels)	5.0E+02	1.0E+03	1.0E+02
TRICHLOROBENZENE, 1,2,4-	7.6E+00	7.6E+00	2.5E+01
TRICHLOROETHANE, 1,1,1-	7.8E+00	7.8E+00	6.2E+01
TRICHLOROETHANE, 1,1,2-	3.3E-02	7.0E-02	5.0E+00
TRICHLOROETHYLENE	2.6E-01	4.6E-01	5.0E+00
TRICHLOROPHENOL, 2,4,5-	1.8E-01	1.8E-01	1.1E+01
TRICHLOROPHENOL, 2,4,6-	1.7E-01	1.7E-01	5.0E-01
VANADIUM	1.1E+02	2.0E+02	1.5E+01
VINYL CHLORIDE	6.7E-03	1.9E-02	5.0E-01
XYLENES	1.5E+00	1.5E+00	1.3E+01
ZINC	6.0E+02	6.0E+02	8.1E+01

TABLE A. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS Current or Potential Source of Drinking Water

CHEMICAL PARAMETER	[1]Shallow Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
Electrical Conductivity (mS/cm, USEPA Method 120.1 MOD)	2.0	4.0	not applicable
Sodium Adsorption Ratio	5.0	12	not applicable

Notes:

1. Shallow soils defined as soils less than or equal to 3 meters (approximately 10 feet) below ground surface.
2. Category "Residential Land Use" generally considered adequate for other sensitive uses (e.g., day-care centers, hospitals, etc.)
3. Assumes potential discharge of groundwater into a freshwater, marine or estuary surface water system.

Source of soil ESLs: Refer to Appendix 1, Tables A-1 and A-2.

Source of groundwater ESLs: Refer to Appendix 1, Table F-1a.

Soil data should be reported on dry-weight basis (see Appendix 1, Section 6.2).

Soil ESLs intended to address direct-exposure, groundwater protection, ecologic (urban areas) and nuisance concerns under noted land-use scenarios. **Soil gas data should be collected for additional evaluation of potential indoor-air impacts at sites with significant areas of VOC-impacted soil. See Section 2.6 and Table E.**

Groundwater ESLs intended to be address drinking water, surface water, indoor-air and nuisance concerns. **Use in conjunction with soil gas screening levels to more closely evaluate potential impacts to indoor-air if groundwater screening levels for this concern approached or exceeded (refer to Section 2.6 and Appendix 1, Table F-1a).**

Aquatic habitat goals for bioaccumulation concerns not considered in selection of groundwater goals (refer to Section 2.7).

Refer to appendices for summary of ESL components.

TPH -Total Petroleum Hydrocarbons. TPH ESLs must be used in conjunction with ESLs for related chemicals (e.g., BTEX, PAHs, oxidizers, etc.). See Volume 1, Section 2.2 and Appendix 1, Chapter 5.

TABLE B. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
ACENAPHTHENE	1.9E+01	1.9E+01	2.3E+01
ACENAPHTHYLENE	1.3E+01	1.3E+01	3.0E+01
ACETONE	5.0E-01	5.0E-01	1.5E+03
ALDRIN	2.9E-02	1.0E-01	1.3E-01
ANTHRACENE	2.8E+00	2.8E+00	7.3E-01
ANTIMONY	6.3E+00	4.0E+01	3.0E+01
ARSENIC	5.5E+00	5.5E+00	3.6E+01
BARIUM	7.5E+02	1.5E+03	1.0E+03
BENZENE	1.8E-01	3.8E-01	4.6E+01
BENZO(a)ANTHRACENE	3.8E-01	1.3E+00	2.7E-02
BENZO(b)FLUORANTHENE	3.8E-01	1.3E+00	2.9E-02
BENZO(k)FLUORANTHENE	3.8E-01	1.3E+00	4.0E-01
BENZO(g,h,i)PERYLENE	2.7E+01	2.7E+01	1.0E-01
BENZO(a)PYRENE	3.8E-02	1.3E-01	1.4E-02
BERYLLIUM	4.0E+00	8.0E+00	2.7E+00
BIPHENYL, 1,1-	6.5E+00	6.5E+00	5.0E+00
BIS(2-CHLOROETHYL)ETHER	4.0E-03	1.3E-02	6.1E+01
BIS(2-CHLOROISOPROPYL)ETHER	6.6E-01	6.6E-01	6.1E+01
BIS(2-ETHYLHEXYL)PHTHALATE	1.6E+02	5.7E+02	3.2E+01
BORON	1.6E+00	2.0E+00	1.6E+00
BROMODICHLOROMETHANE	1.2E-02	3.9E-02	1.6E+02
BROMOFORM	6.1E+01	6.9E+01	3.2E+03
BROMOMETHANE	2.2E-01	5.1E-01	1.6E+02
CADMIUM	1.7E+00	7.4E+00	2.2E+00
CARBON TETRACHLORIDE	1.2E-02	3.5E-02	9.5E+00
CHLORDANE	4.4E-01	1.7E+00	4.0E-03
CHLOROANILINE, p-	5.3E-02	5.3E-02	5.0E+00
CHLOROBENZENE	1.5E+00	1.5E+00	2.5E+01
CHLOROETHANE	6.3E-01	8.5E-01	1.2E+01
CHLOROFORM	9.8E-02	2.7E-01	3.4E+02
CHLOROMETHANE	2.9E-01	8.1E-01	1.7E+02
CHLOROPHENOL, 2-	1.2E-01	1.2E-01	1.8E+00
CHROMIUM (Total)	5.8E+01	5.8E+01	1.8E+02
CHROMIUM III	7.5E+02	7.5E+02	1.8E+02
CHROMIUM VI	1.8E+00	1.8E+00	1.1E+01
CHRYSENE	3.8E+00	1.3E+01	3.5E-01
COBALT	4.0E+01	8.0E+01	3.0E+00
COPPER	2.3E+02	2.3E+02	3.1E+00
CYANIDE (Free)	1.0E+02	5.0E+02	1.0E+00
DIBENZO(a,h)ANTHTRACENE	1.1E-01	3.8E-01	2.5E-01
DIBROMOCHLOROMETHANE	1.9E-02	5.8E-02	1.8E+02

TABLE B. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	1.1E-03	1.1E-03	2.0E-01
DIBROMOETHANE, 1,2-	7.3E-03	2.1E-02	1.6E+02
DICHLOROBENZENE, 1,2-	1.6E+00	1.6E+00	1.4E+01
DICHLOROBENZENE, 1,3-	3.2E+00	7.4E+00	6.5E+01
DICHLOROBENZENE, 1,4-	4.7E-02	1.3E-01	1.5E+01
DICHLOROBENZIDINE, 3,3-	4.0E-01	1.4E+00	2.5E+02
DICHLORODIPHENYLDICHLOROETHANE (DDD)	2.4E+00	1.0E+01	1.0E-03
DICHLORODIPHENYLDICHLOROETHYLENE (DDE)	1.7E+00	4.0E+00	1.0E-03
DICHLORODIPHENYLTRICHLOROETHANE (DDT)	1.7E+00	4.0E+00	1.0E-03
DICHLOROETHANE, 1,1-	3.3E-01	9.1E-01	4.7E+01
DICHLOROETHANE, 1,2-	2.5E-02	6.9E-02	2.0E+02
DICHLOROETHYLENE, 1,1-	4.3E+00	4.3E+00	2.5E+01
DICHLOROETHYLENE, Cis 1,2-	1.6E+00	3.6E+00	5.9E+02
DICHLOROETHYLENE, Trans 1,2-	3.1E+00	7.3E+00	5.9E+02
DICHLOROPHENOL, 2,4-	3.0E+00	3.0E+00	3.0E+00
DICHLOROPROPANE, 1,2-	5.2E-02	1.5E-01	1.0E+02
DICHLOROPROPENE, 1,3-	3.3E-02	9.1E-02	4.9E+01
DIELDRIN	2.3E-03	2.3E-03	1.9E-03
DIETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHENOL, 2,4-	7.4E-01	7.4E-01	1.1E+02
DINITROPHENOL, 2,4-	2.1E-01	2.1E-01	7.5E+01
DINITROTOLUENE, 2,4-	8.6E-01	8.6E-01	1.2E+02
1,4 DIOXANE	1.8E+01	3.0E+01	5.0E+04
DIOXIN (2,3,7,8-TCDD)	4.5E-06	1.8E-05	5.0E-06
ENDOSULFAN	4.6E-03	4.6E-03	8.7E-03
ENDRIN	6.5E-04	6.5E-04	2.3E-03
ETHYLBENZENE	4.7E+00	1.3E+01	2.9E+02
FLUORANTHENE	4.0E+01	4.0E+01	8.0E+00
FLUORENE	8.9E+00	8.9E+00	3.9E+00
HEPTACHLOR	1.4E-02	1.4E-02	3.8E-03
HEPTACHLOR EPOXIDE	1.5E-02	1.5E-02	3.8E-03
HEXACHLOROBENZENE	2.7E-01	9.6E-01	3.7E+00
HEXACHLOROBUTADIENE	3.7E+00	2.2E+01	4.7E+00
HEXACHLOROCYCLOHEXANE (gamma) LINDANE	4.9E-02	4.9E-02	8.0E-02
HEXACHLOROETHANE	1.2E+01	4.1E+01	1.2E+01
INDENO(1,2,3-cd)PYRENE	3.8E-01	1.3E+00	2.9E-02
LEAD	2.0E+02	7.5E+02	2.5E+00
MERCURY	2.5E+00	1.0E+01	1.2E-02
METHOXYCHLOR	1.9E+01	1.9E+01	1.9E-02
METHYLENE CHLORIDE	5.2E-01	1.5E+00	2.2E+03

TABLE B. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
METHYL ETHYL KETONE	1.3E+01	1.3E+01	1.4E+04
METHYL ISOBUTYL KETONE	3.9E+00	3.9E+00	1.7E+02
METHYL MERCURY	1.2E+00	1.0E+01	3.0E-03
METHYLNAPHTHALENE (total 1- & 2-)	2.5E-01	2.5E-01	2.1E+00
METHYL TERT BUTYL ETHER	2.0E+00	5.6E+00	1.8E+03
MOLYBDENUM	4.0E+01	4.0E+01	2.4E+02
NAPHTHALENE	4.5E+00	4.8E+00	2.4E+01
NICKEL	1.5E+02	1.5E+02	8.2E+00
PENTACHLOROPHENOL	4.4E+00	5.0E+00	7.9E+00
PERCHLORATE	1.6E+00	2.0E+01	6.0E+02
PHENANTHRENE	1.1E+01	1.1E+01	4.6E+00
PHENOL	1.9E+01	1.9E+01	1.3E+03
POLYCHLORINATED BIPHENYLS (PCBs)	2.2E-01	7.4E-01	1.4E-02
PYRENE	8.5E+01	8.5E+01	2.0E+00
SELENIUM	1.0E+01	1.0E+01	5.0E+00
SILVER	2.0E+01	4.0E+01	1.9E-01
STYRENE	1.5E+01	1.5E+01	1.0E+02
tert-BUTYL ALCOHOL	1.0E+02	1.1E+02	1.8E+04
TETRACHLOROETHANE, 1,1,1,2-	3.1E+00	7.2E+00	9.3E+02
TETRACHLOROETHANE, 1,1,2,2-	9.0E-03	2.5E-02	1.9E+02
TETRACHLOROETHYLENE	8.8E-02	2.5E-01	1.2E+02
THALLIUM	1.0E+00	1.3E+01	2.0E+01
TOLUENE	9.3E+00	9.3E+00	1.3E+02
TOXAPHENE	4.2E-04	4.2E-04	2.0E-04
TPH (gasolines)	1.0E+02	4.0E+02	5.0E+02
TPH (middle distillates)	5.0E+02	5.0E+02	6.4E+02
TPH (residual fuels)	5.0E+02	1.0E+03	6.4E+02
TRICHLOROBENZENE, 1,2,4-	7.6E+00	7.6E+00	2.5E+01
TRICHLOROETHANE, 1,1,1-	7.8E+00	7.8E+00	6.2E+01
TRICHLOROETHANE, 1,1,2-	3.3E-02	9.1E-02	3.5E+02
TRICHLOROETHYLENE	2.6E-01	7.3E-01	3.6E+02
TRICHLOROPHENOL, 2,4,5-	1.8E-01	1.8E-01	1.1E+01
TRICHLOROPHENOL, 2,4,6-	6.9E+00	1.0E+01	4.9E+02
VANADIUM	1.1E+02	2.0E+02	1.9E+01

TABLE B. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
VINYL CHLORIDE	6.7E-03	1.9E-02	4.0E+00
XYLENES	1.5E+00	1.5E+00	1.3E+01
ZINC	6.0E+02	6.0E+02	8.1E+01
Electrical Conductivity (mS/cm, USEPA Method 120.1 MOD)	2.0	4.0	not applicable
Sodium Adsorption Ratio	5.0	12	not applicable

Notes:
1. Shallow soils defined as soils less than or equal to 3 meters (approximately 10 feet) below ground surface.
2. Category "Residential Land Use" generally considered adequate for other sensitive uses (e.g., day-care centers, hospitals, etc.)
3. Assumes potential discharge of groundwater into marine or estuary surface water system.

Source of soil ESLs: Refer to Appendix 1, Tables A-1 and A-2.
Source of groundwater ESLs: Refer to Appendix 1, Table F-1b.
Soil data should be reported on dry-weight basis (see Appendix 1, Section 6.2).
Soil ESLs intended to address direct-exposure, groundwater protection, ecologic (urban areas) and nuisance concerns under noted land-use scenarios. **Soil gas data should be collected for additional evaluation of potential indoor-air impacts at at sites with significant areas of VOC-impacted soil. See Section 2.6 and Table E.**
Groundwater ESLs intended to address surface water, indoor-air and nuisance concerns. **Use in conjunction with soil gas screening levels to more closely evaluate potential impacts to indoor-air if groundwater screening levels for this concern approached or exceeded (refer to Section 2.6 and Appendix 1, Table F-1a).**
Aquatic habitat goals for bioaccumulation concerns not considered in selection of groundwater goals (refer to Section 2.7).
Refer to appendices for summary of ESL components.
TPH -Total Petroleum Hydrocarbons. TPH ESLs must be used in conjunction with ESLs for related chemicals (e.g., BTEX, PAHs, oxidizers, etc.). See Volume 1, Section 2.2 and Appendix 1, Chapter 5.

TABLE C. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Deep Soils (>3m bgs)
Groundwater IS a Current or Potential Source of Drinking Water

	[1]Deep Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
ACENAPHTHENE	1.6E+01	1.6E+01	2.0E+01
ACENAPHTHYLENE	1.3E+01	1.3E+01	3.0E+01
ACETONE	2.4E-01	2.4E-01	7.0E+02
ALDRIN	1.2E+00	1.2E+00	2.0E-03
ANTHRACENE	2.8E+00	2.8E+00	7.3E-01
ANTIMONY	3.1E+02	3.1E+02	6.0E+00
ARSENIC	1.6E+01	1.6E+01	3.6E+01
BARIUM	2.5E+03	2.5E+03	1.0E+03
BENZENE	4.4E-02	4.4E-02	1.0E+00
BENZO(a)ANTHRACENE	1.2E+01	1.2E+01	2.7E-02
BENZO(b)FLUORANTHENE	1.5E+01	1.5E+01	2.9E-02
BENZO(k)FLUORANTHENE	2.7E+00	2.7E+00	2.9E-02
BENZO(g,h,i)PERYLENE	2.7E+01	2.7E+01	1.0E-01
BENZO(a)PYRENE	1.5E+00	1.5E+00	1.4E-02
BERYLLIUM	9.8E+01	9.8E+01	2.7E+00
BIPHENYL, 1,1-	6.5E-01	6.5E-01	5.0E-01
BIS(2-CHLOROETHYL)ETHER	1.8E-04	1.8E-04	1.4E-02
BIS(2-CHLOROISOPROPYL)ETHER	5.4E-03	5.4E-03	5.0E-01
BIS(2-ETHYLHEXYL)PHTHALATE	7.8E+02	7.8E+02	4.0E+00
BORON	4.6E+04	4.6E+04	1.6E+00
BROMODICHLOROMETHANE	1.2E-02	3.9E-02	1.0E+02
BROMOFORM	2.2E+00	2.2E+00	1.0E+02
BROMOMETHANE	2.2E-01	3.9E-01	9.8E+00
CADMIUM	3.8E+01	3.8E+01	2.2E+00
CARBON TETRACHLORIDE	1.2E-02	3.5E-02	5.0E-01
CHLORDANE	1.5E+01	1.5E+01	4.0E-03
CHLOROANILINE, p-	5.3E-02	5.3E-02	5.0E+00
CHLOROBENZENE	1.5E+00	1.5E+00	2.5E+01
CHLOROETHANE	6.3E-01	8.5E-01	1.2E+01
CHLOROFORM	9.8E-02	2.7E-01	1.0E+02
CHLOROMETHANE	2.9E-01	4.2E-01	2.7E+00
CHLOROPHENOL, 2-	1.2E-02	1.2E-02	1.8E-01
CHROMIUM (Total)	5.8E+01	5.8E+01	5.0E+01
CHROMIUM III	2.5E+03	5.0E+03	1.8E+02
CHROMIUM VI	1.8E+00	1.8E+00	1.1E+01
CHRYSENE	1.9E+01	1.9E+01	2.9E-01
COBALT	9.4E+01	9.4E+01	3.0E+00
COPPER	2.5E+03	5.0E+03	3.1E+00
CYANIDE (Free)	5.0E+02	1.0E+03	1.0E+00
DIBENZO(a,h)ANTHTRACENE	4.3E+00	4.3E+00	8.5E-03
DIBROMOCHLOROMETHANE	1.9E-02	5.8E-02	1.0E+02
1,2-DIBROMO-3-CHLOROPROPANE	1.1E-03	1.1E-03	2.0E-01

TABLE C. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Deep Soils (>3m bgs)
Groundwater IS a Current or Potential Source of Drinking Water

	[1]Deep Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
DIBROMOETHANE, 1,2-	3.3E-04	3.3E-04	5.0E-02
DICHLOROBENZENE, 1,2-	1.1E+00	1.1E+00	1.0E+01
DICHLOROBENZENE, 1,3-	7.2E-01	7.2E-01	6.3E+00
DICHLOROBENZENE, 1,4-	4.7E-02	1.3E-01	5.0E+00
DICHLOROBENZIDINE, 3,3-	7.7E-03	7.7E-03	2.9E-02
DICHLORODIPHENYLDICHLOROETHANE (DDD)	1.2E+02	1.2E+02	1.0E-03
DICHLORODIPHENYLDICHLOROETHYLENE (DDE)	8.7E+01	8.7E+01	1.0E-03
DICHLORODIPHENYLTRICHLOROETHANE (DDT)	4.3E+00	4.3E+00	1.0E-03
DICHLOROETHANE, 1,1-	2.0E-01	2.0E-01	5.0E+00
DICHLOROETHANE, 1,2-	4.5E-03	4.5E-03	5.0E-01
DICHLOROETHYLENE, 1,1-	1.0E+00	1.0E+00	6.0E+00
DICHLOROETHYLENE, Cis 1,2-	1.9E-01	1.9E-01	6.0E+00
DICHLOROETHYLENE, Trans 1,2-	6.7E-01	6.7E-01	1.0E+01
DICHLOROPHENOL, 2,4-	3.0E-01	3.0E-01	3.0E-01
DICHLOROPROPANE, 1,2-	5.2E-02	1.2E-01	5.0E+00
DICHLOROPROPENE, 1,3-	3.3E-02	5.9E-02	5.0E-01
DIELDRIN	2.3E-03	2.3E-03	1.9E-03
DIETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHENOL, 2,4-	6.7E-01	6.7E-01	1.0E+02
DINITROPHENOL, 2,4-	4.0E-02	4.0E-02	1.4E+01
DINITROTOLUENE, 2,4-	8.5E-04	8.5E-04	1.1E-01
1,4 DIOXANE	1.8E-03	1.8E-03	3.0E+00
DIOXIN (2,3,7,8-TCDD)	2.3E-04	2.3E-04	5.0E-06
ENDOSULFAN	4.6E-03	4.6E-03	8.7E-03
ENDRIN	6.5E-04	6.5E-04	2.3E-03
ETHYLBENZENE	3.3E+00	3.3E+00	3.0E+01
FLUORANTHENE	6.0E+01	6.0E+01	8.0E+00
FLUORENE	8.9E+00	8.9E+00	3.9E+00
HEPTACHLOR	1.4E-02	1.4E-02	3.8E-03
HEPTACHLOR EPOXIDE	1.5E-02	1.5E-02	3.8E-03
HEXACHLOROBENZENE	1.1E+01	1.1E+01	1.0E+00
HEXACHLOROBUTADIENE	1.0E+00	1.0E+00	2.1E-01
HEXACHLOROCYCLOHEXANE (gamma) LINDANE	4.9E-02	4.9E-02	8.0E-02
HEXACHLOROETHANE	2.4E+00	2.4E+00	7.0E-01
INDENO(1,2,3-cd)PYRENE	7.7E+00	7.7E+00	2.9E-02
LEAD	7.5E+02	7.5E+02	2.5E+00
MERCURY	1.1E+02	1.1E+02	1.2E-02
METHOXYCHLOR	1.9E+01	1.9E+01	1.9E-02
METHYLENE CHLORIDE	7.7E-02	7.7E-02	5.0E+00
METHYL ETHYL KETONE	3.9E+00	3.9E+00	4.2E+03
METHYL ISOBUTYL KETONE	2.8E+00	2.8E+00	1.2E+02

TABLE C. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Deep Soils (>3m bgs)
Groundwater IS a Current or Potential Source of Drinking Water

CHEMICAL PARAMETER	[1]Deep Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
METHYL MERCURY	4.1E+01	4.1E+01	3.0E-03
METHYLNAPHTHALENE (total 1- & 2-)	2.5E-01	2.5E-01	2.1E+00
METHYL TERT BUTYL ETHER	2.3E-02	2.3E-02	5.0E+00
MOLYBDENUM	2.5E+03	3.9E+03	3.5E+01
NAPHTHALENE	4.2E+00	4.2E+00	2.1E+01
NICKEL	1.0E+03	1.0E+03	8.2E+00
PENTACHLOROPHENOL	1.5E+02	1.5E+02	1.0E+00
PERCHLORATE	7.7E+01	7.7E+01	7.0E-01
PHENANTHRENE	1.1E+01	1.1E+01	4.6E+00
PHENOL	7.6E-02	7.6E-02	5.0E+00
POLYCHLORINATED BIPHENYLS (PCBs)	6.3E+00	6.3E+00	1.4E-02
PYRENE	8.5E+01	8.5E+01	2.0E+00
SELENIUM	2.5E+03	3.9E+03	5.0E+00
SILVER	2.5E+03	3.9E+03	1.9E-01
STYRENE	1.5E+00	1.5E+00	1.0E+01
tert-BUTYL ALCOHOL	7.3E-02	7.3E-02	1.2E+01
TETRACHLOROETHANE, 1,1,1,2-	2.4E-02	2.4E-02	1.3E+00
TETRACHLOROETHANE, 1,1,2,2-	9.0E-03	1.8E-02	1.0E+00
TETRACHLOROETHYLENE	8.8E-02	2.5E-01	5.0E+00
THALLIUM	5.1E+01	5.1E+01	2.0E+00
TOLUENE	2.9E+00	2.9E+00	4.0E+01
TOXAPHENE	4.2E-04	4.2E-04	2.0E-04
TPH (gasolines)	1.0E+02	1.0E+02	1.0E+02
TPH (middle distillates)	1.0E+02	1.0E+02	1.0E+02
TPH (residual fuels)	1.0E+03	1.0E+03	1.0E+02
TRICHLOROBENZENE, 1,2,4-	7.6E+00	7.6E+00	2.5E+01
TRICHLOROETHANE, 1,1,1-	7.8E+00	7.8E+00	6.2E+01
TRICHLOROETHANE, 1,1,2-	3.3E-02	7.0E-02	5.0E+00
TRICHLOROETHYLENE	2.6E-01	4.6E-01	5.0E+00
TRICHLOROPHENOL, 2,4,5-	1.8E-01	1.8E-01	1.1E+01
TRICHLOROPHENOL, 2,4,6-	1.7E-01	1.7E-01	5.0E-01
VANADIUM	2.5E+03	5.0E+03	1.5E+01

TABLE C. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Deep Soils (>3m bgs)
Groundwater IS a Current or Potential Source of Drinking Water

CHEMICAL PARAMETER	[1]Deep Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
VINYL CHLORIDE	6.7E-03	1.9E-02	5.0E-01
XYLENES	1.5E+00	1.5E+00	1.3E+01
ZINC	2.5E+03	5.0E+03	8.1E+01
Electrical Conductivity (mS/cm, USEPA Method 120.1 MOD)	not applicable	not applicable	not applicable
Sodium Adsorption Ratio	not applicable	not applicable	not applicable

Notes:

1. Deep soils defined as soils greater than 3 meters (approximately 10 feet) below ground surface.
2. Category "Residential Land Use" generally considered adequate for other sensitive uses (e.g., day-care centers, hospitals, etc.)
3. Assumes potential discharge of groundwater into a freshwater, marine or estuary surface water system.

Source of soil ESLs: Refer to Appendix 1, Tables C-1 and C-2.

Source of groundwater ESLs: Refer to Appendix 1, Table F-1a.

Soil data should be reported on dry-weight basis (see Appendix 1, Section 6.2).

Soil ESLs intended to address human health, groundwater protection and nuisance concerns under a construction/trench worker exposure scenario and noted land-use scenarios. **Soil gas data should be collected for additional evaluation of potential indoor-air impacts at sites with significant areas of VOC-impacted soil. See Section 2.6 and Table E.**

Groundwater ESLs intended to be address drinking water, surface water, indoor-air and nuisance concerns. **Use in conjunction with soil gas screening levels to more closely evaluate potential impacts to indoor-air if groundwater screening levels for this concern approached or exceeded (refer to Section 2.6 and Appendix 1, Table F-1a).**

Aquatic habitat goals for bioaccumulation concerns not considered in selection of groundwater goals (refer to Section 2.7).

Refer to appendices for summary of ESL components.

TPH -Total Petroleum Hydrocarbons. TPH ESLs must be used in conjunction with ESLs for related chemicals (e.g., BTEX, PAHs, oxidizers, etc.). See Volume 1, Section 2.2 and Appendix 1, Chapter 5.

TABLE D. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Deep Soils (>3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Deep Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
ACENAPHTHENE	1.9E+01	1.9E+01	2.3E+01
ACENAPHTHYLENE	1.3E+01	1.3E+01	3.0E+01
ACETONE	5.0E-01	5.0E-01	1.5E+03
ALDRIN	1.2E+00	1.2E+00	1.3E-01
ANTHRACENE	2.8E+00	2.8E+00	7.3E-01
ANTIMONY	3.1E+02	3.1E+02	3.0E+01
ARSENIC	1.6E+01	1.6E+01	3.6E+01
BARIUM	2.5E+03	2.5E+03	1.0E+03
BENZENE	1.8E-01	5.0E-01	4.6E+01
BENZO(a)ANTHRACENE	1.2E+01	1.2E+01	2.7E-02
BENZO(b)FLUORANTHENE	1.5E+01	1.5E+01	2.9E-02
BENZO(k)FLUORANTHENE	1.5E+01	1.5E+01	4.0E-01
BENZO(g,h,i)PERYLENE	2.7E+01	2.7E+01	1.0E-01
BENZO(a)PYRENE	1.5E+00	1.5E+00	1.4E-02
BERYLLIUM	9.8E+01	9.8E+01	2.7E+00
BIPHENYL, 1,1-	6.5E+00	6.5E+00	5.0E+00
BIS(2-CHLOROETHYL)ETHER	4.0E-03	1.3E-02	6.1E+01
BIS(2-CHLOROISOPROPYL)ETHER	6.6E-01	6.6E-01	6.1E+01
BIS(2-ETHYLHEXYL)PHTHALATE	7.8E+02	7.8E+02	3.2E+01
BORON	4.6E+04	4.6E+04	1.6E+00
BROMODICHLOROMETHANE	1.2E-02	3.9E-02	1.6E+02
BROMOFORM	6.9E+01	6.9E+01	3.2E+03
BROMOMETHANE	2.2E-01	5.1E-01	1.6E+02
CADMIUM	3.8E+01	3.8E+01	2.2E+00
CARBON TETRACHLORIDE	1.2E-02	3.5E-02	9.5E+00
CHLORDANE	1.5E+01	1.5E+01	4.0E-03
CHLOROANILINE, p-	5.3E-02	5.3E-02	5.0E+00
CHLOROBENZENE	1.5E+00	1.5E+00	2.5E+01
CHLOROETHANE	6.3E-01	8.5E-01	1.2E+01
CHLOROFORM	9.8E-02	2.7E-01	3.4E+02
CHLOROMETHANE	2.9E-01	8.1E-01	1.7E+02
CHLOROPHENOL, 2-	1.2E-01	1.2E-01	1.8E+00
CHROMIUM (Total)	5.8E+01	5.8E+01	1.8E+02
CHROMIUM III	2.5E+03	5.0E+03	1.8E+02
CHROMIUM VI	1.8E+00	1.8E+00	1.1E+01
CHRYSENE	2.3E+01	2.3E+01	3.5E-01
COBALT	9.4E+01	9.4E+01	3.0E+00
COPPER	2.5E+03	5.0E+03	3.1E+00
CYANIDE (Free)	5.0E+02	1.0E+03	1.0E+00
DIBENZO(a,h)ANTHTRACENE	4.3E+00	4.3E+00	2.5E-01
DIBROMOCHLOROMETHANE	1.9E-02	5.8E-02	1.8E+02
1,2-DIBROMO-3-CHLOROPROPANE	1.1E-03	1.1E-03	2.0E-01

TABLE D. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Deep Soils (>3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Deep Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
DIBROMOETHANE, 1,2-	7.3E-03	2.1E-02	1.6E+02
DICHLOROBENZENE, 1,2-	1.6E+00	1.6E+00	1.4E+01
DICHLOROBENZENE, 1,3-	7.4E+00	7.4E+00	6.5E+01
DICHLOROBENZENE, 1,4-	4.7E-02	1.3E-01	1.5E+01
DICHLOROBENZIDINE, 3,3-	1.7E+01	1.7E+01	2.5E+02
DICHLORODIPHENYLDICHLOROETHANE (DDD)	1.2E+02	1.2E+02	1.0E-03
DICHLORODIPHENYLDICHLOROETHYLENE (DDE)	8.7E+01	8.7E+01	1.0E-03
DICHLORODIPHENYLTRICHLOROETHANE (DDT)	4.3E+00	4.3E+00	1.0E-03
DICHLOROETHANE, 1,1-	3.3E-01	9.1E-01	4.7E+01
DICHLOROETHANE, 1,2-	2.5E-02	6.9E-02	2.0E+02
DICHLOROETHYLENE, 1,1-	4.3E+00	4.3E+00	2.5E+01
DICHLOROETHYLENE, Cis 1,2-	1.6E+00	3.6E+00	5.9E+02
DICHLOROETHYLENE, Trans 1,2-	3.1E+00	7.3E+00	5.9E+02
DICHLOROPHENOL, 2,4-	3.0E+00	3.0E+00	3.0E+00
DICHLOROPROPANE, 1,2-	5.2E-02	1.5E-01	1.0E+02
DICHLOROPROPENE, 1,3-	3.3E-02	9.1E-02	4.9E+01
DIELDRIN	2.3E-03	2.3E-03	1.9E-03
DIETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHENOL, 2,4-	7.4E-01	7.4E-01	1.1E+02
DINITROPHENOL, 2,4-	2.1E-01	2.1E-01	7.5E+01
DINITROTOLUENE, 2,4-	8.6E-01	8.6E-01	1.2E+02
1,4 DIOXANE	3.0E+01	3.0E+01	5.0E+04
DIOXIN (2,3,7,8-TCDD)	2.3E-04	2.3E-04	5.0E-06
ENDOSULFAN	4.6E-03	4.6E-03	8.7E-03
ENDRIN	6.5E-04	6.5E-04	2.3E-03
ETHYLBENZENE	4.7E+00	1.3E+01	2.9E+02
FLUORANTHENE	6.0E+01	6.0E+01	8.0E+00
FLUORENE	8.9E+00	8.9E+00	3.9E+00
HEPTACHLOR	1.4E-02	1.4E-02	3.8E-03
HEPTACHLOR EPOXIDE	1.5E-02	1.5E-02	3.8E-03
HEXACHLOROBENZENE	1.1E+01	1.1E+01	3.7E+00
HEXACHLOROBUTADIENE	2.3E+01	2.3E+01	4.7E+00
HEXACHLOROCYCLOHEXANE (gamma) LINDANE	4.9E-02	4.9E-02	8.0E-02
HEXACHLOROETHANE	4.1E+01	4.1E+01	1.2E+01
INDENO(1,2,3-cd)PYRENE	7.7E+00	7.7E+00	2.9E-02
LEAD	7.5E+02	7.5E+02	2.5E+00
MERCURY	1.1E+02	1.1E+02	1.2E-02
METHOXYCHLOR	1.9E+01	1.9E+01	1.9E-02
METHYLENE CHLORIDE	5.2E-01	1.5E+00	2.2E+03
METHYL ETHYL KETONE	1.3E+01	1.3E+01	1.4E+04
METHYL ISOBUTYL KETONE	3.9E+00	3.9E+00	1.7E+02

TABLE D. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Deep Soils (>3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Deep Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
METHYL MERCURY	4.1E+01	4.1E+01	3.0E-03
METHYLNAPHTHALENE (total 1- & 2-)	2.5E-01	2.5E-01	2.1E+00
METHYL TERT BUTYL ETHER	2.0E+00	5.6E+00	1.8E+03
MOLYBDENUM	2.5E+03	3.9E+03	2.4E+02
NAPHTHALENE	4.5E+00	4.8E+00	2.4E+01
NICKEL	1.0E+03	1.0E+03	8.2E+00
PENTACHLOROPHENOL	1.5E+02	1.5E+02	7.9E+00
PERCHLORATE	7.7E+01	7.7E+01	6.0E+02
PHENANTHRENE	1.1E+01	1.1E+01	4.6E+00
PHENOL	1.9E+01	1.9E+01	1.3E+03
POLYCHLORINATED BIPHENYLS (PCBs)	6.3E+00	6.3E+00	1.4E-02
PYRENE	8.5E+01	8.5E+01	2.0E+00
SELENIUM	2.5E+03	3.9E+03	5.0E+00
SILVER	2.5E+03	3.9E+03	1.9E-01
STYRENE	1.5E+01	1.5E+01	1.0E+02
tert-BUTYL ALCOHOL	1.1E+02	1.1E+02	1.8E+04
TETRACHLOROETHANE, 1,1,1,2-	1.6E+01	1.6E+01	9.3E+02
TETRACHLOROETHANE, 1,1,2,2-	9.0E-03	2.5E-02	1.9E+02
TETRACHLOROETHYLENE	8.8E-02	2.5E-01	1.2E+02
THALLIUM	5.1E+01	5.1E+01	2.0E+01
TOLUENE	9.3E+00	9.3E+00	1.3E+02
TOXAPHENE	4.2E-04	4.2E-04	2.0E-04
TPH (gasolines)	4.0E+02	4.0E+02	5.0E+02
TPH (middle distillates)	5.0E+02	5.0E+02	6.4E+02
TPH (residual fuels)	1.0E+03	1.0E+03	6.4E+02
TRICHLOROBENZENE, 1,2,4-	7.6E+00	7.6E+00	2.5E+01
TRICHLOROETHANE, 1,1,1-	7.8E+00	7.8E+00	6.2E+01
TRICHLOROETHANE, 1,1,2-	3.3E-02	9.1E-02	3.5E+02
TRICHLOROETHYLENE	2.6E-01	7.3E-01	3.6E+02
TRICHLOROPHENOL, 2,4,5-	1.8E-01	1.8E-01	1.1E+01
TRICHLOROPHENOL, 2,4,6-	1.6E+02	1.6E+02	4.9E+02
VANADIUM	2.5E+03	5.0E+03	1.9E+01

TABLE D. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Deep Soils (>3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Deep Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
VINYL CHLORIDE	6.7E-03	1.9E-02	4.0E+00
XYLENES	1.5E+00	1.5E+00	1.3E+01
ZINC	2.5E+03	5.0E+03	8.1E+01
Electrical Conductivity (mS/cm, USEPA Method 120.1 MOD)	not applicable	not applicable	not applicable
Sodium Adsorption Ratio	not applicable	not applicable	not applicable

Notes:

1. Deep soils defined as soils greater than 3 meters (approximately 10 feet) below ground surface.
2. Category "Residential Land Use" generally considered adequate for other sensitive uses (e.g., day-care centers, hospitals, etc.)
3. Assumes potential discharge of groundwater into marine or estuary surface water system.

Source of soil ESLs: Refer to Appendix 1, Tables D-1 and D-2.

Source of groundwater ESLs: Refer to Appendix 1, Table F-1b.

Soil data should be reported on dry-weight basis (see Appendix 1, Section 6.2).

Soil ESLs intended to address human health, groundwater protection and nuisance concerns under a construction/trench worker exposure scenario and noted land-use scenarios. **Soil gas data should be collected for additional evaluation of potential indoor-air impacts at sites with significant areas of VOC-impacted soil. See Section 2.6 and Table E.**

Groundwater ESLs intended to address surface water, indoor-air and nuisance concerns. **Use in conjunction with soil gas screening levels to more closely evaluate potential impacts to indoor-air if groundwater screening levels for this concern approached or exceeded (refer to Section 2.6 and Appendix 1, Table F-1a).**

Aquatic habitat goals for bioaccumulation concerns not considered in selection of groundwater goals (refer to Section 2.7).

Refer to appendices for summary of ESL components.

TPH -Total Petroleum Hydrocarbons. TPH ESLs must be used in conjunction with ESLs for related chemicals (e.g., BTEX, PAHs, oxidizers, etc.). See Volume 1, Section 2.2 and Appendix 1, Chapter 5.

ATTACHMENT E
Oakland Risk-Based Screening Levels (RBSLs)

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthra-cene	Arsenic	Barium	Benz(a)-anthracene	Benzene	Benzo(a)-pyrene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					3.2E-01		2.5E-01	2.7E+00	2.5E-02
			Hazard	3.1E+03	3.1E+03	4.8E+03	1.6E+04	2.0E+01	5.2E+03		8.1E+01	
		Commercial/ Industrial	Carcinogenic					1.5E+00		7.9E-01	8.5E+00	7.9E-02
			Hazard	2.0E+04	2.0E+04	3.0E+04	1.0E+05	2.5E+02	9.4E+04		5.1E+02	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	6.9E-02	SAT
			Hazard	SAT	SAT	1.5E+03	SAT				2.3E+00	
		Commercial/ Industrial	Carcinogenic							SAT	1.1E+00	SAT
			Hazard	SAT	SAT	4.4E+04	SAT				6.6E+01	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	1.9E-01	SAT
			Hazard	SAT	SAT	5.0E+03	SAT				7.6E+00	
		Commercial/ Industrial	Carcinogenic							SAT	7.3E-01	SAT
			Hazard	SAT	SAT	2.9E+04	SAT				4.4E+01	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					*4.4E+00*	*1.2E+02*	6.8E-01	*2.1E-03*	*6.2E+00*
			Hazard	2.0E+02	1.4E+02	3.6E-01	SAT	*4.4E+00*	*1.2E+02*		*2.1E-03*	*6.2E+00*
		Commercial/ Industrial	Carcinogenic					*4.4E+00*	*1.2E+02*	2.9E+00	*2.1E-03*	*6.2E+00*
			Hazard	SAT	SAT	2.4E+00	SAT	*4.4E+00*	*1.2E+02*		*2.1E-03*	*6.2E+00*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	1.1E-01	>SOL
			Hazard	>SOL	>SOL	2.0E+04	>SOL				3.7E+00	
		Commercial/ Industrial	Carcinogenic							>SOL	1.8E+00	>SOL
			Hazard	>SOL	>SOL	5.8E+05	>SOL				1.1E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	5.6E+00	>SOL
			Hazard	>SOL	>SOL	2.1E+05	>SOL				2.2E+02	
		Commercial/ Industrial	Carcinogenic							>SOL	2.1E+01	>SOL
			Hazard	>SOL	>SOL	>SOL	>SOL				1.3E+03	
	Ingestion of Groundwater	Residential	Carcinogenic					*5.0E-02*	*1.0E+00*	5.6E-05	*1.0E-03*	*2.0E-04*
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*	*2.0E-04*
		Commercial/ Industrial	Carcinogenic					*5.0E-02*	*1.0E+00*	2.4E-04	*1.0E-03*	*2.0E-04*
			Hazard	>SOL	>SOL	1.0E+01	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*	*2.0E-04*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-03		1.6E-05	6.3E-03	1.1E-06
			Hazard	1.1E+00	1.7E+00	4.2E+01	>SOL	1.2E-01	2.8E+01		1.8E-01	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Beryllium	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Cadmium	Carbon Disulfide
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.5E-01		2.5E-01	4.5E+03	3.6E+01		2.1E+03	
			Hazard		2.1E+02		3.7E+02	1.0E+03	1.0E+04	3.7E+01	1.2E+03
		Commercial/ Industrial	Carcinogenic	7.9E-01		7.9E-01	1.7E+04	1.1E+02		7.9E+03	
			Hazard		1.4E+03		6.8E+03	6.8E+03	6.8E+04	6.8E+02	6.4E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT			SAT			1.1E+00
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT			SAT			3.3E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT			SAT			3.8E+00
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT			SAT			2.2E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	2.1E+00		2.1E+00	9.6E+00	3.7E+03		*1.1E+00*	
			Hazard		SAT		9.6E+00	SAT	SAT	*1.1E+00*	2.9E+00
		Commercial/ Industrial	Carcinogenic	8.9E+00		8.9E+00	9.6E+00	1.6E+04		*1.1E+00*	
			Hazard		SAT		9.6E+00	SAT	SAT	*1.1E+00*	1.9E+01
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL			>SOL			2.1E+00
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL			>SOL			6.2E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL			>SOL			1.7E+02
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL			>SOL			9.6E+02
	Ingestion of Groundwater	Residential	Carcinogenic	5.6E-05		5.6E-05	4.0E-03	8.0E-03		*5.0E-03*	
			Hazard		>SOL		4.0E-03	3.1E-01	>SOL	*5.0E-03*	1.6E+00
		Commercial/ Industrial	Carcinogenic	2.4E-04		2.4E-04	4.0E-03	3.4E-02		*5.0E-03*	
			Hazard		>SOL		4.0E-03	>SOL	>SOL	*5.0E-03*	1.0E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-05		1.2E-05		5.1E-02			
			Hazard		>SOL		2.0E+00	>SOL	>SOL	2.0E-01	9.4E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)	Chrysene	Copper	Cresol(-m)	Cresol(-o)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.8E+00		9.1E+00		1.3E+00	2.5E+00			
			Hazard	3.3E+01	7.9E+02	4.8E+02	7.4E+04	3.7E+02		2.8E+03	2.6E+03	2.6E+03
		Commercial/ Industrial	Carcinogenic	5.6E+00		2.9E+01		8.7E+00	7.9E+00			
			Hazard	2.1E+02	4.7E+03	3.0E+03	1.4E+06	6.8E+03		5.0E+04	1.7E+04	1.7E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.7E-02		3.3E-01			SAT			
			Hazard	4.6E-01	6.2E-01	1.2E+01					SAT	SAT
		Commercial/ Industrial	Carcinogenic	4.3E-01		5.2E+00			SAT			
			Hazard	1.3E+01	1.8E+01	3.5E+02					SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	7.6E-02		9.2E-01			SAT			
			Hazard	1.5E+00	2.1E+00	4.1E+01					SAT	SAT
		Commercial/ Industrial	Carcinogenic	2.9E-01		3.5E+00			SAT			
			Hazard	8.8E+00	1.2E+01	2.4E+02					SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*3.0E-03*	*6.6E-02*	*1.5E-01*		2.9E+00	SAT	*2.8E-01*		
			Hazard	*3.0E-03*	*6.6E-02*	*1.5E-01*	8.5E+07	2.9E+00		*2.8E-01*	2.2E+00	2.3E+00
		Commercial/ Industrial	Carcinogenic	*3.0E-03*	*6.6E-02*	*1.5E-01*		2.9E+00	SAT	*2.8E-01*		
			Hazard	*3.0E-03*	*6.6E-02*	*1.5E-01*	5.6E+08	2.9E+00		*2.8E-01*	1.5E+01	1.5E+01
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.6E-02		7.5E-01			>SOL			
			Hazard	2.7E-01	2.4E+00	2.8E+01					>SOL	>SOL
		Commercial/ Industrial	Carcinogenic	2.6E-01		1.2E+01			>SOL			
			Hazard	7.8E+00	6.9E+01	8.0E+02					>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E+00		3.4E+01			>SOL			
			Hazard	2.2E+01	2.0E+02	1.5E+03					>SOL	>SOL
		Commercial/ Industrial	Carcinogenic	4.2E+00		1.3E+02			>SOL			
			Hazard	1.3E+02	>SOL	>SOL					>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02	5.6E-04	*1.3E+00*		
			Hazard	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.6E+01	5.0E-02		*1.3E+00*	7.8E-01	7.8E-01
		Commercial/ Industrial	Carcinogenic	*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02	>SOL	*1.3E+00*		
			Hazard	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.0E+02	5.0E-02		*1.3E+00*	5.1E+00	5.1E+00
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.1E-03		3.9E-02		6.8E-03	1.6E-04			
			Hazard	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00		1.5E+01	6.7E+00	6.4E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene	Dichloro ethane (1,1-)	Dichloro ethane (1,2-) (EDC)	Dichloro ethylene (1,1-)	Dichloro ethylene (cis 1,2-)	Dichloro ethene (trans 1,2)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			7.4E-02	4.7E+01	3.9E+00	4.9E-01		
			Hazard	2.6E+02	3.0E+03		4.9E+03	1.4E+02	4.3E+02	4.8E+02	9.5E+02
		Commercial/ Industrial	Carcinogenic			2.3E-01	1.5E+02	1.2E+01	1.5E+00		
			Hazard	1.7E+03	5.5E+04		3.1E+04	8.8E+02	2.7E+03	3.0E+03	6.1E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	8.6E-01	1.7E-01	9.4E-03		
			Hazard	SAT			1.3E+02	6.8E+00	3.0E+00	1.4E+01	1.9E+01
		Commercial/ Industrial	Carcinogenic			SAT	1.4E+01	2.7E+00	1.5E-01		
			Hazard	SAT			SAT	2.0E+02	8.7E+01	4.1E+02	5.4E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	2.4E+00	4.8E-01	2.6E-02		
			Hazard	SAT			4.5E+02	2.3E+01	9.9E+00	4.7E+01	6.2E+01
		Commercial/ Industrial	Carcinogenic			SAT	9.1E+00	1.8E+00	1.0E-01		
			Hazard	SAT			SAT	1.3E+02	5.8E+01	2.8E+02	3.6E+02
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		6.0E+00	1.9E+00	6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*	*2.0E-02*
			Hazard	2.1E-01	6.0E+00		6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*	*2.0E-02*
		Commercial/ Industrial	Carcinogenic		6.0E+00	8.0E+00	6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*	*2.0E-02*
			Hazard	1.4E+00	6.0E+00		6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*	*2.0E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	2.3E+00	7.2E-01	1.4E-02		
			Hazard	>SOL			3.6E+02	2.9E+01	4.3E+00	3.5E+01	3.2E+01
		Commercial/ Industrial	Carcinogenic			>SOL	3.6E+01	1.1E+01	2.2E-01		
			Hazard	>SOL			>SOL	8.3E+02	1.2E+02	1.0E+03	9.4E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	1.1E+02	1.8E+01	9.3E-01		
			Hazard	>SOL			>SOL	8.6E+02	3.5E+02	1.6E+03	2.0E+03
		Commercial/ Industrial	Carcinogenic			>SOL	4.0E+02	6.9E+01	3.5E+00		
			Hazard	>SOL			>SOL	5.0E+03	2.0E+03	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		2.0E-01	1.6E-05	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*
			Hazard	7.8E-02	2.0E-01		5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*
		Commercial/ Industrial	Carcinogenic		2.0E-01	7.0E-05	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*
			Hazard	5.1E-01	2.0E-01		5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			1.4E-06	2.1E-01	2.4E-02	1.3E-03		
			Hazard	5.9E-01	7.0E+00		1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-benza(a)-anthracene (7,12)	Dimethyl-phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl-phthalate	Dinitro-toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide	Flouran-thene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					9.7E-01	1.0E+01		8.4E-02	
			Hazard	1.6E+03	1.0E+03	5.2E+03	1.0E+03			5.1E+03	2.7E+00	2.1E+03
		Commercial/ Industrial	Carcinogenic					3.0E+00	3.1E+01		2.6E-01	
			Hazard	1.0E+04	6.7E+03	3.4E+04	6.8E+03			3.3E+04	1.7E+01	1.4E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					SAT	SAT		2.8E-01	
			Hazard		SAT	SAT	SAT			SAT	7.8E-01	SAT
		Commercial/ Industrial	Carcinogenic					SAT	SAT		4.5E+00	
			Hazard		SAT	SAT	SAT			SAT	2.3E+01	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic					SAT	SAT		7.9E-01	
			Hazard		SAT	SAT	SAT			SAT	2.6E+00	SAT
		Commercial/ Industrial	Carcinogenic					SAT	SAT		3.0E+00	
			Hazard		SAT	SAT	SAT			SAT	1.5E+01	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					6.7E-04	1.8E-03	*8.0E+00*	*7.8E-05*	
			Hazard	SAT	2.0E+00	3.9E+06	SAT			*8.0E+00*	*7.8E-05*	SAT
		Commercial/ Industrial	Carcinogenic					2.9E-03	SAT	*8.0E+00*	*7.8E-05*	
			Hazard	SAT	1.3E+01	SAT	SAT			*8.0E+00*	*7.8E-05*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					>SOL	>SOL		5.7E-01	
			Hazard		>SOL	>SOL	>SOL			>SOL	1.6E+00	>SOL
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL		9.0E+00	
			Hazard		>SOL	>SOL	>SOL			>SOL	4.6E+01	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic					>SOL	>SOL		8.7E+00	
			Hazard		>SOL	>SOL	>SOL			>SOL	2.9E+01	>SOL
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL		3.3E+01	
			Hazard		>SOL	>SOL	>SOL			>SOL	1.7E+02	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic					2.2E-04	2.5E-03	*7.0E-01*	*5.0E-05*	
			Hazard	>SOL	3.1E-01	1.6E+00	>SOL			*7.0E-01*	*5.0E-05*	>SOL
		Commercial/ Industrial	Carcinogenic					9.2E-04	1.1E-02	*7.0E-01*	*5.0E-05*	
			Hazard	>SOL	2.0E+00	1.0E+01	>SOL			*7.0E-01*	*5.0E-05*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					6.4E-03	>SOL		5.9E-04	
			Hazard	>SOL	2.7E+00	7.3E+00	2.1E-03			3.6E+00	1.7E-02	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Fluorene	Indeno-(1,2,3-CD)-pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-napthalene (2-)	MTBE	Naphthalene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		2.5E-01				2.1E+01			
			Hazard	2.1E+03		4.7E+00	2.4E+04	2.6E+04	3.1E+03	2.0E+03	2.6E+02	2.0E+03
		Commercial/ Industrial	Carcinogenic		7.9E-01				6.6E+01			
			Hazard	1.4E+04		3.0E+01	1.5E+05	1.6E+05	2.0E+04	1.3E+04	1.7E+03	1.3E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT				1.3E+00			
			Hazard	SAT		1.2E+01	4.5E+04	6.9E+03	7.4E+02	SAT	4.4E+03	SAT
		Commercial/ Industrial	Carcinogenic		SAT				2.0E+01			
			Hazard	SAT			SAT	SAT	SAT	SAT	SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT				3.5E+00			
			Hazard	SAT		4.0E+01	SAT	2.3E+04	2.5E+03	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic		SAT				1.3E+01			
			Hazard	SAT		2.3E+02	SAT	SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	*3.2E-01*			3.1E-03		*7.6E-03*	*1.2E+00*
			Hazard	2.6E+02		*3.2E-01*	1.7E+00	3.3E+00	3.1E-03	1.6E+02	*7.6E-03*	*1.2E+00*
		Commercial/ Industrial	Carcinogenic		SAT	*3.2E-01*			3.1E-03		*7.6E-03*	*1.2E+00*
			Hazard	SAT		*3.2E-01*	1.1E+01	2.2E+01	3.1E-03	1.1E+03	*7.6E-03*	*1.2E+00*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL				6.7E+00			
			Hazard	>SOL		2.6E-01	6.5E+05	6.0E+04	4.0E+03	>SOL	2.4E+04	>SOL
		Commercial/ Industrial	Carcinogenic		>SOL				1.1E+02			
			Hazard	>SOL		7.6E+00	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL				2.3E+02			
			Hazard	>SOL		1.6E+01	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic		>SOL				8.7E+02			
			Hazard	>SOL		9.5E+01	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*	*2.0E-02*
			Hazard	6.3E-01		*2.0E-03*	7.8E+00	9.4E+00	5.0E-03	6.3E-01	*1.3E-02*	*2.0E-02*
		Commercial/ Industrial	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*	*2.0E-02*
			Hazard	>SOL		*2.0E-03*	5.1E+01	6.1E+01	5.0E-03	4.1E+00	*1.3E-02*	*2.0E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		7.0E-06				1.3E-01			
			Hazard	3.1E-01		3.6E-02	2.2E+02	1.5E+02	1.6E+01	6.1E-01	1.5E+00	1.5E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Nickel	Nitro benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium	Silver	Styrene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.4E+04	5.5E+02	5.0E-02				2.8E+02			
			Hazard	1.5E+03		1.2E+00	1.6E+04	3.1E+04	1.6E+03		3.7E+02	3.7E+02	9.8E+03
		Commercial/ Industrial	Carcinogenic	1.3E+05	1.7E+03	1.8E-01				8.9E+02			
			Hazard	2.7E+04		1.0E+01	1.0E+05	2.0E+05	1.0E+04		6.8E+03	6.8E+03	6.3E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT	6.9E+01				2.9E+03			
			Hazard			SAT	SAT	SAT	SAT				SAT
		Commercial/ Industrial	Carcinogenic		SAT	1.1E+03				4.6E+04			
			Hazard			SAT	SAT	SAT	SAT				SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT	1.9E+02				8.1E+03			
			Hazard			SAT	SAT	SAT	SAT				SAT
		Commercial/ Industrial	Carcinogenic		SAT	7.3E+02				3.1E+04			
			Hazard			SAT	SAT	SAT	SAT				SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*2.0E+01*	2.9E-01	*4.7E+00*				1.2E-01	*7.7E-01*	*2.5E+00*	*2.4E+00*
			Hazard	*2.0E+01*		*4.7E+00*	SAT	1.0E+01	SAT		*7.7E-01*	*2.5E+00*	*2.4E+00*
		Commercial/ Industrial	Carcinogenic	*2.0E+01*	1.2E+00	*4.7E+00*				5.3E-01	*7.7E-01*	*2.5E+00*	*2.4E+00*
			Hazard	*2.0E+01*		*4.7E+00*	SAT	6.7E+01	SAT		*7.7E-01*	*2.5E+00*	*2.4E+00*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL	2.3E-02				4.8E+03			
			Hazard			>SOL	>SOL	>SOL	>SOL				>SOL
		Commercial/ Industrial	Carcinogenic		>SOL	3.6E-01				7.7E+04			
			Hazard			>SOL	>SOL	>SOL	>SOL				>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL	3.2E-01				4.1E+04			
			Hazard			>SOL	>SOL	>SOL	>SOL				>SOL
		Commercial/ Industrial	Carcinogenic		>SOL	>SOL				1.5E+05			
			Hazard			>SOL	>SOL	>SOL	>SOL				>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	*1.0E-01*	1.3E-01	*5.0E-04*				6.7E-02	*5.0E-02*	*1.0E-01*	*1.0E-01*
			Hazard	*1.0E-01*		*5.0E-04*	>SOL	9.4E+00	>SOL		*5.0E-02*	*1.0E-01*	*1.0E-01*
		Commercial/ Industrial	Carcinogenic	*1.0E-01*	5.7E-01	*5.0E-04*				2.9E-01	*5.0E-02*	*1.0E-01*	*1.0E-01*
			Hazard	*1.0E-01*		*5.0E-04*	>SOL	6.1E+01	>SOL		*5.0E-02*	*1.0E-01*	*1.0E-01*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		2.8E+00	1.6E-06				2.6E+00			
			Hazard	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00	2.1E+00	9.3E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Tetrachloroethane (1,1,2,2-)	Tetrachloroethylene (PCE)	Tetraethyl-Lead	Toluene	Trichloroethane (1,1,1-)	Trichloroethane (1,1,2-)	Trichloroethylene (TCE)	Vanadium	Vinyl Chloride
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.0E+00	5.7E+00				3.8E+00	1.9E+01		5.0E-01
			Hazard	1.2E+03	4.8E+02	5.2E-03	9.0E+03	1.8E+03	1.9E+02	2.9E+02	5.2E+02	
		Commercial/ Industrial	Carcinogenic	3.1E+00	1.8E+01				1.2E+01	5.9E+01		1.6E+00
			Hazard	7.9E+03	3.0E+03	3.4E-02	5.6E+04	1.2E+04	1.2E+03	1.8E+03	9.5E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.4E-01	3.0E-01				5.4E-01	1.1E+00		1.3E-03
			Hazard	1.0E+03	1.2E+01		3.6E+02	2.6E+02	3.1E+01	1.3E+01		
		Commercial/ Industrial	Carcinogenic	1.2E+01	4.8E+00				8.7E+00	1.7E+01		2.1E-02
			Hazard	SAT	SAT		SAT	SAT	8.9E+02	3.6E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.1E+00	8.4E-01				1.5E+00	3.0E+00		3.7E-03
			Hazard	SAT	4.1E+01		SAT	8.7E+02	1.0E+02	4.2E+01		
		Commercial/ Industrial	Carcinogenic	7.8E+00	3.2E+00				5.8E+00	1.1E+01		1.4E-02
			Hazard	SAT	2.4E+02		SAT	SAT	5.9E+02	2.4E+02		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*		*6.5E-04*
			Hazard	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*	3.3E+02	*6.5E-04*
		Commercial/ Industrial	Carcinogenic	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*		*6.5E-04*
			Hazard	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*	2.2E+03	*6.5E-04*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.5E-01	2.0E-01				9.9E-01	6.9E-01		3.7E-03
			Hazard	1.0E+03	8.4E+00		2.1E+02	2.4E+02	5.6E+01	8.1E+00		
		Commercial/ Industrial	Carcinogenic	1.2E+01	3.3E+00				1.6E+01	1.1E+01		5.9E-02
			Hazard	>SOL	>SOL		>SOL	>SOL	1.6E+03	2.3E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E+01	1.3E+01				2.2E+01	4.1E+01		2.5E-01
			Hazard	>SOL	>SOL		>SOL	>SOL	1.5E+03	5.7E+02		
		Commercial/ Industrial	Carcinogenic	4.1E+01	5.1E+01				8.4E+01	1.5E+02		9.6E-01
			Hazard	>SOL	>SOL		>SOL	>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*		*5.0E-04*
			Hazard	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*	1.1E-01	*5.0E-04*
		Commercial/ Industrial	Carcinogenic	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*		*5.0E-04*
			Hazard	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*	7.2E-01	*5.0E-04*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.5E-03	6.0E-03				1.8E-02	4.6E-03		2.6E-03
			Hazard	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01	7.2E-02	2.8E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

Table ?. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		
			Hazard	5.4E+04	2.2E+04
		Commercial/ Industrial	Carcinogenic		
			Hazard	3.0E+05	4.1E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.3E+01*	
			Hazard	*1.3E+01*	8.8E+02
		Commercial/ Industrial	Carcinogenic	*1.3E+01*	
			Hazard	*1.3E+01*	5.8E+03
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*1.8E+00*	
			Hazard	*1.8E+00*	4.7E+00
		Commercial/ Industrial	Carcinogenic	*1.8E+00*	
			Hazard	*1.8E+00*	3.1E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		
			Hazard	6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

URS

Facsimile

To: ACHCS Attn. Mr. Don Hung
Firm: ACHCS
Facsimile: 5.0.337.2335
From: Chad Shenton
Date: 12.12.03
Page 1 of : 10

Subject: Fuel Leak Case # RO0000104, BP Station #11132

Message:

Mr. Hung,

Attached is a copy of URS's Technical Response to your letter dated October 13, 2003. I've also emailed you the file, however it is such a large file, I'm sending this as a backup. Hard copies will be sent to you next week. Attachment D & E have been omitted.

Regards,
Chad Shenton
510.874.3125

cc:

URS Corporation
500 12th Street, Suite 200
Oakland, CA 94607-4014
Tel: 510-893-3600
Fax: 510-874-3268
www.urscorp.com

URS

12/13/2003

Mr. Don Hwang
Alameda County Health Care Services
1131 Harbor Bay Parkway, Ste. 250
Alameda, CA 94502-6577

RE: Fuel Leak Case No. RO0000014, BP Station #11132, 3201 35th Ave., Oakland, CA Response to Technical Comments from ACHCS on "Soil and Groundwater Investigation Workplan Amendment," May 28, 2003.

Dear Mr. Hwang,

On behalf of Atlantic Richfield Company (ARCO, an affiliate of BP), URS has prepared this letter report in response to technical comments made by the Alameda County Health Care Services (ACHCS) in a letter dated October 13, 2003. The comments regard the "Soil and Groundwater Investigation Workplan Addendum," submitted by URS on May 28, 2003.

1. Corrective Action Plan – URS will base risk evaluation at the Site on The California Regional Water Quality Control Board, San Francisco Bay Region (SFRWQCB)'s "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater (Interm Final – July 2003)". Environmental Screening Levels (ESLs) for Commercial/Industrial Land Use have been obtained and are included in Attachment D. The Oakland Risk-Based Corrective Action (RBCA)'s, Risk Based Screening Levels (RBSLs) will be used to evaluate risk for Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) (Attachment E). URS will include cleanup goals based on the appropriate site specific ESLs and RBSLs in the Corrective Action Plan, to be submitted following completion of the proposed Soil and Groundwater Investigation.

2. Contaminant Source Characterization – Proposed borings UB-7 and UB-8 have been located closer to the underground tanks, and remain in native soil (Attachment A). However, due to BP/ARCO Utility Clearance Guidelines, URS cannot locate any borings closer than 10 feet from any underground utility. It may be feasible to conduct angle borings if samples closer to the USTs are required, however the borings would still be required to be advanced at least 10 feet below the UST depth.

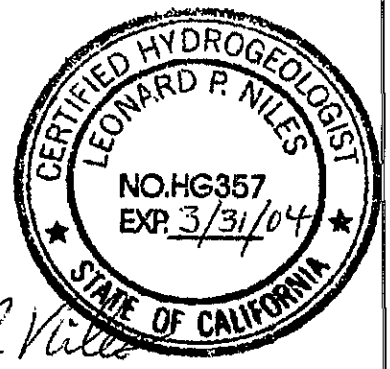
3. Preferential Pathway Survey – URS has prepared an Underground Utility Map (Attachment B) after reviewing various utility maps and plans in order to locate any possible contaminant pathways. The map shows the approximate elevation and location of the sanitary sewer and storm drain lines that underlie 35th Avenue. Other utilities are most likely located no deeper than the sewer and storm lines. The sanitary sewer line is located approximately 6 feet below ground surface (bgs). The storm drain lies approximately 4.5-5.0 feet bgs. Groundwater has historically been found at approximately 14-20 feet bgs and will most likely not intersect the sewer and storm lines.

URS Corporation
500 12th Street, Suite 200
Oakland, CA 94607-4014
Tel: 510.893.3600
Fax: 510.874.3268

4. Well Survey – Using the California State Water Control Board program, *Geotracker* , URS conducted a well survey in order to locate any wells within one half mile of the site that could be potential receptors of any contamination. No wells were located and results are shown on a map included in Attachment C. A survey conducted by Alton Geoscience Inc (Alton) in 1990 (Alton, 1990 – attached) found no production water wells within ½ mile of the subject site. A sensitive receptor survey conducted by Alton in 1991 indicated that the nearest residence was 50 feet from the subject site, the nearest school 1000 feet, and the nearest hospital 11,000 feet. Groundwater in the vicinity of the subject site was classified as a Class III aquifer, which is not a potential source for drinking water (Alton, 1991 - attached).

5. Missing Reports
   a. 1986- Tank removal – No report specifically pertaining to the 1986 UST removals was located by URS during a review of the available BP/ARCO files or City of Oakland Fire Department files. However, a summary account of the 1986 UST removals and analytical data is given in the attached EMCON Baseline Assessment Report (1994).
   b. *Supplemental Site Investigation*, Alton Geoscience Inc., September 4, 1990
   c. *Soil Sampling Report*, Kaprealian Engineering Inc., October 11, 1990
   d. *Baseline Assessment Report*, Encon Environmental, December, 27, 1994 (contains info regarding December sampling of THP1-S-4-4.5 in Appendix. A).
   e. *Phase III Supplemental Site Investigation Study*, Alton Geoscience , August 1991

Please feel free to contact either Chris Sheridan (510.874.3125) or Leonard Niles (510.874.1720) with any questions or comments you may have.



Sincerely,

URS Corporation

Christopher Sheridan
Geologist

Leonard P. Niles, R.G. 5774/C.H.G 357
Project Manager

Cc: Mr. Paul Supple: BP/ARCO, Environmental Resources Management, PO Box 6549, Moraga, CA 94549

Ms. Liz Sewell, ConocoPhillips, 75 Broadway, Sacramento, CA 95818

Attachments:
Attachment A: Updated Proposed Soil Boring/Well Location map
Attachment B: Underground Utilities Map
Attachment C: Well Survey Map
Attachment D: *Environmental Screening Levels (ESLs) for Commercial/Industrial Land Use*, The California Regional Water Quality Control Board, San Francisco Bay Region (SFRWQCB)'s "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater
Attachment E: Oakland Risk-Based Corrective Action (RBCA)'s, Risk Based Screening Levels (RBSLs).

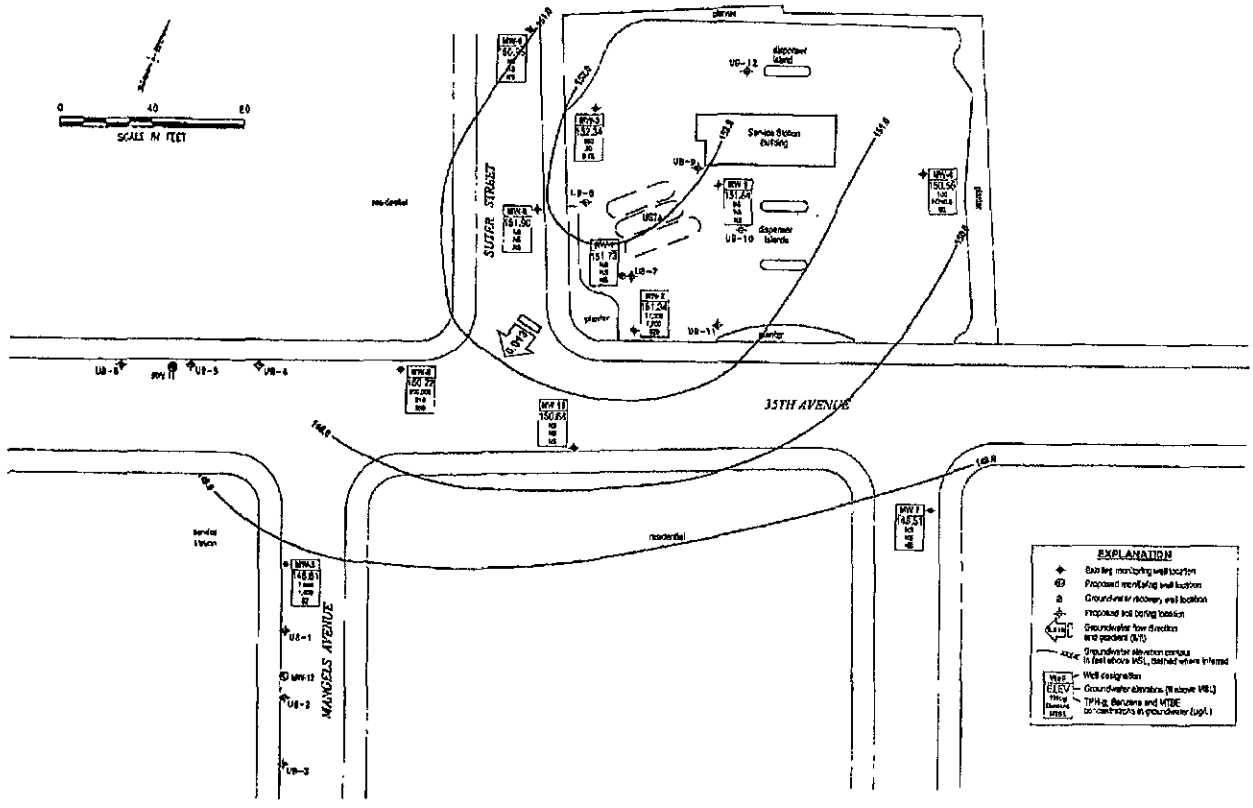
Reports:
A: *Supplemental Site Investigation*, Alton Geoscience Inc., September 4, 1990
B: *Soil Sampling Report*, Kaprealian Engineering Inc., October 11, 1990
C: *Phase III Supplemental Site Investigation Study*, Alton Geoscience Inc, August 1991.
D: *Baseline Assessment Report*, Emcon Environmental, December 24, 1994.

References:

Alton, 1990, *Supplemental Site Investigation*, Alton Geoscience Inc., September 4, 1990

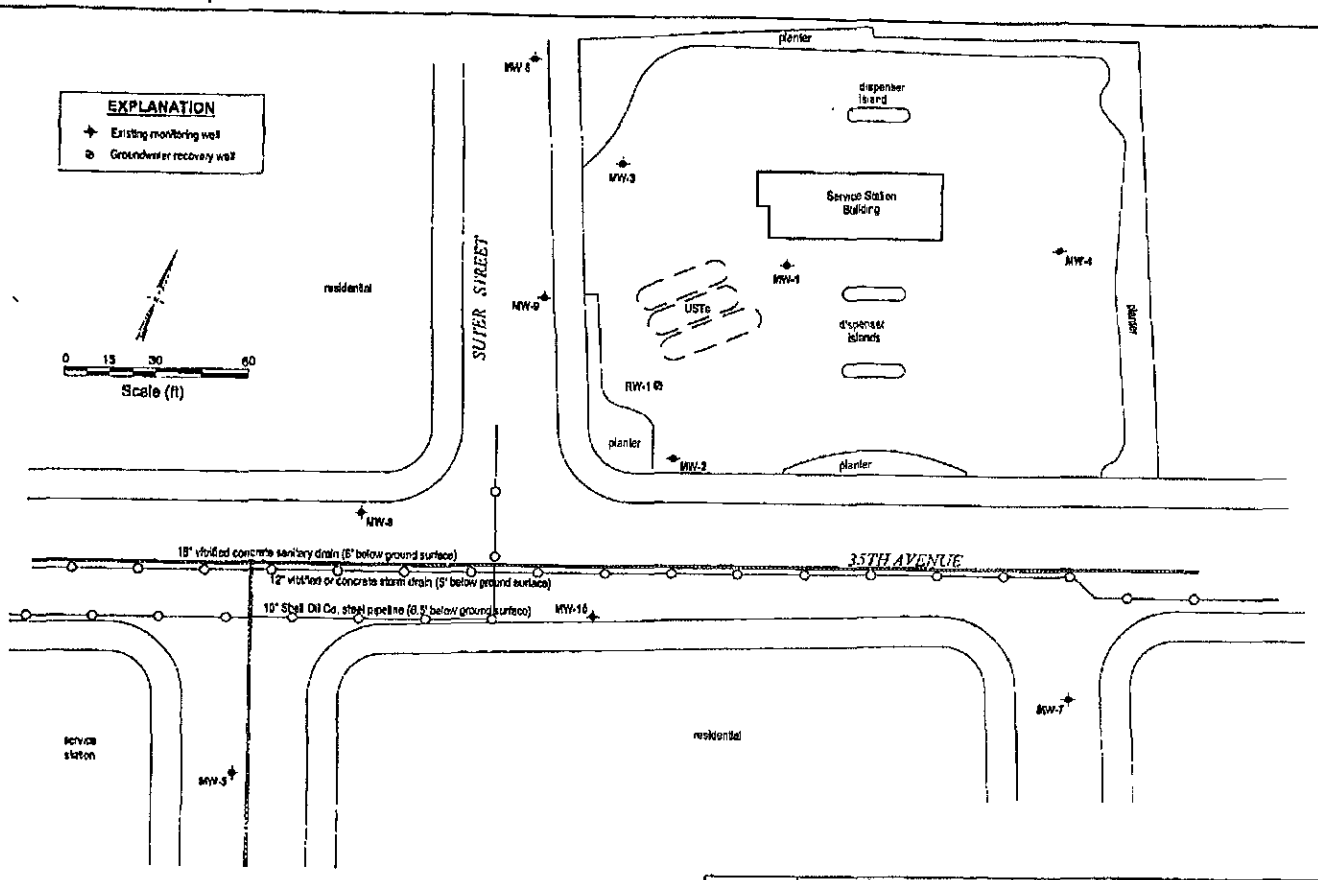
Alton, 1991, *Phase III Supplemental Site Investigation Study*, Alton Geoscience Inc, August 1991.

ATTACHMENT A
Proposed Soil Boring/Well Installation Map



URS	Project No. 38486259 Former BP Service Station #11132 3201 36th Avenue Oakland, California	PROPOSED SOIL BORINGS AND GROUNDWATER ELEVATION CONTOUR AND ANALYTICAL SUMMARY MAP First Quarter 2003 (January 29, 2003)	FIGURE 1

ATTACHMENT B
Underground Utilities Map



URS	Project No. 38486259 Former BP Service Station #11132 3201 35th Avenue Oakland, California	UNDERGROUND UTILITY MAP	Figure 2

ATTACHMENT C
Well Survey Map

GeoTracker Help

ZoomIn 2X ZoomOut 2X Pan Identify UST Sites

Show All sites within Any of public wells.

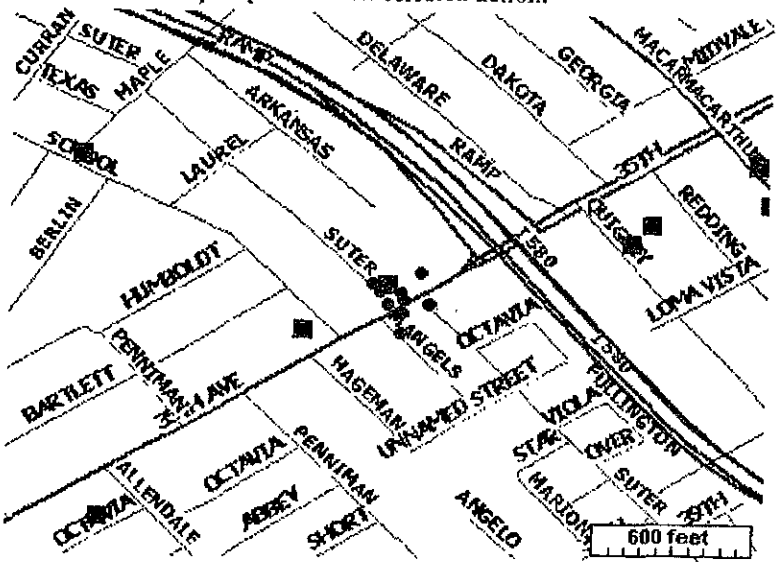
Click on the map to perform the selected action.

Layers

- [x] LUFT Sites
- [ ] UST Sites
- [ ] Public Wells
- [x] Highways
- [x] Major Roads
- [x] Minor Roads
- [ ] USGS Quads
- [ ] Surface Water
- [ ] Watersheds
- [ ] GW Basins
- [ ] Vulnerability

Map Size: 1X

Redraw



Street:

City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ETAK

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

GeoTracker help

Zoomin 2X ZoomOut 2X Pan Identify UST Sites

Layers

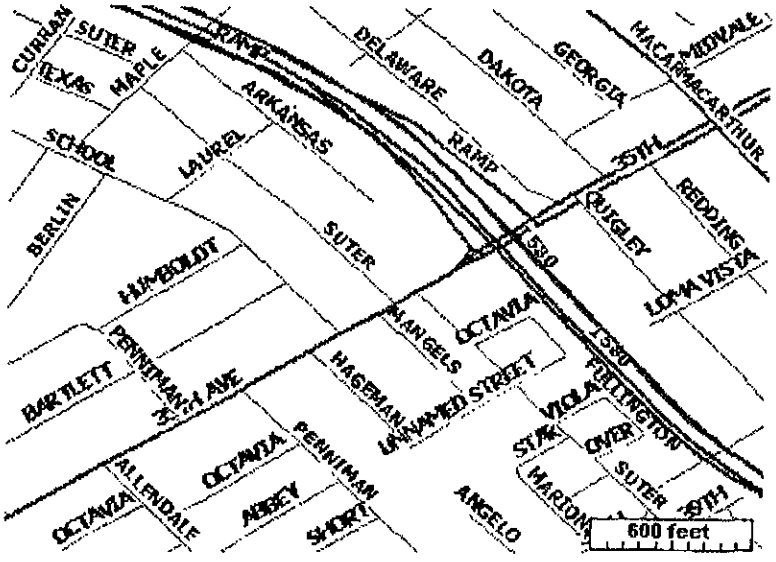
Show Open sites within 1000' of public wells.

Click on the map to perform the selected action.

- LUFT Sites
- UST Sites
- Public Wells
- Highways
- Major Roads
- Minor Roads
- USGS Quads
- Surface Water
- Watersheds
- GW Basins
- Vulnerability

Map Size: 1X

Redraw

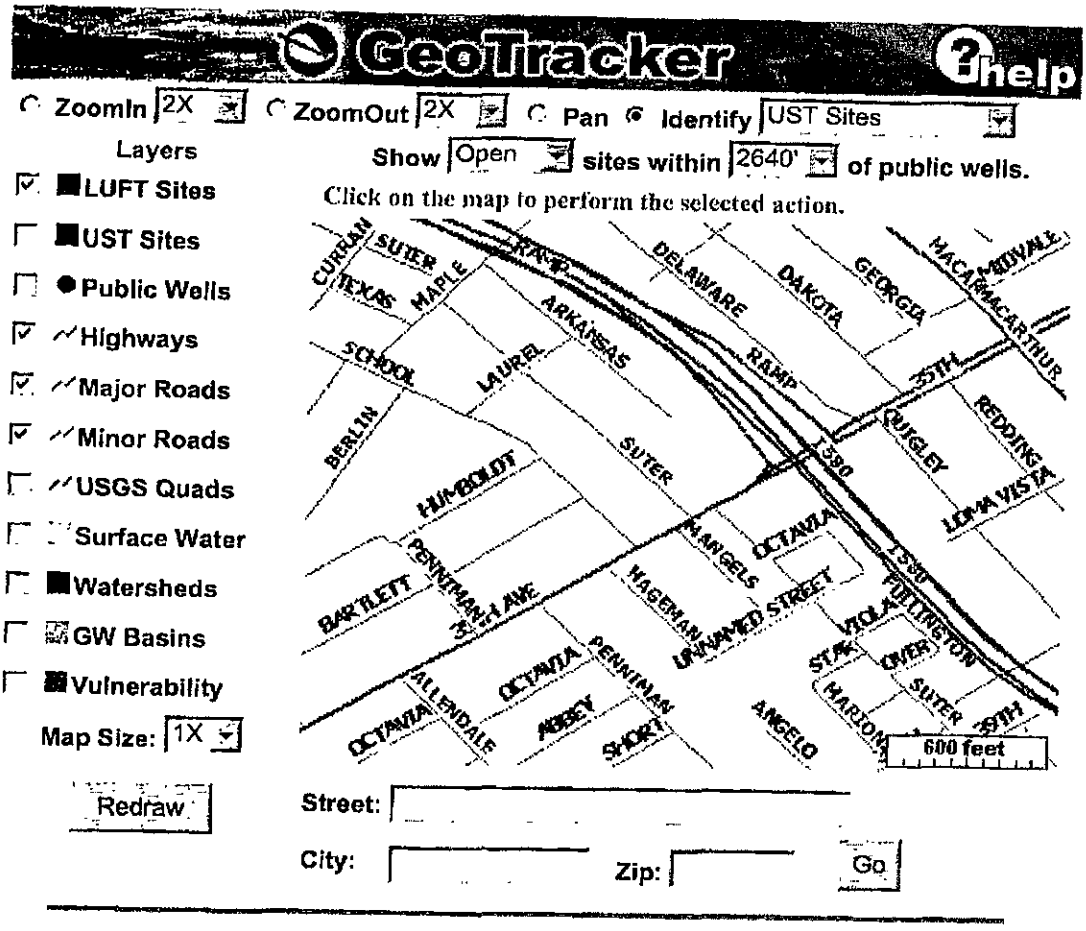


Street:

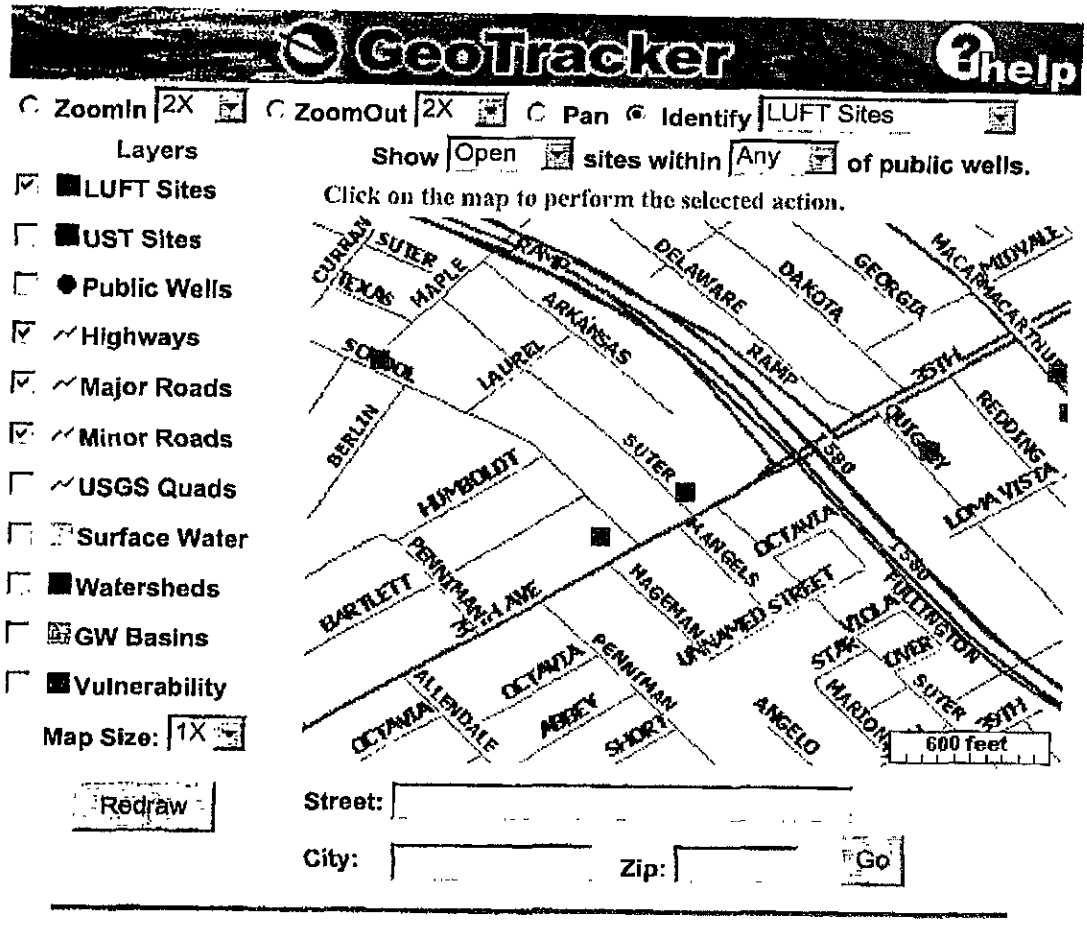
City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ESRI

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

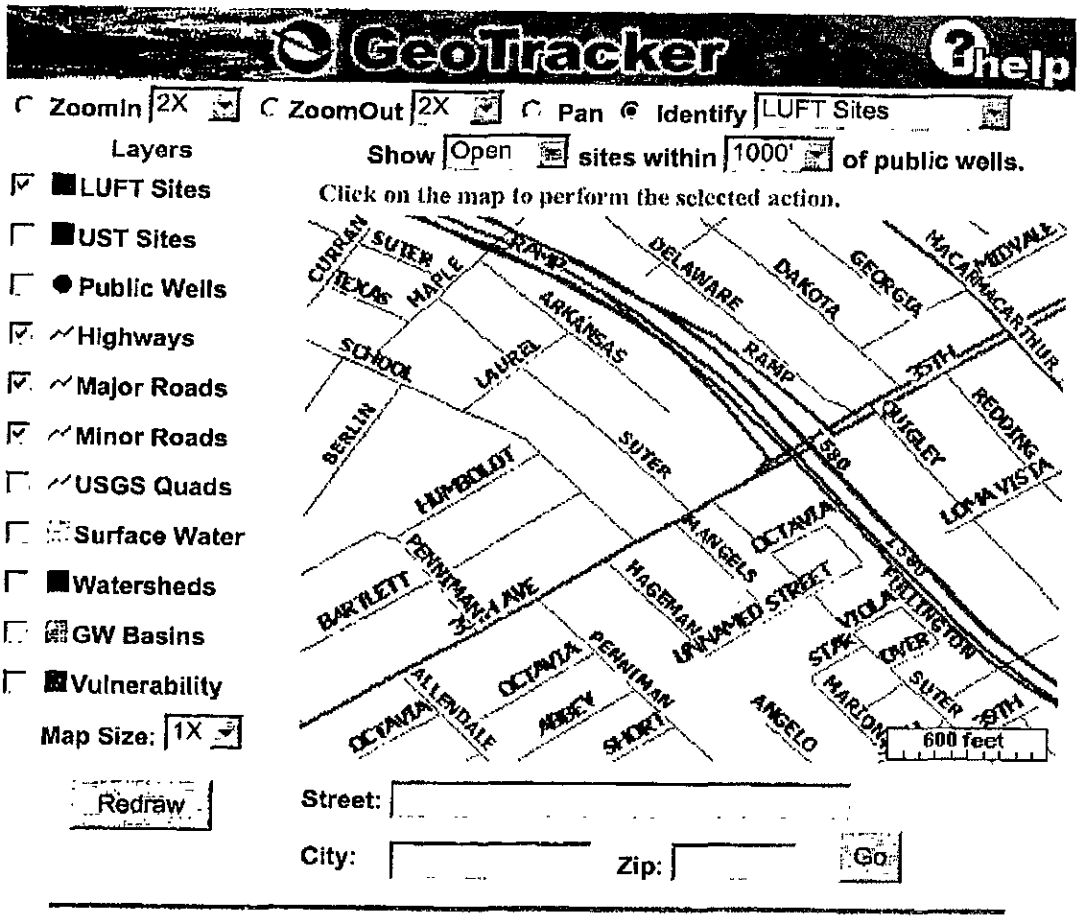


GeoTracker Home | Contact Site Administrator | Road Maps by ETAK
Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.



GeoTracker Home | Contact Site Administrator | Road Maps by ESRI

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.



Geo Tracker Home | Contact Site Administrator | Road Maps by TAK
Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.

GeoTracker help

Zoomin 2X ZoomOut 2X Pan Identify LUFT Sites

Layers

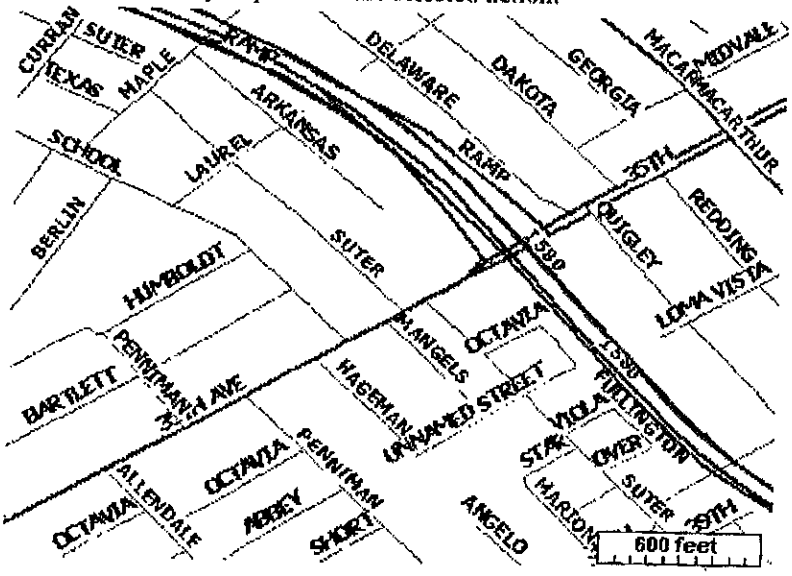
- [x] LUFT Sites
- [ ] UST Sites
- [ ] Public Wells
- [x] Highways
- [x] Major Roads
- [x] Minor Roads
- [ ] USGS Quads
- [ ] Surface Water
- [ ] Watersheds
- [ ] GW Basins
- [ ] Vulnerability

Map Size: 1X

Redraw

Show Open sites within 2640' of public wells.

Click on the map to perform the selected action.



Street:

City: Zip: Go

GeoTracker Home | Contact Site Administrator | Road Maps by ETAK

Well and LUFT site positions are approximate. Locational accuracy will improve as state agencies and responsible parties obtain and report new information.