Section 01160

POTENTIALLY CONTAMINATED AREAS

PART 1 GENERAL

1.01 SUMARY

This Section includes:

A. Handling, testing, stockpile, treatment, and disposal of *potentially contaminated* areas.

B. Removal, testing, treatment, and disposal of *potentially contaminated* groundwater.

C. Obtaining and paying for required permits.

D. Hiring qualified professional environmental consultants.

E. Hiring a testing laboratory to perform required testing.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices

1. Preparatory Work related to *potentially contaminated* areas is on a lump sum basis. This item includes hiring environmental consultants, preparation of an Environmental Health and Safety Plan, preparation of an Environmental Work Plan, training personnel, and obtaining permits and environmental insurance. Contractor shall provide documents of all plans, training records, permits, and insurance prior to mobilization. The Contractor shall provide a schedule of values as specified in Section 01292 - Schedule of Values. Payment shall be made according to the schedule of values upon acceptance of each respective submittal or documentation confirming completion of the individual work items.

2. Environmental Health and Safety Monitoring and Field Screening includes, monitoring to assure safe working conditions, as defined in paragraph 3.03, Environmental Monitoring in Potentially Contaminated Areas and Field Screening, as defined in paragraph 3.04, Screening Potentially Contaminated Soil. No separate payment.

3. Mobilization, Handling, transportation, treatment, and disposal of *impacted* soil from open cut construction of water lines is on an unit price basis per cubic yard of bulked soil. This unit price is in addition to the unit price for installation of water line. Such price includes all additional costs associated with soil from open cut construction through *impacted* areas, as described in paragraph 3.01, Areas Potentially Contaminated, subparagraph 3.01B.2. Such

additional costs include sampling, testing, handling, transportation, temporary storage, treatment, and final disposal in accordance with paragraph 3.06. For this item, assume that all *contaminated* soil can be disposed in a landfill accepting Class I or Class II soil. Measurement for this item will be from the station where *impacted* soil is first identified by field screening to the station where there is no further indication of contamination as approved by the Project Manager. This item also includes preparation of temporary storage areas; providing and mobilizing water treatment equipment, plus any moving required within or between *potentially contaminated* areas; providing monitoring equipment to implement the Environmental Health and Safety Plan; providing screening equipment to implement the Environmental Work Plan; and required submittals. Payment for this item will be made upon receipt of documentation that material has been properly disposed.

4. Handling, transportation, treatment, and disposal of *impacted* soil from tunnel construction of water lines is on a unit price basis per cubic yard of bulked spoil. This unit price is in addition to the unit price for installation of water line. Such price includes all additional costs associated with soil from tunnel construction, including shafts, through *impacted* areas, as described in paragraph 3.01, Areas Potentially Contaminated, subparagraph 3.01B.2. Such additional costs include sampling, testing, handling, transportation, temporary storage, treatment, and final disposal in accordance with paragraph 3.06. For this item, assume that all *contaminated* soil can be disposed in a landfill accepting Class I or Class II soil. Payment for this item will be made upon receipt of documentation that material has been properly disposed.

5. Handling, transportation, treatment, and disposal of water pumped from the excavation or from dewatering activities in *potentially contaminated* areas is on an unit price basis per 1,000 gallons of contaminated water. This unit price is in addition to the unit price for installation of water line. Such price includes all additional costs associated with water from construction of water lines through *potentially contaminated* areas. Such additional costs include sampling, testing, handling, transportation, required treatment, temporary storage, and final disposal. For this item, assume that all treated water can be properly disposed in a sanitary sewer and that all material removed from the water by the treatment process can be properly disposed at a petroleum liquid recycling facility. Petroleum contamination levels, as presented in Phase II Environmental Site Assessment (ESA) Report, are expressed in terms of mg/L Total Petroleum Hydrocarbon (TPH). For purposes of interpreting data provided from the design phase, 1 mg/L of TPH can be assumed to be equivalent to 1 mg/L of oil and grease.

6. Refer to Section 01270 – “Measurement and Payment” for unit price procedures.

1.03 REFERENCES

A. ASTM D 5092 – Standard Practice for Design and Installation of Ground Water Monitoring Wells.

B. Code of Federal Regulation (CFR), Title 29, Section 1926 – "Safety and Health Regulations for Construction"

C. CFR, Title 40, Section 261.24 – "Toxicity characteristic"

D. CFR, Title 40, Section 261, Appendix II.

E. Texas Administrative Code (TAC), Title 30, Section 116, Standard Exemptions 68 and 118.

F. TAC, Title 30, Section 321, Subchapter H – "Control of Certain Activities by Rule; Subchapter H: Discharge to Surface Waters from Treatment of petroleum Substance Contaminated Waters.

G. U.S. Environmental Protection Agency (EPA), (SW-846) Test Methods for Evaluating Solid Waste, Office of Solid Waste and Emergency Response, Washington, D.C. (P1388-239223, November 1986)

1.04 SUBMITTALS

A. Submit an Environmental Work Plan to the Project Manager prior to the Date of Commencement.

1. Have the Work Plan prepared by a Corrective Action Project Manager licensed in Texas.

2. Do not commence work in potentially contaminated areas until the Environmental Work Plan for dealing with these materials has been reviewed and accepted by the Project Manager.

3. Include in the Environmental Work Plan:

a. Sequence of construction through potentially contaminated areas;

b. Procedures for screening soil in potentially contaminated areas, identifying impacted material, and identifying contaminated material;

c. Procedures for handling impacted and contaminated material;

d. Proposed location of stockpile areas;

e. Proposed treatment of contaminated material to meet disposal requirements, if required;

f. Proposed methods for disposal of treated or contaminated material;

g. Proposed carriers of contaminated material with verification each is properly licensed;

h. Proposed recycle/disposal sites for contaminated material with verification each is properly licensed;

i. List of any permits that may be required for handling or recycle/disposal of contaminated material;

j. Name and qualifications of professional environmental consultants to be used by Contractor on health, environmental, and safety issues regarding operations within potentially contaminated areas; and,

k. Proposed analytical laboratory with verification it is properly certified.

B. Submit an Environmental Health and Safety Plan to the Project Manager prior to Date of Commencement.

1. Have the plan prepared by either a Corrective Action Project Manager licensed in Texas, with 40 hours of Health and Safety Training, or a Certified Industrial Hygienist.

2. Include in the Plan, methods and procedures for assuring operations under conditions encountered are safe for citizens and workers.

C. Submit a Groundwater Monitoring Plan to the Project Manager prior to Date of Commencement

1. Have the Monitoring Plan prepared by a professional engineer licensed in Texas.

2. Include in the Monitoring Plan number and location of wells to be installed in potentially contaminated areas, size and depth of wells, anticipated screen intervals, type of casing, well development procedures, sampling procedures, plan for disposal of cuttings, number and location of existing wells to be abandoned, and abandonment procedures for wells.

D. Submit to the Project Manager soil and groundwater field screening, monitoring and analytical laboratory test results on a weekly basis as work proceeds. Summarize test results in tables together with applicable regulatory criteria.

E. Submit to the Project Manager copies of correspondence, reports, permits and other documents provided to, or received from, regulatory agencies.

F. Submit to the Project Manager original, signed manifests for off-site disposal of contaminated material.

1.05 RELATED REQUIREMENTS

A. Document 00300 – "Bid"

B. Section 01270 – "Measurement and Payment"

C. Section 01576 – "Waste Material Disposal"

D. Section 01578 – "Control of Ground Water and Surface Water"

1.06 – 1.09 NOT USED

1.10 DEFINITIONS

A. *Potentially contaminated*: Soil and groundwater within station-to-station locations identified in a report where petroleum contamination has been detected during a Phase II ESA.

B. *Impacted*: Soil or groundwater that contains visual or physical evidence of contamination, as described in paragraph 3.01, Areas Potentially Contaminated, subparagraph 3.01B.2.

C. *Contaminated*: Soil that contains petroleum contamination in excess of levels identified in paragraph 3.06, Handling Impacted and Contaminated Soil, subparagraph 3.06A, or groundwater that contains petroleum contamination requiring permitted discharge to storm or sanitary sewer.

1.11 – 1.13 NOT USED

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL / MANUFACTURER(S)

A. Areas Potentially Contaminated

1. Conduct operations in potentially contaminated areas and in impacted areas in accordance with the Environmental Work Plan and the Environmental Health and Safety Plan.

2. Immediately notify the Project Manager and implement the Environmental Health and Safety Plan and the Environmental Work Plan whenever impacted soil or groundwater is encountered.

    a. Provide location, depth, type (soil or groundwater), source (if known), and evidence contamination is suspected.

    b. Impacted material is determined by visual or physical evidence of soil or groundwater contamination. Visual or physical evidence includes a petroleum or chemical odor, an indication of levels of contamination by air monitoring devices included as a part of the Environmental Health and Safety Plan that may be of concern, soil or groundwater discoloration, material oozing/dripping into the excavation, liquid floating on the groundwater, buried containers or refuse, unusual physical symptoms experienced by workers, and field screening results in excess of 50 ppm reading on the photoionization detector (PID). Refer to paragraph 3.04, Screening Potentially Contaminated Soil.

B. Environmental Monitoring in Potentially Contaminated Areas

1. Monitor conditions in *potentially contaminated* areas, as specified in the Environmental Health and Safety Plan, to maintain safe working conditions in accordance with Occupational Health and Safety Administration (OSHA) requirements (29 CFR 1926).

C. Additional Insurance Coverage

1. Contractor has provided unit prices for performing work associated with petroleum contaminated soil, if encountered (See Section 00300 – "BID").

2. Contractor is obligated to perform this work not withstanding paragraph 4.5 of the General Conditions.

3. If any of this work is encountered on this project, Owner may require, at Owner's expense that the Contractor provide additional insurance coverage related to this work.

3.02 PREPARATION (NOT USED)

3.03 ERECTION/INSTALLATION APPLICATION AND/OR CONSTRUCTION

A. Screening Potentially Contaminated Soil

1. Retain services of an environmental consultant or analytical testing laboratory for continuous field screening of soil removed from the excavation in potentially contaminated areas.

a. Place samples in a sealed plastic bag for 15 minutes prior to screening.

b. Use a properly calibrated PID to screen the level of contamination in the head space of the plastic bag.

c. Use 100 ppm isobutylene as the calibration gas.

d. For the purposes of field screening, continuous is defined as at least twice per hour while soils are being removed in open cut areas or shafts, or once for each construction cycle in tunnels (i.e., each pipe length in pipe jacked tunnels or each advance of the tunnel shield in primary-lined tunnels).

2. Soil with field screening results in excess of a 50 ppm reading on the PID, or as otherwise defined in paragraph 3.01, Areas Potentially Contaminated, subparagraph 3.01B.2, is considered impacted.

B. Handling Impacted and Contaminated Soils

1. If soil is contaminated with petroleum only, the concentration of contaminants must exceed one or more of the levels listed in Table 01160B, Soil Contamination Criteria - Petroleum Only to be considered contaminated. Table 01160B is located at the end of this Section.

2. Remove, handle, transport, stockpile, and dispose of contaminated soil under the direction of an individual licensed by the State of Texas as a Corrective Action Project Manager with 40 hours of Health and Safety Training.

3. With concurrence of the Project Manager, place impacted soil, as described in paragraph 3.01, Areas Potentially Contaminated, subparagraph 3.01B.2, in suitable covered containers; in a stockpile at a temporary storage area, pending receipt of analytical results and receipt of authorization from TCEQ and the disposal site for final disposal; or, in trucks for transport directly to the disposal facility.

a. To avoid having to obtain a TCEQ permit for a storage facility, do not commingle impacted soil from different locations or with different sources.

b. Locate the temporary storage area to meet all of the following criteria:

1) Selected by the Contractor.

2) Acceptable to the Owner.

3) Within a reasonable distance to allow access by personnel.

4) Outside the 100-year floodplain.

5) Outside of, and not adjacent to, an area known or suspected to be a wetland.

6) Secured using temporary fencing or other means of controlling access.

c. Place stockpiled soils on an impervious membrane and surround it with a berm to prevent migration of soils or moisture, other than evaporation.

d. Cover the stockpile and protect it from rain using a waterproof membrane covering.

e. Do not place soil over monitoring wells or piezometers, utility line manholes, or any other potential route for water to migrate to the subsurface.

f. Contact TCEQ-Air Permitting Division for assistance with completion of a PI 7 form in accordance with 30 TAC 116 Standard Exemptions 68 and 118. Additional testing may be required to evaluate emission rates from stockpiled soil.

g. Handle runoff from the temporary storage area in accordance with paragraph 3.07, Handling Water.

h. Remove any material, including excavated soil from the construction site, from the temporary storage area prior to completion of the project.

i. Comply with requirements as otherwise required by law.

4. If acceptable emission rates are not exceeded, and with required TCEQ permits and concurrence of the Project Manager, contaminated soil may be mixed and aerated so volatile petroleum hydrocarbons can evaporate, reducing the level of contamination to below concentrations prescribed in paragraph 3.06, Handling Impacted and Contaminated Soils, subparagraph 3.06A or 3.06I. Work the soil as follows:

a. Spread stockpiled material to a maximum depth of 18 inches and make at least 3 passes with a disc harrow and at least 3 passes with a road grader to turn material completely over.

b. Make the specified passes to turn material over at least twice per day for 5 consecutive days or until the material contains less than permissible levels of contaminants.

5. If acceptable emission rates are exceeded and level of contamination is below levels prescribed in paragraph 3.06I, Contractor may choose to dispose of contaminated soil or develop and implement an appropriate emissions control plan, both subject to approval by the Project Manager. Such a plan should include provisions to work the soil as described in paragraph 3.06D, limit emissions to below allowable levels, and obtain required TCEQ permits.

6. If acceptable emission rates are exceeded and level of contamination exceeds levels prescribed in paragraph 3.06I, Contractor may choose to treat contaminated soil by another method or develop and implement an appropriate emissions control plan, both subject to approval by the Project Manager. Again, such a plan should include provisions to work the soil as described in paragraph 3.06D, limit emissions to below allowable levels, and obtain required TCEQ permits.

7. Transport contaminated soil in accordance with Department of Transportation and TCEQ rules and regulations. Use a licensed carrier acceptable to the Project Manager for such transport.

8. Dispose of contaminated soil at a properly licensed facility with prior approval of the Project Manager.

9. Assure that limits of contamination for disposal at the facility are not exceeded. General limits for proper disposal of Class II petroleum contaminated soil at landfills are listed at the end of this Section in Table 01160C, Contamination Limits for Disposal of Class II Soil.

    a. Contact the landfill operator for exact disposal limits and for requirements regarding disposal of other types of contaminated soil.

    b. Obtain signed manifests from the receiving facility and provide originals to the Project Manager.

C. Handling Water

1. Install and operate groundwater control systems, as described in Section 01578 – “Control of Ground Water and Surface Water”, and conduct construction activities in potentially contaminated areas to minimize the spread of contamination. Design and operate the groundwater control systems such that water from potentially contaminated areas is handled in systems separated and isolated from groundwater control systems outside of the potentially contaminated area.

2. Handle, test, treat, and discharge contaminated water to the storm or sanitary sewer in accordance with TCEQ, and EPA requirements.

a. Subchapter H of Section 321, 30 TAC describes the requirements of TCEQ for handling, testing and discharging water contaminated with petroleum to the storm sewer.

b. On-site water handling, treatment, and disposal systems, if not already permitted, are subject to the air permitting provisions of paragraph 3.06C.

c. All such activities shall be under the direction of an individual licensed by the State of Texas as a Corrective Action Project Manager with 40 hours of Health and Safety Training.

3. Treat potentially contaminated, impacted, and contaminated water to be discharged to storm or sanitary sewers in accordance with Table 01160D, or as required to meet other disposal requirements.

a. Provide equipment sized according to standard engineering practices to handle flows anticipated by dewatering operations.

b. Include a standard sized, commercially available oil/water separator as part of the treatment system suitable for intended use for dewatering operation discharges to a storm or sanitary sewer.

c. Where groundwater contamination levels exceed those noted in the Table 01160D, provide additional treatment systems as needed prior to discharge to the sanitary or storm sewers.

d. Do not discharge treated water into a sewer if the flow is less than one foot below the top of the manhole or would cause an overflow situation.

e. Recover free product collected in the treatment equipment.

f. Recycle (i.e., for beneficial reuse) or dispose of recovered contaminants in a manner acceptable to the Project Manager and the TCEQ.

g. Transport contaminated water and recovered contaminants in accordance with Department of Transportation and TCEQ rules and regulations. Use a licensed carrier acceptable to the Project Manager for such transport.

h. Obtain signed manifests from the receiving facility and provide originals to the Project Manager.

i. Furnish laboratory reports to the Project Manager within one week of sample date.

4. Obtain written approval from the Owner for discharge directly to a sanitary sewer which discharges to a wastewater treatment plant prior to commencing such discharge.

5. Obtain a permit from the TCEQ for discharge directly to a storm sewer prior to commencing such discharge.

6. Limits for discharge of water contaminated with only petroleum to sewers are given at the end of this Section in Table 01160D, Petroleum Contaminated Groundwater Discharge Limits

D. Disposal of Material Not Contaminated

1. Dispose of excess or unsuitable excavated materials that are not *contaminated*, off the job site in accordance with Section 01576 – "Waste Material Disposal".

TABLE 01160A
ANALYTICAL TESTS

Suspected Contamination	**Analytical Tests to be Performed**
Acids or caustics	pH
Gasoline	BTEX (if no free product is visible) TPH MTBE (water only) Ignitability/flashpoint (if free product is visible) Lead Oil and Grease
Diesel fuel Jet Fuel Fuel Oils: Nos. 1, 2 and 4	BTEX (if no free product is visible) TPH PAH Ignitability/flashpoint (if free product is visible) Oil and Grease
Lubricating oils Hydraulic fluids No. 6 fuel oil	TPH PAH Oil and Grease
Unknown petroleum contamination Waste oils	BTEX TPH PAH VOC Total metals (soil only) Oil and Grease

Suspected Contamination	**Analytical Tests to be Performed**
Solvents	VOC SVOC TOX Ignitability/flashpoint (if free product is visible)

Notes: BTEX - Benzene, Toluene, Ethyl Benzene, and Xylene
SVOC - Semi-Volatile Organic Compounds
TPH - total petroleum hydrocarbons TOX - total organic halides
MTBE - methyl tertiary butyl ether PAH - Polycyclic aromatic hydrocarbons
VOC - volatile organic compounds

TABLE 01160B
SOIL CONTAMINATION CRITERIA – PETROLEUM ONLY

Contaminant	**Maximum concentration (mg/kg)**
TPH	10.0
Benzene	0.5
Toluene	0.5
Ethyl Benzene	0.5
Xylene	0.5

TABLE **01160C**
CONTAMINATION LIMITS FOR DISPOSAL OF CLASS II SOIL*

Soil Contaminated With	**Contaminant**	**Limit for Disposal**
		Class II Soil
Gasoline or Diesel	TPH BTEX	< 1500 mg/kg and < 150 mg/kg
Waste Oil	TPH BTEX	< 600 mg/kg and <150 mg/kg
	- or -	
	TPH BTEX Benzene	< 600 mg/kg and >150 mg/kg and <5 mg/kg
	- or -	
	TPH BTEX Benzene $_{TCLP}$	< 600 mg/kg and >150 mg/kg and <0.25 mg/L

Note: TCLP - toxicity characteristic leachate procedure (40 CFR 261, Appendix II)
* Class I soils exceed the listed values, but are not hazardous waste as defined by the 40 CFR Part 261.

TABLE 01160D
PETROLEUM CONTAMINATED GROUNDWATER DISCHARGE LIMITS

Parameter	**Discharge to Storm Sewer**		**Discharge to Sanitary Sewer**	
	Limit	Method	Limit	Method
TPH (mg/L)	15	EPA 418.1	N/A	N/A
BTEX (mg/L)	0.5	SW846	N/A	N/A
Benzene (mg/L)	0.05	SW846	N/A	N/A
Lead (mg/L)	0.25	EPA 3020/7421	1.5	EPA 200.7
Lower Explosive Limit (%)	10		10	
pH	6.0 - 9.0	EPA 150.1	5.0 - 11.0	EPA 150.1
Oil and Grease, Total (mg/L)	N/A	N/A	400	EPA 413.1

3.04 – 3.07 NOT USED

3.08 DEMONSTRATION / TESTING AND INSPECTION

A. Sampling and Testing

1. Sample impacted soils at a rate of not less than one composite sample for every 20 cubic yards of excavation or the volume corresponding to every 50 linear feet of installed water line, whichever is more frequent. Make a composite sample by combining 4 samples collected from different locations within the excavated volume.

2. Sample treated water from potentially contaminated areas to be discharged to a sanitary sewer at a rate of one grab sample once per week or as otherwise specified in the discharge permit.

3. Sample treated water from potentially contaminated areas to be discharged to a storm sewer at a rate of one composite sample and one grab sample every 24-hours, or as otherwise specified in the discharge permit. Make a composite sample by combining at least 24 samples of equal volume collected at 1-hour intervals.

4. Analyze soil samples.

a. Analyze samples for the type of contamination suspected, as listed at the end of this section in Table 01160A, Analytical Tests, in accordance with SW-846. Use grab samples for analysis of TPH and VOCs

(including BTEX) and composite samples for analysis of other parameters.

b. Have analyses conducted by a testing laboratory certified by the Environmental Protection Agency.

5. Analyze Groundwater Samples.

a. For discharge to storm sewers, analyze samples for the type of contamination suspected, as listed at the end of this section in Table 01160A, Analytical Tests, in accordance with SW-846. Use grab samples for analysis of TPH and VOCs (including BTEX) and composite samples for analysis of other parameters.

b. For discharge to sanitary sewers, analyze samples for oil and grease.

c. Have analyses conducted by a testing laboratory certified by the Environmental Protection Agency.

3.09 – 3.10 NOT USED

END OF SECTION