SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

September 20, 2022

Mr. Scott Benda
City of Valdez
300 Airport Road, Suite 201
Valdez, Alaska 99686

RE: CUMULATIVE RISK EVALUATION AND CONCEPTUAL SITE MODEL, HERMON HUTCHENS ELEMENTARY SCHOOL, 1009 WEST KLUTINA STREET, VALDEZ, ALASKA; ADEC FILE NO. 2264.026.021 AND 2264.38.044

Dear Mr. Benda,

This letter presents a cumulative risk evaluation and conceptual site model (CSM) prepared for the Hermon Hutchens Elementary School (HHES) located at 1009 West Klutina Street, Anchorage, Alaska (the Property). The HHES, which includes an admin building and a generator building, is located onsite. A vicinity map is included as Figure 1 and a site plan is included as Figure 2. Two active Alaska Department of Environmental Conservation (ADEC) contaminated sites identified as "Hermon Hutchens Elementary School UST 2" (ADEC File No. 2264.26.021) and "Hermon Hutchens Elementary School Admin Bldg" (ADEC File No. 2264.38.044) are located at the site.

BACKGROUND

2018 UST Closure

As documented in our July 2018 *UST Closure and Cleanup Activities, Hermon Hutchens Elementary School, Valdez, Alaska, Facility Identification Number 320* report, one approximately 15,000-gallon underground storage tank (UST) and one approximately 1,000 gallon single-walled UST were removed from the site, in July 2017. The 15,000-gallon UST was located north of the generator building and was used to store fuel for the boilers and emergency generator at the school. The 1,000-gallon UST was located south of the Admin Building and was used to store heating fuel. The former locations of the 15,000-gallon and 1,000-gallon USTs are shown on Figure 2.

Petroleum-impacted soil was documented at each tank location during closure. Analytical soil samples collected following removal of the tanks, and over-excavation of impacted soil, indicated that impacted soil remained at each location. During the removal of the 15,000-gallon UST and over-excavation activities, concentrations of gasoline range organics (GRO)

5430 Fairbanks Street ■ Suite 3 ■ Anchorage, Alaska 99518-1263 ■ 907 561-2120 ■ Fax 206 695-6777
■ www.shannonwilson.com ■

(maximum of 1,020 J+ milligrams per kilogram [mg/kg]), diesel range organics (DRO) (maximum 13,200 mg/kg), benzene (maximum 0.217 mg/kg), toluene (maximum 12.4 mg/kg), ethylbenzene (maximum 22.2 mg/kg), xylenes (maximum 194 mg/kg), 1-methylnaphthalene (maximum 42.4 mg/kg), 2-methylnaphthalene (maximum 49.8 mg/kg), and naphthalene (maximum 15.6 mg/kg) exceeded the ADEC Method Two cleanup levels of 260 mg/kg, 230 mg/kg, 0.022 mg/kg, 6.7 mg/kg, 0.13 mg/kg, 1.5 mg/kg, 0.41 mg/kg, 1.3 mg/kg, and 0.038 mg/kg, respectively.

During the removal of the 1,000-gallon UST and over-excavation activities, concentrations of GRO (maximum 370 J+ mg/kg), DRO (maximum 14,800 mg/kg), benzene (0.110 mg/kg), ethylbenzene (maximum 14.2 mg/kg), xylenes (maximum 90.7 mg/kg), 1-methylnaphthalene (38.4 J+ mg/kg), 2-methylnaphthalene (maximum 47.2 J+ mg/kg), and naphthalene (maximum 17.0 J+ mg/kg) exceeded the ADEC Method Two cleanup levels of 260 mg/kg, 230 mg/kg, 0.022 mg/kg, 0.13 mg/kg, 1.5 mg/kg, 0.41 mg/kg, 1.3 mg/kg, and 0.038 mg/kg, respectively. Approximately 195 cubic yards of petroleum-impacted soil was generated during removal of the tanks and landfarmed offsite. The material was transported offsite and stockpiled in long-term storage cells at the Valdez Baler Facility.

2020 Release Investigation Activities

As documented in our March 26, 2020 *Release Investigation Activities, 1009 West Klutina Street, Valdez, Alaska* report, release investigation activities were conducted at the site in October 2019. The activities consisted of advancing three soil borings (Borings B1, B2, and B3), which were completed as groundwater monitoring wells (Wells MW1, MW2, and MW3), and collecting soil and groundwater samples. Boring B1 was advanced south of the former 1,000-gallon UST excavation located at the Admin Building, Boring B2 was advanced west of the generator building, and Boring B3 was advanced between the source areas and a City of Valdez drinking water supply well. The soil samples collected from Boring B2, advanced adjacent to the Generator Building, contained concentrations of DRO (maximum of 363 mg/kg) exceeding the applicable ADEC cleanup level of 230 mg/kg. The remaining soil and groundwater samples did not contain concentrations of the tested analytes exceeding the applicable ADEC cleanup levels.

2021 Sampling Activities

As documented in our February 9, 2022 *Groundwater and Landfarm Sampling, Hermon Hutchens Elementary School, 1009 West Klutina Street, Valdez, Alaska* report, groundwater samples were collected from Wells MW1 through MW3 in 2021. Contaminant

concentrations exceeding the ADEC Table C cleanup levels were not detected in the groundwater samples.

In a letter dated April 5, 2022, Ms. Janice Wiegers of the ADEC requested the preparation of a CSM and to evaluate cumulative risk for the site, prior to evaluating the site for potential closure.

CONTAMINANTS OF POTENTIAL CONCERN

During the UST closure, release investigation activities, and groundwater sampling activities, soil and groundwater samples have been analyzed for GRO; DRO; benzene, toluene, ethylbenzene, and xylenes (BTEX); volatile organic compounds (VOCs), and/or polynuclear aromatic hydrocarbons (PAHs). The following table presents the analytes which were detected in soil samples during these efforts. As shown on Table 1, the results were compared to the ADEC Method Two migration to groundwater and human health cleanup levels.

Table 1: Detected Analytes

Analyte	Soil- Over 40 Inch Zone Migration to Groundwater CUL (mg/kg)	Soil- Over 40 Inch Zone Human Health CUL (mg/kg)	Soil- 1/10th Human Health CUL (mg/kg)	Soil- Maximum Detected Concentration (mg/kg)
GRO	260	1,400[a]	NA	1,020
DRO	230	8,250[a]	NA	14,800
Benzene	0.022	8.1	0.81	0.217
Toluene	6.7	200	20	12.4
Ethylbenzene	0.13	35	3.5	**22.2**
Xylenes	1.5	57	5.7	**194**
Acenaphthene	37	3,800	380	1.02 J
Fluorene	36	2,500	250	2.06
Naphthalene	0.038	20	2.0	**17.0**
Phenanthrene	39	1,900	190	1.39
1-Methylnaphthalene	0.41	68	6.8	**42.4**
2-Methylnaphthalene	1.3	250	25	**49.8**

Notes:

a. GRO and DRO results compared to the most stringent of the inhalation and ingestion cleanup standards presented in Table B2 of 18 AAC 75.341.

mg/kg = milligrams per kilogram

CUL = cleanup level

NA = not applicable

J = estimated concentration

22.2 = Analyte detected greater than 1/10th Human Health CUL

Per ADEC's *February 2018 Procedures for Calculating Cumulative Risk* guidance document, contaminants of potential concern (COPCs) are compounds that exceed 1/10th the ADEC Method Two human health cleanup levels. As shown on Table 1, ethylbenzene, xylenes, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations exceeding 1/10th the ADEC Method Two human health cleanup levels. Therefore, these analytes are considered site COPCs. DRO was detected at concentrations exceeding the ADEC Method Two ingestion cleanup level of 8,250 mg/kg in samples collected from each of the UST excavations. However, per ADEC's *February 2018 Procedures for Calculating Cumulative Risk* guidance document, ADEC does not require petroleum hydrocarbon fractions to be included in cumulative risk calculations. The remaining tested

analytes were either not detected or did not exceed 1/10th the ADEC Method Two Human Health cleanup levels.

In addition, based on the 2019 and 2021 groundwater sampling events, GRO and DRO are the only tested analytes which have been detected in the groundwater samples. As previously noted, ADEC does not require petroleum hydrocarbon fractions to be included in cumulative risk calculations.

CUMULATIVE RISK EVALUATION

Pursuant to 18 Alaska Administrative Code (AAC) 78.600(d), when detectable contamination remains onsite following a cleanup, a cumulative risk determination must be made that shows the risk from hazardous substances does not exceed a cumulative carcinogenic risk standard of 1 in 100,000 across all exposure pathways. The calculated cumulative carcinogenic risk for the site is 1.7×10^{-5}. The cumulative non-carcinogenic risk standard hazard index of 1.0 across all exposure pathways is exceeded with a calculated hazard index of 1.006. The cumulative carcinogenic and non-carcinogenic risks were calculated by using the COPC analyte concentrations and risk-based concentrations (RBC) presented in the ADEC guidance document for the "over 40-inch zone." Cumulative risk calculations are included in Attachment 1.

CONCEPTUAL SITE MODEL

The following CSM was prepared to identify known and potential exposure pathways at the Property. The CSM was developed using the ADEC's guidance CSM Scoping Form and Graphic Form, which are included as Attachment 2.

Contaminant Sources and Transport Mechanisms

The UST closure activities and cleanup efforts conducted on the Property show that the former 1,000-gallon and 15,000-gallon diesel USTs are considered the source of soil contamination at the Property. Potential transport mechanisms include contaminant migration to subsurface soil, migration to groundwater, and volatilization. Potentially impacted media include surface soil, subsurface soil, groundwater, outdoor air, and indoor air.

Extent of Contamination

Based on soil and groundwater data collected during the UST closure assessment and release investigation activities, petroleum-impacted soil is present in the vicinity of the former tank systems. Based on groundwater flow direction to the southeast and soil and groundwater data, in our opinion, the petroleum-impacted is limited to the former UST excavations and does not extend offsite.

Exposure Pathways

Discussions of the potential exposure pathways are provided below. The narrative includes descriptions of site-specific considerations that increase or decrease the viability of each pathway at the Property. The Property is located in a residential area of Valdez which includes residential structures to the north, south, east, and west greater than 300 feet from the site. The on-site structures consist of an elementary school, generator building, and admin building with parking areas to the east of the buildings, and a playground and open field farther east. The former 1,000-gallon UST was located adjacent to the admin building and the former 15,000-gallon UST was located adjacent to the generator building.

Note this CSM reflects only the known, documented contaminants of concern, and should be revised as warranted if additional site assessment is conducted to address data gaps regarding the nature and/or extent of impacted media.

Soil – Direct Contact

Petroleum-impacted soil is present with 15 feet below ground surface (bgs). Therefore, the incidental soil ingestion pathway is currently considered complete. In addition, due to the presence of the presence of PAH compounds within the top 15 feet bgs, the dermal absorption exposure pathway is also considered complete. Based on current site use and the depth of contamination, viable receptors are likely limited to future site visitors, trespassers, commercial/industrial workers, and construction workers if contaminated soil is uncovered.

Groundwater

Target analyte concentrations were not detected above ADEC Table C cleanup levels in the groundwater samples at the site. However, the petroleum contaminants, PAH, and VOC compounds that have been detected in the soil could potentially migrate to groundwater. HHES is supplied drinking water from the local water utility. A City of Valdez drinking

water supply well is located over 300 feet southwest of the Admin Building. The well is completed to approximately 180 feet bgs and is currently not in operation. ADEC regulation stipulates groundwater must be considered a future potential drinking water source, therefore ingestion and dermal absorption of groundwater are considered potentially complete exposure pathways for future receptors. Potential receptors include future commercial/industrial workers, construction workers, and site visitors.

Air

Volatile hydrocarbon constituents have the potential to impact receptors through outdoor/indoor air inhalation. The outdoor inhalation pathway is considered complete due to the presence of VOCs in soil within 15 feet bgs. In addition, the elementary school, generator building, and admin building are located within 30 feet of the documented soil contamination, therefore the indoor air inhalation (vapor intrusion) pathway is complete. Viable receptors for outdoor air inhalation include current and future site visitors, commercial/industrial workers, and construction workers. Receptors for indoor air inhalation are current and future commercial/industrial workers, site visitors, and construction workers.

Other

Other impacted media and receptors were not identified at the Property.

CSM Summary

Multiple complete or potentially complete exposure pathways have been identified at the Property. The incidental soil ingestion and dermal absorption pathway are potentially complete for future commercial/industrial workers, site visitors, and construction workers. The groundwater ingestion pathway is potentially complete for future commercial/industrial workers and construction workers. Based on the historic soil and groundwater samples, both outdoor air and indoor air inhalation remain viable potential exposure pathways.

It is noted that changes in the Property use or other site conditions may affect the viability of potential exposure pathways. In particular, the CSM will need to be re-evaluated and revised as necessary if construction occurs at the Property, a change in land use occurs, or additional information is obtained regarding either the previously documented contaminated media and/or potential on-site sources.

SHANNON & WILSON

CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives in the study of this site. The findings we have presented in this report are based on the limited sampling and analyses that we conducted. They should not be construed as a definite conclusion regarding the site's soil and groundwater quality. As a result, the sampling and analyses performed is the basis for our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur over time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations for this site may need to be revised.

Shannon and Wilson have prepared and included the document "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our reports.

We appreciate this opportunity to be of service. Please call the undersigned at 907-561-2120 with questions or comments concerning the contents of this report.

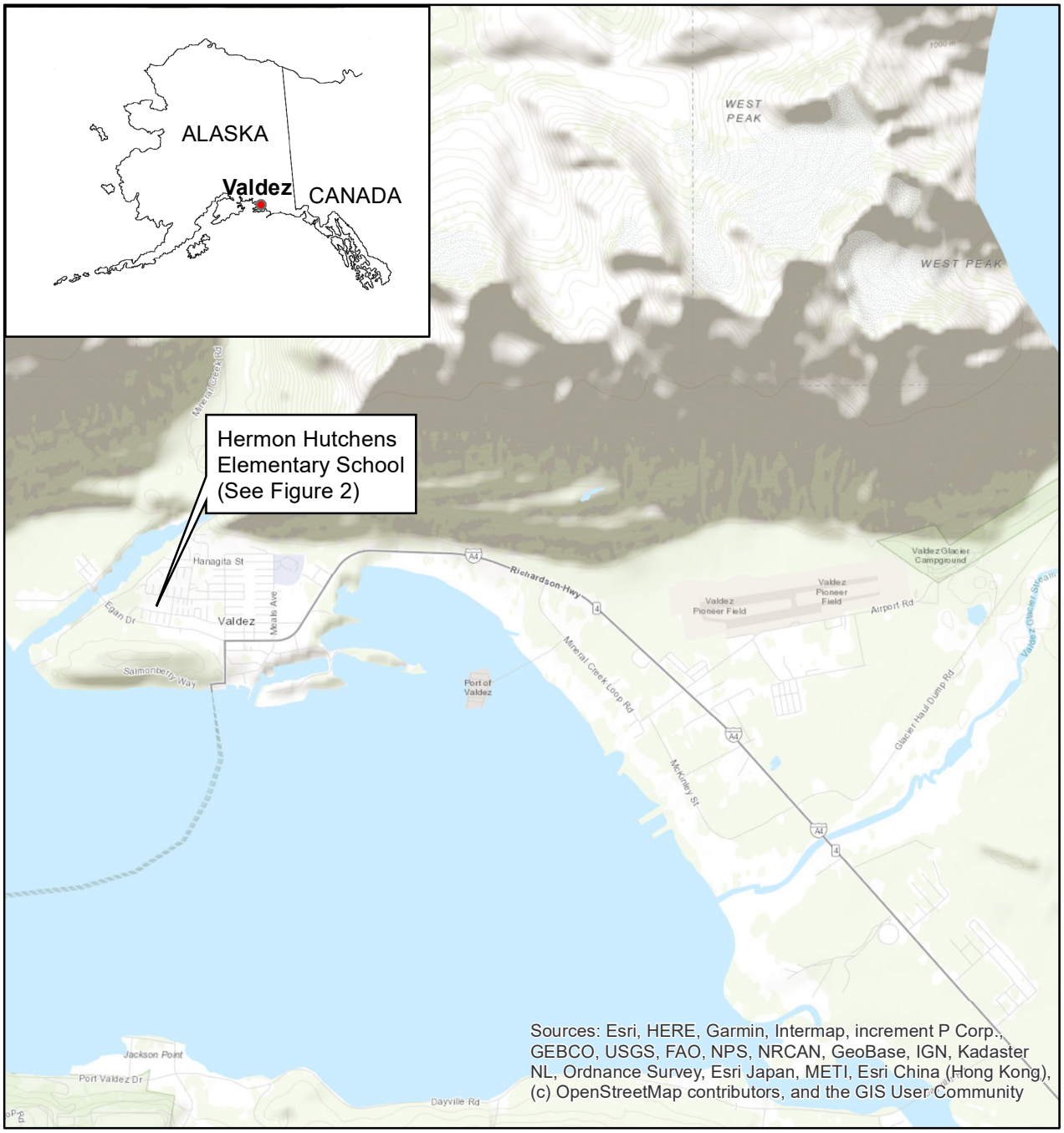
Sincerely,

SHANNON & WILSON

Alec Rizzo
Environmental Staff

Dan P. McMahon, PMP
Vice President

Enc. Figures 1 and 2; and Attachments 1 through 3



N

0 5,750 11,500

Feet

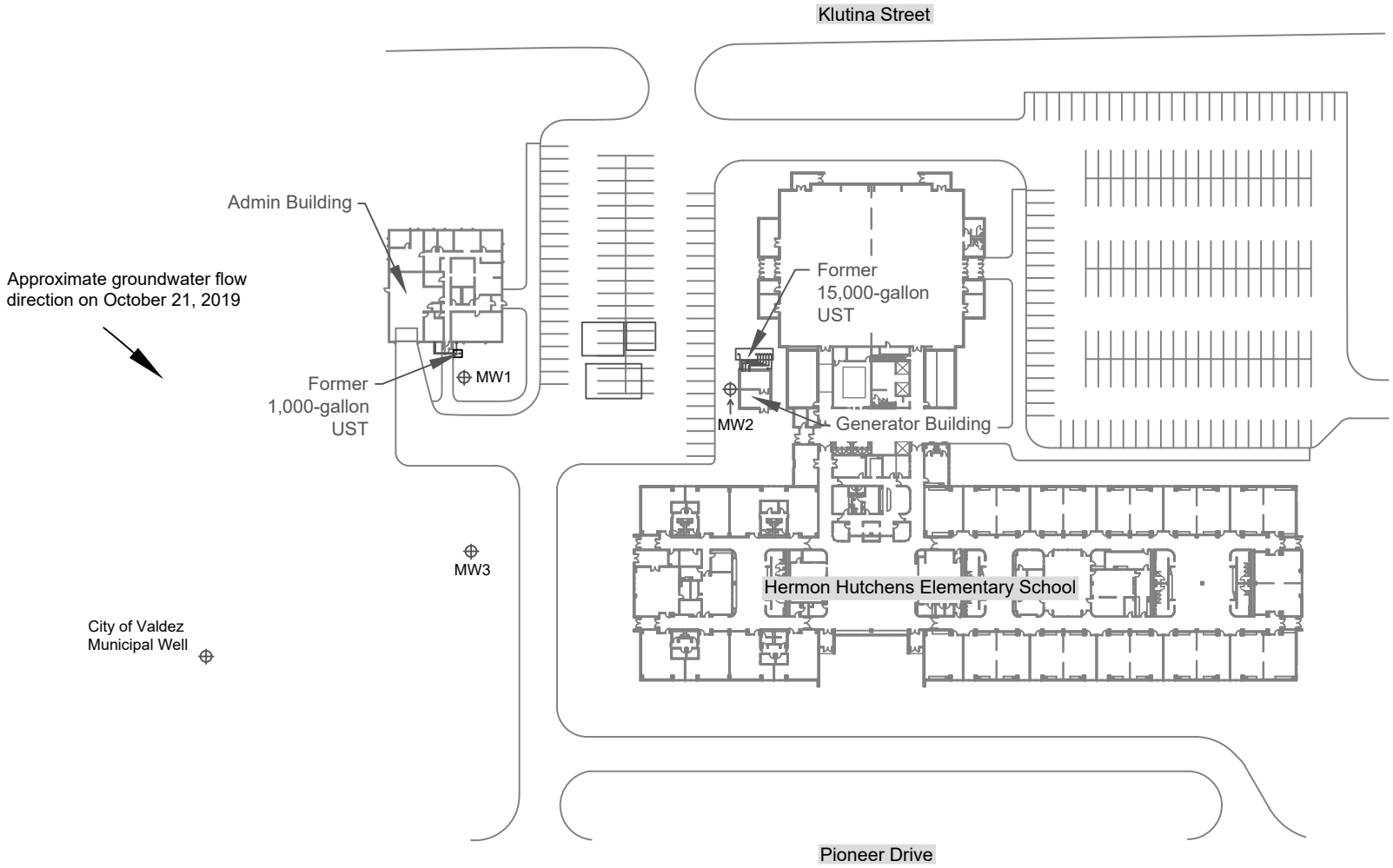
Hermon Hutchens Elementary School
Valdez, Alaska

VICINITY MAP

September 2022 103195-003

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1



NOTES

1. Base drawing provided by RSA Engineering, Inc.

MW1 — Approximate location of Monitoring Well MW1 installed by Shannon & Wilson on October 20, 2019.

0 120 240

APPROXIMATE SCALE IN FEET

Hermon Hutchens Elementary School
Valdez, Alaska

SITE PLAN

September 2022 103195-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2

Attachment 1

Cumulative Risk Evaluation

Ethylbenzene - Soil

APPENDIX A: WORKSHEET FOR CALCULATING CUMULATIVE RISK

Chemicals of Concern Carcinogens	Exposure Media	Exposure Route	Site Concentration (mg/kg, mg/L or mg/m³)	RBC	Conc÷RBC
Ethylbenzene	Soil	Ingestion	22.2	670	0.03313
		Inhalation	22.2	37.4	0.5936

Cumulative Carcinogenic Risk

$$= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 10^{-5}$$

Σ (Conc÷RBC) × 10^{-5} 0.6267 × 10^{-5} Total

Chemicals of Concern Noncarcinogens	Exposure Media	Exposure Route	Site Concentration (mg/kg, mg/L or mg/m³)	RBC	Conc÷RBC
Ethylbenzene	Soil	Ingestion	22.2	8,300	0.002675
		Inhalation	22.2	3,470	0.006400

Cumulative Noncarcinogenic Risk

$$= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 1$$

Σ (Conc÷RBC) X 1 = 0.009075 Total

mg/kg = milligrams per kilogram
mg/L – milligrams per liter
RBC = risk based concentration

Herman Hutchens Elementary School Site Name
Valdez, Alaska.

Xylenes - Soil

APPENDIX A: WORKSHEET FOR CALCULATING CUMULATIVE RISK

Chemicals of Concern Carcinogens	Exposure Media	Exposure Route	Site Concentration(mg/kg, mg/L or mg/m³)	RBC	Conc÷RBC
Cumulative Carcinogenic Risk $= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 10^{-5}$			Σ (Conc÷RBC) × 10^{-5}		Total
Chemicals of Concern Noncarcinogens	Exposure Media	Exposure Route	Site Concentration(mg/kg, mg/L or mg/m³)	RBC	Conc÷RBC
Xylenes	Soil	Ingestion	194	16,000	0.01169
		Inhalation	194	355	0.5465
Cumulative Noncarcinogenic Risk $= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 1$			Σ (Conc÷RBC) X 1	0.5582	Total

mg/kg = milligrams per kilogram
mg/L – milligrams per liter
RBC = risk based concentration

Herman Hutchens Elementary School
Site Name
Valdez, Alaska

1-Methylnaphthalene - Soil

APPENDIX A: WORKSHEET FOR CALCULATING CUMULATIVE RISK

Chemicals of Concern Carcinogens	Exposure Media	Exposure Route	Site Concentration (~~mg/kg~~, mg/L or mg/m³)	RBC	Conc÷RBC
1-Methylnaphthalene	Soil	Ingestion	42.4	254	0.1669
		Dermal	42.4	695	0.06101

Cumulative Carcinogenic Risk

$$= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 10^{-5}$$

Σ (Conc÷RBC) × 10^{-5} = 0.2279 × 10^{-5}

Total

Chemicals of Concern Noncarcinogens	Exposure Media	Exposure Route	Site Concentration (~~mg/kg~~, mg/L or mg/m³)	RBC	Conc÷RBC
1-Methylnaphthalene	Soil	Ingestion	42.4	5,810	0.007298
		Dermal	42.4	18,800	0.002255

Cumulative Noncarcinogenic Risk

$$= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 1$$

Σ (Conc÷RBC) X 1 = 0.009653

Total

mg/kg = milligrams per kilogram
mg/L – milligrams per liter
RBC = risk based concentration

Harmon Hutchens Elementary School
Valdez, Alaska
Site Name

2- Methylnaphthalene - Soil

APPENDIX A: WORKSHEET FOR CALCULATING CUMULATIVE RISK

Chemicals of Concern Carcinogens	Exposure Media	Exposure Route	Site Concentration(mg/kg, mg/L or mg/m³)	RBC	Conc÷RBC
Cumulative Carcinogenic Risk $= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 10^{-5}$			Σ (Conc÷RBC) × 10^{-5}		Total
Chemicals of Concern Noncarcinogens	Exposure Media	Exposure Route	Site Concentration ~~(mg/kg,~~ mg/L or mg/m³)	RBC	Conc÷RBC
2-Methylnaphthalene	Soil	Ingestion	49.8	332	0.1500
		Dermal	49.8	1,080	0.04611
Cumulative Noncarcinogenic Risk $= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 1$			Σ (Conc÷RBC) X 1 = 0.1961		Total

mg/kg = milligrams per kilogram
mg/L – milligrams per liter
RBC = risk based concentration

Herman Hutchens Elementary School Site Name
Valdez, Alaska

Naphthalene - Soil

APPENDIX A: WORKSHEET FOR CALCULATING CUMULATIVE RISK

Chemicals of Concern Carcinogens	Exposure Media	Exposure Route	Site Concentration (mg/kg, mg/L or mg/m³)	RBC	Conc÷RBC
Naphthalene	Soil	Inhalation	17	20.4	0.8333
Cumulative Carcinogenic Risk $= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 10^{-5}$			Σ (Conc÷RBC) × 10^{-5} = 0.8333×10^{-5}		Total
Chemicals of Concern Noncarcinogens	Exposure Media	Exposure Route	Site Concentration (mg/kg, mg/L or mg/m³)	RBC	Conc÷RBC
Naphthalene	Soil	Ingestion	17	1,660	0.01024
		Dermal	17	5380	0.003160
		Inhalation	17	77.3	0.2199
Cumulative Noncarcinogenic Risk $= \left[\left(\frac{conc_x}{RBC_x}\right) + \left(\frac{conc_y}{RBC_y}\right) + \left(\frac{conc_z}{RBC_z}\right) \ldots\right] \times 1$			Σ (Conc÷RBC) X 1 = 0.2333		Total

mg/kg = milligrams per kilogram
mg/L – milligrams per liter
RBC = risk based concentration

Herman Hutchens Elementary School Site Name
Valdez, Alaska

Total Carcinogens - 1.688×10^{-5}

Total Non-Carcinogens - 1.006

Hermon Hutchens Elementary School
Valdez, Alaska

Attachment 2

Conceptual Site Model

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: Hermon Hutchens Elementary School UST 2/ Admin Building

File Number: 2264.26.021 and 2264.38.044

Completed by: Alec Rizzo

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☒ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☐ Other:

Release Mechanisms *(check potential release mechanisms at the site)*

- ☒ Spills
- ☒ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☒ Air
- ☐ Sediment
- ☒ Groundwater
- ☐ Surface water
- ☐ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☐ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☐ Subsistence harvester (i.e. gathers wild foods)
- ☐ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☐ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

GRO, DRO, VOC, and PAH detections greater than ADEC Method Two cleanup levels have been documented between 0 and 15 feet below ground surface (bgs) at the site.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

1-Methylnaphthalene, 2-methylnaphthalene, and naphthalene concentrations greater than ADEC Method Two cleanup levels are present at the site between 0 and 15 feet bgs.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☐

If both boxes are checked, label this pathway complete:

Comments:

Surface water is not located within 1,500 feet of the site. Therefore, surface water was not considered in this CSM.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☐

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☐

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete:

Comments:

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☒

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Ethylbenzene and xylenes were detected at concentrations greater than the ADEC indoor air levels.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Hermon Hutchens Elementary School UST 2/ Admin Building

Completed By: Alec Rizzo

Date Completed: September 2022

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Current & Future Receptors: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil — check soil	☑ soil	☑ Incidental Soil Ingestion		F	F	F			
	☑ Migration to subsurface — check soil		☑ Dermal Absorption of Contaminants from Soil		F	F	F			
	☑ Migration to groundwater — check groundwater		☐ Inhalation of Fugitive Dust							
	☑ Volatilization — check air									
	☐ Runoff or erosion — check surface water									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Subsurface Soil (2-15 ft bgs)	☑ Direct release to subsurface soil — check soil	☑ groundwater	☑ Ingestion of Groundwater		F	F	F			
	☑ Migration to groundwater — check groundwater		☐ Dermal Absorption of Contaminants in Groundwater							
	☑ Volatilization — check air		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Ground-water	☑ Direct release to groundwater — check groundwater	☑ air	☑ Inhalation of Outdoor Air		C/F	C/F	F			
	☑ Volatilization — check air		☑ Inhalation of Indoor Air		C/F	C/F	F			
	☐ Flow to surface water body — check surface water		☐ Inhalation of Fugitive Dust							
	☐ Flow to sediment — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Surface Water	☐ Direct release to surface water — check surface water	☐ surface water	☐ Ingestion of Surface Water							
	☐ Volatilization — check air		☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Sedimentation — check sediment		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Sediment	☐ Direct release to sediment — check sediment	☐ sediment	☐ Direct Contact with Sediment							
	☐ Resuspension, runoff, or erosion — check surface water									
	☐ Uptake by plants or animals — check biota	☐ biota	☐ Ingestion of Wild or Farmed Foods							
	☐ Other (list):									

Revised, 10/01/2010

Attachment 3

Important Information About Your

Geotechnical/ Environmental Report

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 103195-003

Date: September 2022
To: City of Valdez

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland