

Request for Bid

Fixed-Price Defined Scope of Work

Remedial Pilot Testing

Solicitor

Sohail A. Riarh

Sohail's Store

835 South Eisenhower Boulevard, Middletown, PA 17057-5502

PADEP Facility ID #: 22-16012 PAUSTIF Claim #: 2020-0014(I)

Date of Issuance

January 26, 2022

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The Pennsylvania Underground Storage Tank Indemnification Fund (PAUSTIF), on behalf of the claimant who hereafter is referred to as the Client or Solicitor, is providing this Request for Bid (RFB) to prepare and submit a bid to complete the Scope of Work (SOW) for the referenced Site. The Solicitor is the current owner/operator of the Site. PAUSTIF has determined that the claim reported by the Solicitor is eligible for coverage from the PAUSTIF subject to the applicable statutes and regulations. Reimbursement of Solicitor approved reasonable and necessary costs, not to exceed the claim aggregate limit, for the corrective action work described in this RFB will be provided by PAUSTIF. Solicitor is responsible to pay any applicable deductible and/or proration.

Each bid response will be considered individually and consistent with the evaluation process described in the PAUSTIF Competitive Bidding Fact Sheet which can be downloaded from the PAUSTIF website <https://ustif.pa.gov>.

Calendar of Events

Activity	Date and Time
Notification of Intent to Attend Site Visit	February 15, 2022 by 5 p.m.
Mandatory Pre-Bid Site Visit	February 16, 2022 at 10 a.m.
Deadline to Submit Questions	March 2, 2022 by 5 p.m.
Bid Due Date and Time	March 9, 2022 by 3 p.m.

Contact Information

Technical Contact
<p>Christopher D. O’Neil, P.G. Groundwater Sciences Corporation 2550 Interstate Drive, Suite 303 Harrisburg, PA 17110 coneil@groundwatersciences.com..</p>

All questions regarding this RFB and the subject Site conditions must be directed via email to the Technical Contact identified above with the understanding that all questions and answers will be provided to all bidders. The email subject line must be **“Sohail’s Store – 2020-0014(I) – RFB QUESTION”**. Bidders must neither contact nor discuss this RFB with the Solicitor, PAUSTIF, underground utility representatives/owners, the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania Department of Environmental Protection (PADEP), or ICF unless approved by the Technical Contact. Bidders may discuss this RFB with subcontractors and vendors to the extent required for preparing the bid response. Questions and their respective answers will become part of the RFB, which in turn, will become part of the final contract. Bidders are responsible to monitor questions and answers and address any changes, modifications or clarifications made to the RFB as a result of the questions and answers.

Requirements

Mandatory Pre-Bid Site Meeting

On behalf of the Solicitor, the Technical Contact, or their designee will hold a mandatory Site visit on the date and time listed in the Calendar of Events to conduct a Site tour for one (1) participant per bidding company. The Technical Contact will collect questions and respond via email. All questions and answers will be provided via email to all attendees. This meeting is mandatory for all bidders, no exceptions. This meeting will allow each bidding company to inspect the Site and evaluate Site conditions. **A notice of the bidder's intent to attend this meeting is requested to be provided to the Technical Contact via email by the date listed in the Calendar of Events with the subject "Sohail's Store – 2020-0014(I) – SITE MEETING ATTENDANCE NOTIFICATION"**. The name and contact information of the company participant should be included in the body of the email. Notification of intent to attend is appreciated; however, it is not required. Attendance at the Pre-Bid Site Meeting is mandatory and each attendee must sign-in with the Technical Contact on site to record attendance. Due to the circumstances surrounding the COVID-19 pandemic, all attendees should follow CDC safety guidelines. Changes to the Site meeting date and/or time due to inclement weather conditions or other unexpected circumstances will be posted at <https://ustif.pa.gov/bids>; and, the Technical Contact may notify via email all companies that provided Site Meeting Attendance Notification.

Submission of Bids

To be considered for selection, an electronic .pdf version of the signed bid package must be submitted to RA-Bid-Submission@icf.com by the bid due date and time in the Calendar of Events. Bid cost spreadsheets may be submitted in Microsoft Excel format. File sizes in excess of 5 MB are to be submitted using a file share service of your choosing. If you do not have access to a file share service, an email must be sent to RA-Bid-Submission@icf.com, at least 24 hours prior to the bid due date and time, to request access to PAUSTIF's third party administrator, ICF, file share service. Reply messages will be sent to acknowledge receipt of emails. Bid responses will only be accepted from those companies that attended the Mandatory Pre-Bid Site Meeting. Bids attempted to be submitted through ground services such as USPS, UPS, Fed-Ex, etc. or hand delivery will not be considered for selection. PAUSTIF, in its discretion, reserves the right to reject or allow correction to bid submissions that are substantively deficient in some manner, but any late submission will be rejected.

The bid must be received by 3 p.m., on the due date shown in the Calendar of Events. Bids will be opened immediately after the 3 p.m. deadline on the due date. Any bids received after this due date and time will be returned. If, due to inclement weather, natural disaster, or any other cause, the deadline for submission may be extended. The PAUSTIF's third party administrator,

ICF, may notify all companies that attended the Mandatory Pre-Bid Site Meeting of an extended due date. The hour for submission of bids shall remain the same.

Bid Requirements

The Bid Submission Coversheet included as Attachment 1 to this RFB must be completed, signed by an authorized representative of the company, and included as the first page of the Bid Submission. Bids that are not signed may be rejected. The name and contact information of the person who is to be contacted in the event clarification is required and/or the bid is selected by the Solicitor must be listed on the Bid Submission Coversheet.

The Solicitor wishes to execute a mutually agreeable contract with the selected consultant ("Remediation Agreement"). The Remediation Agreement is included as Attachment 2 to this RFB. The bidder must indicate if the Remediation Agreement is accepted with no changes. If changes are proposed, bidder must identify and document proposed modifications to the Remediation Agreement language other than obvious modifications to fit this RFB (e.g., names, dates, and descriptions of milestones). The number and scope of any modifications to the standard agreement language must be listed on the Required Responses Submission Form (Attachment 3), including, but not limited to, terms and conditions, Exhibits A and B, Site-Specific Assumptions and Provisions; and, will be one of the criteria used to evaluate the bid and will need to be agreed upon by both the Solicitor and PAUSTIF (for funding).

The selected consultant will be provided an electronic copy of the draft Remediation Agreement in Microsoft Word format to allow agreement-specific information to be added. The selected consultant shall complete the agreement-specific portions of the draft Remediation Agreement and return the document to the Technical Contact within 10 business days from date of receipt.

The Remediation Agreement fixed costs shall be based on unit prices for labor, equipment, materials, subcontractors/vendors, and other direct costs. The total cost quoted in the bid by the selected consultant will be the maximum amount to be paid by the Solicitor unless a change in scope is authorized and determined to be reasonable and necessary. There may be deviations from and modifications to this SOW during the project. The Remediation Agreement states that any significant changes to the SOW will require approval by the Solicitor, PAUSTIF, and PADEP. NOTE: Any request for PAUSTIF reimbursement of the reasonable costs to repair or replace a well will be considered on a case-by-case basis.

The bidder must complete and include in their bid response the Required Responses Submission Form, included as Attachment 3 to this RFB.

The bidder shall provide its bid cost only in the Bid Cost Submission Form (included as Attachment 4) with descriptions for each task provided in the body of the bid document. No cost information should be provided in the technical submittal. Bidders are responsible to ensure all costs are provided in the Bid Cost Submission Form, and calculations (including, but not limited to the total bid cost) are accurate; the Bid Cost Submission Form must be signed by an authorized representative of the company. In addition, bidders are required to include, as backup for the Bid Cost Submission Form, a list of bid labor rates and a detailed breakdown of each milestone fixed-cost including, but not limited to, labor, subcontractor costs and mark-up, direct costs, and equipment. Copies of subcontractor quotes and/or estimates should be included as part of the cost submittal backup. The technical score for bids will be based solely on those tasks represented as milestones included in the Bid Cost Submission Form and the total bid cost. Any optional bidder-defined tasks, milestones, or cost adders that are not requested as part of this RFB will not be considered by the Bid Evaluation Committee in the technical review and technical score for the bid.

Each bid will be assumed to be valid for a period of up to 180 days after receipt unless otherwise noted. The costs quoted in the Bid Cost Submission Form will be assumed to be valid for the duration of the Remediation Agreement.

Please note that the total fixed-price bid must include all costs, including those cost items that the bidder may regard as “variable”. These variable cost items will not be handled outside of the total fixed-price quoted for the SOW unless the RFB requests costing alternatives for specific items or services.

The RFB is requesting a total fixed-price bid unless the RFB requests costing alternatives for specific items or services. PAUSTIF will not agree to assumptions (in bids or the selected bidders executed Remediation Agreement) referencing a level of effort and/or hours. Costs provided in your bid should be developed using your professional opinion, experience, and the data provided. PAUSTIF will not reimburse costs for additional hours to complete activities included as part of the base bid/contract price.

Each bid response document must include at least the following:

1. Completed Bid Submission Coversheet (Attachment 1), Required Responses Submission Form (Attachment 3) and Bid Cost Submission Form (Attachment 4 and must include supporting documentation).
2. Demonstration of the bidder’s understanding of the Site information provided in this RFB, standard industry practices, and objectives of the project.

3. A clear description, specific details, and original language of how the proposed work scope will be completed for each milestone. The bid should specifically discuss all tasks that will be completed under the Remediation Agreement and what is included (e.g., explain groundwater purging/sampling methods, which guidance documents will be followed, what will be completed as part of the Site specific work scope/SCR/RAP implementation). Bidders must bid the Scope of Work as requested in this RFB. Recommendations for changes/additions to the Scope of Work proposed in this RFB shall be discussed, quantified, and priced separately; however, failure to also bid the SOW "as is" may result in a low technical score. Bids should include enough original language conveying bidder's thought such that the understanding of site conditions, closure approach (if applicable), and approach to addressing the scope of work can be evaluated. Since bidders are not prequalified, the bid response must provide the Bid Evaluation Committee and Solicitor enough information to complete a thorough review of the bid and bidder.
4. A copy of an insurance certificate that shows the bidder's level of insurance consistent with the requirements of the Remediation Agreement. Note: The selected consultant shall submit evidence to the Solicitor before beginning work that they have procured and will maintain Workers Compensation, commercial general and contractual liability, commercial automobile liability, and professional liability insurance commensurate with the level stated in the Remediation Agreement and for the work to be performed.
5. The names and brief resumes and statement of qualifications of the proposed project team including the proposed Professional Geologist and Professional Engineer (if applicable) who will be responsible for overseeing the work and applying a professional seal to the project deliverables (including any major subcontractor(s)). Resumes should directly follow the Required Responses Submission Form.
6. A description of subcontractor involvement by task. Identify and describe the involvement and provide actual cost quotations/bids/proposals from all significant specialized subcontracted service (e.g., drilling/well installations, laboratory, etc.) as part of the bid cost submission back up. If a bidder chooses to prepare its bid without securing bids for specialty subcontract services, it does so at its own risk. Added costs resulting from bid errors, omissions, or faulty assumptions will not be considered for PAUSTIF reimbursement.
7. A detailed schedule of activities for completing the proposed SOW including reasonable assumptions regarding the timing and duration of Solicitor reviews (if any) needed to complete the SOW. Each bid must provide a schedule that begins with execution of the Remediation Agreement with the Solicitor and ends with completion of the final milestone proposed in this RFB. Schedules must also indicate the approximate start and end date of each of the tasks/milestones specified in the Scope of Work, and indicate the timing of all proposed key milestone activities (e.g., within 30 days of the contract being executed).

8. A description of how the Solicitor, ICF, and the PAUSTIF will be kept informed as to project progress and developments and how the Solicitor (or designee) will be informed of and participate in evaluating technical issues that may arise during this project.
9. A description of your approach to working with the PADEP. Describe how the PADEP would be involved proactively in the resolution of technical issues and how the PADEP case team will be kept informed of activities at the Site.
10. Key exceptions, assumptions, or special conditions applicable to the proposed SOW and/or used in formulating the proposed cost estimate. Key exceptions, assumptions, or special conditions that bidder proposes as modification to the Remediation Agreement must be identified and listed on the Required Responses Submission Form (Attachment 3). Please note that referencing extremely narrow or unreasonable assumptions, special conditions, and exceptions will be considered during bid evaluation and may negatively impact technical score.

Bid Review and Evaluation

1. Bid Review and Scoring

Bid submissions where the bidder was represented at the mandatory pre-bid site meeting and that were properly submitted by the designated due date and time will be accepted for review.

Clarification & Additional Information

After receipt of the bids, the USTIF shall have the right to contact Bidders for the purpose of:

- Seeking clarification of the Bid which informs the USTIF's understanding of statements or information in the Bid;
- As a result of clarification, determining whether the bidder seeks to withdraw their bid.

Administrative Evaluation

USTIF will determine if a bid is administratively qualified based on certain criteria including, but not limited to acceptance of the Remediation Agreement, proposed modifications to the Remediation Agreement, history of terminated Remediation Agreements and demonstration of insurance requirements.

Technical Scoring

Bids that are considered administratively qualified are evaluated for technical viability before cost is considered. Bids that have technical scores that are equal to or greater than 70% of the highest technical score will advance to cost scoring. Bids with technical scores below 70% of the highest technical score are eliminated from further consideration.

Numerical values will be assigned for defined SOW bids for two categories:

- Understanding the problem and demonstrating knowledge of how to perform the work
- Qualifications and Experience

Numerical values will be assigned to three categories in those cases where there is a bid-to-result request:

- Understanding of the problem
- Technical and Regulatory Approach to Remediation
- Qualifications and Experience

Cost Scoring

Cost scores are determined by a cost formula. The bid(s) with the lowest total cost receives the maximum cost points available. The remaining bids are scored by applying the following cost formula: $(1 - ((B - A) / A)) \times C = D$

A = the lowest bid cost

B = the bidder's cost being scored

C = the maximum number of cost points available

D = bidder's cost score (points)

If a bid cost is double or greater than double the amount of the lowest bid cost the bid will be assigned zero cost points.

2. Evaluation of Bids

A committee comprised of at least two members of the USTIF staff, two members of TPA staff, and the TPR who assisted in developing the RFB will score all bids that are administratively qualified based on the above criteria. USTIF reserves the right to assign additional non-scoring members to the evaluation committee as needed. USTIF recognizes that several bids may be acceptable and receive similar numerical scores. At the conclusion of the scoring process, the claimant will receive those bids whose numerical scores place them in the category of meeting Reasonable and Necessary criteria and acceptable for USTIF funding. The claimant may select any of the consulting firms that had a technical score that allowed the bid to advance to cost scoring, to implement the tasks described in the bid; however, USTIF will only provide funding up to the highest fixed price of those bids determined to be Reasonable and Necessary for USTIF funding.

General Site Background and Description

Each bidder should carefully review the existing information and documentation provided in Attachment 5. The information and documentation has not been independently verified. Bidders may wish to seek out other appropriate sources of information and documentation specific to this Site. If there is any conflict between the general Site background and description provided herein and the source documents within Attachment 5, the bidder should defer to the source documents. All figures, reports, and logs referenced in this Section are provided in Attachment 5.

Site Name and Address

Sohail's Store - 835 South Eisenhower Boulevard, Middletown, Pennsylvania 17057-5502.

Facility Information

The facility is a retail fueling station and convenience store located along South Eisenhower Boulevard in Lower Swatara Township, Dauphin County, Pennsylvania (**Figure 1**). The facility is connected to municipal sewer and water. The 0.91-acre property is surrounded by a bulk petroleum terminal to the north and west, a restaurant to the south, and Eisenhower Boulevard to the east.

The underground storage tanks (USTs) at the facility are located on the east and west sides of the convenience store building (**Figure 2**). Three USTs exist at the facility consisting of one 10,000-gallon diesel fuel UST (Tank 006), one 8,000-gallon unleaded gasoline UST (Tank 007), and one 12,000-gallon unleaded gasoline UST (Tank 008) that were installed in 1996. In January and February 2020, product piping and dispenser sumps were replaced for Tanks 006, 007, and 008, and the tank-top containment sump for Tank 006 was replaced. No information is available regarding former Tanks 001 through 005.

Release Description

On December 11, 2019, PADEP was notified of a confirmed release of unleaded gasoline at the facility. The release is reported to have occurred from a leaking product pipeline for Tank 007 at dispenser 3/4 shown on **Figure 2**. PADEP Incident No. 53571 was assigned to the release.

Characterization and Remedial Activities

In October 2020, a Site Characterization Report (SCR) was submitted to PADEP and in May 2021 a Remedial Action Plan (RAP) was submitted. The SCR and RAP identified the selected remediation standard as the Statewide health standard (SHS) for soil and groundwater. PADEP approved the SCR and RAP in a letter to the claimant dated July 9, 2021.

Characterization activities described in the SCR and RAP consisted of the installation and sampling of soil borings SB-1 through SB-18 and monitoring wells MW-1 through MW-10. PADEP unleaded gasoline short-list parameters were detected in soil and groundwater samples at

concentrations exceeding the PADEP nonresidential used aquifer SHS medium specific concentrations (MSCs).

A total-phase extraction (TPE) system was proposed in the RAP to remediate soil and groundwater at the site. The TPE system design was based on characterization data and pilot testing results. Discussion of the characterization results and proposed remedial approach are provided in the following sections.

Geology and Hydrogeology

Soil at the property is mapped by the United States Department of Agriculture (USDA) as the Chavies Series soil that is described as a fine sandy loam or silty sand. Bedrock is mapped by the Pennsylvania Geologic Survey as the Triassic age Gettysburg Formation that consists of clastic sedimentary rock (shale and sandstone).

Cross section A-A' (**Figure 3**) illustrates site soil and geology. As shown on the cross section, unconsolidated materials were logged to the maximum depth of the borings and wells (25 feet below ground surface [bgs]).

Unconsolidated materials were logged as primarily silty clay and clay. Fill material (e.g., pea gravel used for UST system backfill), sand, silty sand, sandy silt, sandy clay, gravelly silt, and gravelly clay were also logged. A soil sample from MW-6 at a depth of 10 to 15 feet bgs was submitted to a geotechnical laboratory for analysis. Although the log for MW-6 reports silty clay at this depth interval, the laboratory reported the sample as silty sand.

From mid-2020 through early 2021, depth to groundwater measurements in monitoring wells ranged from 12 to 18 feet below top of well casing (BTOC). As discussed in the SCR and RAP, the inferred direction of groundwater flow is toward the southeast.

Soil Quality

Soil sample analytical data is presented in the SCR dated October 2020. **Figure 4** shows the locations for samples of unsaturated and/or saturated soils (as those terms are defined by the PADEP) with concentrations that exceed the PADEP non-residential SHS MSCs. Soil samples from five soil borings located on the eastern side of the convenience store building in the vicinity of the unleaded gasoline storage tank systems reported concentrations that exceeded the MSCs. The highest constituent of concern (COC) concentrations in soil were reported in samples from SB-4 and SB-15 located adjacent to dispensers 3/4 and 5/6, respectively. Sample locations, depths, and parameters with concentrations greater than MSCs are as follows:

1. SB-1 (12 to 13 feet bgs) – naphthalene and 1,2,4-Trimethylbenzene (124TMB),
2. SB-4 (14 to 15 feet bgs) – benzene, naphthalene, 124TMB, and 1,3,5-Trimethylbenzene (135TMB),
3. SB-6 (14 to 15 feet bgs) – benzene,

4. SB-9 (14 to 15 feet bgs) – 124TMB, and naphthalene, and
5. SB-15 (13 to 14 feet bgs) – ethylbenzene, naphthalene, 124TMB, and 135TMB.

Groundwater Quality

Groundwater sample analytical data is presented in the RAP dated May 2021. **Figure 5** shows the locations for samples of groundwater with concentrations that exceed the PADEP non-residential SHS MSCs. Groundwater samples from seven wells located on the eastern and southern sides of the convenience store building in the vicinity of and downgradient of the unleaded gasoline storage tank systems reported concentrations that exceeded the MSCs. The highest COC concentrations in groundwater were reported in samples from tank field observation well OB-1 and monitoring well MW-5 located in the vicinity of the reported release source at dispenser 3/4. Sample locations and parameters with concentrations greater than MSCs are as follows:

1. MW-1 – benzene and naphthalene,
2. MW-2 – benzene and naphthalene,
3. MW-3 - benzene,
4. MW-5 - benzene, ethylbenzene, naphthalene, toluene, 124TMB, 135TMB, and xylenes (total),
5. MW-6 – benzene and naphthalene,
6. MW-10 - benzene, ethylbenzene, naphthalene, and 124TMB
7. OB-1 - benzene, ethylbenzene, naphthalene, 124TMB, and 135TMB.

Separate-Phase Liquid

Separate-phase liquid (SPL) has only been measured in monitoring well MW-5 in December and July 2020 at thicknesses of 0.2 feet and 0.7 feet, respectively.

Remedial Pilot Test

On March 16, 2021, a total-phase extraction (TPE) pilot test was conducted on recovery well RW-1. As discussed in the Pilot Test Report dated March 2021, a single 7.5-horsepower (HP) rotary claw vacuum pump was used to extract groundwater and vapor from RW-1 during an eight-hour test. Items of note regarding TPE testing procedures and collected data are as follows:

- RW-1 is located approximately 25 feet to the southeast of the reported release source at dispenser 3/4. Although significant hydrocarbon impact was documented in borings and wells adjacent to RW-1 (e.g., high COC concentrations in soil and groundwater and SPL), less significant impact was documented at RW-1. Photoionization detector (PID) measurements were below 31 parts per million (ppm) in the smear zone soil characterized, COC concentrations in extracted vapor were low, only 1-pound of contaminants was removed during testing, and COC concentrations in water samples from RW-1 were below PADEP non-residential SHS MSCs.
- During testing, the RW-1 casing vacuum was only four inches of mercury (inHg).

- The measured RW-1 air flow value of 21 standard cubic feet per minute (scfm) did not match the pump performance curve at the measured vacuum generated. This discrepancy was attributed to equipment or measuring device malfunction.
- Measured vacuum was 0.2 inches of water column (inH₂O) or less at monitoring wells surrounding RW-1.
- RW-1 vapor sample PID measurements ranged from 71 to 137 ppm.
- RW-1 vapor sample laboratory analysis results showed low concentrations of total petroleum hydrocarbons (TPH) ranging from 32 to 58 ppm.
- RW-1 groundwater sample laboratory analysis results showed low concentrations of petroleum constituents. Only ethylbenzene, naphthalene, and 124TMB were detected at reported concentrations less than the PADEP non-residential SHS MSCs.
- Groundwater flow rate during testing was approximately 1 gallon per minute (gpm), which is acceptable for TPE, if the smear zone was dewatered at that flow rate. However, the test was not conducted for a long enough period to allow a determination of adequate smear zone dewatering.
- Water level drawdown in monitoring wells around RW-1 ranged from 0.01 to 1.82 feet during testing indicating that the short-duration test did not provide sufficient smear zone dewatering to evaluate the effectiveness of TPE.
- Dissolved iron in RW-1 groundwater was reported at <0.2 milligrams per liter (mg/L).

Based on the RW-1 pilot test data, the feasibility of TPE technology was not demonstrated to the extent necessary to justify moving forward with a full-scale system. A longer-duration TPE pilot test is needed to show that this technology can be practically and economically used to lower the water table to expose the smear zone to vapor extraction. Therefore, a second pilot test is needed as described in this RFB work scope.

Scope of Work (SOW)

This RFB seeks competitive bids from qualified contractors to perform the activities in the SOW specified herein. PADEP has informally reviewed the scope of work.

Objective

This SOW includes remedial pilot testing activities as part of a Defined Scope of Work RFB. Following completion of the SOW in this RFB, remaining corrective action activities necessary for the Solicitor to obtain relief from liability under the SHS will either be competitively bid, or the consultant selected for this RFB may be invited to continue work under a fixed-price remediation agreement.

Constituents of Concern (COCs)

The COCs for this Site are the PADEP unleaded gasoline short-list parameters that include benzene, toluene, ethylbenzene, xylenes (total), isopropylbenzene (cumene), methyl tertiary butyl ether (MTBE), naphthalene, 124TMB, and 135TMB.

General SOW Requirements

The bidder's approach to completing the SOW shall be in accordance with generally accepted industry standards/practices and all applicable federal, state, and local rules, regulations, guidance, and directives. The latter include, but are not limited to, meeting the applicable requirements of the following:

- The Storage Tank and Spill Prevention Act (Act 32 of 1989, as amended);
- Pennsylvania Code, Title 25, Chapter 245 - Administration of the Storage Tank Spill and Prevention Program;
- The Land Recycling and Environmental Remediation Standards Act of 1995 (Act 2), as amended);
- Pennsylvania Code, Title 25, Chapter 250 - Administration of Land Recycling Program; and
- The PADEP Land Recycling Program Technical Guidance Manual (TGM) dated March 27, 2021 (Technical Guidance Document 261-0300-101); and
- Pennsylvania's Underground Utility Line Protection Law, Act 287 of 1974, as amended by Act 121 of 2008.

During completion of the milestone objectives specified, the selected consultant shall:¹

- Conduct necessary, reasonable, and appropriate project planning and management activities. Such activities may include Solicitor communications/updates, meetings, record keeping, subcontracting, personnel and subcontractor management, quality assurance/quality control, scheduling, and other activities (e.g., utility location). Planning and management activities will also include preparing and implementing plans for health and safety, waste management, field sampling/analysis, and/or other plans that are necessary and appropriate to complete the SOW. Planning and management shall include identifying and taking appropriate safety precautions to not disturb Site utilities including, but not limited to, contacting Pennsylvania One Call as required prior to any ground-invasive work. As appropriate, project management costs shall be included in each bidder's pricing to complete the milestones specified below.
- Be responsible for coordinating, managing, and completing the proper management, characterization, handling, treatment, and/or disposal of all impacted soils, water, and derivative wastes generated during the implementation of this SOW. The investigation-derived wastes, including purge water, shall be disposed in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives. Waste characterization and disposal documentation (e.g., manifests) shall be maintained and provided to the Solicitor and the PAUSTIF upon request. All investigation derived wastes shall be handled and disposed per PADEP's Regional Office guidance. It is the selected consultant's responsibility to conform with current PADEP Regional Office guidance requirements in the region where the Site is located.
- Be responsible for providing the Solicitor and facility operator with adequate advance notice prior to each visit to the property. The purpose of this notification is to coordinate with the Solicitor and facility operator to ensure that appropriate areas of the property are accessible. Return visits to the Site will not constitute a change in the selected consultant's SOW or result in additional compensation under the Remediation Agreement.

Site-Specific Guidelines

- **Responsibility:** Upon execution of the Remediation Agreement, the selected consultant shall become the consultant of record for the Site and the Solicitor. It is expected that the consultant will represent the interest of the Solicitor and PAUSTIF during the execution of all aspects of the project associated with this RFB.

¹ As such, all bids shall include the costs of these activities and associated functions within the quote for applicable tasks/milestones.

- **Field Work.** Provide 72-hour advance notification to the Solicitor prior to field work activities. Field activities should be conducted Monday through Friday between 8:00 AM to 5:00 PM, unless authorized by the Solicitor.
- **Safety Measures:** Each bidder should determine the level of safety measures needed to appropriately complete the work. If a bidder believes it is appropriate and necessary to implement safety measures other than or beyond what is required in the SOW, it should be included in their bid response and fixed-price cost. If a bidder includes costs to conduct specific safety measures or activities, the bidder should specify it in the bid response and discuss why it is appropriate and necessary and indicate which methods will be utilized and to what extent. Cost is not the only factor when evaluating proposals and other factors are taken into consideration during the review process, including appropriate safety measures.
- **Investigation Derived Waste Disposal:** Investigation derived waste (IDW), including soil/rock cuttings, development and purge water, SPL (if present), vapor-phase carbon (if required), and liquids, should be disposed of per the instructions included in the “General SOW Requirements” section of the RFB. The selected consultant will be responsible for arranging any off-site waste disposal (as required) and including costs in their bid response to cover the disposal of all potential waste related to the milestones included in the SOW. Containerized IDW may be temporarily stored on Site at a location agreeable to the Solicitor and should be removed from the Site in a timely manner. Except for IDW volumes specified in Milestones D, E, and F, PAUSTIF will not entertain any assumptions on the contract for costs regarding a volume of waste. Bidders are responsible for including costs to manage and dispose of all anticipated volumes of waste in your bid response based on professional opinion, experience, and data provided. If your bid proposes to dispose of waste under a permit, then your bid needs to include the costs to dispose of waste if the permit is not approved. Invoices submitted to cover additional costs for waste generated as part of activities included under the fixed price contract for this Site will not be paid.
- **Milestones Requiring Approval Prior to Initiation:** This RFB includes contingent Milestone H under the base scope of work and Optional Milestones I through U that may not be reasonable and necessary to perform based on the information gathered by the selected consultant upon completion of the SOW for Site-Specific Milestones A through G. Therefore, the selected consultant shall obtain approval from the Solicitor and PAUSTIF (for funding consideration) prior to initiating Milestone H and optional milestones.

Site-Specific Milestones

Milestone A – Private Utility Mark Out. Conduct a private utility mark out to confirm locations of underground utilities within 10 feet of the proposed new wells. The mark out is to include notification to the Pennsylvania One Call System, discussions with the Solicitor regarding utilities,

review of utility drawings for the facility, and a geophysical survey using ground-penetrating radar (GPR), metal detectors, and utility/line locators. The mark out should include determining the location, construction, use, and depth of underground utilities (e.g., storm sewers, sanitary sewers, water supply lines, drainage pipelines, and conduits) and UST system components (tanks and pipelines).

Underground utilities and UST system components shall be marked on the ground surface with paint and/or stakes during the mark out and photographed. A report shall be prepared with the results of the private utility mark out and a discussion of utilities.

Milestone B - Well Installations. Drill, sample, construct, and develop the following:

- Monitoring wells MW-11, MW-12, and MW-13,
- Multi-phase extraction (MPE) wells MPE-1 and MPE-2,
- Air sparge (AS) well AS-1, and
- Soil vapor extraction (SVE) well SVE-1.

The locations of the wells are shown on **Figure 6**. The well installations shall be completed under the supervision of a Pennsylvania-licensed Professional Geologist.

An Encroachment Agreement with Buckeye Pipe Line Transportation, LLC (Buckeye) was obtained during previous characterization activities at the facility (see Encroachment Agreement in Attachment 5). The agreement was obtained due to the close proximity of wells to the on-site underground gas pipeline located adjacent to the east side of the canopy. Prior to the well installations, the selected consultant shall contact the owner of the pipeline and determine whether a new or modified agreement is required. Cost associated with an encroachment agreement, if required, are to be included as Optional Milestone T.

The locations and construction of the monitoring, MPE, AS, and SVE wells are specifically intended to conduct pilot testing in Milestones E and F. Therefore, if the well locations need to be adjusted more than two feet from the mapped locations or well construction varies by more than two feet from the descriptions in this Milestone (below), the selected consultant shall notify the Solicitor and PAUSTIF and provide the technical justification before proceeding.

Each well location shall be cleared for underground structures prior to drilling (e.g., underground utilities). Clearing shall be completed to a diameter equal to or greater than the diameter of the down-hole drilling equipment to a minimum depth of five feet bgs.

Milestone B1 consists of determining if a new or modified encroachment agreement is necessary, underground utility clearing, collecting soil samples using direct-push technology (DPT), and analyzing soil samples. Milestone B2 consists of using air-rotary drilling methods to install

monitoring, MPE, AS, and SVE wells and constructing the wells following an evaluation of soil sampling data generated during Milestone B1.

Soil samples shall be collected from ground surface to the total depth of the well or refusal, whichever is encountered first. Samples are to be inspected at a minimum of two-foot depth intervals and field screened with a flame ionization detector (FID), calibrated to hexane (1,000 ppm), using a consistent head-space type analysis within 20 minutes of sample collection as follows:

- Transfer soil sample into a dedicated resealable polyethylene bag and seal the bag,
- Manually break up soil clumps and shake the bag,
- Allow headspace development for at least 10 minutes at approximate room temperature,
- Introduce the instrument sampling probe through a small opening in the bag into the headspace, and
- Record the highest FID response.

Two discrete samples per well location shall be submitted to the analytical laboratory for analysis based on FID screening results. One of these samples shall be collected from smear zone soil. Samples shall be collected in laboratory-provided containers and analyzed by a PADEP-accredited laboratory using appropriate analytical methods and detection levels for the substances listed in the COC section of this RFB.

One geotechnical sample shall also be collected from each well location to confirm soil texture from an interval representative of the bulk soil to be remediated. Each sample shall be submitted to a laboratory for sieve and hydrometer analysis using American Society for Testing and Materials (ASTM) D422 or equivalent method. Analysis results, including a particle-size distribution (gradation) curve, shall be provided in a report prepared by the geotechnical laboratory.

The wells shall be completed using air-rotary drilling methods and developed in accordance with generally accepted practices outlined in the PADEP Groundwater Monitoring Guidance Manual, included as Appendix A to the PADEP's TGM as follows:

- Complete two-inch diameter monitoring wells MW-11, MW-12, and MW-13 to a depth of 25 feet bgs. The wells shall be constructed using schedule 40 polyvinyl chloride (PVC) materials with factory-slotted screen installed from a depth of 5 to 25 feet bgs in a minimum four-inch diameter borehole.
- Complete four-inch diameter multi-phase extraction wells MPE-1 and MPE-2 to a depth of 30 feet bgs. The wells shall be constructed using schedule 40 PVC materials with the top of the factory-slotted well screens set at a depth of no less than five feet bgs to allow for both air and water to enter the well and to limit potential short circuiting of atmospheric air

during pilot testing. The wells shall be constructed in a minimum eight-inch diameter borehole.

- Complete two-inch diameter air sparge well AS-1 to a depth of 35 feet bgs. The well shall be constructed with a short factory-slotted screen interval from 27 to 30 feet bgs and a five-foot sump below the screen to allow for siltation from 30 to 35 feet bgs. The well shall be constructed using schedule 40 PVC materials in a minimum four-inch diameter borehole. A minimum five-foot-thick bentonite grout seal shall be installed above the screen.
- Complete four-inch diameter soil vapor extraction well SVE-1 to a depth of 20 feet bgs. The well shall be constructed using schedule 40 PVC materials in a minimum eight-inch diameter borehole with a factory-slotted screen interval from 5 to 20 feet bgs.
- Each new well shall be developed no sooner than 24 hours following construction. Existing monitoring wells MW-1, MW-2, and MW-5 shall also be developed in preparation for pilot testing. The objective of development is to remove fine-grained material from the well/filter pack and provide hydraulic communication between the well screen and surrounding formation. A surge block combined with a water removal mechanism (e.g., air lift or pump) shall be used for development. The surge block shall be raised and lowered over the entire length of the well screen several times concurrent with water removal. Development should be performed for a minimum of one hour or until turbidity is measured at less than 10 Nephelometric Turbidity Units (NTUs), whichever is sooner.
- Bidders shall include in their bid response procedures for well drilling and construction.

The wells shall be completed at the surface with a monitoring well manhole and a water-tight lid, set in concrete flush with the ground surface. A pressure-fit, watertight cap with a lock shall be placed on each well to prevent surface water infiltration and to restrict unauthorized access.

A log for each well shall be prepared that includes classification of encountered soil/rock using a standard and consistent classification system procedure (e.g., Modified Burmister or Unified Soil Classification System [USCS]) and the construction details of the well. The headspace screening results must be recorded on all logs. The logs shall be prepared under the supervision of a Pennsylvania-licensed Professional Geologist.

Milestone C – Site Survey. Complete a site survey by a Pennsylvania-licensed Professional Land Surveyor. The survey should include the convenience store building, underground utilities identified during the private utility mark out, unleaded gasoline storage tank system components, existing monitoring wells, new monitoring, MPE, AS, and SVE wells, and property and right-of-way boundary lines.

According to the Solicitors consultant, who installed MW-8 and MW-9, approval from PennDOT was not obtained for these wells, which are located adjacent to the west side Eisenhower Boulevard (State Route 3001). A Site Access Agreement for MW-9 was executed with the

adjacent property owner (see Access Agreement in Attachment 5); however, the Solicitors consultant indicates that MW-9 was not installed on the off-site property. The SOW for the site survey shall include determining whether a PennDOT Right-of-Entry (ROE) agreement is required for existing monitoring wells MW-8 and MW-9. Cost associated with obtaining approval from PennDOT, if required, are to be included as Optional Milestone U.

The survey shall be referenced to the Pennsylvania State Plane coordinate system with reference to the North American Datum of 1983 (NAD83) and feature elevations shall be surveyed to a vertical accuracy of 0.01 feet using the North American Vertical Datum (NAVD 88).

The Site survey results shall be documented in a report that is signed and sealed by a Pennsylvania-licensed Land Surveyor that includes the following:

- Scaled map showing surveyed features,
- Tabulated information for monitoring, MPE, AS, and SVE wells (top of well casing and ground surface elevations and geographic coordinates [northings and eastings]), and
- References to datums used for the survey.

Milestone D – Groundwater Monitoring and Sampling. Perform two rounds of groundwater monitoring and sampling, an initial event (Milestone D1) and second confirmatory event (Milestone D2). The initial event includes the new Milestone B wells (MW-11, MW-12, MW-13, MPE-1, MPE-2, AS-1, and SVE-1) and shall be completed no sooner than two weeks following development. The second event is to include all site wells (MW-1 through MW-13, MPE-1, MPE-2, AS-1, and SVE-1) and shall be completed no sooner than four weeks following the initial event. The second event shall be completed so it occurs during the calendar quarter following the most recent quarterly groundwater sampling event performed by the consultant retained by the claimant prior to the execution of the Remediation Agreement associated with this RFB.

During each event, the depth to groundwater and SPL thickness (if present) in all site wells shall be gauged (measured) prior to purging for sampling. If a measurable thickness of SPL is present in a well, it shall be removed, and the volume removed measured and recorded for each well prior to the collection of a groundwater sample. For the purposes of this RFB, bidders shall assume that SPL will be present in four wells prior to purging and sampling during each event. For the purposes of this RFB, bidders shall assume 10-gallons of SPL will be generated during groundwater monitoring.

The monitoring, MPE, AS, and SVE wells shall be purged using a low-flow method and sampled in general accordance with the Groundwater Monitoring Guidance document, included as Appendix A to the PADEP's TGM. Field parameters to be measured and recorded at each well during purging shall consist of pH, temperature, specific conductance, dissolved oxygen (DO), and oxidation/reduction potential. Groundwater and quality assurance/quality control (QA/QC) samples, including a trip blank and blind duplicate sample, shall be collected in laboratory-

provided containers and analyzed by a PADEP-accredited laboratory using appropriate analytical methods and detection levels for the substances listed in the COC section of this RFB.

Bidders are required to provide in their bid response document the following:

- Purging and sampling methods,
- SPL removal, containerization, and disposal procedures,
- QA/QC sample collection protocols, and
- Laboratory analysis methods.

Milestone E – Multi-phase Extraction (MPE) Remedial Pilot Testing. The scope of MPE testing includes the following:

- 24-hour MPE test on MPE-1.
- 8-hour MPE test on MPE-1 and MPE-2 immediately following completion of the 24-hour test on MPE-1.

For purposes of this RFB, MPE is defined as using a single vacuum pump to extract water, vapor, and SPL (if present) through a 1.5-inch diameter drop (stinger) tube installed within six inches of the bottom of the four-inch diameter MPE wells. The MPE testing shall be conducted with a minimum 15 HP rotary claw or rotary lobe blower capable of generating a minimum air flow of 100 actual cubic feet per minute (acfm) for each well tested and an operating vacuum of at least 20 inches of mercury (Hg). Use of a vacuum truck to perform any part of this testing is not acceptable.

Successful pilot testing will obtain data for use in the design of the full-scale MPE system as follows:

- Applied blower vacuum and air-flow rate to maximize vapor and water removal,
- Air-flow rate on the discharge side of the blower,
- Vapor influent hydrocarbon concentrations (using laboratory analysis from Tedlar® bag air samples) and mass removal rate (using field FID measurements—the FID shall be calibrated to 1,000 ppm hexane),
- Water level drawdown in wells MPE-1 and MPE-2, AS-1 and SVE-1, and site wells during MPE testing (OB-1 and MW-1 through MW-13),
- Mass removal rate in extracted groundwater,
- Stinger tube and casing vacuum measurements at MPE wells (the target operating casing vacuum in MPE wells tested is 8-10 inches of Hg, or more),
- Vacuum response in site wells during MPE testing (SVE-1, OB-1, and MW-1 through MW-13),
- Vapor radius of influence (ROI) - defined in this RFB as an arbitrary 1-inH₂O vacuum at the end of the 24- and 8-hour tests,

- Dewatering radius of influence (ROI) and steady-state groundwater extraction rate required to expose the smear zone to air in the MPE and surrounding wells,
- Physical chemistry of the groundwater (DO, pH, specific conductance, temperature, total suspended solids [TSS], total/dissolved iron and manganese, and turbidity),
- SPL extraction rates and determine whether SPL separation is necessary,
- Carbon usage for vapor-phase treatment,
- Future MPE well spacing, and
- Future vapor treatment (carbon or thermal/catalytic oxidizer).

Bidders shall include in their bid response for pilot testing the following:

- Process and instrumentation diagram (P&ID) of the pilot test equipment set-up. The P&ID should indicate locations and sizes/types of piping, moisture/vapor separation tank, blower, liquid containment tank, vapor treatment, sampling locations (vapor and liquid), meters, gauges, and electrical/controls instrumentation. Individual piping runs from each extraction well (home run piping), shall be used so that air/water flow and mass recovery can be determined on an individual MPE well basis. In addition, the P&ID should identify instrumentation used to measure vacuum, pressure, flow, and temperature.
- Information on subcontracted pilot test services and/or equipment, if proposed.
- Power source and power source requirements for testing equipment.
- Specification for pilot test blower (manufacturer, type/model, motor size, and performance curves for vacuum operation).
- Description of pilot test equipment enclosure.
- Permit requirements and a scope/schedule for obtaining regulatory approval. This shall include discussion with PADEP southcentral regional office representatives to determine whether an air quality request for determination (RFD) is required to be submitted for pilot testing. Cost for RFD effort, if required, are to be included in Optional Milestone Q.
- Specification for vapor-phase carbon treatment (e.g., carbon type and amount), if required.
- Copies of field data sheets for documenting testing results.
- Health and safety procedures.
- Monitoring and sampling procedures that include the following:
 - Procedures for monitoring well vacuum and water level monitoring. Use of pressure transducers can lead to erroneous results under vacuum conditions and are not to be used. Therefore, monitoring wells should be sealed (capped) between gauging events for vacuum to be maintained. Vacuum measurements shall be obtained using a portable mechanical vacuum gauge from a fitting/control valve or a fixed (dedicated) vacuum gauge installed on the top of the well cap. Water levels shall be measured manually. Although some water level fluctuation may occur when the well cap is temporarily removed for measuring, the rate of water level change should be sufficiently slow to allow for adequate water level measurements.

- Procedure for measuring air flow rates. Air flow rates must be measured after the knockout tank and on the discharge side of the blower (any make-up air used must be accounted for in air flow and mass removal calculations) and corrected for vacuum, pressure, and temperature. Redundant air-flow measurement methods are required to ensure precision. A pitot tube, venturi, or orifice plate should be used as one air-flow measurement method.
- Method and equipment for field measurements of hydrocarbon levels in extracted vapor samples collected at regular intervals throughout the testing of each MPE well to calculate mass removal rates. Measurements must be collected using an FID (note: pilot test mass removal rates from vapor are calculated from field measurement data, not laboratory data).
- Method and equipment for measuring the volume of groundwater removed from each MPE well to calculate extraction rate in gpm.
- Procedure for groundwater and vapor sample collection and analysis. Samples shall be collected from MPE-1 at the start, middle, and end of the 24-hour test. During the subsequent eight-hour testing, samples shall be collected from MPE-2 at the beginning and end of the test. Groundwater samples shall be collected from the wells if SPL is present and following its removal. Samples shall be collected in laboratory-provided containers and analyzed by a PADEP-accredited laboratory using appropriate analytical methods and detection levels for the substances listed in the COC section of this RFB. In addition, analyze groundwater samples collected from MPE-1 and MPE-2 at the end of the testing for DO, pH, specific conductance, temperature, TSS, total/dissolved iron and manganese, and turbidity.
- Procedures for IDW management and disposal during MPE testing in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives as follows:
 - Groundwater containment and disposal. For the purposes of this RFB, bidders shall assume 5,000 gallons of groundwater will be generated during testing.
 - Disposal of vapor-phase carbon if treatment of extracted vapors during testing is required.
 - SPL containment (e.g., oil water separator) and disposal. For the purposes of this RFB, bidders shall assume 20 gallons of SPL will be generated during testing.

Milestone F – Air Sparge and Soil Vapor Extraction Remedial Pilot Testing. The AS and SVE testing shall be completed no sooner than one week following completion of the MPE pilot testing and consists of the following:

- Four-hour air sparge test on AS-1.
- Three consecutive one-hour vacuum step tests on SVE-1 at progressively higher vacuums.
- Eight-hour combined air sparge/soil vapor extraction test on AS-1 and SVE-1.

Objectives of AS and SVE pilot testing are to obtain data for use in the design of full-scale system are as follows:

- Verify the vertical migration of the injected air from the point of injection (top of AS-1 well screen) up through the saturated zone and into the vadose zone;
- Determine the wellhead pressure and air flow relationship (used to specify the design pressure and flow rate at the AS wellhead and to identify the appropriate type and size of compressor);
- Verify and quantify the petroleum hydrocarbon mass removal rate, airflow rates, and vapor phase constituents and concentrations captured in the SVE air stream (used to design the air emission treatment system); and
- Determine the potential AS well operating cycle frequency and well spacing.

The following pilot test design considerations and data collection objectives shall be evaluated as part of pilot testing:

- For AS Testing - The formation fracture pressure in pounds per square inch in gauge (psig) (wellhead pressure not to be exceeded) shall be approximated by $0.73D$, where D is the depth below surface to the top of the sparge well screen (27 feet), or approximately 20 psig. The fracture pressure of 20 psig shall not be exceeded during testing.
- For air sparge well AS-1, above ground conveyance piping shall be galvanized. Pressure exerted on the piping shall not exceed the pressure rating for the pipe. Minimum two-inch diameter conveyance pipe shall be used for the pilot test.
- Rotameters shall be used to monitor air flow and shall be mounted vertically in an up flowing pipe. A pressure gauge shall be mounted at the outlet of the rotameter to measure pressure in the conveyance piping following any pressure drop across the rotameter. Pressure gauges can use quick-connect fittings at the manifold, if desired. Quick-connect fittings shall be used at the well head to promote uniformity of pressure measurements between wells.
- Monitoring wells assumed to be in the sparge zone should be equipped with a nipple or quick-connect fitting so that a pressure gauge can be attached to the well head to confirm that no excessive pressure exists in the well and that the well cap can be safely removed.
- Injection pressure and air flow rate testing (verify assumed pressure / air flow to wellhead) shall be performed to verify that a minimum of 10 scfm can be achieved at a maximum pressure of 15 psig.
- The air compressor used for the pilot test must be capable of producing pressures up to 20 psig and air flows of up to 20 scfm.
- At the start of the pilot test, the pressure in the air sparge well shall be gradually increased until air flow is detected (the pressure where air flow is detected should be greater than the calculated hydrostatic pressure required to displace the water in the sparge well and must be calculated at time of test based on the water level in the well). Note: If the applied

pressure is less than the hydrostatic pressure, it is likely that the pilot test piping or air sparge well casing has a leak. All information and data shall be documented.

- The air flow rate should be increased to the design air flow rate of 10 scfm and the applied pressure should be recorded (Note: Do not exceed 20 psig). If the pressure is below 15 psig at 10 scfm, the pressure should be increased to 15 psig and the air flow rate documented. Note: The applied pressure will be higher during the period of initial pore water displacement (air replacing water in saturated pore space). Once water is displaced and pathways are established, the applied pressure at the well head will decrease to steady state conditions. Run system for three hours at 15 psig in this steady state condition (document air flow). Note: Even if a flow rate of less than 10 scfm is measured at the design pressure of 15 psig, continue to run test. Collect data, below, during test and for one-hour after system has been shut off (post-test).
- Monitor data in surrounding wells in 15-minute intervals as follows:
 - Groundwater elevation changes (mounding) – Water level measurements using a hand-held probe shall be performed in all wells monitored starting at the beginning of air injection.
 - Changes in DO – Field DO probes should be slowly lowered into each well and the DO monitored.
 - Changes in vadose zone pressure – Record pressure increase in all wells monitored. Monitoring wells used for this purpose cannot have submerged screens at the time of testing.
 - Monitoring Well Headspace Screening – During testing, monitoring wells used in testing shall be monitored for volatile organic compound (VOC) concentrations using a FID (calibrated to hexane) or lower explosive limit (LEL) meter.
 - Visual observation of evidence air is entering well (bubbling, foaming, geyser effect) – Document this occurrence at each monitoring point during the intervals specified, where possible. Document by shining light down well. Use of down-hole cameras is not required.
 - Conveyance piping pressure drop – Pressure drop between the manifold and well head shall be measured every 15 minutes during testing if a manifold is used for the test. Excessive pressure drop may indicate that water is collecting in the line, leakage is occurring, or some other form of blockage has occurred.
 - Compressor inlet and outlet pressure (compare to equipment curve).
 - Compressor outlet temperature.
- For SVE testing, a rotary claw or rotary lobe blower is required with a capacity to generate a minimum of 100 acfm air flow (per well tested) and a minimum vacuum of 12 inHg.
- SVE Vacuum Step Test – Testing shall be conducted using three, one-hour vacuum steps, 4-inHg, 8-inHg, and 12-inHg. The vapor flow rate and groundwater mounding in SVE well and monitoring wells shall be determined. The vacuum can be modulated either by using a variable-frequency drive (VFD) or by using a control valve on the vacuum side of the

blower. These data shall be collected during each step test per the intervals mentioned as follows:

- Blower vacuum, extraction well-head vacuum, extracted vapor flow rate, temperature, and dilution air flow rate (if used): twice per step.
 - Extraction well and monitoring well water levels: prior to and at the end of each step.
 - Monitoring well vacuums: once per step.
 - VOC concentrations in extracted vapor using FID (calibrated to hexane) – twice per step.
- Constant Rate AS/SVE Test – The AS/SVE test shall be conducted at 15 psig and flow rate determined from AS testing. SVE system shall be operated using optimum flows and influence developed during step tests. Data shall be collected during the eight-hour combined constant rate AS/SVE test per the intervals mentioned, below, as follows:
 - Groundwater levels and SPL thickness – one per hour.
 - DO in groundwater – one per hour.
 - Extraction well head casing vacuum – one per hour.
 - Extracted vapor flow rate and temperature – one per hour.
 - VOC concentrations in extracted vapors using FID (calibrated to hexane) – two per hour.
 - Visual observation of evidence sparge air is entering well (bubbling, foaming, geyser effect) – Once at start and once at end of test (system running).
 - System blower and compressor performance – one per hour.
 - Vacuum in monitoring wells – one per hour.
 - Conveyance piping pressure drop – Pressure drop between the manifold and well head shall be measured every 15 minutes during testing if a manifold is used for the test. Excessive pressure drop may indicate that water is collecting in the line, leakage is occurring, or some other form of blockage has occurred.
 - Compressor inlet and outlet pressure (compare to equipment curve).
 - Compressor outlet temperature.
 - Compare blower vacuum and air flow to blower performance curve – one per hour.
 - Laboratory analysis of extracted vapors – Once after one hour of AS/SVE combination testing.
 - Record volume of water in moisture separator and SPL removed.
 - Laboratory analysis of water – once at end of AS/SVE testing.

Bidders shall include in their bid response for AS/SVE pilot testing the following:

- P&ID of the pilot test equipment set-up. The P&ID should indicate locations and sizes/types of piping, moisture/vapor separation tank, blower, air compressor, liquid containment tank, vapor treatment, sampling locations (vapor and liquid), meters, gauges,

and electrical/controls instrumentation. In addition, the P&ID should identify instrumentation used to measure vacuum, pressure, flow, and temperature.

- Information on subcontracted pilot test services and/or equipment, if proposed.
- Power source and power source requirements for testing equipment.
- Specification for pilot test blower (manufacturer, type/model, motor size, and performance curves for vacuum operation).
- Description of pilot test equipment enclosure.
- Permit requirements and a scope/schedule for obtaining regulatory approval. This shall include discussion with PADEP southcentral regional office representatives to determine whether an air quality RFD is required to be submitted for pilot testing prior to MPE pilot testing (cost to be included in Milestone E). Cost for RFD effort, if required, are to be included in Optional Milestone Q.
- Specification for vapor-phase carbon treatment (e.g., carbon type and amount), if required.
- Copies of field data sheets for documenting testing results.
- Health and safety procedures.
- Procedures for IDW management and disposal during AS/SVE testing in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives, including the following:
 - Groundwater containment and disposal. For the purposes of this RFB, bidders shall assume 100 gallons of groundwater will be generated during testing.
 - Disposal of vapor-phase carbon if treatment of extracted vapors during pilot testing is required.
 - SPL containment and disposal. For the purposes of this RFB, bidders shall assume 10-gallons of SPL will be generated during testing.

Milestone G – Preparation of Remedial Action Progress Report (RAPR). Prepare a RAPR presenting data and results generated during the completion of Milestones A through F. The RAPR shall include the following:

- Comprehensive well gauging data,
- Comprehensive soil and groundwater quality results,
- Groundwater elevation contour maps and discussion of groundwater flow,
- Time versus concentration graphs for wells with COC concentrations in groundwater samples that exceed the PADEP nonresidential used aquifer MSCs,
- Iso-concentration maps for the substances that exceed the PADEP nonresidential used aquifer MSCs,
- Laboratory reports, chains of custody forms, and field sampling documentation,
- Geologic, construction, and development logs for the wells installed in Milestone B,
- MPE and AS/SVE pilot test procedures, data evaluation, and results presented in text, tables, graphs, and figures,

- Recommendations regarding whether MPE is a feasible and cost-effective remedial technology for this Site,
- Recommendations regarding whether AS/SVE is a feasible and cost-effective remedial technology for this Site, and
- Design criteria for full-scale remediation developed from pilot testing.

The RAPR shall be prepared in draft form for review and comment by the Solicitor and the PAUSTIF. The draft RAPR shall be provided within 60 days following the completion of Milestones A through F. The timeframe for the completion of the RAPR shall provide two weeks for the Solicitor's and PAUSTIF's review and the selected consultant shall address comments received from the Solicitor and the PAUSTIF before submission of the RAPR to PADEP. The RAPR shall be signed and sealed by a Pennsylvania-licensed Professional Geologist and a Professional Engineer (if applicable).

Milestone H – Preparation of Revised Remedial Action Plan (RRAP). Prepare and submit a revised RRAP to PADEP with the elements in 25 Pa. Code § 245.311 that include but is not limited to, implementation of MPE or AS/SVE to attain the SHS for soil and groundwater at the site. Preparation of RRAP under this Milestone is contingent upon the bidder successfully demonstrating MPE or AS/SVE is feasible, cost effective, and performance of the Milestone has been agreed to by the Solicitor and PAUSTIF.

The RRAP shall be prepared in draft form for review and comment by the Solicitor and the PAUSTIF. The draft RRAP shall be provided within 60 days following the completion of the RAPR in Milestone G. The timeframe for the completion of the RRAP shall provide two weeks for the Solicitor's and PAUSTIF's review and the selected consultant shall address comments received from the Solicitor and the PAUSTIF before submission of the RRAP to PADEP. The RRAP shall be signed and sealed by a Pennsylvania-licensed Professional Geologist and a Professional Engineer (if applicable).

The cost for Milestone H will be reimbursed as follows:

- **Milestone H1** – Revised RAP submittal to PADEP: 75% of Milestone H.
- **Milestone H2** – Revised RAP approval by PADEP: 25% of Milestone H.

Optional Milestones

All bidders shall provide the cost for each Optional Milestone included in this SOW in Attachment 4. The cost for each Optional Milestone shall include, but not be limited to, all mobilizations, subcontractors, labor, equipment, expenses, and waste handling. The activation of Optional Milestones requires the prior approval from the Solicitor and PAUSTIF (for funding).

Optional Milestone I – Soil Sampling. Collection and laboratory analysis of one soil sample during DPT drilling in laboratory-provided containers and analyzed by a PADEP-accredited laboratory using appropriate analytical methods and detection levels for the substances listed in the COC section of this RFB. This cost will be used to modify the reimbursement for Milestone B and Optional Milestones J, K, L, and M in the event more or less soil samples are collected during drilling of a well.

Optional Milestone J - Installation of Additional Monitoring Well. Pre-clear, sample soil using DPT, drill using air-rotary, construct, and develop one additional monitoring well to a depth of 25 feet bgs following the SOW in Milestone B as follows:

- **Optional Milestone J1** – Install one additional monitoring well during a separate mobilization event.
- **Optional Milestone J2** – Install one additional monitoring well as an add-on to Milestone E or Optional Milestone J1 where mobilization cost has already been included.
- **Optional Milestone J3** – Provide a per-foot cost to modify the reimbursement for installation of a monitoring well accounted for by Milestone B or Optional Milestones J1 and J2 if a well is advanced shallower or deeper than then the prescribed depth of 25 feet bgs.
- **Optional Milestone J4** – Provide an additional per-foot cost to modify the reimbursement for installation of a monitoring well accounted for by Milestone B or Optional Milestones J1 and J2 if well can't be installed using air-rotary and hollow-stem auger drilling is required (in addition to air rotary).

Optional Milestone K - Installation of Additional MPE Well. Pre-clear, sample soil using DPT, drill using air-rotary, construct, and develop one additional MPE well to a depth of 30 feet bgs following the SOW in Milestone B as follows:

- **Optional Milestone K1** – Install one additional MPE well during a separate mobilization event.
- **Optional Milestone K2** – Install one additional MPE well as an add-on to Milestone B or Optional Milestone K1 where mobilization cost has already been included.
- **Optional Milestone K3** – Provide a per-foot cost to modify the reimbursement for installation of an MPE well accounted for by Milestone B or Optional Milestones K1 and K2 if a well is advanced shallower or deeper than then the prescribed depth of 30 feet bgs.
- **Optional Milestone K4** – Provide an additional per-foot cost to modify the reimbursement for installation of an MPE well accounted for by Milestone B or Optional Milestones K1 and K2 if well can't be installed using air-rotary and hollow-stem auger drilling is required (in addition to air rotary).

Optional Milestone L - Installation of Additional AS well. Pre-clear, sample soil using DPT, drill using air-rotary, construct, and develop one additional AS well to a depth of 35 feet bgs following the SOW in Milestone B as follows:

- **Optional Milestone L1** – Install one additional AS well during a separate mobilization event.
- **Optional Milestone L2** – Install one additional AS well as an add-on to Milestone B or Optional Milestone L1 where mobilization cost has already been included.
- **Optional Milestone L3** – Provide a per-foot cost to modify the reimbursement for installation of an AS well accounted for by Milestone B or Optional Milestones L1 and L2 if a well is advanced shallower or deeper than then the prescribed depth of 35 feet bgs.
- **Optional Milestone L4** – Provide an additional per-foot cost to modify the reimbursement for installation of an AS well accounted for by Milestone B or Optional Milestones L1 and L2 if well can't be installed using air-rotary and hollow-stem auger drilling is required (in addition to air rotary).

Optional Milestone M - Installation of Additional SVE well. Pre-clear, sample soil using DPT, drill using air-rotary, construct, and develop one additional SVE well to a depth of 20 feet bgs following the SOW in Milestone E as follows:

- **Optional Milestone M1** – Install one additional SVE well during a separate mobilization event.
- **Optional Milestone M2** – Install one additional SVE well as an add-on to Milestone B or Optional Milestone M1 where mobilization cost has already been included.
- **Optional Milestone M3** – Provide a per-foot cost to modify the reimbursement for installation of an SVE well accounted for by Milestone B or Optional Milestones M1 and M2 if a well is advanced shallower or deeper than then the prescribed depth of 20 feet bgs.
- **Optional Milestone M4** – Provide an additional per-foot cost to modify the reimbursement for installation of an SVE well accounted for by Milestone B or Optional Milestones M1 and M2 if well can't be installed using air-rotary and hollow-stem auger drilling is required (in addition to air rotary).

Optional Milestone N - Update Site Survey. Update site survey to include Optional Milestone Wells J, K, L, and M following the SOW in Milestone C.

Optional Milestone O – Additional Groundwater Monitoring and Sampling. Perform additional groundwater monitoring and sampling in accordance with the SOW in Milestone D as follows:

- **Optional Milestone O1** – Complete one round of water level measurements from all site monitoring, observation, MPE, AS, and SVE wells and one sampling event from new wells MW-11, MW-12, MW-13, MPE-1, MPE-2, AS-1, and SVE-1 for the substances listed in the COC section of this RFB consistent with the procedures described in Milestone D.
- **Optional Milestone O2** – Complete one round of water level measurements from all site monitoring, observation, MPE, AS, and SVE wells and one sampling event from site wells MW-1 through MW-13, MPE-1, MPE-2, AS-1, and SVE-1 for the substances listed in the COC section of this RFB consistent with the procedures described in Milestone D.
- **Optional Milestone O3** – Complete one round of water level measurements from all site monitoring, observation, MPE, AS, and SVE wells and one sampling event from site monitoring wells MW-1 through MW-13 for the substances listed in the COC section of this RFB consistent with the procedures described in Milestone D.
- **Optional Milestone O4** – Complete sampling of one monitoring well for the substances listed in the COC section of this RFB as an add-on to a Milestone or Optional Milestone where mobilization cost has already been included.
- **Optional Milestone O5** – Complete sampling of one MPE well for the substances listed in the COC section of this RFB as an add-on to a Milestone or Optional Milestone where mobilization cost has already been included.
- **Optional Milestone O6** – Complete sampling of one AS well for the substances listed in the COC section of this RFB as an add-on to a Milestone or Optional Milestone where mobilization cost has already been included.
- **Optional Milestone O7** – Complete sampling of one SVE well for the substances listed in the COC section of this RFB as an add-on to a Milestone or Optional Milestone where mobilization cost has already been included.

Optional Milestone P - Monitoring Well Repairs. Complete monitoring, MPE, AS, and/or SVE well surface completion repairs as indicated below. PAUSTIF reimbursement of well repair costs are considered on a case-by-case basis. Prior approval (for reimbursement) shall be requested and should include documentation of the necessity of well repair, how the well was damaged (if known) and photos of the damaged well.

- **Optional Milestone P1** – Minor repair of a well surface completion that includes the costs to replace manhole lid bolts, manhole lid O-ring, lockable monitoring well “J” plug, and lock. Assume the minor repair will be completed as an add-on to a Milestone or Optional Milestone where mobilization cost has already been included.
- **Optional Milestone P2** – Major repair of a well surface completion that includes the costs to remove, dispose of, and replace the concrete pad and manhole, and the replacement of the “J” plug and lock. Assume the major repair will be completed as an add-on to a Milestone or Optional Milestone where mobilization cost has already been included.
- **Optional Milestone P3** – Major repair of a well surface completion that includes the costs to remove, dispose of, and replace the concrete pad and manhole, and the replacement

of the “J” plug and lock. Assume the major repair will be completed as a stand-alone optional milestone where mobilization cost is included.

Optional Milestone Q – Air Quality RFD. Complete and submit air quality RFD and review fee to PADEP for approval prior to performing pilot testing under Milestones E and F. If required by PADEP, the RFD shall be submitted to PADEP as soon as possible following execution of the Remediation Agreement.

Optional Milestone R – Groundwater, Carbon, and SPL Disposal. Complete disposal of groundwater, carbon, and SPL as an optional milestone to modify reimbursement for Milestones D, E and F as follows:

- **Optional Milestone R1** – Disposal cost on a per gallon basis if more or less than 5,000 and 100 gallons of impacted groundwater are generated during Milestones E and F, respectively.
- **Optional Milestone R2** – Disposal cost on a per pound basis if vapor-phase carbon proposed by the bidder is not used to treat extracted vapors generated during Milestones E and F.
- **Optional Milestone R3** – Disposal cost on a per gallon basis if more or less than 10, 20, and 10-gallons of SPL are generated during Milestones D, E, and F, respectively.

Optional Milestone S – Preparation of RAPR. Prepare and submit RAPR to PADEP in accordance with Milestone G as follows:

- **Optional Milestone S1** - Monitoring and sampling in support of Optional Milestone O1.
- **Optional Milestone S2** - Monitoring and sampling in support of Optional Milestone O2.
- **Optional Milestone S3** - Monitoring and sampling in support of Optional Milestone O3.

Optional Milestone T – Encroachment Agreement. Obtain an Encroachment Agreement from the owner of the on-site underground gas pipeline (if necessary) for proposed RFB well installations based on the determination made in Milestone B1. This cost should include required effort necessary to facilitate issuance of an agreement (e.g., coordination, plan preparation, on-site meeting, answering questions, and execution of an agreement) as follows:

- **Optional Milestone T1** - Completion and approval of a new agreement.
- **Optional Milestone T2** – Completion and approval of a modified agreement.

Optional Milestone U – Preparation of PennDOT Right of Entry Agreement. Prepare and submit PennDOT right-of-entry (ROE) agreement (if necessary) for existing monitoring wells MW-8 and MW-9 based on the determination made in Milestone C. This cost should also include required effort necessary to facilitate issuance of the agreement (e.g., coordination, plan preparation, on-site meeting, answering questions, and executing the agreement).

Do not include the PennDOT security fee in this Optional Milestone's cost. PennDOT security fee is waived on 100% funded PAUSTIF claim sites. Selected bidder shall notify PAUSTIF, through their third-party administrator, if a letter from PAUSTIF is required to waive the fees.

Additional Information

In order to facilitate PAUSTIF's review and reimbursement of invoices submitted under this claim, the Solicitor requires that project costs be invoiced by the milestone identified in the executed Remediation Agreement. Actual milestone payments will occur only after successful and documented completion of the work defined for each milestone. The selected consultant will perform only those tasks/milestones that are necessary to reach the Objective identified in this RFB. Selected consultant will not perform, invoice, or be reimbursed for any unnecessary work completed under a milestone.

Any "new conditions", as defined in Attachment 2, arising during the execution of the SOW for any of the milestones may result in termination of or amendments to the Remediation Agreement. Modifications to the executed Remediation Agreement will require the written approval of the Solicitor and the PAUSTIF (for funding consideration). PADEP approval may also be required.

List of Attachments

1. Bid Submission Coversheet
2. Remediation Agreement
3. Required Responses Submission Form
4. Bid Cost Submission Form
5. Site Information/Historic Documents
 - a. Figures 1 through 6
 - Figure 1 - Site Location Map
 - Figure 2 - Site Features Map
 - Figure 3 – Cross Section A-A'
 - Figure 4 - Soil Sample Location Map
 - Figure 5 - Groundwater Sample Location Map
 - Figure 6 - Pilot Test Well Location Map
 - b. Underground Storage Tank System Closure Report Form, February 20, 2020
 - c. Site Access Agreement, September 29, 2020.
 - d. Site Characterization Report (SCR), October 14, 2020
 - e. Encroachment Agreement, February 12, 2021.
 - f. Progress Report and Remedial Action Plan (RAP), May 26, 2021. Appendix D to this report includes Pilot Test Report, March 2021, and Appendix E includes Remediation System Design Package, May 2021.
 - g. Logs for Soil Borings, Wells, and Soil Vapor Points