

Galleria Drive Bioremediation Treatability Study Phase 2 Cost Estimate and Basis Nevada Environmental Response Trust Site Henderson, Nevada

PREPARED FOR

Nevada Environmental Response Trust

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PRESENTED BY

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LIST OF ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
BEC	Basic Environmental Company, LLC
bgs	below ground surface
MS/MSD	matrix spike/matrix spike duplicates
NERT	Nevada Environmental Response Trust, or Trust
NDEP	Nevada Division of Environmental Protection
NAC	Nevada Administrative Code
NMR	nuclear magnetic resonance logging
ODC	other direct cost
PLFA	phospholipid fatty acids
QA/QC	quality assurance/quality control
SWF	Seep Well Field
TAL	Test America Laboratories
Tetra Tech	Tetra Tech, Inc.
UIC	Underground Injection Control
Work Plan Addendum	Galleria Drive Bioremediation Treatability Study Work Plan Addendum

CERTIFICATION

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been prepared in a manner consistent with the current standards of the profession, and to the best of my knowledge, comply with all applicable federal, state, and local statutes, regulations, and ordinances. I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.

Description of Services Provided: Prepared Galleria Drive Bioremediation Treatability Study Phase 2 Cost Estimate and Basis.



Kyle Hansen, CEM
Field Operations Manager/Geologist
Tetra Tech, Inc.

March 29, 2019

Date

Nevada CEM Certificate Number: 2167
Nevada CEM Expiration Date: September 18, 2020

1.0 BACKGROUND

At the request of the Nevada Environmental Response Trust (NERT or the Trust), Tetra Tech, Inc. (Tetra Tech) prepared this cost estimate and basis to implement Phase 2 of the Galleria Drive Bioremediation Treatability Study in Clark County, Nevada. The Galleria Drive Bioremediation Treatability Study is one of two separate but coordinated in-situ treatability studies that are being performed in the Eastside Study Area, northeast of the NERT site, to evaluate the feasibility and effectiveness of two technologies to reduce contaminant mass flux at the mid-plume containment and mass removal boundary, which has been proposed as a remedial action objective. The second in-situ treatability study, which will evaluate the effectiveness of a zero-valent iron barrier, is being performed by Ramboll. Tetra Tech and Ramboll are coordinating field activities and information to improve overall test efficiency and improve comparability of the results for the two treatability studies.

Treatability study implementation is divided into two phases:

- Phase 1 consisted of specific pre-design investigation activities completed in 2018 to gather additional site-specific information required to finalize the treatability study design. Phase 1 activities and results are presented in the Draft Galleria Drive Bioremediation Treatability Study Work Plan Addendum (Work Plan Addendum).
- Phase 2 activities will consist of implementing the bioremediation treatability study in 2019 and 2020 as described in the Work Plan Addendum.

This document presents the estimated cost and basis of estimate to implement Phase 2 of the Galleria Drive Bioremediation Treatability Study as described in the Work Plan Addendum.

2.0 PHASE 2 TREATABILITY STUDY SCOPE

Phase 2 of the Galleria Drive Bioremediation Treatability Study will be implemented as described in the Work Plan Addendum. For cost estimating purposes, the Phase 2 activities have been segregated into three primary tasks as shown below.

- **Task 1: Treatability Study Implementation:** The Task 1 activities include the following:
 - Complete the well permitting and Underground Injection Control (UIC) permitting as described in Section 5.1 of the Work Plan Addendum.
 - Install the injection and monitoring wells as described in Section 3.2 of the Work Plan Addendum.
 - Perform the baseline groundwater sampling and aquifer testing as described in Section 4.0 of the Work Plan Addendum.
 - Inject the carbon substrate and amendments as described in Section 3.3 of the Work Plan Addendum.
 - Implement the effectiveness monitoring program as described in Section 4.0 of the Work Plan Addendum.
- **Task 2: Reporting**
 - Prepare and submit the UIC Semi-Annual Reports as described in Section 5.1.2 of the Work Plan Addendum.
 - Prepare and submit the monthly progress reports as described in Section 6.0 of the Work Plan Addendum.
 - Prepare and submit the Galleria Drive Bioremediation Treatability Study Results Report as described in Section 6.0 of the Work Plan Addendum.
- **Task 3: Project Closeout**
 - Perform well abandonment (if required) as described in Section 3.2 of the Work Plan Addendum.

In addition to these tasks, Tetra Tech's scope includes overarching program management related activities for the duration of the project.

3.0 BUDGET

Tetra Tech's estimated budget to complete the Galleria Drive Bioremediation Treatability Study Phase 2 activities is summarized in attached Table 1. The estimated budget is based on the scope of work presented in the Work Plan Addendum. Key assumptions and the basis of estimate are described in detail in Section 4.

4.0 BASIS OF ESTIMATE

Tetra Tech's estimated cost to implement Phase 2 of the Galleria Drive Bioremediation Treatability Study is based on the scope of work described in the Work Plan Addendum. Some areas of the Work Plan Addendum are designed to allow flexibility. Where the activities described in the Work Plan Addendum were not specific, Tetra Tech made assumptions, described below, to provide a firm basis of estimate.

The estimated costs are based on Tetra Tech's experience at the NERT Site with applicable field procedures, including well construction, substrate injection, and effectiveness monitoring during the Phase 1 Galleria Drive Bioremediation Treatability Study activities and previous and on-going treatability studies performed for the Trust, including the Bioremediation Treatability Study on City of Henderson property, the Seep Well Field (SWF) Area Bioremediation Treatability Study, and the In-Situ Chromium Treatability Study. Tetra Tech anticipates that the procedures implemented during the Galleria Drive Bioremediation Treatability Study Phase 2 activities will be similar if not identical to many of the procedures used in other treatability studies performed at the site. Indicative price quotes from drilling, injection, surveying, and laboratory subcontractors were used to develop the cost estimate and were based on currently available information. Conservative estimates have been included where information is not currently well known. As new information becomes available, this estimate will be refined as requested by the Trust. Key decisions during the treatability study will be: 1) the need for nested injection wells, which will be based on field observations at the time of injection well installation, 2) the frequency of substrate injections and the need for additional injection wells, which will be based on experience with similar substrate injections in other geologic settings at the site and effectiveness monitoring results following injections, and 3) the ratios of substrate to distribution water, which will be determined in the field based on pre-injection step-rate testing.

The basis of estimate and key assumptions are outlined in the following subsections for each of the tasks described in Section 2.

4.1 Task 1 – Treatability Study Implementation

Access, Well Permits, and UIC Permit

- Access – The Trust was granted access by Basic Environmental Company, LLC (BEC) to perform this treatability study in March 2018 and the Trust is in the process of securing access necessary to complete all Phase 2 activities. The budget does not include potential costs related to access agreement activities based on the following assumptions: (1) all necessary access will be secured by the Trust from BEC for Tetra Tech to complete all treatability study activities described in the Work Plan Addendum under terms consistent with the existing access agreement, (2) no access support will be required from Tetra Tech, and (3) no new site restoration or reporting requirements will be mandated under the continued access. Access delays or requirements that result in changes to the planned project implementation will affect the schedule and budget and have not been accounted for in this estimate.
- Well Permits – As described in Work Plan Addendum Section 5.1, a Nevada Administrative Code (NAC) 534.441 Monitoring Well Drilling Waiver and a NAC 534.320 Notice of Intent Card will be obtained prior to installation of injection and monitoring wells. An authorized Trust signature will be obtained in a notarized Affidavit of Intent to Abandon a Well. Tetra Tech will coordinate preparation of these documents consistent with previous work efforts at the site.
- UIC Permit – A UIC General Permit for Long-Term Remediation will be required prior to injection of carbon substrate, amendments, and water into the saturated subsurface. As described in Work Plan Addendum Section 5.1.2, permit authorization is expected to be a modification to the existing general permit authorization, GU07RL-51057, which was previously issued for the on-going SWF Area Bioremediation Treatability Study and recently amended to include Phase 1 activities for the Galleria

Drive Bioremediation Treatability Study. The budget includes preparation of a modification request letter and associated attachments. The basis of estimate does not include preparation of a full application for issuance of a new individual UIC permit if a modification to the existing permit cannot be obtained.

General Assumptions Related to All Field Activities

- Henderson-based Tetra Tech staff will be utilized to the maximum extent possible; however, local staff may not be available depending on the timing of the field activities and commitments on other NERT tasks. As a result, the budget includes travel costs for non-Henderson staff to provide a conservative budget estimate. Travel allocations include airfare, lodging, per diem, rental vehicles, and fuel. The following travel assumptions have been made for each task:
 - Injection and Monitoring Well Installation – includes travel of one non-Henderson staff for the duration of the installation and development activities.
 - Baseline Groundwater Sampling – includes travel of two non-Henderson staff to assist one Henderson-based staff with groundwater sampling activities.
 - Baseline Aquifer Testing – includes travel of two non-Henderson staff to assist one Henderson-based staff with aquifer testing activities.
 - Injection Events – includes travel for one non-Henderson staff to oversee each injection event. Additionally, travel costs are included for one senior engineer to be present during the initial week of the first injection event.
 - Effectiveness Monitoring Program – includes travel for one non-Henderson staff to assist one Henderson-based staff with each groundwater sampling and aquifer testing activity.
 - Project Closeout – assumes Henderson-based staff will be used for oversight of well abandonment activities.
- Work activities will be coordinated to avoid conflicts with other activities in the area such as activities associated with the Eastside Study Area Remedial Investigation and Zero-Valent Iron Treatability Study. Should unavoidable conflict occur, the Trust will identify priorities. Tetra Tech assumes no delays are incurred related to work suspension due to other priorities.

Injection and Monitoring Well Installation

- Tetra Tech will install injection wells at up to 12 locations (nine locations initially, with a contingency to install injection wells at three additional locations at a subsequent date if warranted based on effectiveness monitoring results) in accordance with Section 3.2.1 of the Work Plan Addendum. As described in Section 3.2.1 of the Work Plan Addendum, injection wells may be installed as nested injection wells at each location depending on the targeted treatment interval thickness, which will be determined in the field based on the depth of water observed during drilling operations. To provide a conservative estimate, the budget includes the installation of nested injection wells (two wells in a common borehole) at each of the twelve locations, with approximate average screened intervals of 55 to 70 feet below ground surface (bgs) and 70 to 85 feet bgs. The final number of locations with nested injection wells and the depths and screened intervals of the injection wells will be determined based on actual field conditions encountered.
- Tetra Tech will install 12 monitoring wells to an average depth of 85 feet bgs as described in Section 3.2.2 of the Work Plan Addendum.
- All injection and monitoring well locations (total of up to 24 locations) will include completing air knife operations to a depth of 10 feet bgs prior to the drilling of each borehole as described in Section 3.2.

- The subcontracted drilling budget, including air knifing, injection and monitoring well installation, well development, is based on an estimate obtained from Cascade Drilling. If Cascade Drilling is unavailable to perform the work due to schedule constraints or other issues beyond the control of Tetra Tech, drilling costs may vary.
- The work areas will be secured using typical construction barriers such as metal plates, orange construction fencing and caution tape for the duration of the drilling activities. No allowances have been included to address damage or vandalism of wells or equipment used to perform the work. Estimated subcontractor costs include using a subcontracted security service to monitor the field area and equipment during non-working hours for the duration of drilling activities. If required by the Trust, other measures can be provided at additional cost.
- Other direct costs (ODCs) include field equipment rentals, including a YSI multimeter, turbidity meter, and water level meter, and miscellaneous field consumables (such as gloves and water for hydration).
- Following completion of well installation, all injection and monitoring well locations will be surveyed by a licensed land surveyor in the same manner previously performed for the Phase 1 pre-design wells described in Section 2.3.1.3 of the Work Plan Addendum. The survey budget is based on an estimate obtained from Atkins. If Atkins is unavailable to perform the work due to schedule constraints or other issues beyond the control of Tetra Tech, survey costs may vary.
- Investigation Derived Wastes generated during drilling activities will be managed in accordance with applicable state, federal, and local regulations and in the same manner as well installations performed during the pre-design activities described in Section 2.3.1.4 of the Work Plan Addendum. The budget includes estimated costs for transportation and placement of soil cuttings and other wastes into 10-yard rolloffs that will be located and stored at a designated area on-site, delivery and rental charges associated with rolloffs, and transportation and disposal of up to 100 cubic yards of non-hazardous waste at a licensed facility. Tetra Tech will prepare a waste manifest memo per Trust requirements. All waste manifests will be signed by an authorized representative of the Trust.
- Groundwater and decontamination water generated during drilling and well development are assumed to be non-hazardous based on existing data and will be transported and discharged to the GW-11 pond on a daily basis with no additional testing.

Baseline Groundwater Sampling

- Tetra Tech will complete baseline groundwater sampling in accordance with Section 4.0 of the Work Plan Addendum. The budget for the baseline groundwater sampling is based on collection and analysis of a total of 58 samples. Baseline groundwater monitoring will include sampling all new injection wells (up to 24 injection wells) with sample analysis for perchlorate, chlorate, nitrate, sulfate, and total organic carbon and sampling 20 monitoring wells, including the 12 newly installed monitoring wells and 8 existing monitoring wells, with sample analysis for parameters listed in Table 3 of the Work Plan Addendum (with the exception of perchlorate reductase gene and phospholipid fatty acids [PLFA], which are described in the subsequent bullet). In addition to standard groundwater samples, field quality assurance/quality control (QA/QC) samples will also be collected and will include equipment blanks, field blanks, field duplicates, and matrix spike/matrix spike duplicates (MS/MSDs) as noted in Work Plan Addendum Section 4.4. The baseline sampling event will also include a total of 14 QA/QC samples, including 5 field duplicates, 6 equipment rinsate/field blanks, and 3 MS/MSDs. All groundwater samples will be submitted to Test America Laboratories (TAL) and analyzed on a standard turn-around-time. The budgetary estimate is based on the Trust's analytical test rates from TAL and assumes rates remain unchanged in 2019. Bio-traps® will be installed within the treatability study area as part of the baseline sampling as described in Section 4.2 of the Work Plan Addendum. The estimated budget includes the installation of Bio-traps® in four monitoring wells. Bio-traps® will remain in the wells for a period of approximately 30

days and then be retrieved for microbial analysis of PLFA and the perchlorate reductase gene. All microbial samples will be submitted to Microbial Insights and analyzed on a standard turn-around-time. The budgetary estimate is based on analytical test rates from Microbial Insights and assumes rates remain unchanged in 2019.

- ODCs include field equipment rentals for two groundwater sampling set-ups that each consist of a bladder pump, YSI multimeter, turbidity meter, water level meter, and silicon tubing. Additional ODCs include the purchase of dedicated tubing for all wells, bladders, metals filters, and miscellaneous field consumables (such as gloves, ice for samples, and water for hydration).
- Data validation costs for the baseline groundwater sampling event are based on validation of 58 samples (44 samples plus 14 quality control samples consisting of 5 field duplicates, 6 rinsate/field blanks, and 3 MS/MSDs). Data validation will be performed as described in Section 4.4 of the Work Plan Addendum.

Baseline Aquifer Testing

- Prior to carbon substrate injections, slug tests will be performed on a subset of injection and monitoring wells to determine pre-injection hydraulic conditions as described in Work Plan Addendum Sections 3.2.1 and 3.2.2. As the basis of this estimate, the budget includes slug testing of 50 percent of the injection and monitoring wells (total of 18 injection/monitoring wells).
- If additional data are needed based on field observations during drilling, nuclear magnetic resonance (NMR) logging will also be performed on a subset of injection wells and up to five additional monitoring wells as described in Work Plan Addendum Sections 3.2.1 and 3.2.2. As the basis of this estimate, the budget includes performing NMR logging in 5 injection wells and 5 monitoring wells. It should be noted that NMR logging may only be used at injection wells not installed in a nested borehole due to the size of the borehole, thus the number of nested injection wells may affect the final number of wells selected for NMR logging.
- ODCs include the purchase of four transducers, rental of NMR logging equipment, rental of a water level meter, and miscellaneous field consumables (such as gloves and water for hydration).

Injections

- Up to three carbon substrate injection events (estimated to require 16 days per event) have been included to maintain sufficient carbon loading throughout the duration of the treatability study as described in Section 3.3 of the Work Plan Addendum. Costs for the carbon substrate and associated amendments (glycerin and phosphate) required for the treatability study are based on the description provided in Section 3.3.1, current costs provided by the specialized carbon substrate vendor (EOS Remediation) and the chemical supplier (Brenntag), and anticipated groundwater flow rates of a maximum of 3 feet per day within the targeted treatment interval.
- The subcontracted injection budget is based on an estimate obtained from Cascade Technical Services. If Cascade Technical Services is unavailable to perform the work due to schedule constraints or other issues beyond the control of Tetra Tech, injection costs may vary. Estimated subcontractor costs include using a subcontracted security service to monitor the field area and equipment during non-working hours for the duration of injection activities. During working hours, the work areas will be secured using typical construction barriers such as metal plates, orange construction fencing and/or caution tape. If required by the Trust, other measures can be provided at additional cost.
- ODCs include rental of a water level meter and purchase of miscellaneous field consumables (such as gloves and water for hydration).

Effectiveness Monitoring Program

- Tetra Tech will perform monthly groundwater sampling for a 12-month period to collect data to determine the effectiveness of in-situ bioremediation in accordance with Section 4.0 of the Work Plan Addendum. The frequency of sampling, selected wells, and specific parameters to be sampled during each individual event may be adjusted based on the results from prior treatability study effectiveness monitoring events. The budgeted scope of work consists of collecting groundwater samples from 24 monitoring wells, consisting of 12 newly installed monitoring wells and 12 existing monitoring wells. The 12 existing wells include the four deep wells installed as part of pre-design that may be periodically sampled as described in Section 4.2. Because data exists for those four deep wells and they are not screened within the targeted treatment interval, they were not included in the baseline sampling activities previously described. Groundwater samples will be analyzed for parameters listed in Table 3 of the Work Plan Addendum (with the exception of perchlorate reductase gene and PLFA, which are described in the subsequent bullet). In addition to standard groundwater samples, field QA/QC samples will also be collected and will include equipment blanks, field blanks, field duplicates, and MS/MSDs as noted in Work Plan Addendum Section 4.4. Each effectiveness monitoring event will include a total of 9 QA/QC samples, including 3 field duplicates, 4 equipment rinsate/field blanks, and 2 MS/MSDs. Based on the scope described herein, the budget for the effectiveness monitoring program includes collection and analysis of 24 groundwater samples and 9 QA/QC samples (33 total) during each of the 12 monitoring events for a total of 396 groundwater samples. With the exception of ferrous iron and sulfide, which will be analyzed in the field via HACH field kits, all groundwater samples will be submitted to TAL and analyzed on a standard turn-around-time. The budgetary estimate is based on the Trust's analytical test rates from TAL and assumes rates remain unchanged in 2019 and 2020.
- Bio-traps® will be installed during the study (post-injection) as described in Section 4.2 of the Work Plan Addendum. The estimated budget includes the installation of Bio-traps® in four monitoring wells, Bio-traps® will remain in the wells for a period of approximately 30 days and then be retrieved for microbial analysis of PLFA and perchlorate reductase gene. All microbial samples will be submitted to Microbial Insights and analyzed on a standard turn-around-time. The budgetary estimate is based on analytical test rates from Microbial Insights and assumes rates remain unchanged in 2019 and 2020.
- Per Section 4.2, periodic slug tests will be performed to examine changes in hydraulic conductivity. The budgeted scope of work consists of two rounds of slug tests on up to 10 monitoring wells each round.
- ODCs include field equipment rentals for two groundwater sampling set-ups per monitoring event that each consist of a bladder pump, YSI multimeter, turbidity meter, water level meter, and silicon tubing. Additional ODCs include the purchase of bladders, metals filters, and miscellaneous field consumables (such as gloves, ice for samples, and water for hydration). Rental of a water level meter is also included for slug testing.
- Data validation costs for the effectiveness monitoring program based on validation of a total of 396 samples (288 samples plus 108 quality control samples consisting of 36 field duplicates, 48 rinsate/field blanks, and 24 MS/MSDs) described in the previous bullets. Data validation will be performed as described in Section 4.4 of the Work Plan Addendum.
- Labor costs have also been included to perform ongoing evaluation of the effectiveness monitoring results during the treatability study. This includes preparation of data tables, graphical depictions of analytical results, evaluation of degradation kinetics, and internal discussion of results, which will be used in the decision-making process to determine the timing of subsequent injection events and refinement of the effectiveness monitoring program if required.

4.2 Task 2 – Reporting

This task includes engineering and technical labor to prepare UIC semi-annual reports, monthly progress updates, and the final Galleria Drive Bioremediation Treatability Study Results Report that includes the components listed in Section 6.0 of the Work Plan Addendum. The budget includes an estimate to prepare and submit the following documents:

- UIC Semi-Annual Reports (Section 5.1.2 of the Work Plan Addendum) – budget estimate includes three reports with projected dates of August 2019, February 2020, and August 2020.
- Monthly progress updates (Section 6.0 of the Work Plan Addendum) – budget estimate includes 21 reports, beginning in April 2019 and continuing through December 2020.
- Galleria Drive Bioremediation Treatability Study Results Report (Section 6.0 of the Work Plan Addendum) – budget estimate includes preparation and submittal of the results report, which includes a data validation summary report for both Phase 1 and 2 samples. The basis of estimate includes draft submittal for Trust review and comment, revised draft submittal addressing Trust comments, assembling a final report for Trust submittal to NDEP, and revised report and response to comment matrix addressing NDEP comments. The budget for this report is based on prior experience with treatability study reporting, including anticipated level of effort required to respond to comments received from the Trust, NDEP, and Stakeholders.

4.3 Task 3 – Project Closeout

Upon completion of this treatability study, Tetra Tech will perform field activities to return the site to pre-treatability study conditions, unless otherwise authorized by the Trust. This includes the abandonment of all injection and monitoring wells following completion of the study as described in Section 3.2 of the Work Plan Addendum. All wells will be abandoned in accordance with the NAC 534.4365 and all other applicable rules and regulations for plugging wells in the State of Nevada. The subcontracted well abandonment budget is based on an estimate obtained from Cascade Drilling for the abandonment of 46 injection/monitoring wells (up to 24 injection wells, 12 newly installed monitoring wells, and 10 previously installed Phase 1 pre-design monitoring wells). If Cascade Drilling is unavailable to perform the work due to schedule constraints or other issues beyond the control of Tetra Tech, abandonment costs may vary. During working hours, the work areas will be secured using typical construction barriers such as metal plates, orange construction fencing and/or caution tape. During non-working hours all equipment will be demobilized to a secure location such that overnight security will not be required. If required by the Trust, other measures can be provided at additional cost. ODCs include miscellaneous field consumables including gloves and water for hydration.

4.4 Program Management

Tetra Tech's scope includes overarching program management related activities for the duration of the project. Program management will include communications and updates to the Trust and Ramboll as requested and standard program management activities related to staffing, safety, procurement, document control, document quality reviews, scheduling, insurance, subcontractor management, submittal reviews, and overall project coordination with Ramboll, NDEP, and the Trust.

Based on published guidance from the United States Environmental Protection Agency and the United States Army Corp of Engineers, program management costs during project planning, permitting, and implementation activities are expected to range from 5 to 10% of the total project costs. Budget for program management is included within the individual task budgets shown in Table 2.

5.0 SCHEDULE

Task milestone targets are based on the schedule in the Work Plan Addendum and receipt of the approved work authorization and notice to proceed by mid-April 2019.

Tables



Table 1 - Detailed Budget

Galleria Drive Bioremediation Treatability Study - Phase 2 Implementation

Nevada Environmental Response Trust

Attention: Andrew Steinberg

Phases / Tasks				Task 1.1 - Permitting		Task 1.2 - Injection and Monitoring Well Installation		Task 1.3 - Baseline Groundwater Sampling		Task 1.4 - Baseline Aquifer Testing		Task 1.5 - Injections		Task 1.6 - Effectiveness Monitoring (12 Events)		Task 2 - Reporting		Task 3 - Well Abandonment			
				Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost		
Tetra Tech Labor																					
Principal Specialist	\$258.00	370.0	\$ 95,460.00	-	\$ -	16.0	\$ 4,128.00	8.0	\$ 2,064.00	-	\$ -	82.0	\$ 21,156.00	132.0	\$ 34,056.00	132.0	\$ 34,056.00	-	\$ -		
Principal	\$223.00	58.0	\$ 12,934.00	8.0	\$ 1,784.00	4.0	\$ 892.00	1.0	\$ 223.00	1.0	\$ 223.00	12.0	\$ 2,676.00	12.0	\$ 2,676.00	20.0	\$ 4,460.00	-	\$ -		
Sr Consultant II	\$217.00	103.0	\$ 22,351.00	-	\$ -	12.0	\$ 2,604.00	8.0	\$ 1,736.00	-	\$ -	48.0	\$ 10,416.00	28.0	\$ 6,076.00	5.0	\$ 1,085.00	2.0	\$ 434.00		
Sr Program Manager	\$206.00	102.0	\$ 21,012.00	2.0	\$ 412.00	8.0	\$ 1,648.00	8.0	\$ 1,648.00	2.0	\$ 412.00	30.0	\$ 6,180.00	40.0	\$ 8,240.00	8.0	\$ 1,648.00	4.0	\$ 824.00		
Sr Consultant I	\$204.00	526.0	\$ 107,304.00	12.0	\$ 2,448.00	44.0	\$ 8,976.00	16.0	\$ 3,264.00	4.0	\$ 816.00	51.0	\$ 10,404.00	204.0	\$ 41,616.00	187.0	\$ 38,148.00	8.0	\$ 1,632.00		
Sr Project Manager II	\$195.00	26.0	\$ 5,070.00	-	\$ -	4.0	\$ 780.00	-	\$ -	-	\$ -	18.0	\$ 3,510.00	-	\$ -	4.0	\$ 780.00	-	\$ -		
Sr Project Manager I	\$183.00	472.0	\$ 86,376.00	-	\$ -	8.0	\$ 1,464.00	4.0	\$ 732.00	4.0	\$ 732.00	12.0	\$ 2,196.00	364.0	\$ 66,612.00	80.0	\$ 14,640.00	-	\$ -		
Project Engineer/Scientist III	\$165.00	596.0	\$ 98,340.00	1.0	\$ 165.00	60.0	\$ 9,900.00	16.0	\$ 2,640.00	20.0	\$ 3,300.00	-	\$ -	368.0	\$ 60,720.00	131.0	\$ 21,615.00	-	\$ -		
Sr Staff	\$137.00	2,343.0	\$ 320,991.00	-	\$ -	532.0	\$ 72,884.00	108.0	\$ 14,796.00	108.0	\$ 14,796.00	693.0	\$ 94,941.00	673.0	\$ 92,201.00	14.0	\$ 1,918.00	215.0	\$ 29,455.00		
GIS II	\$130.00	42.0	\$ 5,460.00	6.0	\$ 780.00	8.0	\$ 1,040.00	4.0	\$ 520.00	-	\$ -	-	\$ -	-	\$ -	24.0	\$ 3,120.00	-	\$ -		
Staff II	\$127.00	1,594.0	\$ 202,438.00	10.0	\$ 1,270.00	98.0	\$ 12,446.00	86.0	\$ 10,922.00	54.0	\$ 6,858.00	122.0	\$ 15,494.00	1,028.0	\$ 130,556.00	191.0	\$ 24,257.00	5.0	\$ 635.00		
Document Management II	\$121.00	188.0	\$ 22,748.00	-	\$ -	28.0	\$ 3,388.00	10.0	\$ 1,210.00	10.0	\$ 1,210.00	72.0	\$ 8,712.00	64.0	\$ 7,744.00	-	\$ -	4.0	\$ 484.00		
Staff I	\$117.00	100.0	\$ 11,700.00	-	\$ -	-	\$ -	-	\$ -	16.0	\$ 1,872.00	12.0	\$ 1,404.00	27.0	\$ 3,159.00	34.0	\$ 3,978.00	11.0	\$ 1,287.00		
Sr Technician	\$103.00	325.0	\$ 33,475.00	-	\$ -	60.0	\$ 6,180.00	-	\$ -	24.0	\$ 2,472.00	90.0	\$ 9,270.00	112.0	\$ 11,536.00	39.0	\$ 4,017.00	-	\$ -		
Document Management I	\$95.00	164.0	\$ 15,580.00	-	\$ -	20.0	\$ 1,900.00	-	\$ -	-	\$ -	27.0	\$ 2,565.00	27.0	\$ 2,565.00	86.0	\$ 8,170.00	4.0	\$ 380.00		
Technician IV	\$94.00	180.0	\$ 16,920.00	-	\$ -	40.0	\$ 3,760.00	-	\$ -	4.0	\$ 376.00	-	\$ -	96.0	\$ 9,024.00	40.0	\$ 3,760.00	-	\$ -		
Subtotal Tetra Tech Labor				7,189.0 hrs	\$ 1,078,159.00	39.0	\$ 6,859.00	942.0	\$ 131,990.00	269.0	\$ 39,755.00	247.0	\$ 33,067.00	1,269.0	\$ 188,924.00	3,175.0	\$ 476,781.00	995.0	\$ 165,652.00	253.0	\$ 35,131.00
--Total Tetra Tech Labor					\$ 1,078,159.00		\$ 6,859.00		\$ 131,990.00		\$ 39,755.00		\$ 33,067.00		\$ 188,924.00		\$ 476,781.00		\$ 165,652.00		\$ 35,131.00
Subcontractors																					
Driller			\$ 418,915.00		\$ -		\$ 357,315.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ 61,600.00		
IDW Disposal			\$ 11,000.00		\$ -		\$ 11,000.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		
Surveyor			\$ 1,800.00		\$ -		\$ 1,800.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		
Analytical Laboratory			\$ 232,000.00		\$ -		\$ 2,000.00		\$ 20,000.00		\$ -		\$ -		\$ 210,000.00		\$ -		\$ -		
Injection Contractor			\$ 400,050.00		\$ -		\$ -		\$ -		\$ -		\$ 400,050.00		\$ -		\$ -		\$ -		
Biological Laboratory			\$ 6,000.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ 6,000.00		\$ -		\$ -		
Subtotal Subcontractors					\$ 1,069,765.00		\$ -		\$ 372,115.00		\$ 20,000.00		\$ -		\$ 400,050.00		\$ 216,000.00		\$ -		\$ 61,600.00
Markup				\$ 53,488.25	5.00%		\$ 18,605.75		\$ 1,000.00			\$ 20,002.50		\$ 10,800.00					\$ 3,080.00		
--Total Subcontractors					\$ 1,123,253.25		\$ -		\$ 390,720.75		\$ 21,000.00		\$ -		\$ 420,052.50		\$ 226,800.00		\$ -		\$ 64,680.00
Other Direct Costs																					
Travel Allocation			\$ 67,000.00		\$ -		\$ 13,000.00		\$ 3,800.00		\$ 4,100.00		\$ 20,400.00		\$ 24,200.00		\$ 1,500.00		\$ -		
Field Equipment			\$ 75,650.00		\$ -		\$ 6,000.00		\$ 10,700.00		\$ 3,400.00		\$ 5,550.00		\$ 49,000.00		\$ -		\$ 1,000.00		
NMR Equipment			\$ 10,000.00		\$ -		\$ -		\$ -		\$ 10,000.00		\$ -		\$ -		\$ -		\$ -		
Carbon Substrate Amendments			\$ 318,150.00		\$ -		\$ -		\$ -		\$ -		\$ 318,150.00		\$ -		\$ -		\$ -		
			\$ 12,000.00		\$ -		\$ -		\$ -		\$ -		\$ 12,000.00		\$ -		\$ -		\$ -		
Subtotal Other Direct Costs					\$ 482,800.00		\$ 19,000.00		\$ 14,500.00		\$ 17,500.00		\$ 356,100.00		\$ 73,200.00		\$ 1,500.00		\$ 1,000.00		
Markup				\$ 24,140.00	5.00%		\$ 950.00		\$ 725.00		\$ 875.00		\$ 17,805.00		\$ 3,660.00		\$ 75.00		\$ 50.00		
--Total Other Direct Costs					\$ 506,940.00		\$ -		\$ 19,950.00		\$ 15,225.00		\$ 18,375.00		\$ 373,905.00		\$ 76,860.00		\$ 1,575.00		\$ 1,050.00
Project/Task --Total					\$ 2,708,352.25		\$ 6,859.00		\$ 542,660.75		\$ 75,980.00		\$ 51,442.00		\$ 982,881.50		\$ 780,441.00		\$ 167,227.00		\$ 100,861.00
PROJECT Total					\$ 2,708,352.25																