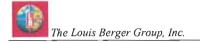




# ATTACHMENT 1 Conceptual Design



#### CONCEPTUAL DESIGN OF THE ORC SLURRY INJECTION REMEDY

As stated earlier, a bench scale treatability study would need to be conducted to determine the most compatible bioremediation enhancement products (e.g., ORC Advanced® or EHC-O<sup>TM</sup>) for the Site. In this conceptual design, ORC Advanced® is discussed for technology evaluation and cost estimation purposes.

ORC Advanced<sup>®</sup> is a proprietary formulation of calcium oxy-hydroxide that releases oxygen for approximately 12 months to stimulate indigenous aerobic microbes to significantly accelerate rates of biodegradation. It is anticipated that ORC Advanced<sup>®</sup> would be injected at a total of approximately 40 locations to the target depth interval of 10 to 20 feet bgs.

ORC Advanced® would be applied within the property areas of the 398 North Olden Avenue property and the 302 North Olden Avenue via a 15-foot grid injection pattern (Figure 1) using direct-push technology (details for the injection plan is presented in the table below). It is assumed that one (1) injection event would be implemented at the Site (with a possible additional event approximately one year later if it is deemed necessary based on groundwater monitoring results). The injection locations for the additional injection event would be shifted by 5 feet from the original locations to optimize the contact between ORC Advanced® solution and contaminants in soil pores. A dosage of 10 lbs/foot, resulting in a total of approximately 4,000 pounds of ORC Advanced®, would be used for the initial injection event. The Geoprobe® would be advanced to the bottom of contaminated zone and then pulled up to the top of contaminated zone while delivering ORC Advanced® throughout the vertical length of the impacted aquifer. A field pilot study would need to be conducted to increase effectiveness and applicability of this technology to the Site conditions. See summary below:

Injection Product: ORC Advanced® (or similar)

Expected Duration of Performance: 12 months Number of Injection Points (borings): 40 (Total)

Injection Points at 398 Olden Ave.: 16 Injection Points at 302 Olden Ave.: 24

Spacing of Injection Borings: 15 feet

Injection Depth Interval: 10 to 20 feet below ground surface

Injection Rate: 10 lbs per foot

Amount of ORC Injected at Each Borehole: 100 lbs Total Amount of ORC Injected in One Round: 4,000 lbs



To track the effectiveness of the remedial action, groundwater samples will be collected from selected wells approximately monthly (for at least one year), starting 2 months after the ORC slurry injections; the need for additional injections will be assessed based upon the sampling results. Once it is determined that no additional injections are needed, quarterly sampling from selected wells will be conducted for at least 2 years. Details of the anticipated monitoring plan are presented below.

### 1. Immediately prior to ORC injection:

Schedule: 2 rounds, approximately one month apart

Monitoring wells: 2, 3, 5, 6, 8, 9, 10, 12, 13, and 14

Purpose: Establish "baseline" contaminant levels

### 2. Starting 2 months after ORC injection:

Schedule: 10 monthly rounds

Monitoring wells: 2, 3, 5, 6, and 10

Purpose: Determine if ORC injections are reducing contaminants

#### 3. After determination that no additional ORC injection is required:

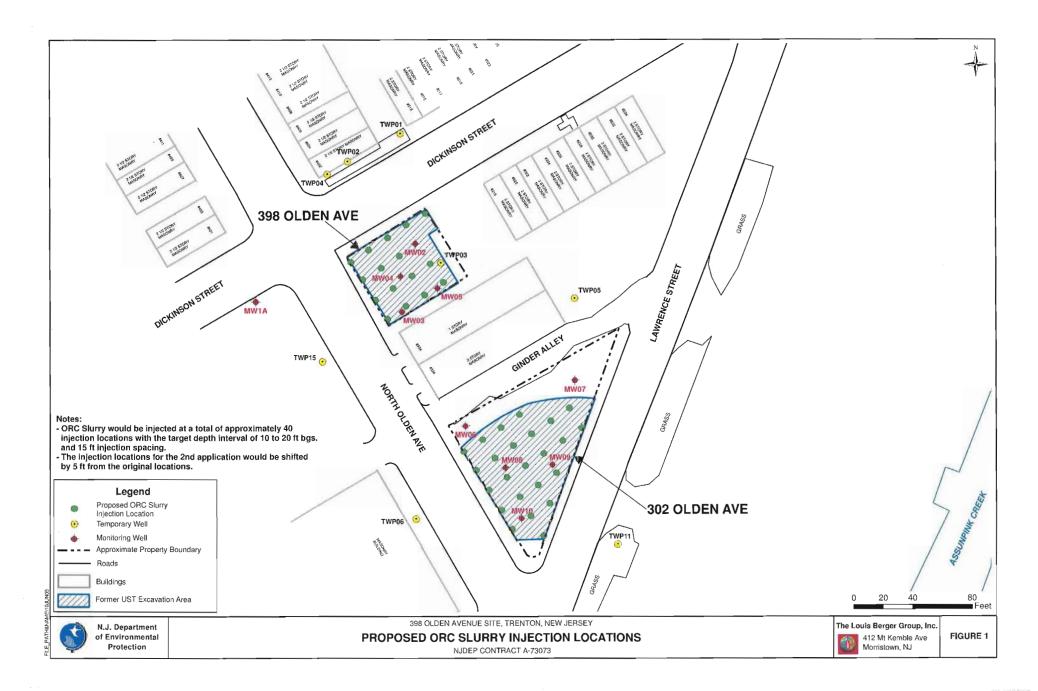
Schedule: At least 2 years of quarterly sampling

Monitoring wells: 2, 3, 5, 6, 10, 12, 13, and 14

Purpose: Monitor degradation of contaminants

A groundwater Classification Exception Area (CEA) will also be established to protect human health and the environment until contaminant concentrations are reduced to applicable standards.

The total estimated cost development of this approach is \$300,000, which assumes a 3-year groundwater monitoring period. The cost estimate was developed, in part, using the parametric cost modeling software Remedial Action Cost Engineering and Requirements (RACER) (Earth Tech, Ltd., Long Beach, CA). RACER's costs were adopted from the 2006 Environmental Cost Handling Options and Solutions (ECHOS) cost database published by RS Means. A detailed cost estimate for this alternative is provided in **Attachment 2**.



### **ATTACHMENT 2**

Detailed Cost Estimate for the Selected Remedial Action (ORC Slurry Injection)

#### **Attachment 2**

398 Olden Avenue Site Trenton, New Jersey

### Estimated Cost Breakdown Groundwater ORC Slurry Injection

Activity <sup>1</sup>	Cost <sup>1</sup>	Cost with Markups <sup>2</sup>
ORC-Advanced Injection	\$102,008	\$137,030
Monitoring & Maintenance Groundwater Monitoring Classification Exception Area	\$31,085	\$111,817
Total	\$133,093	\$248,847
Total (Rounded)	\$133,000	\$249,000
Total Net Present Value <sup>3</sup>		\$282,473
Total Net Present Value (Rounded) <sup>3, 4</sup>		\$300,000

#### Notes:

<sup>1</sup> See Attachment 1 - Conceptual Design of ORC Slurry Injection Remedy for design assumptions and anticipated groundwater monitoring plan.

<sup>&</sup>lt;sup>2</sup> Refer to Phase Element Technology Cost Detail Report.

<sup>&</sup>lt;sup>3</sup> Refer to Phase Element Cost Overtime Detail Report.

<sup>&</sup>lt;sup>4</sup>Net Present Value includes Cost Overtime with inflation and markups, where applicable.

<sup>&</sup>lt;sup>5</sup> Berger adjusted the estimated costs by applying an escalation factor assuming the proposed remedial alternatives would take place in January 2010.

# Trenton, New Jersey NET PRESENT VALUE CALCULATION Groundwater ORC Slurry Injection

Technology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Capital Costs	\$ 143,552	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$	\$ -	\$ -
O & M Cost	\$44,364	\$31,381	\$26,515	\$3,035							
Total Phase Element Cost	\$187,916	\$31,381	\$26,515	\$3,035	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Escalation Factor	1.1465	1.1717	1.1975	1.2238	1.2508	1.2783	1.3064	1.3352	1.3645	1.3945	1.4252
Escalated Phase Element Cost	\$215,446	\$36,770	\$31,752	\$3,714	\$0	\$0	\$0	\$0	\$0	\$0	\$0
n = No. of Years		1	2	3	4	5	6	7	8	9	10
Net Present Value (NPV)	\$215,446	\$35,019	\$28,800	\$3,209	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Technology	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21
Capital Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$	\$ -	\$ -
O & M Cost										
Total Phase Element Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Escalation Factor	1.4566	1.4886	1.5214	1.5548	1.5890	1.6240	1.6597	1.6963	1.7336	1.7717
Escalated Phase Element Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
n = No. of Years	11	12	13	14	15	16	17	18	19	20
Net Present Value (NPV)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Technology	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Total
Capital Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$143,552
O & M Cost										\$105,295
Total Phase Element Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$248,847
Escalation Factor	1.8107	1.8505	1.8912	1.9328	1.9754	2.0188	2.0632	2.1086	2.1550	
Escalated Phase Element Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$287,682
n = No. of Years	21	22	23	24	25	26	27	28	29	
Net Present Value (NPV)	\$0	\$0	\$0	\$0	\$0	\$0	S0	S0	\$0	\$282,473

System:

RACER Version: 8.1.2

Database Location: G:\RTiyarattanachai\Racer\LBG RACER.mdb

Folder:

Folder Name: Olden DD Revised Sep 09

Project:

Project ID: 398 Olden Ave Project Name: 398 Olden Ave

Project Category: None

Location

State / Country: NEW JERSEY

City: NEW JERSEY STATE AVERAGE

<u>Location Modifiers</u> <u>Default</u> <u>User</u>

 Material:
 1.035
 1.035

 Labor:
 1.558
 1.558

 Equipment:
 1.054
 1.054

**Options** 

Database: Modified System

Cost Database Date: 2006

Report Option: Calendar

<u>Description</u> GW Remediation

Contaminants - Gasoline-Related Technology: EMNA (ORC-Adv)

Print Date: 9/25/2009 6:08:22 PM Page: 1 of 4

Site:		
	Groundwater - EMNA (ORC-Adv) Groundwater - EMNA (ORC-Adv) None	
Phase Names Pre-Study: Study: Design: Removal/Interim Action: Remedial Action: Operations & Maintenance: Long Term Monitoring: Site Closeout:		
Documentation Description: Support Team: References:		
Estimator Title: Agency/Org./Office: Business Address: Telephone Number:	The Louis Berger Group, Inc Morristown, NJ 973-407-1409 rtiyarattanachai@louisberger.com	
Estimator Signature:  Reviewer Information		Date:
Reviewer Name: Reviewer Title: Agency/Org./Office: Business Address: Telephone Number: Email Address: Date Reviewed:		
Reviewer Signature:		Date:

Print Date: 9/25/2009 6:08:22 PM Page: 2 of 4

#### Phase:

**Phase Type:** Remedial Action **Phase Name:** EMNA - ORC-Adv

Description:

Media/Waste Type

Primary: Groundwater

Secondary: Soil

**Contaminant** 

Primary: Volatile Organic Compounds (VOCs)

Secondary: None

Approach: In Situ

Start Date: January, 2010

Rate Groups

**Labor:** System Labor Rate **Analysis:** System Analysis Rate

Phase Markups: System Defaults

Technology Markups	<u>Markup</u>	% Prime	% Sub.
In Situ Biodegradation (Saturated Zone)	Yes	100	0
INSTITUTIONAL CONTROL	Yes	100	0
Monitoring	Yes	100	0
Monitoring	Yes	100	0
Monitoring	Yes	100	0

Print Date: 9/25/2009 6:08:22 PM Page: 3 of 4

Technology	Direct Cost	<u>Markups</u>	Total Cost
In Situ Biodegradation (Saturated Zone)	\$102,008	\$35,022	\$137,030
INSTITUTIONAL CONTROL	\$5,000	\$1,522	\$6,522
Monitoring	\$9,241	\$7,240	\$16,481
Monitoring	\$22,459	\$12,853	\$35,312
Monitoring	\$29,602	\$23,901	\$53,503
Total Capital Cost	\$168,310	\$80,538	\$248,848

	Direct Cost	Markups	Total Cost
Total Phase Cost	\$168,310	\$80,538	\$248,848

Print Date: 9/25/2009 6:08:22 PM Page: 4 of 4

System:

RACER Version: 8.1.2

Database Location: G:\RTiyarattanachai\Racer\LBG RACER.mdb

Folder:

Folder Name: Olden DD Revised Sep 09

Project:

Project ID: 398 Olden Ave Project Name: 398 Olden Ave

Project Category: None

Location

State / Country: NEW JERSEY

City: NEW JERSEY STATE AVERAGE

Location Modifiers Default User

 Material:
 1.035
 1.035

 Labor:
 1.558
 1.558

 Equipment:
 1.054
 1.054

**Options** 

Database: Modified System

Cost Database Date: 2006

Report Option: Calendar

Description

**GW** Remediation

Contaminants - Gasoline-Related Technology: EMNA (ORC-Adv)

Print Date: 9/25/2009 6:07:29 PM Page: 1 of 5

Site:	
	Groundwater - EMNA (ORC-Adv) Groundwater - EMNA (ORC-Adv) None
Phase Names Pre-Study: Study: Design: Removal/Interim Action: Remedial Action: Operations & Maintenance: Long Term Monitoring: Site Closeout:	
<u>Documentation</u> Description: Support Team: References:	
Estimator Title: Agency/Org./Office: Business Address: Telephone Number:	The Louis Berger Group, Inc Morristown, NJ 973-407-1409 rtiyarattanachai@louisberger.com
Estimator Signature:	Date:

Print Date: 9/25/2009 6:07:29 PM Page: 2 of 5

Reviewer Information		
Reviewer Name:		
Reviewer Title:		
Agency/Org./Office:		
<b>Business Address:</b>		
Telephone Number:		
Email Address:		
Date Reviewed:		
Reviewer Signature:	 Date:	 

Print Date: 9/25/2009 6:07:29 PM Page: 3 of 5

### Phase:

Phase Type: Remedial Action
Phase Name: EMNA - ORC-Adv

Description:

Media/Waste Type

Primary: Groundwater

Secondary: Soil

Contaminant

Primary: Volatile Organic Compounds (VOCs)

Secondary: None

Approach: In Situ

Start Date: January, 2010

Rate Groups

Labor: System Labor Rate

Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups	<u>Markup</u>	% Prime	<u>% Sub.</u>
In Situ Biodegradation (Saturated Zone)	Yes	100	0
INSTITUTIONAL CONTROL	Yes	100	0
Monitoring	Yes	100	0
Monitoring	Yes	100	0
Monitoring	Yes	100	0

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Technology	2010	2011	2012	2013	Total
In Situ Biodegradation (Saturated Zone)	\$137,030	\$0	\$0	\$0	\$137,030
INSTITUTIONAL CONTROL	\$6,522	\$0	\$0	\$0	\$6,522
Monitoring	\$16,481	\$0	\$0	\$0	\$16,481
Monitoring	\$27,883	\$7,429	\$0	\$0	\$35,312
Monitoring	\$0	\$23,953	\$26,515	\$3,035	\$53,503
Total Phase Cost	\$187,917	\$31,381	\$26,515	\$3,035	\$248,848

Print Date: 9/25/2009 6:07:29 PM Page: 5 of 5

System:

RACER Version: 8.1.2

Database Location: G:\RTiyarattanachai\Racer\LBG RACER.mdb

Folder:

Folder Name: Olden DD Revised Sep 09

Project:

**Project ID:** 398 Olden Ave **Project Name:** 398 Olden Ave

Project Category: None

Location

State / Country: NEW JERSEY

City: NEW JERSEY STATE AVERAGE

Location Modifiers Default User

 Material:
 1.035
 1.035

 Labor:
 1.558
 1.558

Equipment:

*1.054* 1.054

**Options** 

Database: Modified System

Cost Database Date: 2006

Report Option: Calendar

Description

**GW** Remediation

Contaminants - Gasoline-Related Technology: EMNA (ORC-Adv)

Print Date: 9/25/2009 6:07:58 PM Page: 1 of 12

Site:	
	Groundwater - EMNA (ORC-Adv) Groundwater - EMNA (ORC-Adv) None
Phase Names Pre-Study: Study: Design: Removal/Interim Action: Remedial Action: Operations & Maintenance: Long Term Monitoring: Site Closeout:	
Documentation  Description: Support Team: References:	
Estimator Title: Agency/Org./Office: Business Address: Telephone Number:	The Louis Berger Group, Inc Morristown, NJ 973-407-1409 rtiyarattanachai@louisberger.com
Estimator Signature:	Date:

Print Date: 9/25/2009 6:07:58 PM Page: 2 of 12

Reviewer Information		
Reviewer Name:		
Reviewer Title:		
Agency/Org./Office:		
<b>Business Address:</b>		
Telephone Number:		
Email Address:		
Date Reviewed:		
Reviewer Signature:	Date:	

### Phase:

Phase Type: Remedial Action Phase Name:

EMNA - ORC-Adv

Description:

Media/Waste Type

Primary: Groundwater

Secondary: Soil

**Contaminant** 

Primary: Volatile Organic Compounds (VOCs)

Secondary: None

Approach: In Situ

Start Date: January, 2010

Rate Groups

Labor: System Labor Rate

Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups	<u>Markup</u>	% Prime	<u>% Sub.</u>
In Situ Biodegradation (Saturated Zone)	Yes	100	0
INSTITUTIONAL CONTROL	Yes	100	0
Monitoring	Yes	100	0
Monitoring	Yes	100	0
Monitoring	Yes	100	0

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**Technology:** In Situ Biodegradation (Saturated Zone)

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Includes Labor, Sampling, Decontamination	4.00	DAY	2,608.88	0.00	0.00	\$10,435.53	Ø	Ø
33020668	Mobilize Direct Push Rig and Crew	1.00	DAY	773.97	0.00	0.00	\$773.97		V
33020669	Demobilize Direct Push Rig and Crew	1.00	DAY	773.97	0.00	0.00	\$773.97		
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	314.90	0.00	0.00	\$314.90		<b>&gt;</b>
33021913	Testing, biomonitoring & bioassay, laboratory bench-scale studies	3.00	EA	996.79	0.00	0.00	\$2,990.37		
33220105	Project Engineer	40.00	HR	0.00	105.67	0.00	\$4,226.62	$\checkmark$	<b>/</b>
33220112	Field Technician	40.00	HR	0.00	60.38	0.00	\$2,415.21	<b>/</b>	<b>/</b>
33231187	Load Supplies/Equipment	1.00	LS	195.95	928.35	488.87	\$1,613.17		<b>/</b>
33240102	Bench Scale Test	1.00	LS	6,522.21	0.00	0.00	\$6,522.21		<b>/</b>
33240103	Pilot Scale Test	1.00	LS	65,222.06	0.00	0.00	\$65,222.06	$\checkmark$	<b>&gt;</b>
95010803	ORC-Adv Material Cost	4,000.00	LBS	10.44	0.00	0.00	\$41,742.00	$\checkmark$	V

Total Element Cost	\$137,030.01
Total 1st Year Technology Cost	\$137,030.01

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Technology: INSTITUTIONAL CONTROL

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
95010203	Classification Exception Area	1.00	LS	6,522.21	0.00	0.00	\$6,522.21	<b>✓</b>	<b>!</b>
			7	Total Element C	Cost		\$6,522.21		
				Total 1st Year Technology Cost				_	

Technology: Monitoring

Element: Groundwater

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33020401	Disposable Materials per Sample	22.00	EA	11.25	0.00	0.00	\$247.41		$\square$
33020402	Decontamination Materials per Sample	22.00	EA	10.02	0.00	0.00	\$220.39		<b>2</b>
33020561	Lysimeter accessories, nylon tubing, 1/4" OD	325.00	LF	0.68	0.00	0.00	\$219.38		
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	314.90	0.00	0.00	\$314.90		$\square$
33021618	Testing, purgeable organics (624, 8260)	22.00	EA	225.37	0.00	0.00	\$4,958.23		
33230509	4" Submersible Pump Rental, Day	4.00	DAY	102.31	0.00	0.00	\$409.22		<b>2</b>
33231186	Well Development Equipment Rental (weekly)	1.00	WK	583.17	118.02	0.00	\$701.19		

**Total Element Cost** 

\$7,070.72

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**Element:** General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	520.00	MI	0.55	0.00	0.00	\$286.00		
33010202	Sample collection, sampling personnel travel, per diem	8.00	DAY	99.00	0.00	0.00	\$792.00		
33220102	Project Manager	8.00	HR	0.00	150.95	0.00	\$1,207.60		
33220105	Project Engineer	16.00	HR	0.00	105.67	0.00	\$1,690.65	<b>/</b>	

**Element:** General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost		Markups Applied
33220109	Staff Scientist	40.00	HR	0.00	75.48	0.00	\$3,019.01	<b>✓</b>	<b>V</b>
33220112	Field Technician	40.00	HR	0.00	60.38	0.00	\$2,415.21	<b>V</b>	$\checkmark$

Total Element Cost \$9,410.48

Total 1st Year Technology Cost \$16,481.19

Technology: Monitoring

Element: Groundwater

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33020401	Disposable Materials per Sample	55.00	EA	11.25	0.00	0.00	\$618.54		$\checkmark$
33020402	Decontamination Materials per Sample	55.00	EA	10.02	0.00	0.00	\$550.97		
33020561	Lysimeter accessories, nylon tubing, 1/4" OD	775.00	LF	0.68	0.00	0.00	\$523.13		
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	2.00	WK	314.90	0.00	0.00	\$629.79		$\square$
33021618	Testing, purgeable organics (624, 8260)	55.00	EA	225.37	0.00	0.00	\$12,395.59		
33230510	4" Submersible Pump Rental, Week	2.00	WK	306.92	0.00	0.00	\$613.83		Z
33231186	Well Development Equipment Rental (weekly)	2.00	WK	583.17	118.02	0.00	\$1,402.37		2

Total Element Cost

\$16,734.22

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	2,300.00	MI	0.55	0.00	0.00	\$1,265.00		
33010202	Sample collection, sampling personnel travel, per diem	20.00	DAY	99.00	0.00	0.00	\$1,980.00	Z	
33220102	Project Manager	16.00	HR	0.00	150.95	0.00	\$2,415.21	<b>✓</b>	<b>✓</b>
33220105	Project Engineer	32.00	HR	0.00	105.67	0.00	\$3,381.29	<b>✓</b>	ightharpoons

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Element: General Monitoring

Element: General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220109	Staff Scientist	100.00	HR	0.00	75.48	0.00	\$7,547.53	<b>&gt;</b>	<b>/</b>
33220112	Field Technician	100.00	HR	0.00	60.38	0.00	\$6,038.03	<b>&gt;</b>	abla
			Т	otal Element C	Cost		\$22,627.06		

**Total 1st Year Technology Cost** 

\$39,361.28

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Technology: Monitoring

Element: Groundwater

Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
Disposable Materials per Sample	31.00	EA	11.25	0.00	0.00	\$348.63		
Decontamination Materials per Sample	31.00	EA	10.02	0.00	0.00	\$310.55		<b>&gt;</b>
Lysimeter accessories, nylon tubing, 1/4" OD	445.00	LF	0.68	0.00	0.00	\$300.38		V
Monitor well sampling equipment, rental, water quality testing parameter device rental	2.00	WK	314.90	0.00	0.00	\$629.79		V
Testing, purgeable organics (624, 8260)	31.00	EA	225.37	0.00	0.00	\$6,986.60		<b>&gt;</b>
4" Submersible Pump Rental, Week	2.00	WK	306.92	0.00	0.00	\$613.83		Z
Well Development Equipment Rental (weekly)	2.00	WK	583.17	118.02	0.00	\$1,402.37		<b>_</b>
	Disposable Materials per Sample  Decontamination Materials per Sample  Lysimeter accessories, nylon tubing, 1/4" OD  Monitor well sampling equipment, rental, water quality testing parameter device rental  Testing, purgeable organics (624, 8260)  4" Submersible Pump Rental, Week  Well Development Equipment	Disposable Materials per Sample  Decontamination Materials per 31.00 Sample  Lysimeter accessories, nylon tubing, 1/4" OD  Monitor well sampling equipment, rental, water quality testing parameter device rental  Testing, purgeable organics (624, 8260)  4" Submersible Pump Rental, Week  Well Development Equipment 2.00	Disposable Materials per Sample  Decontamination Materials per Sample  Lysimeter accessories, nylon tubing, 1/4" OD  Monitor well sampling equipment, rental, water quality testing parameter device rental  Testing, purgeable organics (624, 8260)  4" Submersible Pump Rental, Week  Well Development Equipment 2.00 WK	DescriptionQuantityMeasureUnit CostDisposable Materials per Sample31.00EA11.25Decontamination Materials per Sample31.00EA10.02Lysimeter accessories, nylon tubing, 1/4" OD445.00LF0.68Monitor well sampling equipment, rental, water quality testing parameter device rental2.00WK314.90Testing, purgeable organics (624, 8260)31.00EA225.374" Submersible Pump Rental, Week2.00WK306.92Well Development Equipment2.00WK583.17	DescriptionQuantityMeasureUnit CostUnit CostDisposable Materials per Sample31.00EA11.250.00Decontamination Materials per Sample31.00EA10.020.00Lysimeter accessories, nylon tubing, 1/4" OD445.00LF0.680.00Monitor well sampling equipment, rental, water quality testing parameter device rental2.00WK314.900.00Testing, purgeable organics (624, 8260)31.00EA225.370.004" Submersible Pump Rental, Week2.00WK306.920.00Well Development Equipment2.00WK583.17118.02	Description         Quantity         Measure         Unit Cost         Unit Cost         Unit Cost           Disposable Materials per Sample         31.00         EA         11.25         0.00         0.00           Decontamination Materials per Sample         31.00         EA         10.02         0.00         0.00           Lysimeter accessories, nylon tubing, 1/4" OD         445.00         LF         0.68         0.00         0.00           Monitor well sampling equipment, rental, water quality testing parameter device rental         2.00         WK         314.90         0.00         0.00           Testing, purgeable organics (624, 8260)         31.00         EA         225.37         0.00         0.00           4" Submersible Pump Rental, Week         2.00         WK         306.92         0.00         0.00           Well Development Equipment         2.00         WK         583.17         118.02         0.00	Description         Quantity         Measure         Unit Cost         Unit Cost         Unit Cost         Cost           Disposable Materials per Sample         31.00         EA         11.25         0.00         0.00         \$348.63           Decontamination Materials per Sample         31.00         EA         10.02         0.00         0.00         \$310.55           Lysimeter accessories, nylon tubing, 1/4" OD         445.00         LF         0.68         0.00         0.00         \$300.38           Monitor well sampling equipment, rental, water quality testing parameter device rental         2.00         WK         314.90         0.00         0.00         \$629.79           Testing, purgeable organics (624, 8260)         31.00         EA         225.37         0.00         0.00         \$6,986.60           4" Submersible Pump Rental, Week         2.00         WK         306.92         0.00         0.00         \$613.83           Well Development Equipment         2.00         WK         583.17         118.02         0.00         \$1,402.37	Description         Quantity         Measure         Unit Cost         Unit Cost         Unit Cost         Override           Disposable Materials per Sample         31.00         EA         11.25         0.00         0.00         \$348.63         □           Decontamination Materials per Sample         31.00         EA         10.02         0.00         0.00         \$310.55         □           Lysimeter accessories, nylon tubing, 1/4" OD         445.00         LF         0.68         0.00         0.00         \$300.38         □           Monitor well sampling equipment, rental, water quality testing parameter device rental         2.00         WK         314.90         0.00         0.00         \$6,986.60         □           Testing, purgeable organics (624, 8260)         31.00         EA         225.37         0.00         0.00         \$6,986.60         □           4" Submersible Pump Rental, Week         2.00         WK         306.92         0.00         0.00         \$613.83         □           Well Development Equipment         2.00         WK         583.17         118.02         0.00         \$1,402.37         □

**Total Element Cost** 

\$10,592.15

**Element:** General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	1,040.00	MI	0.55	0.00	0.00	\$572.00		
33010202	Sample collection, sampling personnel travel, per diem	16.00	DAY	99.00	0.00	0.00	\$1,584.00	<b>&gt;</b>	
33220102	Project Manager	8.00	HR	0.00	150.95	0.00	\$1,207.60	<b>✓</b>	
33220105	Project Engineer	16.00	HR	0.00	105.67	0.00	\$1,690.65		
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Element: General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220109	Staff Scientist	80.00	HR	0.00	75.48	0.00	\$6,038.02	<b>✓</b>	<b>✓</b>
33220112	Field Technician	80.00	HR	0.00	60.38	0.00	\$4,830.42	<b>✓</b>	
				Total Element Cost  Total 1st Year Technology Cost  Total Phase Cost			\$15,922.70 \$26,514.85		
			Total				\$225,909.54	_	

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