

**From:** [Pritt, Michael](#)  
**To:** [Parks, James](#)  
**Cc:** [Terri, Greg](#); [Wilson, Tyler](#); [Proffitt, Andrew](#)  
**Subject:** Evansville Water Treatment - Auger Cast Budget  
**Date:** Wednesday, November 16, 2022 3:32:28 PM  
**Attachments:** [image001.png](#)

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James,

Find below the requested budgetary pricing for the Auger Cast piles at the new Evansville Water Treatment Plant.

Mobilization	\$100,000
Price per LF of 18" Auger Cast Pile	\$64.00
Price per LF of 24" Auger Cast Pile	\$109.00
Compression Test	\$75,000

These numbers are based on an assumed 75' deep auger cast pile with 35' of reinforcement. The 24" auger cast pile steel was adjusted to match a similar Steel/Concrete ratio as to what is proposed in the 18" piles.

Thanks,

**Michael Pritt, P.E.** – Project Manager  
**Keller – North America**  
**1838 South Preston Highway, Shepherdsville, KY 40165**  
c: 502-818-2951

**From:** [Parks, James](#)  
**To:** [Pritt, Michael](#)  
**Subject:** RE: Evansville Water Treatment - Auger Cast Budget  
**Date:** Tuesday, November 15, 2022 8:42:00 AM  
**Attachments:** [image002.png](#)  
[image003.png](#)

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I need a number by tomorrow morning.

Thank you



James T. Parks, P.E.  
Senior Analyst  
Indiana Office of Utility Consumer Counselor  
115 West Washington Street, Suite 1500 South  
Indianapolis, Indiana 46204  
[www.IN.gov/OUCC](http://www.IN.gov/OUCC)  
317.232.2766 • [jparks@oucc.IN.gov](mailto:jparks@oucc.IN.gov)

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**From:** Pritt, Michael <Michael.Pritt@keller-na.com>  
**Sent:** Tuesday, November 15, 2022 8:41 AM  
**To:** Parks, James <JParks@oucc.IN.gov>  
**Subject:** RE: Evansville Water Treatment - Auger Cast Budget

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James,

Yes we should be able to get you a budgetary cost for this. Do you have a hard date you are needing these by?

Apologies for the delay, I was out sick yesterday and playing catchup.

Thanks,

**Michael Pritt, P.E.** – Project Manager  
**Keller – North America**  
**1838 South Preston Highway, Shepherdsville, KY 40165**  
c: 502-818-2951



[kellerfoundations.com](http://kellerfoundations.com) | [LinkedIn](#)

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**From:** Parks, James <[JParks@oucc.IN.gov](mailto:JParks@oucc.IN.gov)>  
**Sent:** Monday, November 14, 2022 3:07 PM  
**To:** Pritt, Michael <[Michael.Pritt@keller-na.com](mailto:Michael.Pritt@keller-na.com)>  
**Subject:** RE: Evansville Water Treatment - Auger Cast Budget

Are you able to provide the requested budget costs? I have to file my testimony in a few days and wanted to benchmark costs for the auger cast piles.

Thank you



James T. Parks, P.E.  
Senior Analyst  
Indiana Office of Utility Consumer Counselor  
115 West Washington Street, Suite 1500 South  
Indianapolis, Indiana 46204  
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**From:** Pritt, Michael <[Michael.Pritt@keller-na.com](mailto:Michael.Pritt@keller-na.com)>  
**Sent:** Tuesday, November 8, 2022 11:38 AM  
**To:** Parks, James <[JParks@oucc.IN.gov](mailto:JParks@oucc.IN.gov)>  
**Subject:** RE: Evansville Water Treatment - Auger Cast Budget

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Jim,

Thank you very much for the response.

Enjoy your time off as best as you can!

Thanks,

**Michael Pritt, P.E.** – Project Manager

**Keller – North America**

**1838 South Preston Highway, Shepherdsville, KY 40165**

c: 502-818-2951



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**From:** Parks, James <[JParks@oucc.IN.gov](mailto:JParks@oucc.IN.gov)>  
**Sent:** Tuesday, November 8, 2022 11:08 AM  
**To:** Pritt, Michael <[Michael.Pritt@keller-na.com](mailto:Michael.Pritt@keller-na.com)>  
**Subject:** RE: Evansville Water Treatment - Auger Cast Budget

Good morning,  
We are off for Election Day but I checked my email.

Thanks for following up with me. I'm a Senior Utility Analyst at the Indiana Office of Utility Consumer Counselor (OUCC) reviewing Evansville's request for additional funding authority for its new Water Treatment Plant. Evansville indicates it needs larger diameter and deeper auger cast piles (24-inch versus the original 18-inch design and 75 feet vs. the original 25 feet deep). It appears the original design included over 2,000 auger cast piles (with no reinforcing). The current design calls out 580 piles (but reinforcing has not been listed). My review will be presented to the Indiana Utility Regulatory Commission (IURC).

I requested drawings (30% design and 60% design) and geotechnical reports (2021 and 2022) but have not received them.

**I show my responses in red below.**

Thank you for your help in providing a budgetary price that I can use to evaluate Evansville's request. I appreciate it.



James T. Parks, P.E.

Senior Analyst

Indiana Office of Utility Consumer Counselor

115 West Washington Street, Suite 1500 South

Indianapolis, Indiana 46204

[www.IN.gov/OUCC](http://www.IN.gov/OUCC)

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**From:** Pritt, Michael <[Michael.Pritt@keller-na.com](mailto:Michael.Pritt@keller-na.com)>  
**Sent:** Tuesday, November 8, 2022 8:44 AM  
**To:** Parks, James <[JParks@oucc.IN.gov](mailto:JParks@oucc.IN.gov)>  
**Subject:** Evansville Water Treatment - Auger Cast Budget

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Jim,

I gave you a call, but also following up here. Feel free to respond whichever way is easier for you.

Just looking to get a few more details clarified on what you were looking for.

- 1.) Are there any access concerns for the project? **No. There is good access along Veterans Memorial Parkway about 2 miles west of the Interstate I-69 interchange north of the Ohio River with site entrances via Waterworks Road and Shawnee Drive (new).**
- 2.) When will the project start? **Construction is anticipated to start in the Fall of 2023. There are two buildings on the site (Street Maintenance Dept. Garage and Levee Authority Building) that must be demolished first.**
- 3.) What are anticipated loads on a per pile basis? **I do not have this information. The heaviest load is probably for the Filter Building (I do not know the water depth – possibly 11 feet?) which has a finished water storage tank (clearwell with a 24 feet deep water level) below the filters.**
- 4.) Do they have a general layout plan on the piles? **The design is at 60%. I requested the drawings but have not yet received them. On a nearby project (Sunrise Effluent Pump Station – 500 feet north) the auger cast piles were 18-inch diameter and up to 60 feet long. Attached are pile drawings from this other project.**
- 5.) Are they looking for pricing on both 18” and 24” dia.? **Yes. Could you also provide separate budget pricing for steel reinforcing like the reinforcing on the Sunrise Effluent Pump Station?**
- 6.) Do they have a current geotechnical report? **We have a partial geotechnical report only right now. I requested the complete copy but have not yet received it. Attached is the geotechnical information that I have.**
- 7.) Is there load testing required? If so, to what capacity? **I assume load testing will be required. I don’t know the capacity.**
- 8.) What strength of grout is required? **The engineer listed 4,000 psi concrete on its cost estimate for all concrete slabs, walls, and auger cast piles.**

Thanks,

**Michael Pritt, P.E.** – Project Manager  
**Keller – North America**  
**1838 South Preston Highway, Shepherdsville, KY 40165**  
c: 502-818-2951



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**From:** Keller North America <[info@keller-na.com](mailto:info@keller-na.com)>

**Sent:** Monday, November 7, 2022 4:35 PM

**To:** Lewis, Justin <[JRLewis@keller-na.com](mailto:JRLewis@keller-na.com)>

**Cc:** Terri, Greg <[gaterri@keller-na.com](mailto:gaterri@keller-na.com)>; Frey, DeAna <[dlfrey@keller-na.com](mailto:dlfrey@keller-na.com)>; Proffitt, Andrew <[aproffitt@keller-na.com](mailto:aproffitt@keller-na.com)>; Finocchio, David <[DWFinocchio@keller-na.com](mailto:DWFinocchio@keller-na.com)>; Capraro, Michael <[Michael.Capraro@keller-na.com](mailto:Michael.Capraro@keller-na.com)>; McDermott, Martin <[mmcdermott@keller-na.com](mailto:mmcdermott@keller-na.com)>

**Subject:** Website request from James Parks of Indiana Office of Utility Consumer Counselor

The following inquiry was received

at 16:34 on Nov 7, 2022 from:

Mr James Parks

[jparks@oucc.in.gov](mailto:jparks@oucc.in.gov)

3172322766

Senior Utility Analyst

Company name: Indiana Office of Utility Consumer Counselor

Country/region: Indiana , United States

Project type:

Message:

James Parks Looking for a budgetary cost for 18-inch or 24-inch diameter, 75 feet deep auger cast piles with no casing and no reinforcing. Soils are sands and silty clays at a site of a new water treatment plant along the Ohio River at Evansville, IN. The total number of piles is 580. I do not have any purchasing authority. My purpose is to check cost estimates prepared by others against typical budgetary values. Thank you for any help you can provide.



EVANSVILLE WATER AND SEWER UTILITY  
CITY OF EVANSVILLE, INDIANA

REQUEST FOR QUALIFICATIONS FOR  
NEW WATER TREATMENT PLANT

EWSU PROJECT NO. U1032

APRIL 2022

PREPARED BY:

AECOM  
2450 South Tibbs Avenue  
Indianapolis, IN 46241

- **Other Load Considerations:** For structures with SDC “D”, the lateral force resisting system will include one or more of the following: “Steel Intermediate Moment Frames” with height limit of 35ft, “Steel Ordinary Concentrically Braced Frames” with height limit of 35ft, “Special Reinforced Concrete Shear Walls” with height limit of 160ft, “Special Reinforced Masonry Shear Walls” with height limit of 160ft, “Intermediate Precast Shear Walls” with height limit of 40ft, and “Special Reinforced Concrete Moment Frames” without height limit. For tank structures, the design forces will include lateral and vertical amplified forces based upon seismic-induced impulse wave action as defined by ACI 350.3. Process equipment within internal material storage will also include seismic forces within individual attachment and restraint detailing.

**Geotechnical Findings: (CTL Engineering):** Preliminary borings were attempted in the region immediately beyond the perimeter walls of the existing Street Maintenance Building that currently occupies the proposed site. A copy of the geotechnical investigation is included in Appendix C. Soil strata encountered include a “dense to loose fine sand with soil” material at shallow depth, a thin layer of firm to soft silty LEAN CLAY, underlain by a significant depth of material categorized as “loose to very loose SAND”. Groundwater was observed within the borings at between 8ft and 12ft below grade.

Preliminary finding is that the loose sands are considered “subject to liquefaction”. Resulting soil differential settlements were estimated in the range of 6 to 8 inches. Additional borings and soils analysis will be required following removal of the existing street maintenance building when moving into the next design phase.

The observed groundwater will require “dewatering measures” to build the proposed structures. Current layout has the Clearwell base slab placed at approximately EL 330.00, or 36 ft below current grade. Other structures are below grade and below projected groundwater elevations at varying depths.

Based upon the extent of “loose to very loose SAND” at depth, all structures will likely be placed on deep foundations (auger-cast piles, or similar shafts). These foundations may be extended to competent material and provide support for building loads, while also providing uplift restraint for buoyant forces developed by the presence of groundwater. Foundations are anticipated to include deep foundations penetrating the shallow soils and bearing upon deeper competent in-situ soils. Soil site class is currently estimated to be Site Class “F”, with final property determination to be defined with additional engineering in the next design phase. The Site Class “F” will create a condition where the Seismic Design Category (SDC) “D” is our optimistic target. Foundations will require grade beams tying all column supports in both directions if soil is classified as “liquefiable”, in accordance with provisions of ACI 318- Part 18.13.

Considering the requirements for SDC “D”, seismic bracing of Architectural components and of Mechanical, Electrical and Plumbing components plus many of the Process equipment and piping will be required. For tank structures and Process equipment, additional loading criteria defined by ACI 350.3 are also applicable.



**Systems for Each Structure:** The facility includes multiple structures ranging from open tanks for the pretreatment basins (PTB), closed tanks for the residuals pump station (RPS), ozone process structures including ozone building and ozone tank (OZB-OZT), filter building (FTB), clearwell (CLR), high service pump building (HSP), chemical handling (CHB) and Administration/Control and Maintenance (ADM). The structure for each will be tailored to suit the activities and/or process intended.

- ❖ PTB – grade-level tank designed per ACI 350 with wall loading including internal process liquids, external soil pressures, buoyant hydrostatic forces and equipment loading.
- ❖ OZB-OZT – combination of below grade-level tank with top slab (OZT) plus adjoining grade-level process equipment building with concrete bearing walls and framing. Roof structure is anticipated to include precast framing (precast double tees spanning the longer areas, hollow-core slab spanning the smaller rooms accessing the OZT).
- ❖ FTB, CLR, HPS - combination of deep-structure clearwell tank with top slab (CLR) plus adjoining “stacked” filter structure building with piping galleries and backwash flume-channels. Roof structure is anticipated to include precast framing (precast double tees spanning the longer areas, hollow-core slab spanning the center filter gallery). For the framing supports of the stacked “filter over clearwell” and the “roof over filter”, concrete moment frame construction will provide vertical and lateral supports. Filter tank structure walls will be supported upon clearwell structure via “divider-baffle walls” plus column piers and concrete beams where stacked framing does not continue to base.
- ❖ CHB - combination of below grade-level containment sump area plus at-grade floor construction for support of process chemical storage. The upper building will consist of concrete bearing walls supporting a precast roof structure (hollow-core slab spanning between walls). A cast-in-place three chamber tank for COAG bulk storage is incorporated into the structure near its southwest corner. Multiple rooms will have FRP grated access platforms for equipment controls placed above containment sump regions.
- ❖ RPS - combination of below grade-level containment sump area plus at-grade access. Above the grade-level slab, a pump control structure will consist of concrete bearing walls supporting a precast hollow-core slab roof structure.
- ❖ ADM – structural steel framing with concrete composite floor slabs at elevated second floor. Roof structure over Maintenance and atop the two-story area will be metal deck over structural steel framing. Lateral restraint system will consist of Steel Ordinary Concentrically Braced Frames. Elevated floor structure to be designed to limit floor vibrations within the laboratory floor area. Floor fire-separation ratings to be final determined by Architectural for each area, with anticipation of a 1-hr rated floor system at this time.

Several of the structures (OZB, HPS) are planned to include overhead bridge cranes for maintenance access and repair-replacement of process equipment. All cranes (monorails, bridge cranes, etc.) will be hung from the roof structure that is designed for load support. Preliminary crane capacity is estimated at 2.5T lifted load, with specific requirements determined in final design phase. The

## **APPENDIX C**

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# **Preliminary Geotechnical Investigations**

### **Generalized subsurface conditions.**

Generally, our borings encountered the worst of soil conditions (very poor):

0 to 6 – Medium dense to loose, FINE SAND with silt (SM)

(very loose in Boring B-4)

6 to 9 - firm to soft, silty LEAN CLAY (CL)

9 to (35 - 40) very soft SILTY CLAY OR SILTY SAND

(35 -40) to 55 very loose to loose, SAND with silt .

Soil sampling was terminated at 50 to 56 feet

Rock (SHALE) was encountered at 111 feet in Boring B-2. The rock quality was good.

Ground water observed in borings is 8 to 12 feet deep. We are waiting for our piezometer data.

### **Geotechnical Concerns:**

- Liquefaction – the very loose sands and soft silty are susceptible to liquefaction. We can estimate the settlement from the sand, but for the silt, there isn't a good method. However, I would plan on a potential of 6 to 8 inches of differential settlement (could be as high as 12 inches).
- Heave - The contractor will have to design his dewatering system and reinforce the bottom of the excavation to prevent the bottom from heave.
- Low bearing capacity for shallow foundation. Since Auger Cast In Place piles (ACIP) will be required for the heavier structures, I would just use ACIP for all the structures. The ACIP would be based on friction; therefore, they can also be used for uplift resistance.
- Seismic Site Class – D: The liquifiable soils trigger a site class F with the exception of short wide buildings (building periods less than ½ second). We have assumed all structures will have a natural period less than ½ second. Structural engineer to confirm. If the structures do not meet the exception, then a site response analysis is required (out of scope).

### **Preliminary Considerations for Design**

*Foundations for Pretreatment Tanks* – foundations 15 feet below existing grade.

- Some dewatering may be required.
- ACIP piles foundations for compression and uplift loads. If you provided the design loads you plan to use, we can provide recommendations for pile length and diameters. (i.e. 40 Kip, 60 kip, 100 kip piles).
- ACIP piles may be longer than normal to resist downdrag in the event of a seismic event; however, we can use a lower factor of safety for the seismic event. Suggested Factor of Safety's (open for discussion):
  - 2.0 gravity static load
  - 3.0 uplift at stable groundwater level (normal pool)
  - 1.5 uplift at 100-year flood level
  - 1.2 gravity due to down drag during a seismic event.
- If you still need soil anchors, we can recommend bond strength for micropiles. However, it would be simpler to just use one type of foundation system.

**Foundations for Clear Wells:**

- Bearing 38.5 feet deep.
- We believe construction of ACIP at that depth would be difficult. We need to consult with contractors to see if it can be done. However, it may not be necessary.
  - We anticipate the loads from the clear well tanks will be less than the weight of the soil removed for the excavation. Therefore, we could float the structure.
  - The excavation will need a massive concrete bottom to control heave. A mat foundation for the tanks could serve that purpose. A mat foundation could also be heavily reinforced to bridge over differential settlement from liquefaction. Also, the mat foundation could be sized to resist the uplift force.
- The contractor will need to put temporary bracing for construction which will require tiebacks
- If additional resistance capacity is needed for the design structure, vertical tieback or micropiles drilled through mat foundations could be used.
- Anchors will need to be load tested.

**Lateral Earth Pressures:**

Our report will include lateral earth pressure coefficients for “Active” –forward rotation, “At-Rest” – no rotation, and “Passive – backward rotation. We will also include recommended unit weights for above and below the groundwater, and groundwater levels. This should be sufficient for lateral earth pressures.

**Seismic Site Class:**

- Currently we are considering Site Class D. See the seismic comments listed under the Geotechnical Concerns section.
- Looks like your look-up tool used ASCE 7-16. The values are slightly different for ASCE 7-10. Which code are we using? Regardless, we are in seismic design category “D”.

Building Code	ASCE 7-10		ASCE 7-16	
Coordinates	Lat: 37.958105		Long: -87.570315	
Risk Category	IV - Essential Structure			
Bedrock acceleration, short ( $S_s$ )	0.57		0.538	
Bedrock acceleration, 1 sec ( $S_1$ )	0.20		0.182	
Design acceleration, short ( $S_{DS}$ )	0.511	0.593	0.491	0.588
Design acceleration, 1 sec ( $S_{D1}$ )	0.267	0.427	0.271	0.508
Seismic Design Category	D	D	D	D

We will need to provide you with acceleration values for the seismic lateral pressures, PGA at the mid wall height.

### **Seismic Relative Movement:**

Likely several inches (plan on 8 to 12 inches)

### **Dewater and Pump Rates**

The design of dewatering system is beyond our proposed scope of services and is not the design team responsibility. This is the contractor's responsibility. We are looking into providing estimated dewatering parameters based on empirical correlations. However, you may not want us to do that because it makes the client and the design team responsible (i.e. if the dewatering system underperforms, then the contractor could blame the design team). We can perform a slug test and have a hydrogeologist estimate pumping rates for an additional fee.

There is another concern with dewatering. Pumping the water from the lower sand aquifer may not lower the groundwater in the clay layer. The contractor may need a shallow and deep dewatering points.

EWSU may have information regarding the dewatering system used for the recent construction of the Effluent Pump Station (approximately 650 feet north of this project site). Pumping rates and measured drawdowns during construction dewatering may be available and useful information for dewatering efforts for this project.

### **Groundwater Design Level**

A common simple practice is to use the 100-year flood elevation. The Effluent Pump station design uses a land side flood level of 365 feet. Our site elevation is 366 feet. Based on our preliminary observations, a groundwater elevation of 365 feet is reasonable for shallow structures. On the other side of the levy (about 700 feet away), the river and flood level is 378 feet. Our experience indicates a strong correlation of the hydraulic pressure in the sand layer and the flow level in the adjacent Ohio River. Therefore, a higher design groundwater level may be needed for deep structures were excavations or foundations extend through the clay overburden soils and expose the granular soils. There is a piezometer installed at a depth of 48 feet at Boring B-3 taking hourly groundwater readings. These readings and correlations with the flow level of the Ohio River will be used to assess the design high water level for the project.

### **Closing**

We look forward to discussing the project further with you and appreciate getting us involved early in the design process. This is a very challenging site.

# TEST BORING RECORD

CLIENT : AECOM  
 PROJECT : EWSU Water Treatment Facility  
 LOCATION : Evansville, IN  
 PROJECT NO. : 21050038IND


BORING NO.: B-1  
 SHEET 1 OF 3  
 DATE STARTED : 03-01-21  
 DATE COMPLETED : 03-02-21

Boring Elevation: <u>366 Feet</u>	Boring Depth : <u>51.5 Feet</u>	Boring Method : <u>ATV</u>	Hammer : <u>Automatic</u>
Latitude : <u>37.957725</u>	Station: _____	Rig Type : <u>CA</u>	Hammer Efficiency: <u>Estimated 80%</u>
Longitude <u>-87.570826</u>	Offset : _____	Casing Diameter : <u>3" I.D.</u>	Driller : <u>DD</u>
	Line : _____	Core Size : <u>---</u>	Temperature : <u>45° F</u>
			Weather : <u>Fair</u>

GROUNDWATER:

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
365.5		<b>OLD PAVER (6") (Visual)</b>	0.5											
	5	Brown, Moist, Medium Dense to Loose, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (Lab 1)		SS-1	6 9 10	19	67	9				NP	NP	NP
360.5			5.5	SS-2	5 5 4	9	100	12						
	10	Gray, Wet to Moist, Stiff to Very Soft, <b>LEAN CLAY with SAND (CL)</b> with Traces of Organics (Lab 2)		SS-3	2 2 2	4	100	41						
				SS-4	0 0 0	0	100	33				34	21	13
353.0			13.0											
	15	Gray, Wet, Very Loose to Loose, <b>SILTY SAND (SM)</b> (Lab 3)		SS-5	1 0 1	1	100	24				NP	NP	NP
	20			SS-6	0 0 0	0	0							

Continued on next page

 CTL Engineering, Inc. Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD

CLIENT : AECOM


BORING NO.: **B-1**

PROJECT : EWSU Water Treatment Facility

SHEET 2 OF 3

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
25		Gray, Wet, Very Loose to Loose, <b>SILTY SAND (SM)</b> (Lab 3)		SS-7	0 0 2	2	100	33						
337.0			29.0											
30				SS-8	5 5 3	8	100	27			29	23	6	
35		Gray, Wet, Medium Stiff to Very Soft, <b>SILT with SAND (ML)</b> (Lab 5)		SS-9	0 0 0	0	0							
326.0			40.0											
40		Heaving Sand Encountered at between 40 and 50 feet and drilling mud injected for drilling.		SS-10	3 1 1	2	100	21						
45		Brown, Wet, Very Loose to Loose, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (As Lab 1)		SS-11	1 3 6	9	67	22						

Continued on next page

 CTL Engineering, Inc. Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD


CLIENT : AECOM

BORING NO.: **B-1**

PROJECT : EWSU Water Treatment Facility

SHEET 3 OF 3

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
314.5	50	Brown, Wet, Very Loose to Loose, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (As Lab 1)	51.5	SS-12	2 2 5	7	67	22						
		<b>Bottom of Boring at 51.5 feet</b>  Boring backfilled according to Aquifer Protection Guidelines												
	55													
	60													
	65													
	70													
	75													

 <b>CTL Engineering, Inc.</b> Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD

CLIENT : AECOM  
 PROJECT : EWSU Water Treatment Facility  
 LOCATION : Evansville, IN  
 PROJECT NO. : 21050038IND

BORING NO.: B-2  
 SHEET 1 OF 5  
 DATE STARTED : 03-03-21  
 DATE COMPLETED : 03-03-21

Boring Elevation: <u>366 Feet</u>	Boring Depth : <u>56.5 Feet</u>	Boring Method : <u>ATV</u>	Hammer : <u>Automatic</u>
Latitude : <u>37.957701</u>	Station: _____	Rig Type : <u>CA</u>	Hammer Efficiency: <u>Estimated 80%</u>
Longitude <u>-87.569875</u>	Offset : _____	Casing Diameter : <u>3" I.D.</u>	Driller : <u>DD</u>
	Line : _____	Core Size : <u>2" NQ</u>	Temperature : <u>55° F</u>
			Weather : <u>Fair</u>

GROUNDWATER:

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits		
											LL	PL	PI
365.7-		OLD PAVER (4") (Visual)	0.3										
	5	Brown, Moist, Medium Dense to Loose, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (As Lab 1)		SS-1	7 11 13	24	67	12					
360.0				SS-2	5 6 4	10	67	19					
	10			SS-3	4 2 3	5	100	25					
	15	Brown, Moist to Wet, Stiff to Very Soft, <b>LEAN CLAY with SAND (CL)</b> (As Lab 2)		SS-4	1 2 2	4	67	31					
	20			SS-5	0 0 0	0	33	33					
				SS-6	0 0 0	0	0	0					

Continued on next page



CTL Engineering, Inc.  
Phone: 317-295-8650

BORING METHOD	SAMPLING METHOD	ABBREVIATIONS
HSA - Hollow Stem Auger	SS - Split Spoon Sample	* - Hand Penetrometer
SFA - Solid Flight Auger	ST - Shelby Tube Sample	LL - Liquid Limit
RC - Rock Coring	CR - Rock Core Sample	PL - Plastic Limit
MD - Mud Drilling	BS - Bag Sample	PI - Plasticity Index
CA - Casing Advancer	AC - Auger Cuttings	SPT - Standard Penetration Test
HA - Hand Auger		

# TEST BORING RECORD

CLIENT : AECOM


BORING NO.: **B-2**

PROJECT : EWSU Water Treatment Facility

SHEET 2 OF 5

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
344.0	25	Brown, Very Moist, Very Soft, <b>LEAN CLAY (CL)</b> (Lab 8)	22.0	ST-1			100	35	109.4	1.3 @ 11.1%	42	24	18	
	30		SS-7			0 0 0	0	100	34					
333.0	35	Heaving Sand Encountered at 35 feet.	33.0	SS-8			0 4 5	9	100	40				
	40	Brown and Gray, Wet, Medium Dense to Very Loose, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (Lab 7)		SS-9			1 1 4	5	100	23		NP	NP	NP
	45		SS-10			2 3 8	11	0						

Continued on next page

 <b>CTL Engineering, Inc.</b> Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD

CLIENT : AECOM


BORING NO.: **B-2**

PROJECT : EWSU Water Treatment Facility

SHEET 3 OF 5

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
50		Brown and Gray, Wet, Medium Dense to Very Loose, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (Lab 7)		SS-11	0 0 0	0	100	28						
313.0			53.0											
55		Brown, Wet, Medium Dense, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (As Lab 1)		SS-12	4 6 7	13	67	17						
309.5			56.5											
60														
65		Heaving sand encountered and drilling mud injected. Drilling mud could not stop heaving. Drilled to 111 feet without sampling because of heaving sand and casing refusal conditions.												
70														
75														

Continued on next page

 <b>CTL Engineering, Inc.</b> Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD

CLIENT : AECOM


BORING NO.: **B-2**

PROJECT : EWSU Water Treatment Facility

SHEET 4 OF 5

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
	80													
	85													
	90	Heaving sand encountered and drilling mud injected. Drilling mud could not stop heaving. Drilled to 111 feet without sampling because of heaving sand and casing refusal conditions.												
	95													
	100													

Continued on next page

 CTL Engineering, Inc. Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD


CLIENT : AECOM

BORING NO.: **B-2**

PROJECT : EWSU Water Treatment Facility

SHEET 5 OF 5

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
105		Heaving sand encountered and drilling mud injected. Drilling mud could not stop heaving. Drilled to 111 feet without sampling because of heaving sand and casing refusal conditions.												
255.0			111.0											
254.6		Whitish Tan, Medium Grained, Slightly Weathered, Hard, Strong, <b>SANDSTONE</b>	111.4											
254.0		Light Tannish Gray, Fine Grained with some Coarse Grained, Highly Weathered, Highly Fractured, Moderately Soft, <b>SANDSTONE</b>	112.0				95							
				RC-RQD= 77%										
115		Grey to Dark Grey, Fine Grained with some Coarse Grained, Scattered throughout, Slightly Weathered, Hard, Strong, <b>SANDSTONE</b>												
				RC-RQD= 92%			97							
120														
245.0		Bottom of Boring at 121 feet	121.0											
		Boring backfilled according to Aquifer Protection Guidelines												
125														

 CTL Engineering, Inc. Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD

CLIENT : AECOM  
 PROJECT : EWSU Water Treatment Facility  
 LOCATION : Evansville, IN  
 PROJECT NO. : 21050038IND


BORING NO.: B-4  
 SHEET 1 OF 3  
 DATE STARTED : 03-02-21  
 DATE COMPLETED : 03-02-21

Boring Elevation: <u>365 Feet</u>	Boring Depth : <u>50.5 Feet</u>	Boring Method : <u>ATV</u>	Hammer : <u>Automatic</u>
Latitude : <u>37.958387</u>	Station: _____	Rig Type : <u>CA</u>	Hammer Efficiency: <u>Estimated 80%</u>
Longitude <u>-87.569674</u>	Offset : _____	Casing Diameter : <u>3" I.D.</u>	Driller : <u>DD</u>
	Line : _____	Core Size : <u>---</u>	Temperature : <u>43° F</u>
			Weather : <u>Fair</u>

GROUNDWATER:

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
364.7		TOPSOIL (4") (Visual)	0.3											
		Brown, Wet, Very Loose, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (As Lab 1)		SS-1	2 1 1	2	67	12						
359.5	5		5.5	SS-2	1 1 1	2	56	21						
		Gray, Moist, Soft to Medium Stiff, <b>LEAN CLAY with SAND (CL) (FILL)</b> with Traces of Brick (Lab 4)		SS-3	3 4 3	7	33	20			32	20	12	
356.0	10		9.0	SS-4	0 1 1	2	67	29						
	15	Gray, Moist, Soft to Very Soft, <b>LEAN CLAY with SAND (CL)</b> (As Lab 2)		SS-5	0 0 0	0	100	35						
	20			SS-6	0 0 0	0	6	41						

Continued on next page

 CTL Engineering, Inc. Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD

CLIENT : AECOM


BORING NO.: **B-4**

PROJECT : EWSU Water Treatment Facility

SHEET 2 OF 3

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
339.0	25	Gray, Moist, Soft to Very Soft, <b>LEAN CLAY with SAND (CL)</b> (As Lab 2)	26.0	SS-7	0 0 0	0	0							
				ST-1			100	44	106.4	1.0 @ 5.1%	48	27	21	
	30			SS-8	0 0 0	0	100	38						
		Gray, Very Moist, Very Soft, <b>LEAN CLAY (CL)</b> (Lab 6)												
	35			SS-9	0 0 0	0	100	43						
328.0			37.0											
	40	Gray, Wet, Very Loose, <b>SILTY SAND (SM)</b> (As Lab 3)		SS-10	3 2 2	4	22	26						
323.0			42.0											
	45	Brown, Wet, Very Loose to Medium Dense, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (As Lab 1)		SS-11	0 0 0	0	0							

Continued on next page

 <b>CTL Engineering, Inc.</b> Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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# TEST BORING RECORD


CLIENT : AECOM

BORING NO.: **B-4**

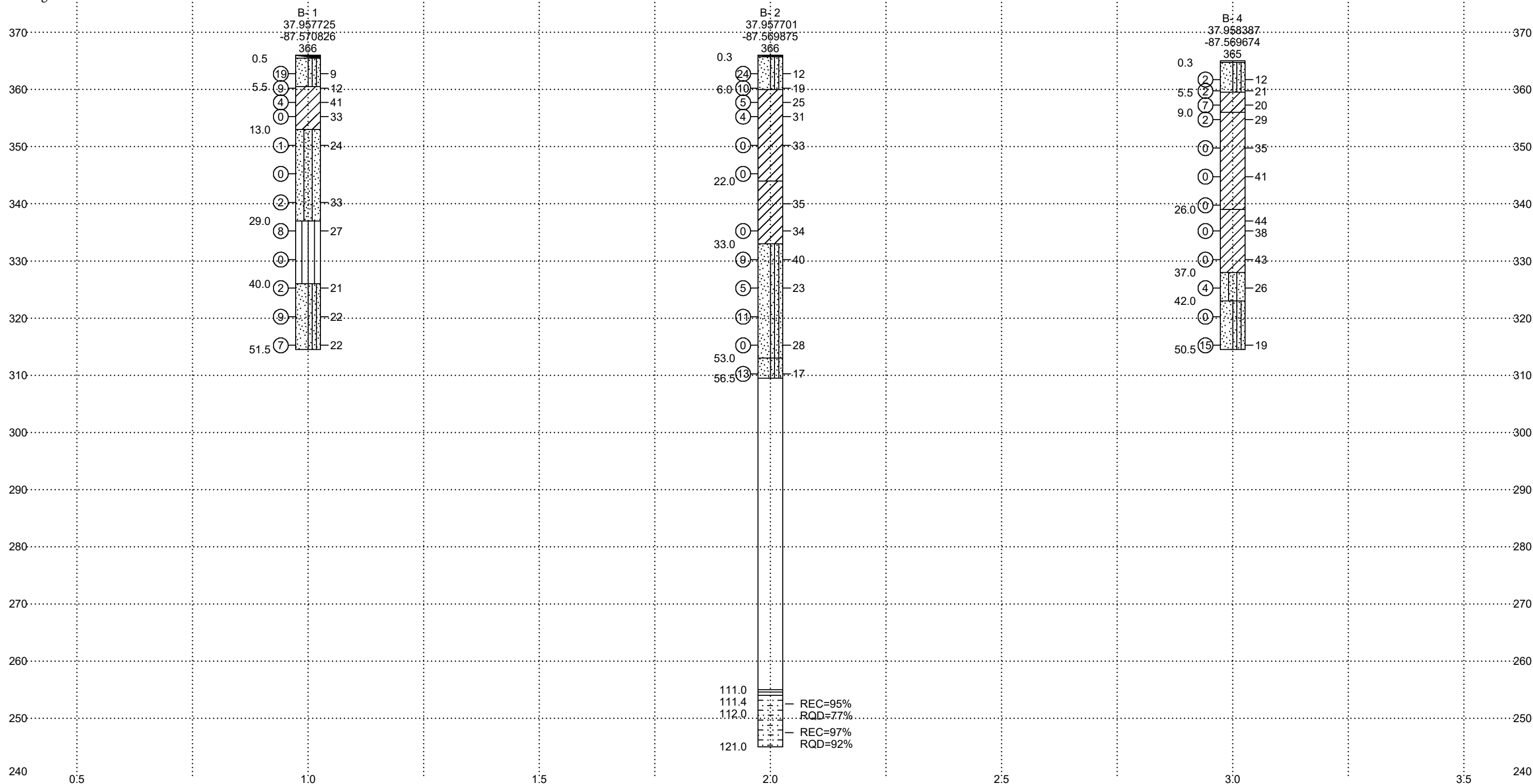
PROJECT : EWSU Water Treatment Facility

SHEET 3 OF 3

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits			
											LL	PL	PI	
314.5	50	Brown, Wet, Very Loose to Medium Dense, <b>POORLY GRADED SAND with SILT (SP-SM)</b> (As Lab 1)	50.5	SS-12	5 7 8	15	67	19						
		<b>Bottom of Boring at 50.5 feet</b>												
		Boring backfilled according to Aquifer Protection Guidelines												
	55													
	60													
	65													
	70													
	75													

 CTL Engineering, Inc. Phone: 317-295-8650	<b>BORING METHOD</b> HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling CA - Casing Advancer HA - Hand Auger	<b>SAMPLING METHOD</b> SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample AC - Auger Cuttings	<b>ABBREVIATIONS</b> * - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test
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**LEGEND**

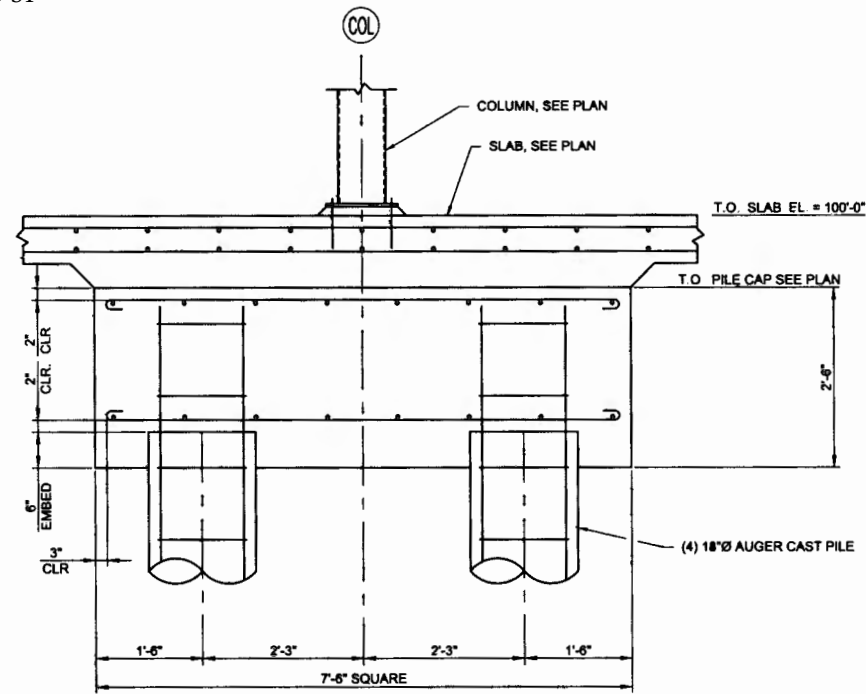
- ASPHALT CONCRETE
- SILTY SAND
- TOPSOIL
- SAND WITH SILT POORLY GRADED
- SILT
- LEAN CLAY
- SANDSTONE

- GROUND WATER DURING DRILLING
- GROUND WATER AT COMPLETION OF DRILLING
- GROUND WATER AT "N" HOURS AFTER COMPLETION
- W MOISTURE CONTENT IN PERCENT (w)
- STANDARD PENETRATION IN BLOWS PER FOOT (N)

**SOIL PROFILE**

Scale As Shown	AECOM	
Date 4/9/21	EWSU Water Treatment Facility	
Drawn By CG	Evansville, IN	
Reviewed By	Project No. 21050038IND	Page 1 of 1

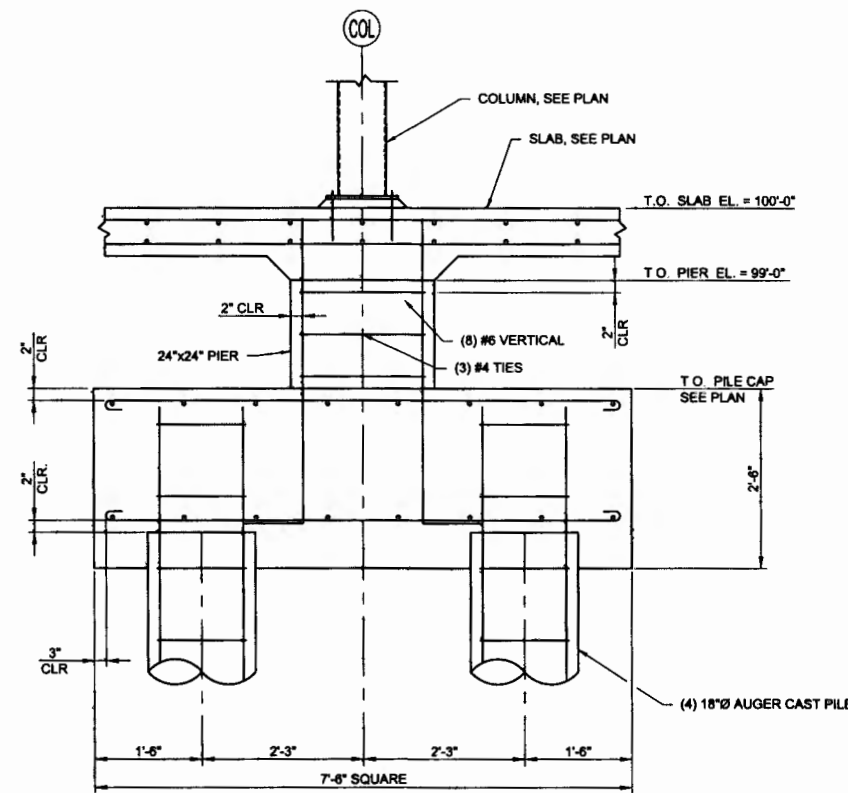




**PILE CAP DETAIL PC#3**

SCALE: 3/4" = 1'-0"

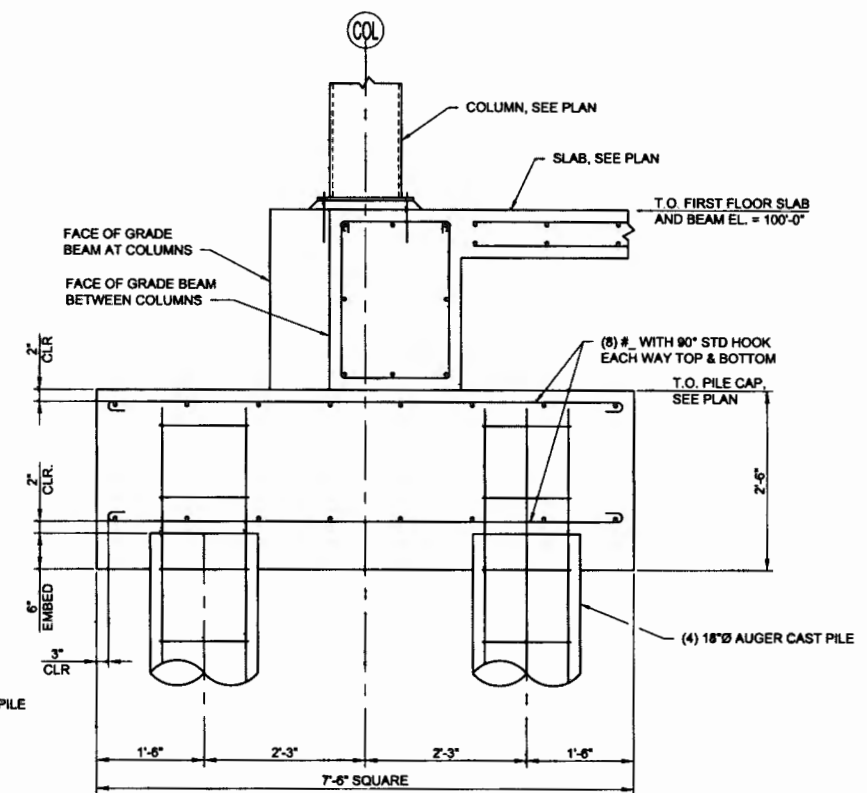
NOTE: SEE PILE CAP DETAIL PC#1 FOR ADDITIONAL INFORMATION



**PILE CAP DETAIL PC#2**

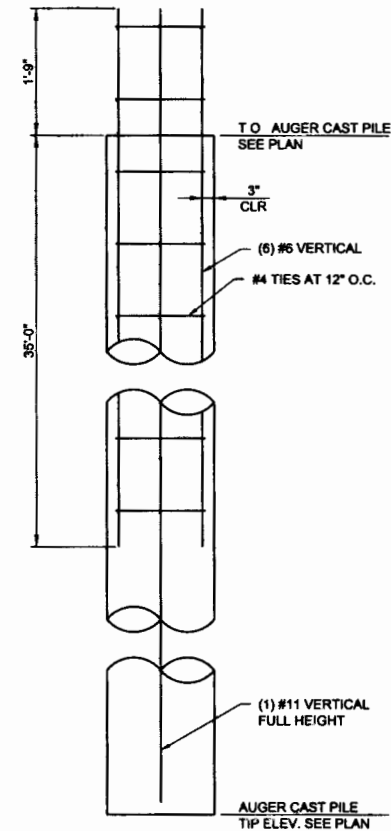
SCALE: 3/4" = 1'-0"

NOTE: SEE PILE CAP DETAIL PC#1 FOR ADDITIONAL INFORMATION



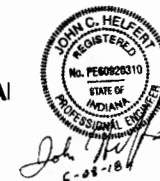
**PILE CAP DETAIL PC#1**

SCALE: 3/4" = 1'-0"



**AUGER CAST PILE REINFORCING DETAIL**

SCALE: 3/4" = 1'-0"



Revision Number	Revision Description

Designed By	DWB
Drawn By	LFV
Checked By	
Approved By	JCH
Filename	100-S-30.DWG
Project No.	13204
Project Date	04/05/18

EVANSVILLE WATER AND SEWER UTILITY  
 SUNRISE PUMP STATION  
 CONTRACT A - SUNRISE PUMP STATION  
 EVANSVILLE, INDIANA  
 SUNRISE PUMP STATION  
 DETAILS





(<https://www.beatyinc.com/>)



## AUGERED CAST-IN-PLACE PILES

[Home \(https://www.beatyinc.com\)](https://www.beatyinc.com/) / [Deep Foundations \(https://www.beatyinc.com/deep-foundations/\)](https://www.beatyinc.com/deep-foundations/) / Augered Cast-in-Place Piles

Augered Cast-in-Place piles – also simply known as “augercast” piles – are concrete piles that are installed by drilling into the soil using a continuous auger with a hollow stem. When the auger reached the desired tip elevation, the tool is withdrawn as structural grout is pumped through the hollow stem. This method of construction permits concrete piles to be installed in soft, loose and wet soils without having to use casings – or producing large vibrations.



## Banks Phase 3B

**Project Location:** Cincinnati, OH

**Owner:** Hamilton County Ohio

**Architect/Engineer:** THP Limited

**Completion Year:** 2019

- 700 augercast piles up to 75' in length

[? More Info](#)



## Magnetation Pellet Plant

**Project Location:** Reynolds, IN

**Owner:** Magnetation LLC

**Completion Year:** 2013

**% Self-Performed Work:** 100%

- 1,200 EA – 18" Diameter Auger Cast Piles
- 350 EA – 24" Diameter Auger Cast Piles
- 800 EA – 14" Driven H Piles Averaging 90' in Length

[? More Info](#)



## St. Vincent Pacers Practice Facility

**Project Location:** Indianapolis, IN

**Owner:** Indiana Pacers

**Architect/Engineer:** Ratio Architects

**Completion Year:** 2016

- 350 each 18" diameter augercast piles up to 51' deep

[? More Info](#)





With over 55 years in heavy highway civil construction, we have done it all from design-bid-build bridge projects to pedestrian trails to specialty earth retention to deep foundations. No matter the client or size of project, our dedication to excellence never changes.

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- Health Insurance Resources  
(<https://unifiedgrp.com/resources>)

## CONTACT US

🏠 5292 W. 100 N., Boggstown, IN 46110

☎ 317-835-2254

☎ 800-486-8094

📠 317-835-2913

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November 7, 2022 phone call between Jim Parks / OUCC and  
Bruce Fenimore, Senior Estimator, Project Engineer  
Beaty Construction, Inc.  
(317) 835-2254

Budget \$4 million for:

580 auger cast piles with no casing and no reinforcing  
24-inch diameter

75 feet deep

Total of 43,500 vertical feet

Budgetary cost per vertical foot = \$87.50

Budgetary cost = \$3,806,250

Need to add in mobilization / demobilization

Need to add in pile load tests (I stated EWSU has separate line item costs for testing)

RS Means Cost Estimator - Auger Cast Piles November 2022

rsmeansonline.com/SearchData

Imported From IE SPD Training Login My Dashboard - Dy... Home Mail - Parks, James... Concrete Financial...

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Cost Data .....Heavy Construction Type Unit Labor Type Standard Union Location EVANSVILLE (476-477) Release Year 2022 Quarter 3

Search What are you searching for? Index Search Include My Custom Data New Estim

**3163 Bored Piles** Total 131 records

Line Number	Description	Unit	Daily Output	Labor Hours	Bare Material	Bare Labor	Bare Equipment	Bare Total	Total O&P
31632900000	Drilled Concrete Piers and Shafts								
316329130010	UNCASED DRILLED CONCRETE PIERS								
316329130020	Unless specified otherwise, not incl. pile caps or mobilization								
316329130050	Cast in place augered piles, no casing or reinforcing								
316329130060	8" diameter	V.L.F.	540.00	0.089	5.67	4.26	1.68	11.61	14.41
316329130065	10" diameter	V.L.F.	480.00	0.100	8.99	4.81	1.88	15.68	19.10
316329130070	12" diameter	V.L.F.	420.00	0.114	12.72	5.47	2.15	20.34	24.47
316329130075	14" diameter	V.L.F.	360.00	0.133	17.15	6.38	2.50	26.03	31.09
316329130080	16" diameter	V.L.F.	300.00	0.160	23.10	7.66	3.01	33.77	40.11
316329130085	18" diameter	V.L.F.	240.00	0.200	28.35	9.57	3.75	41.67	49.53

rsmeansonline.com/SearchData

Imported From IE SPD Training Login My Dashboard - Dy... Home Mail - Parks, James... Concrete Financial...

Search Data Manage Estimates Square Foot Estimator Life Cycle Cost My Favorites

Cost Data .....Heavy Construction Type Unit Labor Type Standard Union Location EVANSVILLE (476-477) Release Year 2022 Quarter 4

Search What are you searching for? Index Search Include My Custom Data New Estim

**3163 Bored Piles** Total 131 records

Line Number	Description	Unit	Daily Output	Labor Hours	Bare Material	Bare Labor	Bare Equipment	Bare Total	Total O&P
31632900000	Drilled Concrete Piers and Shafts								
316329130010	UNCASED DRILLED CONCRETE PIERS								
316329130020	Unless specified otherwise, not incl. pile caps or mobilization								
316329130050	Cast in place augered piles, no casing or reinforcing								
316329130060	8" diameter	V.L.F.	540.00	0.089	5.05	4.18	1.64	10.87	13.58
316329130065	10" diameter	V.L.F.	480.00	0.100	8.01	4.72	1.84	14.57	17.84
316329130070	12" diameter	V.L.F.	420.00	0.114	11.33	5.38	2.10	18.81	22.74
316329130075	14" diameter	V.L.F.	360.00	0.133	15.28	6.26	2.45	23.99	28.80
316329130080	16" diameter	V.L.F.	300.00	0.160	20.57	7.53	2.94	31.04	37.06
316329130085	18" diameter	V.L.F.	240.00	0.200	25.26	9.40	3.67	38.33	45.79

**Auger Cast Piles Costs included in the project costs**

Original 2021 Cost Estimate

45545 EWSU Rsp DR 17-6 Timberline Est 20-018 Evansville WTP Rehabilitation- Estimate Reports 6-21-20 rev2 081221

Timberline Line #	WBS Lvl 4	Description	Takeoff Quantity	Total Cost Amount	Total Price Amount
<b>Pretreatment Basins</b>					
904	31.02	<b>Piles</b>			
905		Augered Piles CIP 18" x @ 25 ft depth, 10' oc = 410 ea (1 per 64 sf)	10,250 vf	430,824	656,306
906		<b>31.02 Piles</b>	410 ea	430,824	656,306
<b>Ozone building / basin</b>					
2569	31.02	<b>Piles</b>			
2570		Augered Piles CIP 18" x @ 25 ft depth, 10' oc = 121 ea (1 per 77 sf)	3,025 vf	127,145	193,441
2571		<b>31.02 Piles</b>	121 ea	127,145	193,441
<b>Filter</b>					
2254	31.02	<b>Piles</b>			
2255		Augered Piles CIP 18" x @ 25 ft depth, 10' oc = 329 ea (1 per 77 sf)	8,225 vf	345,710	526,645
2256		<b>31.02 Piles</b>	329 ea	345,710	526,645
<b>Clearwell</b>					
3457	31.02	<b>Piles</b>	20,231 vf	\$ 850,339	\$ 1,295,263
3458		Augered Piles CIP 18" x @ 25 ft depth, 1079 ea (1 per 36.46 sf)	26,975 vf	1,133,796	1,727,195
3459		<b>31.02 Piles</b>	1,079 ea	1,133,796	1,727,195
<b>High Service Pump Station</b>			809 ea	Clearwell reduced to 75%	
4291	31.02	<b>Piles</b>	0 vf	0	0
4292		Augered Piles CIP 18" x @ 25 ft depth, 10' oc = 79 ea (1 per 64 sf)	1,975 vf	83,012	126,459
4293		<b>31.02 Piles</b>	79 ea	83,012	126,459
<b>Chemical handling building (no cost details on auger cast piles shown)</b>			0 ea	AECOM reduced HSP Qty. to 0	
<b>Residuals pump station and wet well (no cost details on auger cast piles shown)</b>					
<b>Administration and maintenance building (no cost details on auger cast piles shown)</b>					
<b>Influent chemical / PAC structures (no cost details on auger cast piles shown)</b>					
<b>Filter wash water tank (no cost details on auger cast piles shown)</b>					
<b>FTW and sludge pump stations (no cost details on auger cast piles shown)</b>					
<b>Total piles quantity</b>			1,669 ea	\$ 1,754,026	\$ 2,671,788
<b>Vertical Lineal Feet</b>			41,731 VF	\$ 42.03	\$ 64.02

**OUCG DR 3-8**

**DATA REQUEST**  
**City of Evansville**

**Cause No. 45545 S1**

**Information Requested:**

Please provide copies of all other contracts including subconsultant contracts for soil borings, geotechnical investigations, geotechnical engineering services, environmental site investigations, soil sampling, and contaminated soil remediation for the new Water Treatment Plant since January 1, 2019.

**Information Provided:**

Petitioner prefaces its answer by reminding why Petitioner has sought an increase in financing authority at this time. As explained in Petitioner's Exhibit No. 1, the United States economy has experienced sustained inflation at levels not seen in over two generations. This historic inflation was not anticipated at the time of the evidentiary hearing in the main docket and thus was not reflected in the earlier cost estimates. Any reasonable engineer or economist would know that the earlier estimates will be insufficient. In addition, we are currently in an environment of rapidly rising interest rates. The worst possible outcome for Evansville customers would be to wait until after the project has been completely designed before seeking additional financing authority. This would delay the closing the bond issue, which, in this environment of rising interest rates, would be imprudent if not reckless. Evansville is doing everything in its power to avoid that outcome. If Evansville must wait for additional financing authority to close, it will not be because Evansville made that choice but because it was forced to do so. Evansville would under such circumstances compute the effect on customer rates from any increase in interest rates resulting from such a delay and would inform Evansville customers who caused that increase.

*(Continued on next page)*

OUCC DR 3-8  
(Continued from previous page)

The only components of Evansville's request for additional financing authority that are driven by further engineering of the project are the deeper auger cast piles; environmental investigation identifying heavy metals in the soil; the river intake carbon steel piping and associated river intake costs; undercover basins; and depth of filter beds allowing for future PFAS treatment. No further changes in the estimate are proposed based upon further engineering. For any questions related to engineering components beyond these identified categories, please see the extensive evidence and discovery shared in Cause No. 45545. As indicated, before Petitioner closes on its bond issuance, engineering will have been completed. Hopefully the additional authority requested herein will allow a prompt closing on the bonds at that point.

CTL is the only firm providing geotechnical services (contract and financial information included in Attachment OUCC DR 3-6). CTL is retaining refrigerated soil samples from soil borings for analysis of contaminants. The laboratory which will perform the soil contaminant analysis has not been retained as of this writing. AECOM performed the phase I environmental assessment as part of their engineering services and the draft report is included with Attachment OUCC DR 3-8. No soil remediation work is underway, as the project is not under construction and the site is covered with existing buildings and parking areas. However, EWSU performed soil remediation (hauling to landfill) for the neighboring Bee Slough and Sunrise Pump Station projects. Cost information and soil sampling data from these projects are also included in Attachment OUCC DR 3-8 and used as the basis for the cost estimates in Attachment OUCC DR 3-3.

**Attachment:**

OUCC DR 3-8.pdf

Attachment OUCC DR 3-8 Phase I Environmental Site Assessment of Public Works  
Maintenance Facility, 1400 Waterworks Road, Evansville, IN 47713, August 2022 Draft AECOM  
Project Number: 60613867.4 (26 pages - missing figures)

# Phase I Environmental Site Assessment of Public Works Maintenance Facility 1400 Waterworks Road, Evansville, IN 47713

Evansville Water and Sewer Utility (EWSU)

Project Number: 60613867.4

August 2022

**DRAFT**

## Quality information

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Revision	Revision date	Details	Authorized	Name	Position
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2. Site Layout and Surrounding Properties Map

## Executive Summary

Evansville Water and Sewer Utility (EWSU) contracted with AECOM Technical Services, Inc. (AECOM) to perform a Phase I Environmental Site Assessment (ESA) of a commercial property located at 1400 Waterworks Road, Evansville, Indiana 47713 (subject property). This Phase I ESA was performed in general conformance with the scope and limitations of ASTM Standard Practice Designation E 1527-13 for ESAs. Exceptions to, or deletions from, this practice are described in this report.

The site visit occurred on August 16, 2022. The approximately 4-acre subject property is located on a larger parcel of land that is approximately 13 acres. The subject property contains one approximately 52,800 square feet, two story building. The building includes a first-floor office, a second-floor office area, and a warehouse. The warehouse has an equipment maintenance area, a paint storage area, and a truck parking area. A loading dock is located at the southwestern corner of the subject property building. One dumpster is located at the northwest corner of the subject property and two dumpsters are located at the southeastern corner of the subject property. Paved areas for parking are located to the south of the subject property building. The east end of the warehouse floor had motor oil stains from vehicles.

No visual evidence of underground storage tanks (e.g., vent pipes, fill ports), potable water wells, monitoring wells, clarifiers, dry wells, septic tanks, or leach fields was observed during the site visit.

The subject property is located in a mixed commercial and residential area of Evansville, Indiana. The subject property is bordered to the north by a new wastewater treatment plant, the east by a vacant field followed by Veterans Memorial Parkway and residential properties, the south by a vacant field, and the west by Evansville Levee Authority Office (1300 Waterworks Road), followed by a wastewater treatment plant. AECOM did not observe any gasoline service stations or dry cleaners in the immediate vicinity (500 feet) of the subject property. In addition, no sensitive receptors (i.e., day care centers, schools, hospitals, water bodies) are located adjacent to the subject property.

Historical research indicates that the subject property was vacant/undeveloped land from 1940 until 1985. The subject property building was constructed in 1985. One structure was depicted on the 1992 aerial photograph and has remained relatively unchanged ever since. The subject property was occupied by City Highway Garage in 2005 and is currently occupied by the City of Evansville's Traffic Department Headquarters.

The subject property is identified on the Resource Conservation and Recovery Act-Non Generator/No Longer Regulated (RCRA-NonGen/NLR), Facility Index System (FINDS), Enforcement and Compliance History Online (ECHO), Manifest Data (IN Manifest), and Indiana Underground Storage Tank (IN UST) databases. The RCRA-NonGen listing identifies the subject property as a former small quantity generator of hazardous waste with no violations found. The FINDS database points to the generator listing. The UST listing is for two 10,000-gallon gasoline USTs and one 10,000-gallon diesel UST that were all installed in 1985 for New City Garage. All of the USTs are reported as permanently out of service and have been closed since 1998. All of the USTs were removed in 1998. There was no sign of contamination in any of the tank pits according to Indiana Department of Environmental Management UST System Closure Report. This report also indicated that an 8,000-gallon heating oil UST was located at the subject property and removed in 1998.

A number of surrounding sites were identified in the environmental database search report. However, the majority of these sites were listed on non-contamination-related databases. Based on AECOM's review and analysis of the database listings, one of the surrounding sites is considered a recognized environmental condition (REC) to the subject property. Based on the above-described activities, the following RECs were identified in connection with the subject property:

- The subject property has been used for vehicle maintenance and storage of road maintenance materials since 1985. Significant staining was observed in the building, some of which appeared

to extend to floor drains which, reportedly, were connected to an oil-water separator. The integrity of the separator and related sub-slab piping associated with the floor drains is unknown.

- The boundary of the Jacobsville Neighborhood Soil Contamination site at Main and Illinois is mapped approximately 60 feet to the northeast of the subject property. This site is listed in the National Priority List (NPL), Superfund Enterprise Management System (SEMS), Engineering Controls Sites (US ENG Controls), Institutional Controls Sites List (US INST Controls), and Records of Decision (ROD) databases. The site is predominantly a residential area including a hospital, school, and several small businesses. This site includes an abandoned electroplating and metal refinishing facility. Soil sample results indicate that the soil over an area at least 250 acres is contaminated with lead. As of 2001, the full extent of the contamination had not been fully delineated, and the source of the lead-contaminated soils was undetermined. As of 2009, the NPL status was "currently on the Final NPL." Prior investigations did not extend west of Veterans Memorial Parkway. A soil management plan is recommended to be implemented during the ground disturbing activities at the subject property. It is AECOM's opinion that this site is a REC to the subject property.

The following de minimis conditions (DMCs) were identified in connection with the subject property:

- AECOM observed multiple spots with staining throughout the warehouse portion of the subject property.
- AECOM observed minor staining outside the secondary containment at the base of the tar emulsion AST.

## Introduction

1.

### 1.1 Purpose

This Phase I Environmental Site Assessment (ESA) was performed pursuant to AECOM Technical Services, Inc. This assessment was performed in advance of the proposed demolition of the site facility to provide space for the construction of a wastewater treatment plant. The purpose of this Phase I ESA is to provide the client with information for use in evaluating recognized environmental conditions (RECs) associated with the subject property.

Per the ASTM standard, potential findings can include RECs, including historical RECs (HRECs), controlled RECs (CRECs), and de minimis conditions. A REC is defined by the ASTM standard as “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.” The term includes hazardous substances or petroleum products even under conditions in compliance with laws. HRECs are a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. CRECs are a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. De minimis conditions are those situations that do not present a material risk of harm to public health or the environment and generally would not be subject to enforcement action if brought to the attention of the regulating authority.

This assessment is based on a review of existing conditions, reported pre-existing conditions, and observed operations at the subject property and adjacent properties.

### 1.2 Scope of Work

The Phase I ESA included a site visit, regulatory research, historical review, and a review and an environmental database analysis of the subject property. In conducting the Phase I ESA, AECOM assessed the subject property for visible signs of possible contamination, researched public records for the subject property and adjacent properties (as applicable), and conducted interviews with persons knowledgeable about the subject property.

This project was performed in general accordance with ASTM Standard Practice Designation E 1527-13. Conclusions reached in this report are based upon the assessment performed and are subject to limitations set forth in Sections 1.3, 1.4, and 1.5 below.

### 1.3 Study Limitations

This report describes the results of AECOM's Phase I ESA to identify the presence of contamination-related liabilities materially affecting the subject facility and/or property. In the conduct of this assessment, AECOM assessed the presence of such problems within the limits of the established scope of work as described in our proposal.

As with any due diligence assessment, there is a certain degree of dependence upon oral information provided by facility or site representatives, which is not readily verifiable through visual observations or supported by any available written documentation. AECOM shall not be held responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed by facility or site representatives at the time this assessment was performed. In addition, the findings and opinions expressed in this report are subject to certain conditions and assumptions, which are noted in the report. Any party reviewing the findings of the report must carefully review and consider all such conditions and assumptions.

This report and all field data and notes were gathered and/or prepared by AECOM in accordance with the agreed upon scope of work and generally accepted engineering and scientific practice in effect at the time of AECOM's assessment of the subject property. The statements, findings and opinions contained in this report are only intended to give approximations of the environmental conditions at the subject property.

As specified in the ASTM standard (referred to below as "this practice"), it is incumbent that the client and any other parties who review and rely upon this report understand the following inherent conditions surrounding any Phase I ESA:

- Uncertainty Not Eliminated - No ESA can wholly eliminate uncertainty regarding the potential for REC in connection with a property. Performance of this practice is intended to reduce, but not eliminate, uncertainty regarding the potential for REC in connection with a property, and this practice recognizes reasonable limits of time and costs. (Section 4.5.1 of the ASTM standard)
- Not Exhaustive - "All appropriate inquiry" does not mean an exhaustive assessment of a clean property. There is a point at which the cost of information obtained outweighs the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. One of the purposes of this practice is to identify a balance between the competing goals of limiting the costs and time demands inherent in performing an ESA and the reduction of uncertainty about unknown conditions resulting from additional information. (Section 4.5.2 of the ASTM Standard)
- Comparison with Subsequent Inquiry - ESAs must be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made. Subsequent ESAs should not be considered valid standards to judge the appropriateness of any prior assessment based on hindsight, new information, use of developing technology or analytical techniques, or other factors. (Section 4.5.4 of the ASTM Standard)

A similar set of inherent limitations exist in cases where the Phase I ESA included a screening-level assessment of vapor migration or vapor encroachment; such an assessment is a required part of a Phase I ESA when the ASTM E1527-13 standard is employed. According to the ASTM E2600-10 Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions, the following limitations apply:

- Uncertainty Not Eliminated in Screening - No vapor encroachment screen (VES) can wholly eliminate uncertainty regarding the identifications of vapor encroachment conditions (VECs) in connection with the target property. (Section 4.5.1)
- Not Exhaustive - The guide is not meant to be an exhaustive screening. There is a point at which the cost of information obtained outweighs the usefulness of the information and, in

fact, may be a material detriment to the orderly completion of real estate transactions. One of the purposes of this guide is to identify a balance between the competing goals of limiting the costs and time demands inherent in performing a VES and the reduction of uncertainty about unknown conditions resulting from additional information. (Section 4.5.2)

- Comparison with Subsequent Investigations - It should not be concluded or assumed that an investigation was not adequate because the investigation did not identify any VECs in connection with a property. The VES must be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made. Subsequent VESs should not be considered valid bases to judge the appropriateness of any prior screening if based on hindsight, new information, use of developing technology or analytical techniques, or similar factors. (Section 4.5.4)

This report was prepared pursuant to an agreement between Evansville Water and Sewer Utility (Client) and AECOM and is for the exclusive use of the Client. No other party is entitled to rely on the conclusions, observations, specifications, or data contained herein without first obtaining AECOM's written consent and provided any such party signs an AECOM-generated Reliance Letter. A third party's signing of the AECOM Reliance Letter and AECOM's written consent are conditions precedent to any additional use or reliance on this report.

The passage of time may result in changes in technology, economic conditions, site variations, or regulatory provisions, which would render the report inaccurate. Reliance on this report after the date of issuance as an accurate representation of current site conditions shall be at the user's sole risk.

## 1.4 Site-Related Limiting Conditions

The following site-specific limitations were encountered during the course of this assessment:

- During the site visit, AECOM did not have access to the engineering office on the 2<sup>nd</sup> floor of the building. This particular site-related limiting condition is not expected to have a significant limitation to this assessment.
- During the site visit AECOM could not see the entirety of the floor in the warehouse due to vehicle storage. It is unknown whether additional floor drains were under the vehicles, or whether significant staining was present. This limitation is potentially significant.
- During the site visit, AECOM did not have visual access the oil and water separator. This may be a significant limitation to this assessment.

## 1.5 Data Gaps/Data Failure

The following data failure/data gaps were encountered during the course of this assessment:

- As specified in the agreed upon scope of work, a title search and environmental lien search were not conducted as part of this ESA. However, based upon historical data collected from other sources, this data gap is not expected to impact the results of this assessment. In addition, the user was not aware of environmental liens or activity use limitations (AULs) that have been placed on the subject property.
- AECOM submitted Freedom of Information Act (FOIA) requests to the Evansville Fire Department to determine if they have files related to a historical hazardous materials release

that may have occurred at the subject property. AECOM does not anticipate the response (if any) from the Evansville Fire Department to our FOIA request will significantly alter the conclusions or recommendations of this report.

- It should be noted that not all standard historical sources, as defined per ASTM, were reviewed as part of this assessment. In addition to recorded land title records, building department records were not reviewed. Based on information provided from the remaining standard historical sources, additional historical information obtained from building department records would not likely have assisted in meeting the historical use requirement; therefore, this data gap is not expected to impact the results of this assessment.
- Per ASTM, past owners, operators, and occupants of the subject property who are likely to have material information regarding the potential for contamination at the subject property shall be contacted to the extent that they can be identified and that the information likely to be obtained is not duplicative of information already obtained from other sources. AECOM was unable to interview past owners and/or operators at the subject property. However, based upon historical data collected from other sources, this data gap is not expected to impact the results of this assessment.
- Per the agreed scope-of-work and the ASTM Standard, information related to certain site-specific items should be provided by the ESA report user to AECOM. To assist the user in gathering information that may be material to identifying RECs, AECOM provided the Client (the users) with the User Questionnaire from the ASTM Standard; at this time the completed form has not been returned for inclusion in this report. However, this data gap is not expected to represent a significant limitation to this investigation given the historical use of the subject property.

## Site Description

### 2. 2.1 Site Location and Parcel Description

The subject property is located at 1400 Waterworks Road, Evansville, Vanderburgh County, Indiana 47713. The subject property is situated on the east side of Waterworks Road and the west side of Veterans Memorial Parkway. The subject property is accessed from Waterworks Road (western property boundary).

According to the Vanderburgh County Assessor's website, the subject property consists of a single parcel of land with Parcel ID 82-06-022-080.008-029 and Legal Description PT FRAC 31-6-10 & DUNHAM TRACT PT LT 26 AKA WATERWORKS PARCELIZATION PARCEL 2. The subject property comprises approximately 4 acres of the larger 13-acre parcel. The approximate location of the subject property is illustrated on Figure 1 - Site Location Map.

### 2.2 Site Ownership

According to the Vanderburgh County Assessor's website, the subject property is owned by the City of Evansville Indiana Board of Public Works.



## 2.3 Site Visit

Mr. Marc Harris with AECOM's Cincinnati, Ohio office visited the subject property on August 16, 2022. During the site visit, Mr. Harris was accompanied through the subject property by Greg Bryant. Mr. Bryant has been associated with the subject property for 9 years. Mr. Bryant provided information on the subject property's current operations and history. Site-related limiting conditions encountered during this assessment were previously summarized in Section 1.4.

The site visit methodology consisted of walking over accessible areas of the subject property, including the building interior and exterior, the perimeter, and the portions of the surrounding area. The following sections summarize the results of the site visit.

### 2.3.1 Site and Facility Description

The approximately 4-acre subject property is located on a larger parcel of land that is approximately 13 acres. The subject property contains one approximately 52,800 square feet, two story building. The building has a first-floor office, a second-floor office area, and a warehouse. The warehouse has an equipment maintenance area, a paint storage area, and a truck parking area. A loading dock is located at the southwestern corner of the subject property building. One dumpster is located at the northwest corner of the subject property and two dumpsters are located at the southeastern corner of the subject property. Paved areas for parking are located to the south of the subject property building. The east end of the warehouse floor had motor oil stains from vehicles. These stains are a de minimis condition.

The subject property building is constructed with a slab foundation, a steel frame, a metal exterior, a brick façade, and a metal roof. The office area of the subject property building is finished with vinyl tile, paneling, drywall, and 2x4 foot ceiling tile. The warehouse floor is a concrete slab.

The subject property is occupied by the City of Evansville's Traffic Department Headquarters. On-site activities include engineering and administrative office work, maintenance of street vehicles, and storage of drums of paint for street stripes.

During the site visit, no visual evidence of potable water wells, monitoring wells, dry wells, septic tanks, or leach fields were observed on the subject property. An oil-water separator was reported on site. No visual evidence of discolored soil, water, or unusual vegetative conditions or odors was observed during the site visit. In addition, no visual evidence of significant corrosion was observed on the floors or walls of the subject property building or on the exterior of the subject property. Potentially significant staining was observed in the warehouse area. The general layout of the subject property is illustrated on Figure 2 - Site Layout and Surrounding Properties map, and Representative Site Photographs are provided in Appendix A.

### 2.3.2 Surrounding Properties

The subject property is bordered as follows:

North: New Wastewater Treatment Plant (1304 Waterworks Road)

East: Vacant field followed by Veterans Memorial Parkway. Residential properties are to the east of Veterans Memorial Parkway.

South: A vacant field followed by Shawnee Drive

West: Evansville Levee Authority Office (1300 Waterworks Road), followed by Waterworks Road and a wastewater treatment plant (1500 Waterworks Road).

AECOM did not observe any gasoline service stations or dry cleaners in the immediate vicinity (500 feet) of the subject property. In addition, no sensitive receptors (i.e., day care centers, schools, hospitals, water bodies) are located adjacent to the subject property.

### **2.3.3 Petroleum Products and Hazardous Materials**

Petroleum products and hazardous materials at the subject property include four 50-gallon containers of motor oil, one 150-gallon container of hydraulic oil, one 150-gallon container of transmission fluid, one 500-gallon container of gasoline, one 500-gallon container of diesel, and paint used for equipment maintenance. Additionally, the subject property has approximately eighty 55-gallon paint containers which are used for painting street stripes. All containers were labelled properly. These products are stored in the maintenance area of the warehouse.

### **2.3.4 Polychlorinated Biphenyls**

Polychlorinated biphenyls (PCB)-containing dielectric fluids have been widely used as coolants and lubricants in transformers, capacitors, and other electric equipment due to their insulating and nonflammable properties. Based on the age of the subject property (constructed post-1979), PCBs are not expected to be present on site.

During the site visit, one pad-mounted transformer was observed on the subject property at the southwest corner of the subject property building outside of the office area. Labeling indicating PCB content was not observed on the transformer and the owner of the transformer is unknown. Staining was not observed at the base of the transformer.

Four aboveground electric lifts were observed in the warehouse. One loading dock was observed at the southwest corner of the subject property building. These features did not appear to contain significant volumes of hydraulic oil, and apparently were installed after 1979.

No other oil containing electrical or hydraulic equipment was observed on the subject property.

### **2.3.5 Aboveground Storage Tanks**

Three 5,000-gallon Calcium Chloride ASTs were observed at the southeast corner of the subject property building. The tank material was plastic, and the installation date was not identified by the site contact. One 5,000-gallon tar emulsion tank was observed on the subject property. This tank is comprised of steel and has secondary containment. This tank had minor staining on the outside of the secondary containment. This staining would be considered a de minimis condition. No additional ASTs were observed at the subject property.

### **2.3.6 Underground Storage Tanks**

Four underground storage tanks (USTs) were historically located at the subject property. The USTs at the subject property were two 10,000-gallon gasoline USTs, one 10,000-gallon diesel UST, and one 8,000-gallon heating oil UST. All of the tanks were installed in 1985, had a vapor monitoring leak detection system, and were removed in 1998. The gasoline and diesel USTs were located along the south fencing near the southwest corner of the subject property building near the main entrance. The heating oil UST was located along the building exterior near the offices. The USTs

were removed in 1998. AECOM retrieved a copy of the closure report from the Indiana Department of Environmental Management (IDEM) website. The report indicates that it was a clean closure with no evidence of releases or impacts to soil associated with the former USTs.

### 2.3.7 Solid Waste

Three solid waste dumpsters were observed on the subject property which are serviced by Republic. One was located at the northwestern corner of the subject property and two were located at the southeastern corner of the subject property. Solid waste generated at the subject property includes wastepaper, general packaging, and cardboard. No evidence of inappropriate disposal activities and no significant staining were observed in the vicinity of the dumpster. Waste is disposed of by Republic.

Other regulated wastes generated at the subject property include oil, oily-rags, anti-freeze, hydraulic fluid, tires, and batteries. Used oil is stored on the south side of the building exterior in a steel, 350-gallon tank with secondary (diked) containment. The used oil is recycled, and disposed of by Environmental tech. Oily rags, anti-freeze, and hydraulic fluid are stored in 55-gallon drums near the used oil tank (with secondary containment. These materials are recycled, and disposed of by Environmental Tech. Tires are recycled and disposed of by Vanderburg County Waste. Batteries are stored in the building and removed by Crowe for recycling.

### 2.3.8 Hazardous Waste

According to the site contact, no hazardous materials are current generated on-site. The subject property is identified on the Resource Conservation and Recovery Act-Non Generator/No Longer Regulated (RCRA-NonGen/NLR). The RCRA ID number is 1001219240. The RCRA-NonGen listing identifies the subject property as a former small quantity generator of hazardous waste with no violations found. Ignitable waste was formerly removed from the subject property.

### 2.3.9 Water

The facility receives its potable water supply from the municipal water system. No potable water wells were observed at the subject property or reported by the site contact to be present on site.

### 2.3.10 Wastewater

Wastewater discharges at the subject property include effluent from human consumptive use, floor drains located in the restrooms, and floor drains located in the warehouse which, according to site contact, discharge directly to the municipal sanitary sewer system. Six floor drains were observed in the vehicle maintenance area of the warehouse. Leaking motor oil was observed to be flowing into some of these drains. Material that enters the floor drains is reportedly conveyed through an oil and water separator at the northwest exterior of the subject property building. The integrity of the separator and related sub-slab piping associated with the floor drains is unknown.

### 2.3.11 Stormwater

Stormwater from the subject property appears to drain via sheet flow to the stormwater drains located on the west side of the subject property and a drainage ditch on the south side of the subject property. The subject property is connected to the municipal stormwater sewer system

which is combined with the sanitary sewer system. No staining was observed in the vicinity of the storm drains.

### **2.3.12 Heating and Cooling**

The site contact did not provide information on heating and cooling at the subject property. The warehouse portion of the facility did not appear to have climate control features. Vectren provides electricity and natural gas to the subject property.

### 3. Environmental Setting

#### 3.1 Topography

The United States Geological Survey (USGS) 7.5-minute topographic map of the Evansville South, Indiana quadrangle indicates that the site is approximately 360 above mean sea level (USGS, 2019). Topography in the immediate vicinity of the subject site is generally flat and is dominated by gently sloping ditches, creeks and drainageways. Surface slopes on the subject property are to the south and southeast towards an engineered drainage swale located adjacent and south of the site, while the broader slope in the study area is to the west towards the Ohio River, mapped approximately 890 feet west of the property. Surface water from the subject site likely drains generally southeast towards the drainage ditch located south of the site. The average annual precipitation in the subject area is approximately 44 inches and the average annual runoff, in undeveloped areas, is approximately 15 inches (Lloyd and Lyke, 1995).

#### 3.2 Soil/Geology

The site is located in the Boonville Hills section of the Southern Hills and Lowlands Region of the Interior Low Plateaus physiographic province (Gray, 2000). Surface soils are mapped on site as Lindside silty clay loam and borrow pit. Lindside soils form on flood plains and are derived from loamy alluvium. This soil is moderately well drained with negligible runoff (USDA, 2022). The site is also mapped as a borrow pit by the soil survey. This designation, along with historical aerial photographs, suggest that soils at the subject property may have been excavated to provide fill material for the levee along the river. Soils may have been imported to level the site prior to the construction of the site facility. No information on the quality of any fill was identified. Quaternary age alluvial deposits likely underlie surface soils at the subject site. Pennsylvanian age sedimentary rocks likely underlie the alluvial deposits (Lloyd and Lyke, 1995).

#### 3.3 Groundwater/Hydrology

The Ohio River alluvial aquifer and the Pennsylvanian bedrock aquifer are mapped in the study area and likely serve as a regional source for groundwater (Lloyd and Lyke, 1995). Groundwater in the Pennsylvanian bedrock aquifer is generally stored in fractures in uppermost bedrock, in open pore spaces, along bedding planes and in regolith at the soil/bedrock interface. Twelve water wells are reported within 1.0 mile of the subject property (EDR, 2022). Documentation of the removal of onsite USTs in 1998 reported that groundwater was not encountered in the excavations that extended to a depth of 20 feet below ground surface (U.S. Tech, 1998). Based on local geology and proximity to the Ohio River, uppermost groundwater is anticipated to occur within 35 feet of ground surface is unconsolidated alluvial material. Uppermost groundwater flow direction is anticipated to be to the west towards the Ohio River. Areas up to 2,000 feet generally east of the site are anticipated to be hydraulically upgradient.

## 4. Site and Area History

Historical information for the subject property and surrounding properties is based on AECOM's review and analysis of the following historical sources:

- Aerial photographs dated 1940, 1956, 1958, 1962, 1973, 1983, 1992, 1998, 1999, 2005, 2008, 2012, and 2016;
- Topographic maps dated 1914, 1916, 1952, 1957, 1981, 1999, 2013, 2016, and 2019;
- City directories for the years 1974, 1979, 1984, 1989, 1992, 1995, 2000, 2005, 2010, 2014, and 2017;

According to EDR, Sanborn® Fire Insurance Map coverage is not available for the subject property.

### 4.1 Subject Property

Historical research indicates that the subject property was vacant/undeveloped land from 1940 until 1985. The subject property building was constructed in 1985. One structure was depicted on the 1992 aerial photograph and has remained relatively unchanged ever since. The subject property was occupied by City Highway Garage in 2005 and is currently occupied by the City of Evansville's Traffic Department Headquarters.

### 4.2 Off-site Properties

The north adjoining property was depicted as vacant/undeveloped land from at least 1940 until 1998. By 1999, some structures associated with a public park were depicted adjacent to the north of the subject property. At the time of this assessment, construction activities associated with a new sewer treatment plant were observed on the north adjoining property.

Since at least 1940, the south adjoining property has been depicted as vacant land followed by wooded land. Currently, the south adjoining property is vacant land followed by Shawnee Drive followed by wooded land.

The east adjoining property was depicted as a vacant/undeveloped land followed by residential properties from at least 1940 until 1973. By 1973, a road named Veterans Memorial Parkway was depicted in between the vacant field and the residential properties. The east adjoining property has remained relatively unchanged ever since.

Since as early as 1940, the west adjoining property was depicted as vacant/undeveloped land followed by a structure across Waterworks Road (1500 Waterworks Road). By 1973, one structure was depicted adjacent to the west of the subject property (1300 Waterworks Road) and additions were added to 1500 Waterworks Road. Both of these structures have remained relatively unchanged ever since. According to the City Directories, 1500 Waterworks Road was occupied by Environmental Management Corporation in 2005 and 2010. This address was occupied by Evansville Wastewater Treatment in 2010 and by Evansville Water and Sewer Utility in 2014. 1300 Waterworks Road has been historically occupied by Evansville Levee Authority, Vanderburgh Co Levee Authority, and the city of Evansville. 1500 Waterworks Road is currently occupied by a Wastewater Treatment Plant. 1300 Waterworks Road is currently occupied by the Evansville Levee Authority Office.

According to the site contact, the wastewater treatment plant does not have the capacity to treat the combined sewer and has been piping the excess sewage into the Ohio River during heavy rain events.

### **4.3 Previously Prepared Environmental Reports**

AECOM inquired about existing environmental reports associated with the subject property. Previously prepared environmental reports were not identified during this assessment.

## 5. Database and Records Review

### 5.1 User Provided Information

Section 6 of the ASTM Standard states that certain tasks, which will help to determine the possibility of RECs associated with the subject property, are generally conducted by the ESA report user. This includes the following: reviewing title records for environmental liens or activity and land use limitations and considering awareness of any specialized knowledge (e.g., information about previous ownership or environmental litigation), experience related to RECs at the subject property, or significant reduction in the purchase price of the subject property. Per the agreed scope-of-work, information related to these items should be provided by the ESA report user to AECOM. To assist the user in gathering information that may be material to identifying RECs, AECOM has provided the Client (the users) with the User Questionnaire from the ASTM Standard; however, at this time the completed form has not been returned for inclusion in this report. This data gap is not expected to represent a significant limitation to this investigation based on other documentation reviewed as part of the Phase I ESA.

### 5.2 Title Records/Environmental Liens

Per the agreed upon scope of work, a chain-of-title and an environmental lien search were not performed as part of this assessment.

### 5.3 Database Information

In accordance with the scope of work and ASTM Standard E-1527-13, a search of various governmental databases was conducted by EDR. The site-specific environmental database report was reviewed to evaluate if soil and/or groundwater from an on-site and/or off-site sources of concern has the potential to impact the subject property. The database abbreviations are provided in the site-specific environmental database report.

The database report includes various reports detailing database information for each of the sites identified/geocoded within the specified radius. One additional site was identified within the database report; however, EDR was not able to map this site to a specific location due to insufficient/contradicting address information. This site was included in the database report as an "orphan" site. Based upon AECOM's review, there does not appear to be any significant concerns associated with the orphan site, which is reportedly in Henderson, Kentucky. A summary of AECOM's review and analysis of the site-specific environmental database report is presented below. A copy of the database report is provided in Appendix B.

Based on AECOM's research, the subject property is not located on or within a 1-mile radius of tribal lands.

#### 5.3.1 Subject Property

The subject property is identified on the Resource Conservation and Recovery Act-Non Generator/No Longer Regulated (RCRA-NonGen/NLR), Facility Index System (FINDS), Enforcement and Compliance History Online (ECHO), Manifest Data (IN Manifest), and Indiana Underground Storage Tank (IN UST) databases. The RCRA-NonGen listing identifies the subject



property as a former small quantity generator of hazardous waste with no violations found. The FINDS database points to the generator listing. The UST listing is for two 10,000-gallon gasoline USTs and one 10,000-gallon diesel UST that were all installed in 1985 for New City Garage. All of the USTs are reported as permanently out of service and have been closed since 1998. All of the USTs were removed in 1998. There was no sign of contamination in any of the tank pits according to an Indiana Department of Environmental Management UST System Closure Report. This report also indicated that an unregulated 8,000-gallon heating oil UST was located at the subject property and removed in 1998.

### 5.3.2 Surrounding Sites

According to the environmental database report, numerous sites were identified within their respective ASTM and/or EDR search distances from the subject property. Due to their proximity to the subject property, the following sites are discussed in additional detail:

- Evansville Levee Authority at 1300 Waterworks Road is located adjacent to the west of the subject property. This address is listed in the IN UST database. This address has two 1,000-gallon gasoline USTs that were closed in 1995 and have a permanently out of service status. There is no information provided on the removal of these tanks, and no releases were reported. Based on the available information, AECOM does not believe that the former USTs on the west adjoining property should be considered a REC.
- Evansville City of Department of Transportation at 1304 Waterworks Road is located adjacent to the north of the subject property. This address is listed in the RCRA NonGen/NLR, FINDS, ECHO, Indiana Waste (IN IND WASTE), and IN Manifest databases. The RCRA listings states that this address was a historic small quantity generator and violations were found in the past. All the violations have been returned to compliance. The FINDS and ECHO databases point to the generator listing. Due to the RCRA listings being brought to compliance, these listings are not considered a REC to the subject property.
- Evansville Water and Sewer Utility at 1500 Waterworks Road is located approximately 310 feet to the west of the subject property. This address is listed in the RCRA NonGen/NLR, FINDS, ECHO, IN MANFIEST, IN NPDES, and IN TIER 2 databases. No RCRA violations were identified and the Manifest listing states that the property is no longer a generator of hazardous waste. The NPDES listing states that there are three open permits. The first permit states that the site facility description is a sewerage system. This permit was issued on November 11, 2016 and expired on January 31, 2022. The second permit does not have a primary facility SIC description and was issued on August 6, 2019 and will expire on August 5, 2024. The third permit does not have a facility description type and was issued on January 1, 2021 and will expire on December 31, 2025. These listings are not considered a REC to the subject property
- Jacobsville Neighborhood Soil Contamination at Main and Illinois is located approximately 60 feet to the northeast of the subject property. This site is listed in the National Priority List (NPL), Superfund Enterprise Management System (SEMS), Engineering Controls Sites (US ENG Controls), Institutional Controls Sites List (US INST Controls), and Records of Decision (ROD) databases. The site is predominantly a residential area including a hospital, school, and several small businesses and currently is identified as approximately 250 acres in area. This site includes an abandoned electroplating and metal refinishing facility. Soil sample results indicate that the soil is contaminated with lead. As of 2001, the full extent of

the contamination had not been fully delineated, and the source of the lead-contaminated soils was undetermined. As of 2009 the NPL status was “currently on the Final NPL”. No soil sampling was reported to the west of Veterans Memorial Parkway. Since the transport mechanism was reportedly airborne deposition, there is a potential for impacts at the subject property. It is AECOM's opinion that this site is a REC to the subject property.

## 5.4 Vapor Encroachment Screening

AECOM conducted a Tier 1 vapor encroachment screening (VES) as part of this assessment. This screening was conducted in general accordance with the ASTM E2600 *Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions* dated October 2015. The objective of the VES was to determine if a VEC exists or if a VEC does not exist.

### 5.4.1 Subject Property

No on-site sources of vapor encroachment (e.g., current UST, contaminated soil, groundwater plume, etc.) were identified during this assessment. No contamination was identified associated with the former USTs. However, the subject property has operated as a vehicle maintenance facility since 1985, and has floor drains that reportedly discharge to an oil-water separator. No information on the integrity of the oil-water separator was identified. Based on the age of the facility various solvents may have been used in the past, and could have been collected in the oil-water separator. A VEC cannot be excluded at this time.

### 5.4.2 Off-site

To conduct the VES of the nearby area, AECOM conducted a detailed review and analysis of the site-specific environmental database report with particular focus on the follow two types of sites:

1. Off-site properties that are impacted by chlorinated volatile organic compounds (VOCs) and/or semi-volatile-organic compounds (SVOCs) and are located within approximately 1,750 feet of the subject property, and
2. Off-site properties that are impacted by petroleum hydrocarbons and are located within approximately 525 feet of the subject property.

None of the releases identified by EDR were located in areas considered upgradient to the subject property and based upon status of the incidents and or inferred direction of groundwater flow, would not be expected to present a VEC to the subject property.

## 5.5 Agency File Review

### 5.5.1 Local

AECOM submitted Freedom of Information Act (FOIA) requests to the Evansville Fire Department to determine if they have files related to a historical hazardous materials release that may have occurred at the subject property. A response was received from the Evansville Fire Department that stated, “our records indicate the Evansville Fire Department did not respond to the reference address for any hazardous materials incidents.”

### **5.5.2 County**

AECOM reviewed the Vanderburgh County Assessor website for records pertaining to the subject property's physical and parcel addresses. No records were identified for the subject property physical and parcel addresses.

### **5.5.3 State**

AECOM searched the Indiana Department of Environmental Management Virtual File Cabinet for information pertaining to the subject property. AECOM retrieved documentation of the removal of the onsite USTs in 1998.

### **5.5.4 Federal**

AECOM searched the U.S. EPA's Envirofacts and Superfund Enterprise Management System (SEMS) online databases. The SEMS database replaced the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) which has been retired. SEMS includes the same data fields and content as CERCLIS. The Envirofacts database retrieves information obtained from 17 national systems, including the CERCLIS, Superfund program (NPL sites), hazardous waste sites, and potential hazardous waste sites. The subject property was not listed on the Envirofacts or SEMS databases.

## 6. Findings and Opinions

AECOM performed a Phase I ESA of the subject property in conformance with the scope and limitations of ASTM Practice E 1527-13, which meets the requirements of Title 40, Code of Federal Regulations Part 312 and is intended to constitute *all appropriate inquiry* for purposes of the landowner liability protections. Any exceptions to, or deletions from, this practice are described in Section 1.3 through 1.5 of this report.

The following sections summarize the findings and opinions of this Phase I ESA of the subject property.

### 6.1 Recognized Environmental Conditions

The following RECs were identified during this assessment:

- The subject property has been used for vehicle maintenance and storage of road maintenance materials since 1985. Significant staining was observed in the building, some of which appeared to extend to floor drains which, reportedly, were connected to an oil-water separator. The integrity of the separator and related sub-slab piping associated with the floor drains is unknown.
- Jacobsville Neighborhood Soil Contamination is located at the intersection of Main and Illinois is located approximately 60 feet to the northeast of the subject property. This site is listed in the (NPL), (SEMS), (US ENG Controls), (US INST Controls), and (ROD) databases. The site is predominantly a residential area including a hospital, school, and several small businesses. This site is an abandoned electroplating and metal refinishing facility. Soil sample results indicate that the soil is contaminated with lead. As of 2001, the full extent of the contamination has not been fully delineated, and the source of the lead-contaminated soils is undetermined. A soil management plan will need to be implemented during the ground disturbing activities at the subject property. It is AECOM's opinion that this site is a REC to the subject property.

### 6.2 Controlled Recognized Environmental Conditions

Based on the above-described activities, no CRECs were identified in connection with the subject property.

### 6.3 Historical Recognized Environmental Conditions

Based on the above-described activities, no HRECs were identified in connection with the subject property.

### 6.4 De Minimis Conditions

The following DMCs were identified during this assessment:

- AECOM observed multiple spots with staining throughout the warehouse portion of the subject property.

- AECOM observed minor staining outside the secondary containment at the base of the emission AST.

## 7. Conclusions

We have performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E 1527-13 of 1600 Waterworks Road, Evansville, Indiana 47713, the subject property. Any exception to, or deletions from, this practice are described in Sections 1.3 through 1.5 of this report.

This assessment has revealed no evidence of RECs in connection with the property except the following:

- The subject property has been used for vehicle maintenance and storage of road maintenance materials since 1985. Significant staining was observed in the building, some of which appeared to extend to floor drains which, reportedly, were connected to an oil-water separator. The integrity of the separator and related sub-slab piping associated with the floor drains is unknown.
- Jacobsville Neighborhood Soil Contamination is located at the intersection of Main and Illinois is located approximately 60 feet to the northeast of the subject property. This site is listed in the (NPL), (SEMS), (US ENG Controls), (US INST Controls), and (ROD) databases. The site is predominantly a residential area including a hospital, school, and several small businesses. This site is an abandoned electroplating and metal refinishing facility. Soil sample results indicate that the soil is contaminated with lead. As of 2001, the full extent of the contamination has not been fully delineated, and the source of the lead-contaminated soils is undetermined. A soil management plan will need to be implemented during the ground disturbing activities at the subject property. It is AECOM's opinion that this site is a REC to the subject property.

## 8. Environmental Professional Statement

*Ms. Natalie Masopust was the Environmental Professional (EP) for this project. Ms. Natalie Masopust's EP statement is below and her resume is provided in Appendix C:*

*I declare that, to the best of our professional knowledge and belief, I meet the definition of an EP as defined in §312.10 of 40 Code of Federal Regulations (CFR) and that I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.*

Signature: \_\_\_\_\_

Date: Month Day, Year

## 9. References

### 9.1 Persons Interviewed

Bryant, Greg, Manager at the City of Evansville's Traffic Department's Headquarters, 1600 Waterworks Road, Evansville, Indiana 47713, (812) 568-9497. Provided site walk escort and site history on August 16, 2022.

### 9.2 Agencies Contacted

Assessor parcel information, reviewed for Vanderburgh County Indiana at [City of Evansville/Vanderburgh County Indiana GIS Hub Portal \(arcgis.com\)](https://www.cityofevansville.org/arcgis/). This information was reviewed online by Ms. Masopust with AECOM on August, 25, 2022.

City of Evansville Fire Department, 1 N.W. Martin Luther King, Jr. Boulevard Evansville, Indiana 47709-1833. Emailed by Ms. Masopust with AECOM on August 25, 2022. They have not provided information on potential hazardous materials releases that may have occurred at the subject property.

Environmental Protection Agency CERCLIS database - <http://www.epa.gov/enviro/facts/cerclis/search.html>

Environmental Protection Agency Envirofacts database - <http://www.epa.gov/enviro/>

Environmental Protection Agency Superfund Enterprise Management System (SEMS) database, <https://cumulis.epa.gov/supercpad/cursites/srchsites.cfm> .

### 9.3 Documents Reviewed

ASTM E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, dated November 2013. [www.astm.org](http://www.astm.org)

ASTM E2600-15, Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions, dated October 2015. [www.astm.org](http://www.astm.org)

EDR 7.5 Minute Topographic Maps, prepared for 1400 Waterworks Road, Evansville, Indiana 47713, dated August 15, 2022. Inquiry number 7086582.4. Topographic Maps 1914, 1916, 1952, 1957, 1981, 1999, 2013, 2016, and 2019. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, [www.edrnet.com](http://www.edrnet.com).

EDR Aerial Photos Decade Package prepared for 1400 Waterworks Road, Evansville, Indiana 47713, dated August 15, 2022. Inquiry number 7086582.8. Aerial photographs dated 1940, 1956, 1958, 1962, 1973, 1983, 1992, 1998, 1999, 2005, 2008, 2012, and 2016. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, [www.edrnet.com](http://www.edrnet.com).

EDR City Directory Abstract prepared for 1400 Waterworks Road, Evansville, Indiana 47713, dated August 16, 2022. Inquiry number 7086582.5. City directories reviewed included 1974, 1979, 1984, 1989, 1992, 1995, 2000, 2005, 2010, 2014, and 2017. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, [www.edrnet.com](http://www.edrnet.com).

EDR Radius Map with GeoCheck®, prepared for 1400 Waterworks Road, Evansville, Indiana 47713. Inquiry number 7086582.2s. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, [www.edrnet.com](http://www.edrnet.com).

EDR Sanborn Map Report, prepared for 1400 Waterworks Road, Evansville, Indiana 47713. Inquiry number 7086582.3. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, [www.edrnet.com](http://www.edrnet.com).

Google Earth website, [www.google.earth.com](http://www.google.earth.com). This information was reviewed online by Ms. Masopust with AECOM on August 25, 2022.

Gray, H.H., 2000. [Physiographic Divisions of Indiana](#). IGS Special Report 61, Plate 1. Digital compilation by Kimberly H. Sowder.

Lloyd, Jr., O. B., and Lyke, W. L., 1995. [Ground Water Atlas of the United States, Segment 10: Illinois, Indiana, Kentucky, Ohio, Tennessee. Hydrologic Investigations Atlas 730-K](#). U. S. Geological Survey, Reston, VA.

United States Department of Agriculture (USDA), 2022. [Soil Survey of Vanderburgh County, Indiana](#): Web Soil Service URL as viewed on 8/21/2022. <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.

U.S. Tech Group. UST Removal at City of Evansville City Garage, 1400 Water Works Road, Evansville, Indiana. Dated April 28, 1998.

United States Department of Agriculture (USDA), 2022. [Soil Survey of Vanderburgh County, Indiana](#): Web Soil Service URL as viewed on 8/21/2022.





May 8, 2017

Mr. Steve Capin  
Evansville Water & Sewer Utility  
1500 Waterworks Road  
Evansville, Indiana 47648

Re: Cass-Adams Sewer Project Soil Sampling

Dear Mr. Capin:

Please find attached the analytical results for the soil sampling that was conducted in conjunction with the Cass-Adams sewer project. Three (3) soil borings were collected along the proposed project area, and one (1) composite sample was collected from the two (2) stockpiles. Attached are the following: a map showing sampling locations, the analytical report, and a table showing the compounds that were detected in the soil samples.

Some of the results indicate that the levels exceed the residential land use exposure limits; however, those exposure limits are based on a 30-year time frame of exposure to surface soil. If the material were covered with four (4) feet of soil fill, the low level residential exposure limits would not apply.

We would like to thank you for utilizing the services of Environmental Management Consultants, Inc., and if you have questions or comments regarding this report, please contact us at the address or telephone number above.

Respectfully Submitted,

Tracy McConnell, IN P.E.  
Senior Project Manager

TM/kd

Enclosures

\\jade\emc\Technical\Project Files\17 projects\17074 Cass-Adams Sewer Project, Evansville, IN\Reports and Attachments\17074 Summary Letter 5.08.17.doc

Cass-Adams Sewer Soil Sampling

Sample ID	Collected Date	Parameter	Results	Units	PQL	EPA Background	Direct Contact Residential <sup>1</sup> (0-2' exposure)	Direct Contact Commercial/ Industrial <sup>2</sup> (0-2' exposure)	Direct Contact Excavation <sup>3</sup> (0-15' exposure)
BH-01 4-6	04/26/2017 14:00	Arsenic	10.2	mg/kg	1.2	30	9.5	30	920
BH-01 4-6	04/26/2017 14:00	Barium	126	mg/kg	1.2		21000	100000	100000
BH-01 4-6	04/26/2017 14:00	Chromium	15.6	mg/kg	1.2				
BH-01 4-6	04/26/2017 14:00	Lead	12.1	mg/kg	1.2		400	800	1000
BH-02 16-18	04/26/2017 14:50	Arsenic	8.7	mg/kg	1.2	30	9.5	30	920
BH-02 16-18	04/26/2017 14:50	Barium	178	mg/kg	1.2		21000	100000	100000
BH-02 16-18	04/26/2017 14:50	Chromium	20.3	mg/kg	1.2				
BH-02 16-18	04/26/2017 14:50	Lead	13.1	mg/kg	1.2		400	800	1000
BH-03 10-12	04/26/2017 15:11	Acetone	0.26	mg/kg	0.15		85000	100000	100000
BH-03 10-12	04/26/2017 15:11	Arsenic	9.1	mg/kg	1.3	30	9.5	30	920
BH-03 10-12	04/26/2017 15:11	Barium	271	mg/kg	1.3		21000	100000	100000
BH-03 10-12	04/26/2017 15:11	Benzo(a)anthracene	0.088	mg/kg	0.037		2.2	29	1600
BH-03 10-12	04/26/2017 15:11	Benzo(a)pyrene	0.086	mg/kg	0.037		.22	2.9	160
BH-03 10-12	04/26/2017 15:11	Benzo(b)fluoranthene	0.096	mg/kg	0.037		2.2	29	1600
BH-03 10-12	04/26/2017 15:11	Benzo(g,h,i)perylene	0.065	mg/kg	0.037				
BH-03 10-12	04/26/2017 15:11	Benzo(k)fluoranthene	0.090	mg/kg	0.037		22	290	16000
BH-03 10-12	04/26/2017 15:11	Cadmium	4.4	mg/kg	0.67		99	980	1900
BH-03 10-12	04/26/2017 15:11	Chromium	26.4	mg/kg	1.3				
BH-03 10-12	04/26/2017 15:11	Chrysene	0.092	mg/kg	0.037		220	2900	100000
BH-03 10-12	04/26/2017 15:11	Fluoranthene	0.17	mg/kg	0.037		3400	30000	68000
BH-03 10-12	04/26/2017 15:11	Indeno(1,2,3-cd)pyrene	0.058	mg/kg	0.037		2.2	29	1600
BH-03 10-12	04/26/2017 15:11	Lead	502 <sup>4</sup>	mg/kg	1.3		400	800	1000
BH-03 10-12	04/26/2017 15:11	Mercury	1.5	mg/kg	0.30		3.1	3.1	3.1
BH-03 10-12	04/26/2017 15:11	Phenanthrene	0.12	mg/kg	0.037				
BH-03 10-12	04/26/2017 15:11	Pyrene	0.13	mg/kg	0.037		2500	23000	51000
BH-03 10-12	04/26/2017 15:11	Selenium	1.5	mg/kg	1.3		550	5800	9800
BH-03 10-12	04/26/2017 15:11	Silver	4.2	mg/kg	0.67		550	5800	9800
Stock Pile	04/26/2017 15:25	1-Methylnaphthalene	0.33	mg/kg	0.032		250	390	390
Stock Pile	04/26/2017 15:25	2-Methylnaphthalene	0.42	mg/kg	0.032		340	3000	6800
Stock Pile	04/26/2017 15:25	Acenaphthene	1.2	mg/kg	0.032		5000	45000	100000

Cass-Adams Sewer Soil Sampling

Sample ID	Collected Date	Parameter	Results	Units	PQL	EPA Background	Direct Contact Residential <sup>1</sup> (0-2' exposure)	Direct Contact Commercial/ Industrial <sup>2</sup> (0-2' exposure)	Direct Contact Excavation <sup>3</sup> (0-15' exposure)
Stock Pile	04/26/2017 15:25	Acenaphthylene	0.075	mg/kg	0.032				
Stock Pile	04/26/2017 15:25	Anthracene	3.6	mg/kg	0.032		25000	100000	100000
Stock Pile	04/26/2017 15:25	Arsenic	18.4	mg/kg	1.2	30	9.5	30	920
Stock Pile	04/26/2017 15:25	Barium	193	mg/kg	1.2		21000	100000	100000
Stock Pile	04/26/2017 15:25	Benzo(a)anthracene	4.8	mg/kg	0.032		2.2	29	1600
Stock Pile	04/26/2017 15:25	Benzo(a)pyrene	5.1	mg/kg	0.032		.22	2.9	160
Stock Pile	04/26/2017 15:25	Benzo(b)fluoranthene	4.7	mg/kg	0.032		2.2	29	1600
Stock Pile	04/26/2017 15:25	Benzo(g,h,i)perylene	3.0	mg/kg	0.032				
Stock Pile	04/26/2017 15:25	Benzo(k)fluoranthene	3.8	mg/kg	0.032		22	290	16000
Stock Pile	04/26/2017 15:25	Cadmium	1.1	mg/kg	0.58		99	980	1900
Stock Pile	04/26/2017 15:25	Chromium	20.5	mg/kg	1.2				
Stock Pile	04/26/2017 15:25	Chrysene	4.2	mg/kg	0.032		220	2900	100000
Stock Pile	04/26/2017 15:25	Dibenz(a,h)anthracene	1.2	mg/kg	0.032		.22	2.9	160
Stock Pile	04/26/2017 15:25	Fluoranthene	13.1	mg/kg	0.16		3400	30000	68000
Stock Pile	04/26/2017 15:25	Fluorene	1.6	mg/kg	0.032		3400	30000	68000
Stock Pile	04/26/2017 15:25	Indeno(1,2,3-cd)pyrene	3.0	mg/kg	0.032		2.2	29	1600
Stock Pile	04/26/2017 15:25	Lead	317	mg/kg	1.2		400	800	1000
Stock Pile	04/26/2017 15:25	Mercury	0.76	mg/kg	0.25		3.1	3.1	3.1
Stock Pile	04/26/2017 15:25	Naphthalene	1.4	mg/kg	0.032		53	170	3100
Stock Pile	04/26/2017 15:25	Phenanthrene	13.5	mg/kg	0.16				
Stock Pile	04/26/2017 15:25	Pyrene	9.5	mg/kg	0.032		2500	23000	51000

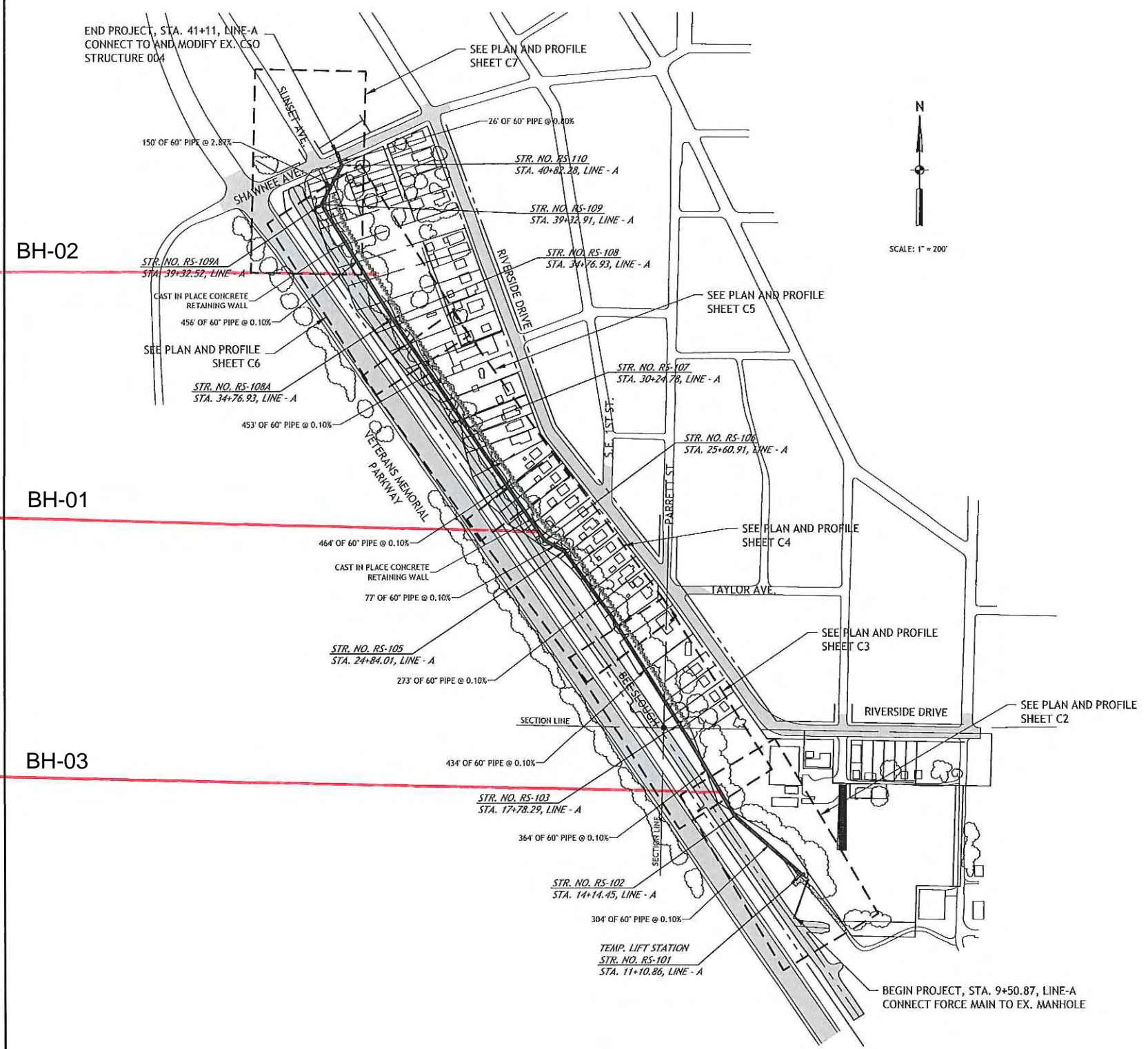
Note:

1. Assumes 30 years of exposure and 250 days per year of exposure.
2. Assumes 25 years of exposure and 250 days per year of exposure.
3. Assumes 1 year of exposure and 45 days per year of exposure.
4. Concentration in red exceeds a screening level.

3

4

5



DRAWING INDEX			
DRAWING NUMBER	SHEET NUMBER	DESCRIPTION	REVISION
<b>GENERAL</b>			
G1	1	TITLE SHEET	
G2	2	SCOPE OF WORK AND SHEET INDEX	
G3	3	LEGEND, SYMBOLS AND ABBREVIATIONS	
G4	4	GEOMETRICS	
G5	5	GENERAL NOTES	
G6	6	GENERAL NOTES	
G7	7	MAINTENANCE OF TRAFFIC PLAN	
G8	8	MAINTENANCE OF TRAFFIC SIGNAGE DETAILS	
<b>CIVIL</b>			
C1	9	SITE DEMOLITION AND CLEARING	
C2	10	PLAN AND PROFILE, LINE A STA. 9+43 TO STA. 15+25	
C3	11	PLAN AND PROFILE, LINE A STA. 15+25 TO STA. 21+25	
C4	12	PLAN AND PROFILE, LINE A STA. 21+25 TO STA. 27+25	
C5	13	PLAN AND PROFILE, LINE A STA. 27+25 TO STA. 33+25	
C6	14	PLAN AND PROFILE, LINE A STA. 33+25 TO STA. 39+00	
C7	15	PLAN AND PROFILE, LINE A STA. 39+00 TO STA. 42+00	
C8	16	TEMPORARY PUMP STATION SITE GRADING PLAN AND DETAILS	
C9	17	GRADING AND RETAINING WALL PLANS	
C10	18	GRADING AND RETAINING WALL PLANS	
C11	19	GRADING AND RETAINING WALL PLANS, AND DETAILED CROSS SECTIONS	
C12	20	DETAILED CROSS SECTIONS	
C13	21	MANHOLE AND TRENCHING DETAILS	
C14	22	ALTERNATE FIBERGLASS MANHOLE DETAILS	
C15	23	MISCELLANEOUS DETAILS	
C16	24	MISCELLANEOUS DETAILS	
C17	25	STAGING AREA SITE PLAN	
C18	26	STORM WATER POLLUTION PREVENTION PLAN	
C19	27	STORM WATER POLLUTION PREVENTION PLAN	
C20	28	EROSION CONTROL DETAILS	
C21	29	EROSION CONTROL DETAILS	
C22 - C28	30 - 36	CROSS SECTIONS - LINE A	
<b>PROCESS</b>			
D1	37	CSO DIVERSION STRUCTURE 004 - DEMOLITION PLANS	
D2	38	CSO DIVERSION STRUCTURE 004 - MODIFICATION PLANS	
D3	39	BEE SLOUGH DRAINAGE STRUCTURE RS-108A - PLAN & SECTION	
D4	40	BEE SLOUGH DRAINAGE STRUCTURE RS-108A - SECTION	
D5	41	BEE SLOUGH DRAINAGE STRUCTURE RS-109A - PLAN & SECTION	
D6	42	BEE SLOUGH DRAINAGE STRUCTURE RS-109A - SECTION	
D7	43	TEMPORARY PUMP STATION - PLANS AND SECTION	
D8	44	TEMPORARY PUMP STATION - MISCELLANEOUS DETAILS	
<b>STRUCTURAL</b>			
S1	45	MISCELLANEOUS STRUCTURAL DETAILS	
S2	46	CSO DIVERSION STRUCTURE 004 - STRUCTURAL PLANS AND SECTION	
S3	47	BEE SLOUGH DRAINAGE STRUCTURE RS-108A - PLAN & SECTIONS	
S4	48	BEE SLOUGH DRAINAGE STRUCTURE RS-109A - PLAN AND SECTIONS	
S5	49	RETAINING WALL DETAILS	
S6	50	RETAINING WALL DETAILS	
<b>ELECTRICAL</b>			
E1	49	ELECTRICAL SITE PLAN AND DETAILS	
E2	50	TEMP. PUMP STATION - BACKBOARD LAYOUT AND ONE-LINE DIAGRAM	
E3	51	PANEL ELEVATIONS & WIRING DIAGRAM	
E4	52	WIRING DIAGRAMS	
E5	53	WIRING DIAGRAMS	
E6	53A	RETAINING WALL LIGHTING PLANS	
E7	53B	RETAINING WALL LIGHTING PLANS, PANEL SCHEDULE, AND DIAGRAMS	
E8	53C	RETAINING WALL DETAILS	
E9	53D	RETAINING WALL DETAILS	

**UTILITY CONTACTS**

**WATER & SEWER**  
EVANSVILLE WATER AND SEWER UTILITY  
1931 ALLENS LANE  
EVANSVILLE, IN 47720  
CONTACT: MICHAEL LABITZKE  
PHONE - (812) 421-2130

**COMMUNICATIONS**  
WIDE OPEN WEST  
6045 WEDEKING AVENUE  
P.O. BOX 5789  
EVANSVILLE, IN. 47716  
CONTACT: RICK BOWEN  
PHONE - (812) 437-0395

**COMMUNICATIONS**  
TIME WARNER  
1900 FARES AVENUE  
EVANSVILLE, IN 47711  
CONTACT: DARYL HOLSEY  
PHONE - (812) 253-2755

**COMMUNICATIONS**  
AT&T  
134 NW SIXTH STREET  
EVANSVILLE, IN 47708  
CONTACT: ANDY FOLZ  
PHONE - (812) 4646055

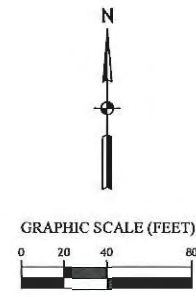
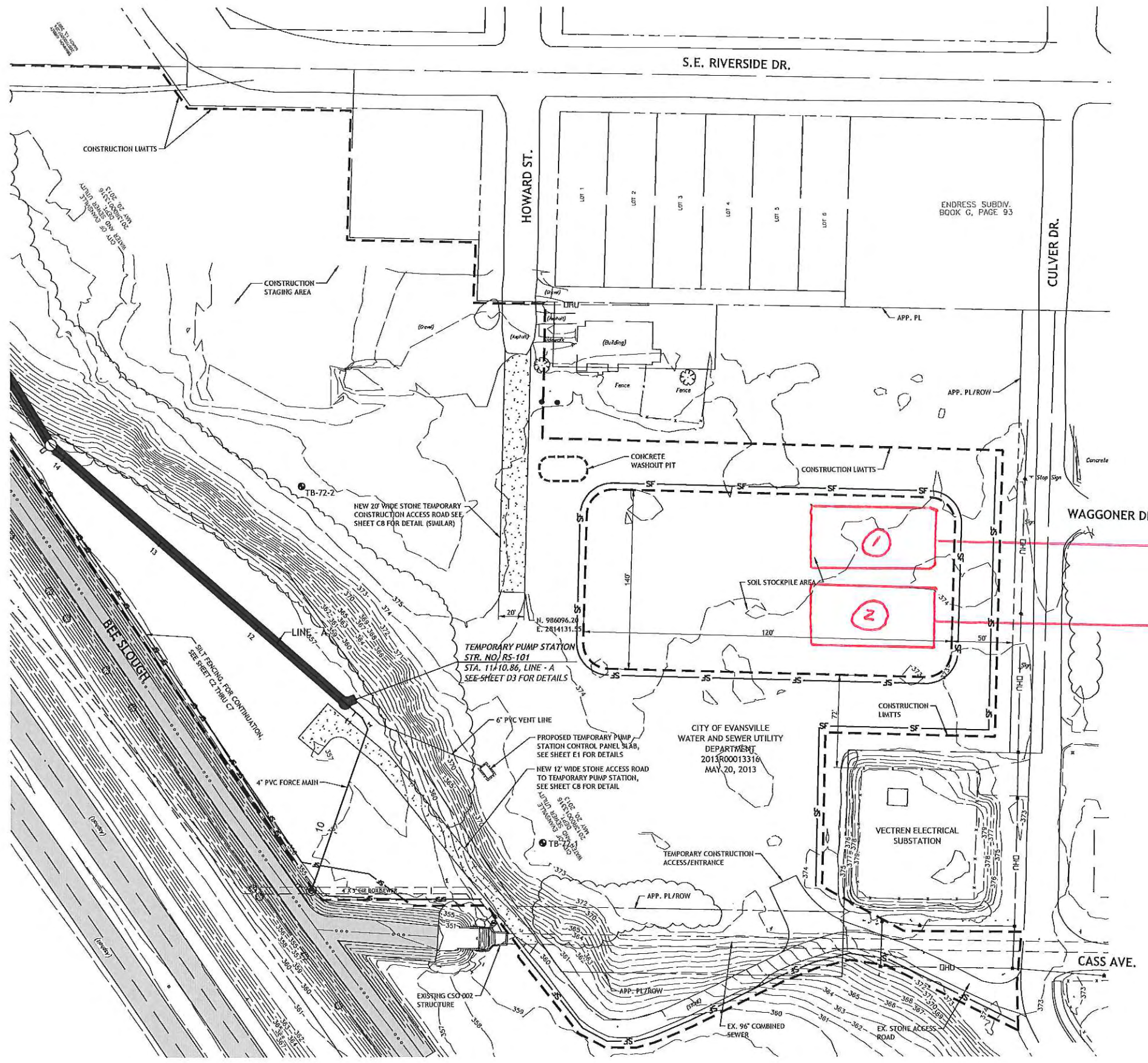
**GAS**  
VECTREN  
1 N. MAIN STREET  
EVANSVILLE, IN 47711  
CONTACT: MARTY FREDERICK  
PHONE - (812) 491-4765

**OHIO RIVER LEVEE**  
EVANSVILLE - VANDERBURGH LEVEE AUTHORITY DISTRICT  
1300 WATERWORKS ROAD  
EVANSVILLE, IN 477180  
CONTACT: JAY PERRY  
PHONE - (812) 435-6137

**SCOPE OF WORK**  
SCALE: 1" = 200'

DESIGNED: CLM / WWS	DATE: 10-28-16
DRAWN: CLM	CHECKED: AMS
SCALE: AS NOTED	APPROVED: _____
DATE: _____	
<b>EVANSVILLE WATER AND SEWER UTILITY</b> 1931 Allens Lane - Evansville, IN 47720 (812) 421-2126	
<b>CASS/ADAMS CSO RELIEF SEWER</b> SCOPE OF WORK AND SHEET INDEX	
APPROVED	
REVISIONS	DESCRIPTION
DATE	
DRAWING NO:	
SHEET NO:	
<b>G2</b>	
S-1388 2 of 53	

File Name: I:\Projects\1162\Environmental\Projects\EWS\U098602 CSO 004 72 Inch Relief Sewer\07 CAD\07 2 Plan Production\SheetDrawings\72RL-G-SOV\U098602.dwg - Layout  
 Modified By: December 15, 2016 4:27:51 PM / 4848  
 Plotted By: December 15, 2016 4:34:32 PM / Miller, Gary



- GENERAL NOTES:
1. CONTRACTOR SHALL MAINTAIN ACCESS TO PROPERTY AND STRUCTURES AT ALL TIMES.
  2. CONTRACTOR SHALL PROTECT CURBS, SIDEWALKS, AND PAVEMENTS WITHIN STAGING AREA FROM DAMAGE AND SHALL REPLACE DAMAGED CURBS, SIDEWALKS AND PAVEMENTS AT NO COST TO THE OWNER.
  3. CONTRACTOR SHALL LEAVE ALL SUITABLE SOIL STOCKPILED ON-SITE AT THE COMPLETION OF THE PROJECT TO BE UTILIZED BY THE UTILITY ON FUTURE PROJECTS.

EXCAVATED  
 MATERIAL  
 STOCK PILES

File Name: I:\Projects\UNEP\Evansville\ESU\26802 CSC 004 72 Inch Relief Sewer\07 CADD\7.5 Plan\Production\Sheet\Drawing\72R-C-PLAN-EROS-STAG.dwg - SHEET 1  
 Date: 10/26/2016 11:45:09 AM / Miller, Gray  
 Plotted By:

DESIGNED:	GLM / WWS
CHECKED:	AMS
DATE:	10-28-16
SCALE:	1" = 40'
APPROVED:	
TITLE:	
EVANSVILLE WATER AND SEWER UTILITY 1831 Allens Lane - Evansville, IN 47720 (812) 421-2126	
CASS/ADAMS CSO RELIEF SEWER STAGING AREA SITE PLAN	
REVISIONS	APPROVED
DATE	DESCRIPTION
DRAWING NO:	
SHEET NO:	
S-1388 26 of 53	

May 08, 2017

Ms. Tracy McConnell  
Environmental Management Consultants  
427 Main Street  
Evansville, IN 47708

RE: Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Dear Ms. McConnell:

Enclosed are the analytical results for sample(s) received by the laboratory on April 28, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Mick Mayse  
mick.mayse@pacelabs.com  
(317)228-3100  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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### CERTIFICATIONS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

---

**Indiana Certification IDs**

7726 Moller Road, Indianapolis, IN 46268  
Illinois Certification #: 003971  
Indiana Certification #: C-49-06  
Kansas/NELAP Certification #:E-10177  
Kentucky UST Certification #: 80226  
Kentucky WW Certification #:98019

Ohio VAP Certification #: CL-0065  
Oklahoma Certification #: 2016-075  
Texas Certification #: T104704355-16-10  
West Virginia Certification #: 330  
Wisconsin Certification #: 999788130  
USDA Soil Permit #: P330-16-00257

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### REPORT OF LABORATORY ANALYSIS

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### SAMPLE SUMMARY

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50169829001	BH-01 4-6	Solid	04/26/17 14:00	04/28/17 08:30
50169829002	BH-02 16-18	Solid	04/26/17 14:50	04/28/17 08:30
50169829003	BH-03 10-12	Solid	04/26/17 15:11	04/28/17 08:30
50169829004	Stock Pile	Solid	04/26/17 15:25	04/28/17 08:30

### REPORT OF LABORATORY ANALYSIS

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**SAMPLE ANALYTE COUNT**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50169829001	BH-01 4-6	EPA 6010	MJC	7	PASI-I
		EPA 7471	JGJ	1	PASI-I
		EPA 8270 by SIM	JCM	20	PASI-I
		EPA 8260	JLZ	73	PASI-I
		SM 2540G	MLS	1	PASI-I
50169829002	BH-02 16-18	EPA 6010	MJC	7	PASI-I
		EPA 7471	JGJ	1	PASI-I
		EPA 8270 by SIM	JCM	20	PASI-I
		EPA 8260	JLZ	73	PASI-I
		SM 2540G	MLS	1	PASI-I
50169829003	BH-03 10-12	EPA 6010	MJC	7	PASI-I
		EPA 7471	JGJ	1	PASI-I
		EPA 8270 by SIM	JCM	20	PASI-I
		EPA 8260	JLZ	73	PASI-I
		SM 2540G	MLS	1	PASI-I
50169829004	Stock Pile	EPA 6010	MJC	7	PASI-I
		EPA 7471	JGJ	1	PASI-I
		EPA 8270 by SIM	JCM	20	PASI-I
		EPA 8260	JLZ	73	PASI-I
		SM 2540G	MLS	1	PASI-I

**REPORT OF LABORATORY ANALYSIS**

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### SUMMARY OF DETECTION

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>50169829001</b>	<b>BH-01 4-6</b>					
EPA 6010	Arsenic	10.2	mg/kg	1.2	05/03/17 12:03	
EPA 6010	Barium	126	mg/kg	1.2	05/03/17 12:03	
EPA 6010	Chromium	15.6	mg/kg	1.2	05/03/17 12:03	
EPA 6010	Lead	12.1	mg/kg	1.2	05/03/17 12:03	
SM 2540G	Percent Moisture	21.6	%	0.10	05/05/17 10:52	
<b>50169829002</b>	<b>BH-02 16-18</b>					
EPA 6010	Arsenic	8.7	mg/kg	1.2	05/03/17 12:05	
EPA 6010	Barium	178	mg/kg	1.2	05/03/17 12:05	
EPA 6010	Chromium	20.3	mg/kg	1.2	05/03/17 12:05	
EPA 6010	Lead	13.1	mg/kg	1.2	05/03/17 12:05	
SM 2540G	Percent Moisture	26.2	%	0.10	05/05/17 10:52	
<b>50169829003</b>	<b>BH-03 10-12</b>					
EPA 6010	Arsenic	9.1	mg/kg	1.3	05/03/17 12:07	
EPA 6010	Barium	271	mg/kg	1.3	05/03/17 12:07	
EPA 6010	Cadmium	4.4	mg/kg	0.67	05/03/17 12:07	
EPA 6010	Chromium	26.4	mg/kg	1.3	05/03/17 12:07	
EPA 6010	Lead	502	mg/kg	1.3	05/03/17 12:07	
EPA 6010	Selenium	1.5	mg/kg	1.3	05/03/17 12:07	
EPA 6010	Silver	4.2	mg/kg	0.67	05/03/17 12:07	
EPA 7471	Mercury	1.5	mg/kg	0.30	05/04/17 23:24	
EPA 8270 by SIM	Benzo(a)anthracene	0.088	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Benzo(a)pyrene	0.086	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Benzo(b)fluoranthene	0.096	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Benzo(g,h,i)perylene	0.065	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Benzo(k)fluoranthene	0.090	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Chrysene	0.092	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Fluoranthene	0.17	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	0.058	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Phenanthrene	0.12	mg/kg	0.037	05/01/17 05:53	
EPA 8270 by SIM	Pyrene	0.13	mg/kg	0.037	05/01/17 05:53	
EPA 8260	Acetone	0.26	mg/kg	0.15	05/01/17 20:20	
SM 2540G	Percent Moisture	32.4	%	0.10	05/05/17 10:52	
<b>50169829004</b>	<b>Stock Pile</b>					
EPA 6010	Arsenic	18.4	mg/kg	1.2	05/03/17 12:22	
EPA 6010	Barium	193	mg/kg	1.2	05/03/17 12:22	
EPA 6010	Cadmium	1.1	mg/kg	0.58	05/03/17 12:22	
EPA 6010	Chromium	20.5	mg/kg	1.2	05/03/17 12:22	
EPA 6010	Lead	317	mg/kg	1.2	05/03/17 12:22	
EPA 7471	Mercury	0.76	mg/kg	0.25	05/04/17 23:26	
EPA 8270 by SIM	Acenaphthene	1.2	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Acenaphthylene	0.075	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Anthracene	3.6	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Benzo(a)anthracene	4.8	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Benzo(a)pyrene	5.1	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Benzo(b)fluoranthene	4.7	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Benzo(g,h,i)perylene	3.0	mg/kg	0.032	05/01/17 06:09	

### REPORT OF LABORATORY ANALYSIS

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**SUMMARY OF DETECTION**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>50169829004</b>	<b>Stock Pile</b>					
EPA 8270 by SIM	Benzo(k)fluoranthene	3.8	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Chrysene	4.2	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Dibenz(a,h)anthracene	1.2	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Fluoranthene	13.1	mg/kg	0.16	05/04/17 01:50	
EPA 8270 by SIM	Fluorene	1.6	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	3.0	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	1-Methylnaphthalene	0.33	mg/kg	0.032	05/01/17 06:09	N2
EPA 8270 by SIM	2-Methylnaphthalene	0.42	mg/kg	0.032	05/01/17 06:09	
EPA 8270 by SIM	Naphthalene	1.4	mg/kg	0.032	05/01/17 06:09	ED
EPA 8270 by SIM	Phenanthrene	13.5	mg/kg	0.16	05/04/17 01:50	
EPA 8270 by SIM	Pyrene	9.5	mg/kg	0.032	05/01/17 06:09	
SM 2540G	Percent Moisture	23.5	%	0.10	05/05/17 10:53	

**REPORT OF LABORATORY ANALYSIS**

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## PROJECT NARRATIVE

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

---

**Method:** EPA 6010  
**Description:** 6010 MET ICP  
**Client:** Environmental Management Consultants  
**Date:** May 08, 2017

### General Information:

4 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

---

**Method:** EPA 7471  
**Description:** 7471 Mercury  
**Client:** Environmental Management Consultants  
**Date:** May 08, 2017

### General Information:

4 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

---

**Method:** EPA 8270 by SIM  
**Description:** 8270 MSSV PAH by SIM  
**Client:** Environmental Management Consultants  
**Date:** May 08, 2017

### General Information:

4 samples were analyzed for EPA 8270 by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Surrogates:

All surrogates were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 384459

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 50169824001

R1: RPD value was outside control limits.

- MSD (Lab ID: 1773152)
  - Benzo(b)fluoranthene
  - Benzo(g,h,i)perylene

### Additional Comments:

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### PROJECT NARRATIVE

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

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**Method:** EPA 8270 by SIM  
**Description:** 8270 MSSV PAH by SIM  
**Client:** Environmental Management Consultants  
**Date:** May 08, 2017

Analyte Comments:

QC Batch: 384459

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BH-01 4-6 (Lab ID: 50169829001)
  - 1-Methylnaphthalene
- BH-02 16-18 (Lab ID: 50169829002)
  - 1-Methylnaphthalene
- BH-03 10-12 (Lab ID: 50169829003)
  - 1-Methylnaphthalene
- BLANK (Lab ID: 1773149)
  - 1-Methylnaphthalene
- LCS (Lab ID: 1773150)
  - 1-Methylnaphthalene
- MS (Lab ID: 1773151)
  - 1-Methylnaphthalene
- MSD (Lab ID: 1773152)
  - 1-Methylnaphthalene
- Stock Pile (Lab ID: 50169829004)
  - 1-Methylnaphthalene

### REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

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**Method:** EPA 8260  
**Description:** 8260 MSV 5030 Low Level  
**Client:** Environmental Management Consultants  
**Date:** May 08, 2017

### General Information:

4 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Surrogates:

All surrogates were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

**Sample: BH-01 4-6**      **Lab ID: 50169829001**      Collected: 04/26/17 14:00      Received: 04/28/17 08:30      Matrix: Solid  
*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b> Analytical Method: EPA 6010      Preparation Method: EPA 3050								
Arsenic	10.2	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:03	7440-38-2	
Barium	126	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:03	7440-39-3	
Cadmium	ND	mg/kg	0.59	1	05/02/17 07:08	05/03/17 12:03	7440-43-9	
Chromium	15.6	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:03	7440-47-3	
Lead	12.1	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:03	7439-92-1	
Selenium	ND	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:03	7782-49-2	
Silver	ND	mg/kg	0.59	1	05/02/17 07:08	05/03/17 12:03	7440-22-4	
<b>7471 Mercury</b> Analytical Method: EPA 7471      Preparation Method: EPA 7471								
Mercury	ND	mg/kg	0.25	1	05/04/17 12:06	05/04/17 23:20	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM      Preparation Method: EPA 3546								
Acenaphthene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	83-32-9	
Acenaphthylene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	208-96-8	
Anthracene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	120-12-7	
Benzo(a)anthracene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	56-55-3	
Benzo(a)pyrene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	50-32-8	
Benzo(b)fluoranthene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	205-99-2	
Benzo(g,h,i)perylene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	191-24-2	
Benzo(k)fluoranthene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	207-08-9	
Chrysene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	53-70-3	
Fluoranthene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	206-44-0	
Fluorene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	193-39-5	
1-Methylnaphthalene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	90-12-0	N2
2-Methylnaphthalene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	91-57-6	
Naphthalene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	91-20-3	
Phenanthrene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	85-01-8	
Pyrene	ND	mg/kg	0.0063	1	04/28/17 22:40	05/01/17 05:03	129-00-0	
<b>Surrogates</b>								
2-Fluorobiphenyl (S)	58	%	30-94	1	04/28/17 22:40	05/01/17 05:03	321-60-8	
p-Terphenyl-d14 (S)	57	%	27-102	1	04/28/17 22:40	05/01/17 05:03	1718-51-0	
<b>8260 MSV 5030 Low Level</b> Analytical Method: EPA 8260								
Acetone	ND	mg/kg	0.13	1		05/01/17 15:32	67-64-1	
Acrolein	ND	mg/kg	0.13	1		05/01/17 15:32	107-02-8	
Acrylonitrile	ND	mg/kg	0.13	1		05/01/17 15:32	107-13-1	
Benzene	ND	mg/kg	0.0064	1		05/01/17 15:32	71-43-2	
Bromobenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	108-86-1	
Bromochloromethane	ND	mg/kg	0.0064	1		05/01/17 15:32	74-97-5	
Bromodichloromethane	ND	mg/kg	0.0064	1		05/01/17 15:32	75-27-4	
Bromoform	ND	mg/kg	0.0064	1		05/01/17 15:32	75-25-2	
Bromomethane	ND	mg/kg	0.0064	1		05/01/17 15:32	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.032	1		05/01/17 15:32	78-93-3	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Sample: BH-01 4-6 Lab ID: 50169829001 Collected: 04/26/17 14:00 Received: 04/28/17 08:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV 5030 Low Level</b>		Analytical Method: EPA 8260						
n-Butylbenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	98-06-6	
Carbon disulfide	ND	mg/kg	0.013	1		05/01/17 15:32	75-15-0	
Carbon tetrachloride	ND	mg/kg	0.0064	1		05/01/17 15:32	56-23-5	
Chlorobenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	108-90-7	
Chloroethane	ND	mg/kg	0.0064	1		05/01/17 15:32	75-00-3	
Chloroform	ND	mg/kg	0.0064	1		05/01/17 15:32	67-66-3	
Chloromethane	ND	mg/kg	0.0064	1		05/01/17 15:32	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.0064	1		05/01/17 15:32	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.0064	1		05/01/17 15:32	106-43-4	
Dibromochloromethane	ND	mg/kg	0.0064	1		05/01/17 15:32	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.0064	1		05/01/17 15:32	106-93-4	
Dibromomethane	ND	mg/kg	0.0064	1		05/01/17 15:32	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	106-46-7	
trans-1,4-Dichloro-2-butene	ND	mg/kg	0.13	1		05/01/17 15:32	110-57-6	
Dichlorodifluoromethane	ND	mg/kg	0.0064	1		05/01/17 15:32	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.0064	1		05/01/17 15:32	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.0064	1		05/01/17 15:32	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.0064	1		05/01/17 15:32	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.0064	1		05/01/17 15:32	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0064	1		05/01/17 15:32	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.0064	1		05/01/17 15:32	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.0064	1		05/01/17 15:32	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.0064	1		05/01/17 15:32	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.0064	1		05/01/17 15:32	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.0064	1		05/01/17 15:32	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.0064	1		05/01/17 15:32	10061-02-6	
Ethylbenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	100-41-4	
Ethyl methacrylate	ND	mg/kg	0.13	1		05/01/17 15:32	97-63-2	
Hexachloro-1,3-butadiene	ND	mg/kg	0.0064	1		05/01/17 15:32	87-68-3	
n-Hexane	ND	mg/kg	0.0064	1		05/01/17 15:32	110-54-3	
2-Hexanone	ND	mg/kg	0.13	1		05/01/17 15:32	591-78-6	
Iodomethane	ND	mg/kg	0.13	1		05/01/17 15:32	74-88-4	
Isopropylbenzene (Cumene)	ND	mg/kg	0.0064	1		05/01/17 15:32	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.0064	1		05/01/17 15:32	99-87-6	
Methylene Chloride	ND	mg/kg	0.026	1		05/01/17 15:32	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.032	1		05/01/17 15:32	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.0064	1		05/01/17 15:32	1634-04-4	
Naphthalene	ND	mg/kg	0.0064	1		05/01/17 15:32	91-20-3	
n-Propylbenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	103-65-1	
Styrene	ND	mg/kg	0.0064	1		05/01/17 15:32	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0064	1		05/01/17 15:32	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0064	1		05/01/17 15:32	79-34-5	

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Project No.: 50169829

Sample: BH-01 4-6 Lab ID: 50169829001 Collected: 04/26/17 14:00 Received: 04/28/17 08:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV 5030 Low Level</b>		Analytical Method: EPA 8260						
Tetrachloroethene	ND	mg/kg	0.0064	1		05/01/17 15:32	127-18-4	
Toluene	ND	mg/kg	0.0064	1		05/01/17 15:32	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.0064	1		05/01/17 15:32	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.0064	1		05/01/17 15:32	79-00-5	
Trichloroethene	ND	mg/kg	0.0064	1		05/01/17 15:32	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.0064	1		05/01/17 15:32	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.0064	1		05/01/17 15:32	96-18-4	
1,2,4-Trimethylbenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.0064	1		05/01/17 15:32	108-67-8	
Vinyl acetate	ND	mg/kg	0.13	1		05/01/17 15:32	108-05-4	
Vinyl chloride	ND	mg/kg	0.0064	1		05/01/17 15:32	75-01-4	
Xylene (Total)	ND	mg/kg	0.013	1		05/01/17 15:32	1330-20-7	
<b>Surrogates</b>								
Dibromofluoromethane (S)	109	%	69-136	1		05/01/17 15:32	1868-53-7	
Toluene-d8 (S)	96	%	64-150	1		05/01/17 15:32	2037-26-5	
4-Bromofluorobenzene (S)	92	%	51-142	1		05/01/17 15:32	460-00-4	

**Percent Moisture** Analytical Method: SM 2540G

Percent Moisture	21.6	%	0.10	1		05/05/17 10:52		
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Sample: BH-02 16-18 Lab ID: 50169829002 Collected: 04/26/17 14:50 Received: 04/28/17 08:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	8.7	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:05	7440-38-2	
Barium	178	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:05	7440-39-3	
Cadmium	ND	mg/kg	0.62	1	05/02/17 07:08	05/03/17 12:05	7440-43-9	
Chromium	20.3	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:05	7440-47-3	
Lead	13.1	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:05	7439-92-1	
Selenium	ND	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:05	7782-49-2	
Silver	ND	mg/kg	0.62	1	05/02/17 07:08	05/03/17 12:05	7440-22-4	
<b>7471 Mercury</b>		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	ND	mg/kg	0.28	1	05/04/17 12:06	05/04/17 23:22	7439-97-6	
<b>8270 MSSV PAH by SIM</b>		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546						
Acenaphthene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	83-32-9	
Acenaphthylene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	208-96-8	
Anthracene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	120-12-7	
Benzo(a)anthracene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	56-55-3	

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Sample: BH-02 16-18 Lab ID: 50169829002 Collected: 04/26/17 14:50 Received: 04/28/17 08:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8270 MSSV PAH by SIM</b>		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546						
Benzo(a)pyrene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	50-32-8	
Benzo(b)fluoranthene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	205-99-2	
Benzo(g,h,i)perylene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	191-24-2	
Benzo(k)fluoranthene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	207-08-9	
Chrysene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	53-70-3	
Fluoranthene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	206-44-0	
Fluorene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	193-39-5	
1-Methylnaphthalene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	90-12-0	N2
2-Methylnaphthalene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	91-57-6	
Naphthalene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	91-20-3	
Phenanthrene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	85-01-8	
Pyrene	ND	mg/kg	0.0067	1	04/28/17 22:40	05/01/17 05:36	129-00-0	
<b>Surrogates</b>								
2-Fluorobiphenyl (S)	61	%	30-94	1	04/28/17 22:40	05/01/17 05:36	321-60-8	
p-Terphenyl-d14 (S)	55	%	27-102	1	04/28/17 22:40	05/01/17 05:36	1718-51-0	
<b>8260 MSV 5030 Low Level</b>		Analytical Method: EPA 8260						
Acetone	ND	mg/kg	0.14	1		05/01/17 16:04	67-64-1	
Acrolein	ND	mg/kg	0.14	1		05/01/17 16:04	107-02-8	
Acrylonitrile	ND	mg/kg	0.14	1		05/01/17 16:04	107-13-1	
Benzene	ND	mg/kg	0.0068	1		05/01/17 16:04	71-43-2	
Bromobenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	108-86-1	
Bromochloromethane	ND	mg/kg	0.0068	1		05/01/17 16:04	74-97-5	
Bromodichloromethane	ND	mg/kg	0.0068	1		05/01/17 16:04	75-27-4	
Bromoform	ND	mg/kg	0.0068	1		05/01/17 16:04	75-25-2	
Bromomethane	ND	mg/kg	0.0068	1		05/01/17 16:04	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.034	1		05/01/17 16:04	78-93-3	
n-Butylbenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	98-06-6	
Carbon disulfide	ND	mg/kg	0.014	1		05/01/17 16:04	75-15-0	
Carbon tetrachloride	ND	mg/kg	0.0068	1		05/01/17 16:04	56-23-5	
Chlorobenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	108-90-7	
Chloroethane	ND	mg/kg	0.0068	1		05/01/17 16:04	75-00-3	
Chloroform	ND	mg/kg	0.0068	1		05/01/17 16:04	67-66-3	
Chloromethane	ND	mg/kg	0.0068	1		05/01/17 16:04	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.0068	1		05/01/17 16:04	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.0068	1		05/01/17 16:04	106-43-4	
Dibromochloromethane	ND	mg/kg	0.0068	1		05/01/17 16:04	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.0068	1		05/01/17 16:04	106-93-4	
Dibromomethane	ND	mg/kg	0.0068	1		05/01/17 16:04	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	106-46-7	

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Sample: BH-02 16-18 Lab ID: 50169829002 Collected: 04/26/17 14:50 Received: 04/28/17 08:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV 5030 Low Level</b>		Analytical Method: EPA 8260						
trans-1,4-Dichloro-2-butene	ND	mg/kg	0.14	1		05/01/17 16:04	110-57-6	
Dichlorodifluoromethane	ND	mg/kg	0.0068	1		05/01/17 16:04	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.0068	1		05/01/17 16:04	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.0068	1		05/01/17 16:04	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.0068	1		05/01/17 16:04	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.0068	1		05/01/17 16:04	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0068	1		05/01/17 16:04	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.0068	1		05/01/17 16:04	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.0068	1		05/01/17 16:04	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.0068	1		05/01/17 16:04	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.0068	1		05/01/17 16:04	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.0068	1		05/01/17 16:04	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.0068	1		05/01/17 16:04	10061-02-6	
Ethylbenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	100-41-4	
Ethyl methacrylate	ND	mg/kg	0.14	1		05/01/17 16:04	97-63-2	
Hexachloro-1,3-butadiene	ND	mg/kg	0.0068	1		05/01/17 16:04	87-68-3	
n-Hexane	ND	mg/kg	0.0068	1		05/01/17 16:04	110-54-3	
2-Hexanone	ND	mg/kg	0.14	1		05/01/17 16:04	591-78-6	
Iodomethane	ND	mg/kg	0.14	1		05/01/17 16:04	74-88-4	
Isopropylbenzene (Cumene)	ND	mg/kg	0.0068	1		05/01/17 16:04	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.0068	1		05/01/17 16:04	99-87-6	
Methylene Chloride	ND	mg/kg	0.027	1		05/01/17 16:04	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.034	1		05/01/17 16:04	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.0068	1		05/01/17 16:04	1634-04-4	
Naphthalene	ND	mg/kg	0.0068	1		05/01/17 16:04	91-20-3	
n-Propylbenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	103-65-1	
Styrene	ND	mg/kg	0.0068	1		05/01/17 16:04	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0068	1		05/01/17 16:04	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0068	1		05/01/17 16:04	79-34-5	
Tetrachloroethene	ND	mg/kg	0.0068	1		05/01/17 16:04	127-18-4	
Toluene	ND	mg/kg	0.0068	1		05/01/17 16:04	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.0068	1		05/01/17 16:04	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.0068	1		05/01/17 16:04	79-00-5	
Trichloroethene	ND	mg/kg	0.0068	1		05/01/17 16:04	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.0068	1		05/01/17 16:04	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.0068	1		05/01/17 16:04	96-18-4	
1,2,4-Trimethylbenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.0068	1		05/01/17 16:04	108-67-8	
Vinyl acetate	ND	mg/kg	0.14	1		05/01/17 16:04	108-05-4	
Vinyl chloride	ND	mg/kg	0.0068	1		05/01/17 16:04	75-01-4	
Xylene (Total)	ND	mg/kg	0.014	1		05/01/17 16:04	1330-20-7	
<b>Surrogates</b>								
Dibromofluoromethane (S)	109	%	69-136	1		05/01/17 16:04	1868-53-7	
Toluene-d8 (S)	96	%	64-150	1		05/01/17 16:04	2037-26-5	

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

**Sample: BH-02 16-18** Lab ID: **50169829002** Collected: 04/26/17 14:50 Received: 04/28/17 08:30 Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV 5030 Low Level</b> Analytical Method: EPA 8260								
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	93	%	51-142	1		05/01/17 16:04	460-00-4	
<b>Percent Moisture</b> Analytical Method: SM 2540G								
Percent Moisture	26.2	%	0.10	1		05/05/17 10:52		

**Sample: BH-03 10-12** Lab ID: **50169829003** Collected: 04/26/17 15:11 Received: 04/28/17 08:30 Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b> Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	9.1	mg/kg	1.3	1	05/02/17 07:08	05/03/17 12:07	7440-38-2	
Barium	271	mg/kg	1.3	1	05/02/17 07:08	05/03/17 12:07	7440-39-3	
Cadmium	4.4	mg/kg	0.67	1	05/02/17 07:08	05/03/17 12:07	7440-43-9	
Chromium	26.4	mg/kg	1.3	1	05/02/17 07:08	05/03/17 12:07	7440-47-3	
Lead	502	mg/kg	1.3	1	05/02/17 07:08	05/03/17 12:07	7439-92-1	
Selenium	1.5	mg/kg	1.3	1	05/02/17 07:08	05/03/17 12:07	7782-49-2	
Silver	4.2	mg/kg	0.67	1	05/02/17 07:08	05/03/17 12:07	7440-22-4	
<b>7471 Mercury</b> Analytical Method: EPA 7471 Preparation Method: EPA 7471								
Mercury	1.5	mg/kg	0.30	1	05/04/17 12:06	05/04/17 23:24	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546								
Acenaphthene	ND	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	83-32-9	
Acenaphthylene	ND	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	208-96-8	
Anthracene	ND	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	120-12-7	
Benzo(a)anthracene	0.088	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	56-55-3	
Benzo(a)pyrene	0.086	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	50-32-8	
Benzo(b)fluoranthene	0.096	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	205-99-2	
Benzo(g,h,i)perylene	0.065	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	191-24-2	
Benzo(k)fluoranthene	0.090	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	207-08-9	
Chrysene	0.092	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	53-70-3	
Fluoranthene	0.17	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	206-44-0	
Fluorene	ND	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	86-73-7	
Indeno(1,2,3-cd)pyrene	0.058	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	193-39-5	
1-Methylnaphthalene	ND	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	90-12-0	N2
2-Methylnaphthalene	ND	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	91-57-6	
Naphthalene	ND	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	91-20-3	ED
Phenanthrene	0.12	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	85-01-8	
Pyrene	0.13	mg/kg	0.037	5	04/28/17 22:40	05/01/17 05:53	129-00-0	
<b>Surrogates</b>								
2-Fluorobiphenyl (S)	50	%	30-94	5	04/28/17 22:40	05/01/17 05:53	321-60-8	
p-Terphenyl-d14 (S)	38	%	27-102	5	04/28/17 22:40	05/01/17 05:53	1718-51-0	

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**ANALYTICAL RESULTS**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Sample: BH-03 10-12 Lab ID: 50169829003 Collected: 04/26/17 15:11 Received: 04/28/17 08:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV 5030 Low Level</b>		Analytical Method: EPA 8260						
Acetone	0.26	mg/kg	0.15	1		05/01/17 20:20	67-64-1	
Acrolein	ND	mg/kg	0.15	1		05/01/17 20:20	107-02-8	
Acrylonitrile	ND	mg/kg	0.15	1		05/01/17 20:20	107-13-1	
Benzene	ND	mg/kg	0.0074	1		05/01/17 20:20	71-43-2	
Bromobenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	108-86-1	
Bromochloromethane	ND	mg/kg	0.0074	1		05/01/17 20:20	74-97-5	
Bromodichloromethane	ND	mg/kg	0.0074	1		05/01/17 20:20	75-27-4	
Bromoform	ND	mg/kg	0.0074	1		05/01/17 20:20	75-25-2	
Bromomethane	ND	mg/kg	0.0074	1		05/01/17 20:20	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.037	1		05/01/17 20:20	78-93-3	
n-Butylbenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	98-06-6	
Carbon disulfide	ND	mg/kg	0.015	1		05/01/17 20:20	75-15-0	
Carbon tetrachloride	ND	mg/kg	0.0074	1		05/01/17 20:20	56-23-5	
Chlorobenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	108-90-7	
Chloroethane	ND	mg/kg	0.0074	1		05/01/17 20:20	75-00-3	
Chloroform	ND	mg/kg	0.0074	1		05/01/17 20:20	67-66-3	
Chloromethane	ND	mg/kg	0.0074	1		05/01/17 20:20	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.0074	1		05/01/17 20:20	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.0074	1		05/01/17 20:20	106-43-4	
Dibromochloromethane	ND	mg/kg	0.0074	1		05/01/17 20:20	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.0074	1		05/01/17 20:20	106-93-4	
Dibromomethane	ND	mg/kg	0.0074	1		05/01/17 20:20	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	106-46-7	
trans-1,4-Dichloro-2-butene	ND	mg/kg	0.15	1		05/01/17 20:20	110-57-6	
Dichlorodifluoromethane	ND	mg/kg	0.0074	1		05/01/17 20:20	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.0074	1		05/01/17 20:20	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.0074	1		05/01/17 20:20	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.0074	1		05/01/17 20:20	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.0074	1		05/01/17 20:20	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0074	1		05/01/17 20:20	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.0074	1		05/01/17 20:20	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.0074	1		05/01/17 20:20	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.0074	1		05/01/17 20:20	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.0074	1		05/01/17 20:20	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.0074	1		05/01/17 20:20	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.0074	1		05/01/17 20:20	10061-02-6	
Ethylbenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	100-41-4	
Ethyl methacrylate	ND	mg/kg	0.15	1		05/01/17 20:20	97-63-2	
Hexachloro-1,3-butadiene	ND	mg/kg	0.0074	1		05/01/17 20:20	87-68-3	
n-Hexane	ND	mg/kg	0.0074	1		05/01/17 20:20	110-54-3	
2-Hexanone	ND	mg/kg	0.15	1		05/01/17 20:20	591-78-6	
Iodomethane	ND	mg/kg	0.15	1		05/01/17 20:20	74-88-4	

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**ANALYTICAL RESULTS**

Project: Cass Adams Sewer 17074-20-130  
Lab Project No.: 50169829

**Sample: BH-03 10-12** Lab ID: 50169829003 Collected: 04/26/17 15:11 Received: 04/28/17 08:30 Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV 5030 Low Level</b>		Analytical Method: EPA 8260						
Isopropylbenzene (Cumene)	ND	mg/kg	0.0074	1		05/01/17 20:20	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.0074	1		05/01/17 20:20	99-87-6	
Methylene Chloride	ND	mg/kg	0.030	1		05/01/17 20:20	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.037	1		05/01/17 20:20	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.0074	1		05/01/17 20:20	1634-04-4	
Naphthalene	ND	mg/kg	0.0074	1		05/01/17 20:20	91-20-3	
n-Propylbenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	103-65-1	
Styrene	ND	mg/kg	0.0074	1		05/01/17 20:20	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0074	1		05/01/17 20:20	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0074	1		05/01/17 20:20	79-34-5	
Tetrachloroethene	ND	mg/kg	0.0074	1		05/01/17 20:20	127-18-4	
Toluene	ND	mg/kg	0.0074	1		05/01/17 20:20	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.0074	1		05/01/17 20:20	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.0074	1		05/01/17 20:20	79-00-5	
Trichloroethene	ND	mg/kg	0.0074	1		05/01/17 20:20	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.0074	1		05/01/17 20:20	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.0074	1		05/01/17 20:20	96-18-4	
1,2,4-Trimethylbenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.0074	1		05/01/17 20:20	108-67-8	
Vinyl acetate	ND	mg/kg	0.15	1		05/01/17 20:20	108-05-4	
Vinyl chloride	ND	mg/kg	0.0074	1		05/01/17 20:20	75-01-4	
Xylene (Total)	ND	mg/kg	0.015	1		05/01/17 20:20	1330-20-7	
<b>Surrogates</b>								
Dibromofluoromethane (S)	115	%	69-136	1		05/01/17 20:20	1868-53-7	
Toluene-d8 (S)	112	%	64-150	1		05/01/17 20:20	2037-26-5	
4-Bromofluorobenzene (S)	77	%	51-142	1		05/01/17 20:20	460-00-4	

**Percent Moisture** Analytical Method: SM 2540G

Percent Moisture **32.4** % 0.10 1 05/05/17 10:52

**Sample: Stock Pile** Lab ID: 50169829004 Collected: 04/26/17 15:25 Received: 04/28/17 08:30 Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	<b>18.4</b>	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:22	7440-38-2	
Barium	<b>193</b>	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:22	7440-39-3	
Cadmium	<b>1.1</b>	mg/kg	0.58	1	05/02/17 07:08	05/03/17 12:22	7440-43-9	
Chromium	<b>20.5</b>	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:22	7440-47-3	
Lead	<b>317</b>	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:22	7439-92-1	
Selenium	ND	mg/kg	1.2	1	05/02/17 07:08	05/03/17 12:22	7782-49-2	
Silver	ND	mg/kg	0.58	1	05/02/17 07:08	05/03/17 12:22	7440-22-4	

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

**Sample: Stock Pile**      **Lab ID: 50169829004**      Collected: 04/26/17 15:25      Received: 04/28/17 08:30      Matrix: Solid  
*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>7471 Mercury</b> Analytical Method: EPA 7471      Preparation Method: EPA 7471								
Mercury	0.76	mg/kg	0.25	1	05/04/17 12:06	05/04/17 23:26	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM      Preparation Method: EPA 3546								
Acenaphthene	1.2	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	83-32-9	
Acenaphthylene	0.075	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	208-96-8	
Anthracene	3.6	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	120-12-7	
Benzo(a)anthracene	4.8	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	56-55-3	
Benzo(a)pyrene	5.1	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	50-32-8	
Benzo(b)fluoranthene	4.7	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	205-99-2	
Benzo(g,h,i)perylene	3.0	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	191-24-2	
Benzo(k)fluoranthene	3.8	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	207-08-9	
Chrysene	4.2	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	218-01-9	
Dibenz(a,h)anthracene	1.2	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	53-70-3	
Fluoranthene	13.1	mg/kg	0.16	25	04/28/17 22:40	05/04/17 01:50	206-44-0	
Fluorene	1.6	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	86-73-7	
Indeno(1,2,3-cd)pyrene	3.0	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	193-39-5	
1-Methylnaphthalene	0.33	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	90-12-0	N2
2-Methylnaphthalene	0.42	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	91-57-6	
Naphthalene	1.4	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	91-20-3	ED
Phenanthrene	13.5	mg/kg	0.16	25	04/28/17 22:40	05/04/17 01:50	85-01-8	
Pyrene	9.5	mg/kg	0.032	5	04/28/17 22:40	05/01/17 06:09	129-00-0	
<b>Surrogates</b>								
2-Fluorobiphenyl (S)	61	%	30-94	5	04/28/17 22:40	05/01/17 06:09	321-60-8	
p-Terphenyl-d14 (S)	52	%	27-102	5	04/28/17 22:40	05/01/17 06:09	1718-51-0	

**8260 MSV 5030 Low Level**      Analytical Method: EPA 8260

Acetone	ND	mg/kg	0.13	1		05/01/17 20:52	67-64-1	
Acrolein	ND	mg/kg	0.13	1		05/01/17 20:52	107-02-8	
Acrylonitrile	ND	mg/kg	0.13	1		05/01/17 20:52	107-13-1	
Benzene	ND	mg/kg	0.0065	1		05/01/17 20:52	71-43-2	
Bromobenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	108-86-1	
Bromochloromethane	ND	mg/kg	0.0065	1		05/01/17 20:52	74-97-5	
Bromodichloromethane	ND	mg/kg	0.0065	1		05/01/17 20:52	75-27-4	
Bromoform	ND	mg/kg	0.0065	1		05/01/17 20:52	75-25-2	
Bromomethane	ND	mg/kg	0.0065	1		05/01/17 20:52	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.033	1		05/01/17 20:52	78-93-3	
n-Butylbenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	98-06-6	
Carbon disulfide	ND	mg/kg	0.013	1		05/01/17 20:52	75-15-0	
Carbon tetrachloride	ND	mg/kg	0.0065	1		05/01/17 20:52	56-23-5	
Chlorobenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	108-90-7	
Chloroethane	ND	mg/kg	0.0065	1		05/01/17 20:52	75-00-3	
Chloroform	ND	mg/kg	0.0065	1		05/01/17 20:52	67-66-3	
Chloromethane	ND	mg/kg	0.0065	1		05/01/17 20:52	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.0065	1		05/01/17 20:52	95-49-8	

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

**Sample: Stock Pile**      **Lab ID: 50169829004**      Collected: 04/26/17 15:25      Received: 04/28/17 08:30      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV 5030 Low Level</b>		Analytical Method: EPA 8260						
4-Chlorotoluene	ND	mg/kg	0.0065	1		05/01/17 20:52	106-43-4	
Dibromochloromethane	ND	mg/kg	0.0065	1		05/01/17 20:52	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.0065	1		05/01/17 20:52	106-93-4	
Dibromomethane	ND	mg/kg	0.0065	1		05/01/17 20:52	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	106-46-7	
trans-1,4-Dichloro-2-butene	ND	mg/kg	0.13	1		05/01/17 20:52	110-57-6	
Dichlorodifluoromethane	ND	mg/kg	0.0065	1		05/01/17 20:52	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.0065	1		05/01/17 20:52	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.0065	1		05/01/17 20:52	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.0065	1		05/01/17 20:52	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.0065	1		05/01/17 20:52	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0065	1		05/01/17 20:52	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.0065	1		05/01/17 20:52	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.0065	1		05/01/17 20:52	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.0065	1		05/01/17 20:52	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.0065	1		05/01/17 20:52	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.0065	1		05/01/17 20:52	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.0065	1		05/01/17 20:52	10061-02-6	
Ethylbenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	100-41-4	
Ethyl methacrylate	ND	mg/kg	0.13	1		05/01/17 20:52	97-63-2	
Hexachloro-1,3-butadiene	ND	mg/kg	0.0065	1		05/01/17 20:52	87-68-3	
n-Hexane	ND	mg/kg	0.0065	1		05/01/17 20:52	110-54-3	
2-Hexanone	ND	mg/kg	0.13	1		05/01/17 20:52	591-78-6	
Iodomethane	ND	mg/kg	0.13	1		05/01/17 20:52	74-88-4	
Isopropylbenzene (Cumene)	ND	mg/kg	0.0065	1		05/01/17 20:52	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.0065	1		05/01/17 20:52	99-87-6	
Methylene Chloride	ND	mg/kg	0.026	1		05/01/17 20:52	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.033	1		05/01/17 20:52	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.0065	1		05/01/17 20:52	1634-04-4	
Naphthalene	ND	mg/kg	0.0065	1		05/01/17 20:52	91-20-3	
n-Propylbenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	103-65-1	
Styrene	ND	mg/kg	0.0065	1		05/01/17 20:52	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0065	1		05/01/17 20:52	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0065	1		05/01/17 20:52	79-34-5	
Tetrachloroethene	ND	mg/kg	0.0065	1		05/01/17 20:52	127-18-4	
Toluene	ND	mg/kg	0.0065	1		05/01/17 20:52	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.0065	1		05/01/17 20:52	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.0065	1		05/01/17 20:52	79-00-5	
Trichloroethene	ND	mg/kg	0.0065	1		05/01/17 20:52	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.0065	1		05/01/17 20:52	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.0065	1		05/01/17 20:52	96-18-4	
1,2,4-Trimethylbenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	95-63-6	

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### ANALYTICAL RESULTS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

**Sample: Stock Pile**      **Lab ID: 50169829004**      Collected: 04/26/17 15:25      Received: 04/28/17 08:30      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV 5030 Low Level</b>		Analytical Method: EPA 8260						
1,3,5-Trimethylbenzene	ND	mg/kg	0.0065	1		05/01/17 20:52	108-67-8	
Vinyl acetate	ND	mg/kg	0.13	1		05/01/17 20:52	108-05-4	
Vinyl chloride	ND	mg/kg	0.0065	1		05/01/17 20:52	75-01-4	
Xylene (Total)	ND	mg/kg	0.013	1		05/01/17 20:52	1330-20-7	
<b>Surrogates</b>								
Dibromofluoromethane (S)	113	%	69-136	1		05/01/17 20:52	1868-53-7	
Toluene-d8 (S)	111	%	64-150	1		05/01/17 20:52	2037-26-5	
4-Bromofluorobenzene (S)	81	%	51-142	1		05/01/17 20:52	460-00-4	
<b>Percent Moisture</b>		Analytical Method: SM 2540G						
Percent Moisture	<b>23.5</b>	%	0.10	1		05/05/17 10:53		

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**QUALITY CONTROL DATA**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

QC Batch: 385043 Analysis Method: EPA 7471  
QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

METHOD BLANK: 1775626 Matrix: Solid  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.20	05/04/17 23:01	

LABORATORY CONTROL SAMPLE: 1775627

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.5	0.53	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1775628 1775629

Parameter	Units	50169855004		MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec						
Mercury	mg/kg	ND		.56	.55	0.62	0.62	109	113	75-125	1	20			

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**QUALITY CONTROL DATA**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

QC Batch: 384453 Analysis Method: EPA 6010  
QC Batch Method: EPA 3050 Analysis Description: 6010 MET  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

METHOD BLANK: 1773121 Matrix: Solid  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.0	05/03/17 11:43	
Barium	mg/kg	ND	1.0	05/03/17 11:43	
Cadmium	mg/kg	ND	0.50	05/03/17 11:43	
Chromium	mg/kg	ND	1.0	05/03/17 11:43	
Lead	mg/kg	ND	1.0	05/03/17 11:43	
Selenium	mg/kg	ND	1.0	05/03/17 11:43	
Silver	mg/kg	ND	0.50	05/03/17 11:43	

LABORATORY CONTROL SAMPLE: 1773122

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	50	50.0	100	80-120	
Barium	mg/kg	50	50.9	102	80-120	
Cadmium	mg/kg	50	49.1	98	80-120	
Chromium	mg/kg	50	50.0	100	80-120	
Lead	mg/kg	50	48.5	97	80-120	
Selenium	mg/kg	50	50.8	102	80-120	
Silver	mg/kg	25	24.7	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1773123 1773124

Parameter	Units	1773123		1773124		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		50169829003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							MSD Result
Arsenic	mg/kg	9.1	71.9	70	77.5	73.4	95	92	75-125	5	20	
Barium	mg/kg	271	71.9	70	350	343	109	102	75-125	2	20	
Cadmium	mg/kg	4.4	71.9	70	71.4	72.4	93	97	75-125	1	20	
Chromium	mg/kg	26.4	71.9	70	90.3	84.6	89	83	75-125	7	20	
Lead	mg/kg	502	71.9	70	557	644	76	202	75-125	14	20	P6
Selenium	mg/kg	1.5	71.9	70	71.4	66.7	97	93	75-125	7	20	
Silver	mg/kg	4.2	36	34.9	38.1	35.9	94	91	75-125	6	20	

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### QUALITY CONTROL DATA

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

QC Batch: 384612 Analysis Method: EPA 8260  
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV 5030 Low  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

METHOD BLANK: 1773974 Matrix: Solid  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.0050	05/01/17 12:20	
1,1,1-Trichloroethane	mg/kg	ND	0.0050	05/01/17 12:20	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.0050	05/01/17 12:20	
1,1,2-Trichloroethane	mg/kg	ND	0.0050	05/01/17 12:20	
1,1-Dichloroethane	mg/kg	ND	0.0050	05/01/17 12:20	
1,1-Dichloroethene	mg/kg	ND	0.0050	05/01/17 12:20	
1,1-Dichloropropene	mg/kg	ND	0.0050	05/01/17 12:20	
1,2,3-Trichlorobenzene	mg/kg	ND	0.0050	05/01/17 12:20	
1,2,3-Trichloropropane	mg/kg	ND	0.0050	05/01/17 12:20	
1,2,4-Trichlorobenzene	mg/kg	ND	0.0050	05/01/17 12:20	
1,2,4-Trimethylbenzene	mg/kg	ND	0.0050	05/01/17 12:20	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.0050	05/01/17 12:20	
1,2-Dichlorobenzene	mg/kg	ND	0.0050	05/01/17 12:20	
1,2-Dichloroethane	mg/kg	ND	0.0050	05/01/17 12:20	
1,2-Dichloropropane	mg/kg	ND	0.0050	05/01/17 12:20	
1,3,5-Trimethylbenzene	mg/kg	ND	0.0050	05/01/17 12:20	
1,3-Dichlorobenzene	mg/kg	ND	0.0050	05/01/17 12:20	
1,3-Dichloropropane	mg/kg	ND	0.0050	05/01/17 12:20	
1,4-Dichlorobenzene	mg/kg	ND	0.0050	05/01/17 12:20	
2,2-Dichloropropane	mg/kg	ND	0.0050	05/01/17 12:20	
2-Butanone (MEK)	mg/kg	ND	0.025	05/01/17 12:20	
2-Chlorotoluene	mg/kg	ND	0.0050	05/01/17 12:20	
2-Hexanone	mg/kg	ND	0.10	05/01/17 12:20	
4-Chlorotoluene	mg/kg	ND	0.0050	05/01/17 12:20	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.025	05/01/17 12:20	
Acetone	mg/kg	ND	0.10	05/01/17 12:20	
Acrolein	mg/kg	ND	0.10	05/01/17 12:20	
Acrylonitrile	mg/kg	ND	0.10	05/01/17 12:20	
Benzene	mg/kg	ND	0.0050	05/01/17 12:20	
Bromobenzene	mg/kg	ND	0.0050	05/01/17 12:20	
Bromochloromethane	mg/kg	ND	0.0050	05/01/17 12:20	
Bromodichloromethane	mg/kg	ND	0.0050	05/01/17 12:20	
Bromoform	mg/kg	ND	0.0050	05/01/17 12:20	
Bromomethane	mg/kg	ND	0.0050	05/01/17 12:20	
Carbon disulfide	mg/kg	ND	0.010	05/01/17 12:20	
Carbon tetrachloride	mg/kg	ND	0.0050	05/01/17 12:20	
Chlorobenzene	mg/kg	ND	0.0050	05/01/17 12:20	
Chloroethane	mg/kg	ND	0.0050	05/01/17 12:20	
Chloroform	mg/kg	ND	0.0050	05/01/17 12:20	
Chloromethane	mg/kg	ND	0.0050	05/01/17 12:20	
cis-1,2-Dichloroethene	mg/kg	ND	0.0050	05/01/17 12:20	

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### QUALITY CONTROL DATA

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

METHOD BLANK: 1773974 Matrix: Solid  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,3-Dichloropropene	mg/kg	ND	0.0050	05/01/17 12:20	
Dibromochloromethane	mg/kg	ND	0.0050	05/01/17 12:20	
Dibromomethane	mg/kg	ND	0.0050	05/01/17 12:20	
Dichlorodifluoromethane	mg/kg	ND	0.0050	05/01/17 12:20	
Ethyl methacrylate	mg/kg	ND	0.10	05/01/17 12:20	
Ethylbenzene	mg/kg	ND	0.0050	05/01/17 12:20	
Hexachloro-1,3-butadiene	mg/kg	ND	0.0050	05/01/17 12:20	
Iodomethane	mg/kg	ND	0.10	05/01/17 12:20	
Isopropylbenzene (Cumene)	mg/kg	ND	0.0050	05/01/17 12:20	
Methyl-tert-butyl ether	mg/kg	ND	0.0050	05/01/17 12:20	
Methylene Chloride	mg/kg	ND	0.020	05/01/17 12:20	
n-Butylbenzene	mg/kg	ND	0.0050	05/01/17 12:20	
n-Hexane	mg/kg	ND	0.0050	05/01/17 12:20	
n-Propylbenzene	mg/kg	ND	0.0050	05/01/17 12:20	
Naphthalene	mg/kg	ND	0.0050	05/01/17 12:20	
p-Isopropyltoluene	mg/kg	ND	0.0050	05/01/17 12:20	
sec-Butylbenzene	mg/kg	ND	0.0050	05/01/17 12:20	
Styrene	mg/kg	ND	0.0050	05/01/17 12:20	
tert-Butylbenzene	mg/kg	ND	0.0050	05/01/17 12:20	
Tetrachloroethene	mg/kg	ND	0.0050	05/01/17 12:20	
Toluene	mg/kg	ND	0.0050	05/01/17 12:20	
trans-1,2-Dichloroethene	mg/kg	ND	0.0050	05/01/17 12:20	
trans-1,3-Dichloropropene	mg/kg	ND	0.0050	05/01/17 12:20	
trans-1,4-Dichloro-2-butene	mg/kg	ND	0.10	05/01/17 12:20	
Trichloroethene	mg/kg	ND	0.0050	05/01/17 12:20	
Trichlorofluoromethane	mg/kg	ND	0.0050	05/01/17 12:20	
Vinyl acetate	mg/kg	ND	0.10	05/01/17 12:20	
Vinyl chloride	mg/kg	ND	0.0050	05/01/17 12:20	
Xylene (Total)	mg/kg	ND	0.010	05/01/17 12:20	
4-Bromofluorobenzene (S)	%	97	51-142	05/01/17 12:20	
Dibromofluoromethane (S)	%	107	69-136	05/01/17 12:20	
Toluene-d8 (S)	%	94	64-150	05/01/17 12:20	

LABORATORY CONTROL SAMPLE: 1773975

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	mg/kg	.05	0.052	104	72-126	
1,1,2,2-Tetrachloroethane	mg/kg	.05	0.049	98	68-125	
1,1-Dichloroethene	mg/kg	.05	0.046	92	70-132	
1,2,4-Trimethylbenzene	mg/kg	.05	0.050	100	70-118	
1,2-Dichloropropane	mg/kg	.05	0.050	100	76-122	
Benzene	mg/kg	.05	0.048	97	75-119	
Chlorobenzene	mg/kg	.05	0.047	94	75-114	
Chloroform	mg/kg	.05	0.049	98	71-114	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

LABORATORY CONTROL SAMPLE: 1773975

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	mg/kg	.05	0.048	95	79-121	
Ethylbenzene	mg/kg	.05	0.050	100	73-121	
Isopropylbenzene (Cumene)	mg/kg	.05	0.050	100	72-122	
Methyl-tert-butyl ether	mg/kg	.05	0.050	101	74-121	
Naphthalene	mg/kg	.05	0.045	91	65-122	
Tetrachloroethene	mg/kg	.05	0.049	98	68-120	
Toluene	mg/kg	.05	0.044	88	71-114	
trans-1,2-Dichloroethene	mg/kg	.05	0.049	97	76-125	
Trichloroethene	mg/kg	.05	0.050	100	77-115	
Vinyl chloride	mg/kg	.05	0.043	86	66-139	
Xylene (Total)	mg/kg	.15	0.15	97	71-119	
4-Bromofluorobenzene (S)	%			102	51-142	
Dibromofluoromethane (S)	%			100	69-136	
Toluene-d8 (S)	%			96	64-150	

MATRIX SPIKE SAMPLE: 1773976

Parameter	Units	50169829001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	mg/kg	ND	.064	0.066	103	31-146	
1,1,2,2-Tetrachloroethane	mg/kg	ND	.064	0.070	110	22-171	
1,1-Dichloroethene	mg/kg	ND	.064	0.061	96	53-154	
1,2,4-Trimethylbenzene	mg/kg	ND	.064	0.039	61	10-162	
1,2-Dichloropropane	mg/kg	ND	.064	0.060	94	49-140	
Benzene	mg/kg	ND	.064	0.060	94	43-141	
Chlorobenzene	mg/kg	ND	.064	0.043	67	20-141	
Chloroform	mg/kg	ND	.064	0.066	103	49-134	
cis-1,2-Dichloroethene	mg/kg	ND	.064	0.058	92	50-144	
Ethylbenzene	mg/kg	ND	.064	0.044	69	21-149	
Isopropylbenzene (Cumene)	mg/kg	ND	.064	0.040	63	15-152	
Methyl-tert-butyl ether	mg/kg	ND	.064	0.073	114	60-141	
Naphthalene	mg/kg	ND	.064	0.032	50	10-134	
Tetrachloroethene	mg/kg	ND	.064	0.048	76	21-155	
Toluene	mg/kg	ND	.064	0.049	76	30-146	
trans-1,2-Dichloroethene	mg/kg	ND	.064	0.058	91	50-146	
Trichloroethene	mg/kg	ND	.064	0.054	84	25-162	
Vinyl chloride	mg/kg	ND	.064	0.060	94	51-160	
Xylene (Total)	mg/kg	ND	.19	0.13	66	15-151	
4-Bromofluorobenzene (S)	%				94	51-142	
Dibromofluoromethane (S)	%				104	69-136	
Toluene-d8 (S)	%				102	64-150	

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**QUALITY CONTROL DATA**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

QC Batch: 384459 Analysis Method: EPA 8270 by SIM  
QC Batch Method: EPA 3546 Analysis Description: 8270 MSSV PAH by SIM  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

METHOD BLANK: 1773149 Matrix: Solid  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	mg/kg	ND	0.0050	04/30/17 09:47	N2
2-Methylnaphthalene	mg/kg	ND	0.0050	04/30/17 09:47	
Acenaphthene	mg/kg	ND	0.0050	04/30/17 09:47	
Acenaphthylene	mg/kg	ND	0.0050	04/30/17 09:47	
Anthracene	mg/kg	ND	0.0050	04/30/17 09:47	
Benzo(a)anthracene	mg/kg	ND	0.0050	04/30/17 09:47	
Benzo(a)pyrene	mg/kg	ND	0.0050	04/30/17 09:47	
Benzo(b)fluoranthene	mg/kg	ND	0.0050	04/30/17 09:47	
Benzo(g,h,i)perylene	mg/kg	ND	0.0050	04/30/17 09:47	
Benzo(k)fluoranthene	mg/kg	ND	0.0050	04/30/17 09:47	
Chrysene	mg/kg	ND	0.0050	04/30/17 09:47	
Dibenz(a,h)anthracene	mg/kg	ND	0.0050	04/30/17 09:47	
Fluoranthene	mg/kg	ND	0.0050	04/30/17 09:47	
Fluorene	mg/kg	ND	0.0050	04/30/17 09:47	
Indeno(1,2,3-cd)pyrene	mg/kg	ND	0.0050	04/30/17 09:47	
Naphthalene	mg/kg	ND	0.0050	04/30/17 09:47	IO
Phenanthrene	mg/kg	ND	0.0050	04/30/17 09:47	
Pyrene	mg/kg	ND	0.0050	04/30/17 09:47	
2-Fluorobiphenyl (S)	%	74	30-94	04/30/17 09:47	
p-Terphenyl-d14 (S)	%	72	27-102	04/30/17 09:47	

LABORATORY CONTROL SAMPLE: 1773150

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	mg/kg	.33	0.21	63	38-105	N2
2-Methylnaphthalene	mg/kg	.33	0.21	63	38-104	
Acenaphthene	mg/kg	.33	0.21	65	39-108	
Acenaphthylene	mg/kg	.33	0.22	68	39-108	
Anthracene	mg/kg	.33	0.24	72	41-119	
Benzo(a)anthracene	mg/kg	.33	0.24	74	42-125	
Benzo(a)pyrene	mg/kg	.33	0.30	93	33-143	
Benzo(b)fluoranthene	mg/kg	.33	0.32	99	31-143	
Benzo(g,h,i)perylene	mg/kg	.33	0.29	88	34-138	
Benzo(k)fluoranthene	mg/kg	.33	0.28	84	32-140	
Chrysene	mg/kg	.33	0.21	64	44-121	
Dibenz(a,h)anthracene	mg/kg	.33	0.33	100	32-144	
Fluoranthene	mg/kg	.33	0.23	70	42-122	
Fluorene	mg/kg	.33	0.23	70	40-114	
Indeno(1,2,3-cd)pyrene	mg/kg	.33	0.32	96	33-142	
Naphthalene	mg/kg	.33	0.20	62	37-101	

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**QUALITY CONTROL DATA**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

LABORATORY CONTROL SAMPLE: 1773150

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phenanthrene	mg/kg	.33	0.23	70	40-116	
Pyrene	mg/kg	.33	0.21	64	43-121	
2-Fluorobiphenyl (S)	%			68	30-94	
p-Terphenyl-d14 (S)	%			64	27-102	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1773151 1773152

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		50169824001 Result	Spike Conc.	Spike Conc.	Conc.								
1-Methylnaphthalene	mg/kg	0.0076	.36	.36	0.22	0.25	59	66	14-124	12	20	N2	
2-Methylnaphthalene	mg/kg	0.012	.36	.36	0.22	0.25	58	66	13-123	12	20		
Acenaphthene	mg/kg	ND	.36	.36	0.21	0.25	59	68	20-120	14	20		
Acenaphthylene	mg/kg	ND	.36	.36	0.23	0.26	63	72	22-116	12	20		
Anthracene	mg/kg	ND	.36	.36	0.21	0.26	57	69	19-128	18	20		
Benzo(a)anthracene	mg/kg	ND	.36	.36	0.20	0.24	55	67	16-134	19	20		
Benzo(a)pyrene	mg/kg	ND	.36	.36	0.24	0.29	66	81	10-148	20	20		
Benzo(b)fluoranthene	mg/kg	ND	.36	.36	0.26	0.32	72	89	10-148	22	20	R1	
Benzo(g,h,i)perylene	mg/kg	ND	.36	.36	0.22	0.27	60	73	10-141	21	20	R1	
Benzo(k)fluoranthene	mg/kg	ND	.36	.36	0.21	0.26	59	72	10-146	19	20		
Chrysene	mg/kg	ND	.36	.36	0.17	0.21	48	58	15-133	19	20		
Dibenz(a,h)anthracene	mg/kg	ND	.36	.36	0.26	0.31	72	86	10-142	18	20		
Fluoranthene	mg/kg	ND	.36	.36	0.20	0.24	54	66	13-135	20	20		
Fluorene	mg/kg	ND	.36	.36	0.22	0.26	61	72	21-125	16	20		
Indeno(1,2,3-cd)pyrene	mg/kg	ND	.36	.36	0.25	0.30	69	84	10-143	19	20		
Naphthalene	mg/kg	ND	.36	.36	0.22	0.25	60	67	12-123	10	20		
Phenanthrene	mg/kg	ND	.36	.36	0.21	0.25	57	68	13-133	17	20		
Pyrene	mg/kg	ND	.36	.36	0.18	0.22	49	59	11-137	19	20		
2-Fluorobiphenyl (S)	%						59	66	30-94				
p-Terphenyl-d14 (S)	%						49	56	27-102				

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**QUALITY CONTROL DATA**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

QC Batch: 385349 Analysis Method: SM 2540G  
QC Batch Method: SM 2540G Analysis Description: Dry Weight/Percent Moisture  
Associated Lab Samples: 50169829001, 50169829002, 50169829003, 50169829004

SAMPLE DUPLICATE: 1777266

Parameter	Units	50169829001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	21.6	21.8	1	5	

SAMPLE DUPLICATE: 1777267

Parameter	Units	50169829004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	23.5	23.5	0	5	

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## QUALIFIERS

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.  
ND - Not Detected at or above adjusted reporting limit.  
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.  
MDL - Adjusted Method Detection Limit.  
PQL - Practical Quantitation Limit.  
RL - Reporting Limit.  
S - Surrogate  
1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.  
Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.  
LCS(D) - Laboratory Control Sample (Duplicate)  
MS(D) - Matrix Spike (Duplicate)  
DUP - Sample Duplicate  
RPD - Relative Percent Difference  
NC - Not Calculable.  
SG - Silica Gel - Clean-Up  
U - Indicates the compound was analyzed for, but not detected.  
N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.  
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.  
TNI - The NELAC Institute.

### LABORATORIES

PASI-I Pace Analytical Services - Indianapolis

### ANALYTE QUALIFIERS

ED Due to the extract's physical characteristics, the analysis was performed at dilution.  
IO The internal standard response was outside the laboratory acceptance limits confirmed by reanalysis. The results reported are from the most QC compliant analysis.  
N2 The lab does not hold NELAC/TNI accreditation for this parameter.  
P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.  
R1 RPD value was outside control limits.

## REPORT OF LABORATORY ANALYSIS

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**QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: Cass Adams Sewer 17074-20-130  
Pace Project No.: 50169829

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50169829001	BH-01 4-6	EPA 3050	384453	EPA 6010	384976
50169829002	BH-02 16-18	EPA 3050	384453	EPA 6010	384976
50169829003	BH-03 10-12	EPA 3050	384453	EPA 6010	384976
50169829004	Stock Pile	EPA 3050	384453	EPA 6010	384976
50169829001	BH-01 4-6	EPA 7471	385043	EPA 7471	385329
50169829002	BH-02 16-18	EPA 7471	385043	EPA 7471	385329
50169829003	BH-03 10-12	EPA 7471	385043	EPA 7471	385329
50169829004	Stock Pile	EPA 7471	385043	EPA 7471	385329
50169829001	BH-01 4-6	EPA 3546	384459	EPA 8270 by SIM	384508
50169829002	BH-02 16-18	EPA 3546	384459	EPA 8270 by SIM	384508
50169829003	BH-03 10-12	EPA 3546	384459	EPA 8270 by SIM	384508
50169829004	Stock Pile	EPA 3546	384459	EPA 8270 by SIM	384508
50169829001	BH-01 4-6	EPA 8260	384612		
50169829002	BH-02 16-18	EPA 8260	384612		
50169829003	BH-03 10-12	EPA 8260	384612		
50169829004	Stock Pile	EPA 8260	384612		
50169829001	BH-01 4-6	SM 2540G	385349		
50169829002	BH-02 16-18	SM 2540G	385349		
50169829003	BH-03 10-12	SM 2540G	385349		
50169829004	Stock Pile	SM 2540G	385349		

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OUCD **Sample Condition Upon Receipt**

Cause No. 45545 S1

Face Analytical

Client Name: EMC

Project # 50169829

Courier:  Fed Ex  UPS  USPS  Client  Commercial  Pace Other

Tracking #: 7261 3097 1311

Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Date/Time 5035A kits placed in freezer

Packing Material:  Bubble Wrap  Bubble Bags  None  Other Ziploc

Thermometer 1 2 3 4 5 6 A B C D E F

Type of Ice: Wet Blue None  Samples on ice, cooling process has begun

Cooler Temperature (Initial/Corrected) 4.4°C/4.4°C

Ice Visible in Sample Containers:  yes  no

Temp should be above freezing to 6°C

Comments:

Date and Initials of person examining contents: MB 4/28/17

Are samples from West Virginia? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1.	
Document any containers out of temp.		
Chain of Custody Present: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.	
Chain of Custody Filled Out: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3.	
Chain of Custody Relinquished: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.	
Sampler Name & Signature on COC: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.	
Short Hold Time Analysis (<72hr): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.	
Rush Turn Around Time Requested: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.	
Containers Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.	
Sample Labels match COC: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.	
-Includes date/time/ID/Analysis		
All containers needing acid/base pres. have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10.	(Circle) HNO3 H2SO4 NaOH NaOH/ZnAc
exceptions: VOA, coliform, TOC, O&G		
All containers needing preservation are found to be in compliance with EPA recommendation (<2, >9, >12) unless otherwise noted.		
Residual Chlorine Check (SVOC 625 Pest/PCB 608)	11.	Present Absent
Residual Chlorine Check (Total/Amenable/Free Cyanide)	12.	Present Absent
Headspace in VOA Vials (>6mm): <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.	
Headspace Wisconsin Sulfide <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	14.	
Trip Blank Present: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	15.	
Trip Blank Custody Seals Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Project Manager Review		
Samples Arrived within Hold Time: <input type="checkbox"/> Yes <input type="checkbox"/> No	15.	
Sufficient Volume: <input type="checkbox"/> Yes <input type="checkbox"/> No	16.	
Correct Containers Used: <input type="checkbox"/> Yes <input type="checkbox"/> No	17.	

Client Notification/ Resolution:

Field Data Required? Y / N

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

Project Manager Review: \_\_\_\_\_

Date: \_\_\_\_\_

### Sample Container Count

CLIENT: EMC

OC PAGE 1 of 1

OC ID# \_\_\_\_\_

SBS  
DI  
Bulk  
Kit

Project # 50169829

Matrix S/M/W/NAL  
(Soil/Water/Non-  
Aqueous Liquid)

Sample Line Item	DG9H	VG9H	AG1U	WGFU	AG0U	R	BP2N	BP2U	BP2S	BP3N	BP3U	BP3S	AG3S	AG1H	BP3B	BP1U	SP5T	AG2U	Matrix S/M/W/NAL (Soil/Water/Non- Aqueous Liquid)	pH <2	pH >9	pH >12
1				2															SL			
2				2																		
3				2																		
4				2																		
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

↓

Container Codes

DG9H	40mL HCL amber vial	AG0U	100mL unpreserved amber glass	BP1N	1 liter HNO3 plastic	DG9P	40mL TSP amber vial
AG1U	1liter unpreserved amber glass	AG1H	1 liter HCL amber glass	BP1S	1 liter H2SO4 plastic	DG9S	40mL H2SO4 amber vial
WGFU	4oz clear soil jar	AG1S	1 liter H2SO4 amber glass	BP1U	1 liter unpreserved plastic	DG9T	40mL Na Thio amber vial
R	terra core kit	AG1T	1 liter Na Thiosulfate amber glass	BP1Z	1 liter NaOH, Zn, Ac	DG9U	40mL unpreserved amber vial
BP2N	500mL HNO3 plastic	AG2N	500mL HNO3 amber glass	BP2A	500mL NaOH, Asc Acid plastic	SP5T	120mL Coliform Na Thiosulfate
BP2U	500mL unpreserved plastic	AG2S	500mL H2SO4 amber glass	BP2O	500mL NaOH plastic	JGFU	4oz unpreserved amber wide
BP2S	500mL H2SO4 plastic	AG2U	500mL unpreserved amber glass	BP2Z	500mL NaOH, Zn Ac	U	Summa Can
BP3N	250mL HNO3 plastic	AG3U	250mL unpreserved amber glass	AF	Air Filter	VG9H	40mL HCL clear vial
BP3U	250mL unpreserved plastic	BG1H	1 liter HCL clear glass	BP3B	250mL NaOH plastic	VG9T	40mL Na Thio. clear vial
BP3S	250mL H2SO4 plastic	BG1S	1 liter H2SO4 clear glass	BP3Z	250mL NaOH, Zn Ac plastic	VG9U	40mL unpreserved clear vial
AG3S	250mL H2SO4 glass amber	BG1T	1 liter Na Thiosulfate clear glass	C	Air Cassettes	VSG	Headspace septa vial & HCL
AG1S	1 liter H2SO4 amber glass	BG1U	1 liter unpreserved glass	DG9B	40mL Na Bisulfate amber vial	WGFU	4oz wide jar w/hexane wipe
BP1U	1 liter unpreserved plastic	BP1A	1 liter NaOH, Asc Acid plastic	DG9M	40mL MeOH clear vial	ZPLC	Ziploc Bag





29 June 2018

Mr. Stephen Capin  
Evansville Sewer

**RE: Evansville – B Slough Project**

Dear Mr. Capin:

On behalf of Republic Services, Inc., I would like to express our thanks and appreciation for allowing us to provide pricing for the aforementioned project. Republic Services Disposal Facilities are a vital component of an integrated approach to solid and special waste management. Your waste can be disposed of at Laubscher Meadows Disposal Facility. The facility is an EPA-CERCLA and IDEM approved permitted contained Subtitle D landfills. The site can provide written "Superfund Indemnification" upon request. Our landfills are approved to accept all non-hazardous solid waste including profiled and approved "Special Wastes".

Subtitle D Disposal	\$ 18.68/ton all in
Option – Transportation/Loading(Excavator/Operator)	\$ 9.50/ton
Street Sweeper – Culver and Riverside – "as needed"	\$110.00/hour

(Disposal pricing includes County/City Host Fee, State of IN Fee, Corporate Environmental Fee and Fuel Surcharge)

(Tri-axle transportation assumes an 18 ton minimum per load. Any delays not caused by the loading company could prompt demurrage charges. Approved demurrage is charged at \$95.00/hour. Pricing includes fuel surcharge and all other fees.)

A manifest template will be provided. The payment term for this project would be 45-days net. If you have any questions or need additional information, please advise.

Sincerely,

Jeff Perry  
Landfill Special Waste Sales Manager

## Unsuitable Soils Removed – Relief Sewer and Effluent Pump Station

Cass Adams Relief Sewer Project	21,713 tons
Sunrise Pump Station Contract A	34,829 tons
Sunrise Pump Station Contract C	4,704 tons
TOTAL	61,246 tons

OUCC DR 3-11  
*(Continued from previous page)*

The only components of Evansville's request for additional financing authority that are driven by further engineering of the project are the deeper auger cast piles; environmental investigation identifying heavy metals in the soil; the river intake carbon steel piping and associated river intake costs; undercover basins; and depth of filter beds allowing for future PFAS treatment. No further changes in the estimate are proposed based upon further engineering. For any questions related to engineering components beyond these identified categories, please see the extensive evidence and discovery shared in Cause No. 45545. As indicated, before Petitioner closes on its bond issuance, engineering will have been completed. Hopefully the additional authority requested herein will allow a prompt closing on the bonds at that point.

See response to OUCC DR 3-8. The draft Phase I environmental report is included in Attachment OUCC DR 3-8. Soil contaminant sampling will be conducted once the geotechnical borings are complete, using refrigerated samples retained during drilling and is expected to occur in November.

**OUCG DR 3-12**

**DATA REQUEST**  
**City of Evansville**

**Cause No. 45545 S1**

**Information Requested:**

For environmental site investigations, soil sampling, and contaminated soil remediation for the new Water Treatment Plant since January 1, 2019, please state the total amount paid to each firm conducting the work and provide copies of all invoices.

**Information Provided:**

Petitioner prefaces its answer by reminding why Petitioner has sought an increase in financing authority at this time. As explained in Petitioner's Exhibit No. 1, the United States economy has experienced sustained inflation at levels not seen in over two generations. This historic inflation was not anticipated at the time of the evidentiary hearing in the main docket and thus was not reflected in the earlier cost estimates. Any reasonable engineer or economist would know that the earlier estimates will be insufficient. In addition, we are currently in an environment of rapidly rising interest rates. The worst possible outcome for Evansville customers would be to wait until after the project has been completely designed before seeking additional financing authority. This would delay the closing the bond issue, which, in this environment of rising interest rates, would be imprudent if not reckless. Evansville is doing everything in its power to avoid that outcome. If Evansville must wait for additional financing authority to close, it will not be because Evansville made that choice but because it was forced to do so. Evansville would under such circumstances compute the effect on customer rates from any increase in interest rates resulting from such a delay and would inform Evansville customers who caused that increase.

*(Continued on next page)*

OUCC DR 3-12  
*(Continued from previous page)*

The only components of Evansville's request for additional financing authority that are driven by further engineering of the project are the deeper auger cast piles; environmental investigation identifying heavy metals in the soil; the river intake carbon steel piping and associated river intake costs; undercover basins; and depth of filter beds allowing for future PFAS treatment. No further changes in the estimate are proposed based upon further engineering. For any questions related to engineering components beyond these identified categories, please see the extensive evidence and discovery shared in Cause No. 45545. As indicated, before Petitioner closes on its bond issuance, engineering will have been completed. Hopefully the additional authority requested herein will allow a prompt closing on the bonds at that point.

Environmental investigations were performed by AECOM as part of their scope of services. Soil sampling (retention) is being performed by CTL as part of their scope of services. The lab which will conduct the soil analysis has not been retained and will occur in November.



Mr. James Parks  
Evansville Sewer

15 November 2022

**RE: Evansville Sewer Project**

Dear Mr. Parks:

On behalf of Republic Services, Inc., I would like to express our thanks and appreciation for allowing us to provide pricing for the aforementioned project. Republic Services Disposal Facilities are a vital component of an integrated approach to solid and special waste management. The waste can be disposed of at Laubscher Meadows Disposal Facility. The facility is an EPA-CERCLA and IDEM approved permitted contained Subtitle D landfills. The site can provide written "Superfund Indemnification" upon request. Our landfills are approved to accept all non-hazardous solid waste including profiled and approved "Special Wastes".

Subtitle D Disposal	\$ 24.80/ton all in
Option – Transportation/Loading w/ Excavator/Operator	\$ 13.22/ton
Street Sweeper – Waterworks and Shawnee Roads – "as needed"	\$140.00/hour

Clean Clay Backfill can be priced upon request

(Disposal pricing includes County/City Host Fee, State of IN Fee, & Corporate Environmental Fee. All pricing based on minimum of 8-hour work day.)

(Tri-axle transportation assumes a 20-ton minimum per load. Any delays not caused by the loading company could prompt demurrage charges at \$125.00/hour. Fuel is based on a fuel base rate of \$3.50/gallon. A fuel surcharge is charged above this rate based on the government EIA/DOE website.)

A manifest template will be provided. The payment term for this project would be 60-days net. If you have any questions or need additional information, please advise.

Sincerely,

Jeff Perry  
Landfill Special Waste Sales Manager

**From:** [Parks, James](#)  
**To:** "Perry, Jeffrey"  
**Subject:** RE: 45545 S1 Request for Soil Disposal Budgetary Costs  
**Date:** Tuesday, November 15, 2022 10:37:00 AM  
**Attachments:** [image001.png](#)

---

Thank you. I appreciate your help.



James T. Parks, P.E.  
Senior Analyst  
Indiana Office of Utility Consumer Counselor  
115 West Washington Street, Suite 1500 South  
Indianapolis, Indiana 46204  
[www.IN.gov/OUCC](http://www.IN.gov/OUCC)  
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**From:** Perry, Jeffrey <[JPerry@republicservices.com](mailto:JPerry@republicservices.com)>  
**Sent:** Tuesday, November 15, 2022 10:35 AM  
**To:** Parks, James <[JParks@oucc.IN.gov](mailto:JParks@oucc.IN.gov)>  
**Subject:** RE: 45545 S1 Request for Soil Disposal Budgetary Costs

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Please find enclosed the requested pricing. I agree with you on their conversion factor. I use 1 cubic yard = 1.35 tons.

**ATTENTION Special Waste Customers:**

**Special Waste Online Account is LIVE!** Starting now all your profiles will be managed online with our Special Waste Online Account. If you haven't registered yet please click here <https://account.republicservices.com/create-account> to register today.

Once your account is created you will need to submit all new profiles and recertifications through <https://account.republicservices.com/login>.

**NOTE: Previous approvals will need to be loaded into your account before a renewal or change can be processed in the portal.** So please register now if you have not already. Thank you for your prompt attention!

**Jeff Perry**

Special Waste Executive

212 Mallard Drive  
Frankfort, KY 40601  
e [jperry@repsrv.com](mailto:jperry@repsrv.com)  
o 8593213530  
c 8593213530  
f 480 718 4313  
w [RepublicServices.com](http://RepublicServices.com)



Sustainability in Action

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**From:** Parks, James <[JParks@oucc.IN.gov](mailto:JParks@oucc.IN.gov)>  
**Sent:** Monday, November 14, 2022 3:10 PM  
**To:** Perry, Jeffrey <[JPerry@republicservices.com](mailto:JPerry@republicservices.com)>  
**Subject:** RE: 45545 S1 Request for Soil Disposal Budgetary Costs

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Will you be able to provide the budgetary quotes? I must file my testimony in a few days and wanted to use current costs.

Please let me know.  
Thank you



James T. Parks, P.E.  
Senior Analyst  
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**From:** Parks, James  
**Sent:** Tuesday, November 8, 2022 3:05 PM  
**To:** Perry, Jeffrey <[JPerry@republicservices.com](mailto:JPerry@republicservices.com)>  
**Subject:** RE: 45545 S1 Request for Soil Disposal Budgetary Costs

Yes, on both. That way, your budget letter follows your 2018 letter. The roads would be Waterworks Road and Shawnee Drive.

Thanks for your quick response.



James T. Parks, P.E.  
Senior Analyst  
Indiana Office of Utility Consumer Counselor  
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**From:** Perry, Jeffrey <[JPerry@republicservices.com](mailto:JPerry@republicservices.com)>  
**Sent:** Tuesday, November 8, 2022 2:49 PM  
**To:** Parks, James <[JParks@oucc.IN.gov](mailto:JParks@oucc.IN.gov)>  
**Subject:** RE: 45545 S1 Request for Soil Disposal Budgetary Costs

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Hi James – Are you wanting disposal only updated pricing. Or is the loading and street sweeper still part of the equation, thanks.

**ATTENTION Special Waste Customers:**

**Special Waste Online Account is LIVE!** Starting now all waste profiles will be managed online. If you haven't registered yet please [click here](#) to register today. Once your account is created and verified (2 verifications in total), you will be able to process requests. Once you are verified use address below to create profile and do recerts on existing approvals.

<https://hub.republicservices.com/login>

**NOTE: Previous approvals will need to be loaded into your account before a renewal or change**

**can be processed in the portal.** So please register now if you have not already. Thank you for your prompt attention!

## Jeff Perry

Special Waste Executive

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o 8593213530  
c 8593213530  
f 480 718 4313  
w [RepublicServices.com](http://RepublicServices.com)



Sustainability in Action

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**From:** Parks, James <[JParks@oucc.IN.gov](mailto:JParks@oucc.IN.gov)>  
**Sent:** Tuesday, November 8, 2022 2:36 PM  
**To:** Perry, Jeffrey <[JPerry@republicservices.com](mailto:JPerry@republicservices.com)>  
**Subject:** 45545 S1 Request for Soil Disposal Budgetary Costs

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Good afternoon,

I'm a Senior Utility Analyst at the Indiana Office of Utility Consumer Counselor (OUCC) reviewing Evansville, Indiana's request for additional funding for its new Water Treatment Plant.

Part of the increase is for off-site disposal of soil with heavy metals at a non-hazardous landfill. I have requested soil test results to understand the extent of contamination, but Evansville has not yet provided it. Evansville indicates the soils contain non-hazardous levels of heavy metals and can be landfilled at a Subtitle D landfill. I understand as much as 80,000 cubic yards of soil (mostly sands and silty clays) will be excavated from the site. Evansville estimates the weight at 200,000 tons based on 2.5 tons per cubic yard. However, I believe the weight is overstated.

On a previous project, the City disposed contaminated soil at the Laubscher Meadows landfill. Attached is a copy of a 2018 disposal quote from you.

Could you please send me updated disposal pricing using the same format as the 2018 letter?

I am a State of Indiana employee and I am not involved in contracting for actual disposal work for Evansville. My task is to review the City's estimated costs as proposed.

Thank you for helping me in determining a budgetary cost.



James T. Parks, P.E.

Senior Analyst

Indiana Office of Utility Consumer Counselor

115 West Washington Street, Suite 1500 South

Indianapolis, Indiana 46204

[www.IN.gov/OUCC](http://www.IN.gov/OUCC)

317.232.2766 • [jparks@oucc.IN.gov](mailto:jparks@oucc.IN.gov)

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29 June 2018

Mr. Stephen Capin  
Evansville Sewer

**RE: Evansville – B Slough Project**

Dear Mr. Capin:

On behalf of Republic Services, Inc., I would like to express our thanks and appreciation for allowing us to provide pricing for the aforementioned project. Republic Services Disposal Facilities are a vital component of an integrated approach to solid and special waste management. Your waste can be disposed of at Laubscher Meadows Disposal Facility. The facility is an EPA-CERCLA and IDEM approved permitted contained Subtitle D landfills. The site can provide written "Superfund Indemnification" upon request. Our landfills are approved to accept all non-hazardous solid waste including profiled and approved "Special Wastes".

Subtitle D Disposal	\$ 18.68/ton all in
Option – Transportation/Loading(Excavator/Operator)	\$ 9.50/ton
Street Sweeper – Culver and Riverside – "as needed"	\$110.00/hour

(Disposal pricing includes County/City Host Fee, State of IN Fee, Corporate Environmental Fee and Fuel Surcharge)

(Tri-axle transportation assumes an 18 ton minimum per load. Any delays not caused by the loading company could prompt demurrage charges. Approved demurrage is charged at \$95.00/hour. Pricing includes fuel surcharge and all other fees.)

A manifest template will be provided. The payment term for this project would be 45-days net. If you have any questions or need additional information, please advise.

Sincerely,

Jeff Perry  
Landfill Special Waste Sales Manager

<b>45545 S1, OUCG Corrections to Evansville WP DLB-1 (09/23/2022)</b>					
<b>Calculations of Contaminated Soil Disposal Cost</b>					
<b>Parameter</b>	<b>Orig. Est. Jan. 2021</b>	<b>WP DLB-1 Requested Costs</b>	<b>OUCG Revised Excess Soil Est. August 2022 Dollars</b>		<b>Increase or Added Costs</b>
	<b>Offsite Soil</b>		<b>Offsite Soil</b>	<b>Landfilled</b>	
Excess Soil Excavating/Loading (CY)	No Change	No Change	No Change	No Change	No Change
Backfill (CY)	No Change	No Change	No Change	No Change	No Change
Excess Soil Disposed Offsite (CY)	80,000	80,000	40,000	40,000	No Change
Conversion of CY to Tons	NA	2.5	NA	1.6	
EWSU or OUCG Assumed Landfilled Soils (Tons)	0	200,000	NA	64,000	
Timberline 2021 Offsite Disposal Cost (\$/CY)	\$ 11.76		\$ 11.76		
Advanced Facility Plan (2021) Mark-ups include:					
Estimating contingency (20%)	\$ 2.35		\$ 2.35		
3% escalation to midpoint (3%)	\$ 0.35		\$ 0.35		
Contractor Gen. Conditions (10%)	\$ 1.45		\$ 1.45		
Contractor Overhead & Profit (12%)	\$ 1.74		\$ 1.74		
Construction Contingencies (5%)	\$ 0.72		\$ 0.72		
Total AFP Mark-ups (1.562)	\$ 6.61		\$ 6.61		
Advanced Facility Plan Mark-up Cost (\$/CY)	\$ 18.37		\$ 18.37		
Total Offsite Disposal Cost - Jan. 2021 (\$)	\$ 1,470,000		\$ 735,000		
Escalation to August 2022 Dollars					
ENR CCI - January 2021	11,628		11,628		
ENR CCI - August 2022	13,171		13,171		
Raw cost escalation to Aug. 2022 (%)	13.27%		13.27%		
Cost escalation already included	4.51%		4.51%		
Total cost escalation to Aug. 2022 (%)	8.76%		8.76%	NA	
Offsite Disposal Cost - August 2022 (\$/CY)	\$ 20.00		\$ 20.00		
Offsite Disposal - August 2022 (\$)	\$ 1,600,000		\$ 800,000		
Landfill Disposal Cost (\$/Ton)	NA	\$ 30.00		\$ 24.80	
Landfill Cost - August 2022 (\$)	\$ -	\$ 6,000,000		\$ 1,587,200	
Total Excess Soil Disposal Cost	\$ 1,600,000	\$ 6,000,000	\$	2,387,000	\$ 787,000



# Water Treatment Plant Advanced Facility Plan

## Alternatives Report

March 2021



# AECOM

CATEGORY	CATEGORY WEIGHT	APPLIED WEIGHT	NOTES AND CONSIDERATIONS
Health Hazards	40%	6.0%	Presence or use of highly hazardous chemicals/gasses, confined spaces
Ergonomic & Accessibility Factors	30%	4.5%	Manual labor effort, ease of access for maintenance
Truck Traffic during Operations	30%	4.5%	Resultant from additional chemical delivery, residuals hauling, future conditions, etc.
<b>Construction Sequencing</b>	<b>15%</b>		<b>Challenging construction for rehabilitation options</b>
Construction Layout and Sequence Ability	80%	12.0%	Ability to keep plant operational during construction and minimize downtime
Retirement / Demolition of Abandoned Infrastructure	20%	3.0%	Eliminate existing infrastructure and reduce overall site footprint

## 7.4 River Intake Alternatives

Two alternatives for the intake are considered in this section and include rehabilitation of the existing intake and construction of a new facility.

### 7.4.1 River Intake Alternative 1: Rehabilitation

In this scenario, the river intake will receive major rehabilitation and continue to serve as the source of raw water. The intake facility was constructed in 1980 and appears to be in fair condition from a structural standpoint. However, the process equipment, electrical systems, HVAC, and ancillary building systems are not in good condition. EWSU performs frequent rebuilds of screens and pumps and much of this major equipment is beyond its useful life. This alternative considers a major overhaul of most of these systems while generally keeping the structure intact.

**Screens:** Screen are about 40 years old and are considered beyond their useful life and should be replaced. This includes full replacement of the ancillary backwash water supply piping and control valves. New control valves will feature electric operators. Due to limitations of the existing intake channel geometry, the style of the screens would need to be like the existing ones. However, there have been advancements in the design and of these types of travelling screens in the last 40 years such as an easier ability to adjust drive chain tension and eliminating sprockets or other maintenance items. Physical installation of the screens may be challenging and may need constructed in sections. EWSU has indicated that they are able to remove and replace pumps and screens using the existing AASHTO-rated bridge, and do not require a barge crane for delivery.

**Pumps:** The six (6) low service pumps are on a rebuild schedule of two per year, which effectively rebuilds a given pump once every three years. At this point, the pumps feature a mix of different motor manufacturers, condition of pump internals, condition and age of electrical switchgear, drives, and feeders. Two of the pumps are 480V power and on VFDs (#1 and #6) and the remaining four are fixed speed drives utilizing 4160V power. It is recommended to completely replace all pumps, motors, and drives to provide consistency through the system, extend equipment life without frequent rebuilds, and improve overall

operational efficiency. Use of VFDs on each pump is recommended to provide turndown, as EWSU currently has some difficulty adapting to low flows. Improvements will include controls to allow multiple pumps to run at the same hertz to avoid pumping against each other.

**Valves:** Most of the larger diameter valves in the lower gallery are in decent condition and can remain, although costs are included for minor rehabilitation. It is recommended to remove the upper level hydraulic control valves at the discharge of each pump and replace these with smaller footprint check and butterfly valves. The use of VFDs for all pumps also effectively eliminates the need for these hydraulic valves during pump startup/shutdown.

**Piping:** The large diameter piping can generally be reused but it is recommended to perform some rehabilitation including rust removal and other surface preparation and application of new coatings. This is especially the case for the more vulnerable exposed headers installed along the exterior walkway. The smaller diameter piping associated with the process water, plumbing, and chemical supplies has undergone many tie-ins over the years. It is proposed to replace all such piping to give a cleaner installation and eliminate piping no longer in use. Scope of the new small diameter piping includes:

- Plant water supply (with new backflow preventer) for raw water screen backwash routed to each screen; pump seal water routed to each pump; and for other general uses such as hose bibs;
- Potassium permanganate piping routed to each screen intake.

**Potassium Permanganate System:** Operation of the existing potassium permanganate system is problematic as operators must carry 55-pound containers of permanganate crystals into the intake and manually load these into a hopper. In 2018, almost 16,000 pounds of permanganate was used and equates to nearly one container per day. The feed system also has little automation or trending ability and chemical use is not easily monitored. It is recommended to completely upgrade this system and locate a new feeder onshore with solution fed to the intake. This includes a modernized and less labor-intensive loading method such as eductors or a sack feeder. Such systems would not only reduce operator physical requirements but would also provide more automation and monitoring to allow better use and benefit of the chemical.

**Electrical Switchgear:** Most of the electrical switchgear and related feeders are original to the intake construction and are subsequently in poor condition and non-code compliant. Pump drives also differ, with pump 1 and pump 6 on VFDs, and the remainder as constant speed. It is proposed to provide consistency across all pumps in terms of feeders and drives and utilize VFDs. The upgrades would also include added switchgear serviceability by providing at least two main power supply disconnects (for example two disconnects each feeding three pump starters). Ancillary electrical systems including transformers and local disconnects are also in poor condition and are recommended for replacement. The power supply is fed via the main plant through conduits supported from the walkway bridge, and any new cabling would be suspended from the bridge as well.

**Instrumentation and Controls:** With upgrades to the electrical and mechanical systems, the controls would also be replaced. This includes a new PLC at the intake and new analytical instruments for monitoring pump status. The raw water flow meters are located outside of



the station and should be replaced but are not considered part of this alternative given their location. Refer to plant-wide alternatives (Chapter 9) for locations of raw water meters.

**HVAC and Plumbing:** Most of the intake HVAC is original to the construction and has reached the end of its useful life. It is recommended to overhaul the HVAC system and provide new exhaust fans, heaters, louvers, and replace much of the ductwork. The building space can remain without air conditioning, but all VFDs should include designated air conditioning units within their enclosure. It is also recommended to utilize mobile dehumidifier units to minimize moisture and corrosion in the building. Lastly, it is recommended to add a redundant sump pump to the lower level gallery.

**Structural and Architectural:** The structural condition of the intake appears to be in relatively good condition and not in need of major repairs. However, it is recommended to inspect the submerged areas for any major cracks or deficiencies and repair as needed if the intake is to be used long-term. There are some apparent deficiencies in the walkways and handrail on the entrance and side access catwalk which should receive some rehabilitation. Costs are also included to upgrade some of the architectural finishes including roof replacement, painting of interior walls, and lighting upgrades.

**Dredging:** In the past, river dredging has been a considerable expense to remove sand dunes building up around the screen channels. If equipment is essentially replaced in kind, dredging operations may need to continue. EWSU had indicated these dunes appeared more persistent in recent years and dredging efforts are not fully removing accumulated sediment. River dredging is a considerable expense. In Fall of 2017, EWSU received a proposal from a contractor of over \$230,000 to perform dredging. However, a very large nearby boat (LST Boat) was recently moved and it is believed that this will help reduce the accumulation of sediment and lead to less dredging in the future. For the 30-year life cycle analysis, it is assumed that the river will be dredged twice over this duration.

**Construction Sequencing:** Downtime can be minimized given the number of available pumps and screens if replaced one at a time. A longer downtime item would be replacement of the primary electrical feeders and equipment. A potential construction challenge which could delay improvements would be the method employed for removal and installation of large equipment.

**Non-Monetary Score:** This alternative received a non-monetary score of 7.687 as outlined in Table 7-4.

Table 7-4 River Intake Rehabilitation Alternative Scoring

CATEGORY	CATEGORY WEIGHT	NOTES AND CONSIDERATIONS	SCORE (1-10)	EFFECTIVE WEIGHT
<b>Process Robustness</b>	<b>20%</b>			
Turbidity Spikes	25%	River Intake Does Not Address these	NA	0.00%
Spills in the River or Recurring / Future Contaminants	30%	River Intake Does Not Address these	NA	0.00%
Taste and Odor Control	20%	River Intake Does Not Address these	NA	0.00%

CATEGORY	CATEGORY WEIGHT	NOTES AND CONSIDERATIONS	SCORE (1-10)	EFFECTIVE WEIGHT
Organics Removal & Disinfection Byproducts	25%	River Intake Does Not Address these	NA	0.00%
<b>Operational Considerations</b>	<b>20%</b>			
Mechanical Complexity	30%	Screens are mechanically cleaned which adds some complexity	8	9.16%
Monitoring & Reporting Requirements	20%	Same for either alternative intake option - NA	NA	0.00%
Operational "Forgiveness"	50%	Robust system but some issues being offshore	7	15.27%
<b>Residuals and Environmental</b>	<b>15%</b>			
Residuals Quantity & Ability to Continue River Discharge	80%	Minimal, but screen backwash is from finished water supply discharge to river	9	18.32%
Energy Use Efficiency / Greenhouse Gases	20%	About the same for either intake option - NA	NA	0.00%
<b>Social Impacts</b>	<b>15%</b>			
System Resiliency: Natural Disasters or other Failures	40%	Fairly susceptible due to being offshore	6	9.16%
Plant or System Expandability	40%	Opportunity to install larger pumps	8	9.16%
Distribution System Impacts	20%	Not applicable for intake - NA	NA	0.00%
<b>Health and Safety</b>	<b>15%</b>			
Health Hazards	40%	Minimal - some safety consideration for travelling screens	9	9.16%
Ergonomic & Accessibility Factors	30%	Minimal - upper and lower levels easily accessed, difficulty accessing screen drives	9	6.87%
Truck Traffic during Operations	30%	No difference in truck traffic for intake options - NA	NA	0.00%
<b>Construction &amp; Sequencing</b>	<b>15%</b>			
Construction Layout and Sequence Ability	80%	Sequencing not major issue, but construction somewhat difficult	7	18.32%
Retirement / Demolition of Abandoned Infrastructure	20%	Minimal opportunity to eliminate aging infrastructure	5	4.58%
<b>Total Non-Monetary Score for Alternative</b>			<b>7.687</b>	<b>100%</b>

**Estimate of Construction and Life Cycle Cost:** Work associated with rehabilitation of the existing river intake structure has an estimated construction cost of approximately \$6.75 million with a summary provided in Table 7-5. The 30-year life cycle cost of this system is estimated at \$19,409,000 with a detailed breakdown of the estimate provided in Appendix B.

Table 7-5 Cost Estimate for River Intake Rehabilitation

Description	Estimated Cost
Demolition Work	\$75,000
Roof Repair / Replacement (3,000 sf)	\$60,000

Description		Estimated Cost
Doors & Hardware Rehab		\$13,000
Building Finishes & Specialties		\$35,000
Structure and Walkway Rehabilitation		\$50,000
Process Piping and Accessories		\$209,000
Pump Replacement (6 units)		\$1,336,000
Intake Screens (3 units)		\$1,300,000
Potassium Permanganate System (1 unit)		\$400,000
HVAC Replacement (3,000 sf)		\$115,000
Misc. Electrical (MCC Upgrades are Underway)		\$150,000
Instrumentation		\$100,000
<b>Subtotal</b>		<b>\$3,843,000</b>
Estimating Contingency	30%	\$1,152,900
Escalation to Midpoint	3%	\$115,290
<b>Construction Subtotal</b>		<b>\$5,111,190</b>
Contractor General Conditions	10%	\$511,119
Contractor Overhead and Profit	12%	\$613,343
Construction Contingencies	5%	\$255,560
Allowance: Dredge River		\$260,000
<b>Grand Total Cost</b>		<b>\$6,752,000</b>

#### 7.4.2 River Intake Alternative 2: New Construction

In this scenario, a new river intake is constructed with the existing facility demolished or abandoned. To avoid potential sediment accumulation, vulnerability of collision with a watercraft, and further vulnerability of suspending piping and electrical systems from the access bridge, it is recommended this new facility be located on the riverbank or slightly inland. One concept would be a concrete intake channel between the river and pumping station featuring bottom intake pipes and pneumatically cleaned screens. Other concepts may include an open channel with wet pit pumps and buried intake lines.

The original EWSU WTP had an inland pump station with multiple river intake pipes supplying water. However, flushing these intake lines to remove sediment was difficult and required a complete plant shut down to reverse the flow. The new intake would consist of a more modern design to address these issues. Conceptual drawings are provided in Appendix A as listed below, followed by a description of the components.

- Figure A1-1: New River Intake: Flow Diagram and Plan View
- Figure A1-2: New River Intake: Section View

**Intake Channel:** The concrete intake channel would be cut into the bank of the river and extended to provide adequate submergence over the intake screen during low flow conditions. The bottom of the channel would feature three (3) 42-inch intake pipes with a



**EVANSVILLE WATER AND SEWER UTILITY  
EVANSVILLE, INDIANA**

**WATER TREATMENT PLANT  
ADVANCED FACILITY PLAN**

**PROCESS  
TECHNICAL MEMO**

**DECEMBER 2019**

*Prepared by*

The HNTB Companies  
Infrastructure Solutions



111 MONUMENT CIRCLE  
INDIANAPOLIS, INDIANA 46204-5178  
(317) 636-4682

HNTB Job No. 74086-PL-001

## CHAPTER 2 PROCESS AND FACILITIES OVERVIEW

The WTP consists of two (2) interconnected treatment systems, the North Plant and South Plant, each with a hydraulic capacity of 36 and 24 million gallons per day (MGD), respectively.

**Table 2.1** summarizes the existing treatment processes comprising each plant and their associated hydraulic capacities. A process flow diagram is located in **Appendix A**.

**TABLE 2.1  
Water Treatment Plant Capacities**

<i>Unit Process</i>	<i>North Plant<sup>1</sup></i>	<i>South Plant<sup>1</sup></i>	<i>Total Capacity</i>	<i>Firm Capacity<sup>2</sup></i>
<b>River Intakes<sup>3</sup></b>			<b>90-140 MGD</b>	<b>70 MGD</b>
<b>Low Service Pumping<sup>4</sup></b>	<b>86 MGD</b>	<b>60 MGD</b>	<b>146 MGD</b>	<b>126 MGD</b>
<b>Mixing</b>	<b>36 MGD</b>	<b>24 MGD</b>	<b>60 MGD</b>	<b>42 MGD<sup>5</sup></b>
<b>Flocculation</b>	<b>36 MGD</b>	<b>24 MGD</b>	<b>60 MGD<sup>6</sup></b>	<b>42 MGD<sup>6</sup></b>
<b>Primary Sedimentation</b>	<b>36 MGD</b>	<b>24 MGD</b>	<b>60 MGD<sup>6</sup></b>	<b>42 MGD<sup>6</sup></b>
<b>Secondary Sedimentation</b>	<b>36 MGD</b>	<b>24 MGD</b>	<b>60 MGD<sup>6</sup></b>	<b>42 MGD<sup>6</sup></b>
<b>Gravity Filtration<sup>8</sup></b>	<b>36 MGD</b>	<b>24 MGD</b>	<b>60 MGD</b>	<b>57 MGD</b>
Filters 13-20	12 MGD			
Filters 21-28		24 MGD		
Filters 29-32	12 MGD			
Filters 33-36	12 MGD			
<b>Finished Water Storage</b>	<b>8.0 MG<sup>9</sup></b>	<b>0.5 MG</b>	<b>8.5 MG</b>	<b>2.0 MG<sup>10</sup></b>
<b>High Service Pumping</b>	<b>85 MGD</b>	<b>0 MGD</b>	<b>85 MGD</b>	<b>70 MGD</b>
HSP Station 2 (Pumps 4-7)	40 MGD			
HSP Station 3 (Pumps 8-10)	45 MGD			
<b>Plant Firm Capacity</b>			<b>60 MGD</b>	<b>42 MGD<sup>6</sup></b>

**Notes:**

- <sup>1</sup> Capacity figures are based on previous engineering reports and analyses.
- <sup>2</sup> Firm capacity based on largest single unit being out of service under worst-case conditions (such as high raw turbidity and high system demand).
- <sup>3</sup> Capacity estimates vary based on river elevations and actual pipe velocities.
- <sup>4</sup> Pump capacities based on 53 ft TDH.
- <sup>5</sup> Plant functioned adequately without rapid mixer until 1997; coagulation may be impacted, but it is not recommended to limit overall plant capacity by the firm capacity of mixing process.
- <sup>6</sup> Total and firm capacities are based on nominal design overflow rates; operational information and historical experience indicate an operational capacity of approximately 48 MGD.
- <sup>7</sup> South primary clarifiers are flocculating clarifiers with 18-percent of volume and surface area for flocculation and 82-percent for clarification.
- <sup>8</sup> Filters 1-12 are currently out of service.
- <sup>9</sup> All 3 clearwells are interconnected via finished water channel between the Diesel Room and Filters 29-32 Building.
- <sup>10</sup> Although plant firm capacity is not based on firm clearwell capacity, risk of failure/emergency closure of 6.5 MG clearwell poses significant potential impact to plant capacity and disinfection capabilities.

**Chapter 2** summarizes the condition of each process in greater detail with respect to the following justification criteria 1) Regulatory Driven 2) Safety 3) Failure Mitigation or 4) Critical Equipment Preventative Maintenance as described in **Chapter 1**.

## 2.1 INTAKE AND LOW SERVICE PUMP STATION

### Unit Process Description

Both the North Plant and South Plant are supplied with raw water by the Low Service Pump Station (LSPS) referenced on **Figure 1-1, Area 11**. The pump station houses three (3) traveling screens, six (6) vertical turbine low service pumps, an air compressor, and a potassium permanganate feed system. The traveling screens, shown in **Figure 2-1**, remove debris from the river intake water prior to pumping for treatment. The six (6) vertical turbine pumps, **Figure 2-2**, pump raw water from the river to both the North and South Plants. The air compressor powers the pneumatically actuated discharge valves. From the pumping station, raw water is delivered to the treatment units in the North and South Plants via two (2) 42-inch low service discharge mains.



**FIGURE 2-1**  
**Traveling Screen**



**FIGURE 2-2**  
**Low Service Pumps**

### Recommended Projects

The critical equipment in the LSPS required to keep the plant in operation include the traveling screens and the low service pumps. Additionally, the riverside perimeter of the pump station requires periodic dredging to clear the intake screens of sediment buildup from the river. The pumps are typically on a six (6) year rebuild cycle, where two (2) pumps are rehabilitated every two (2) years. The traveling screen rehabilitation typically consists of one (1) screen rebuild each year to prevent failure. The maintenance of each of these items should continue at the intervals

currently approved within the water rate case. Additional concerns within the intake area include interior and exterior piping and miscellaneous metal coating corrosion. Additionally, a high-water line on the wall in the lower level likely caused from either a leaking connection or sump pump failure is evident. A back-up sump pump within the lower level for redundancy is recommended. There are also operational and reliability issues with the pneumatic actuators due to age. It is recommended that the discharge valve pneumatic actuators and air compressor be replaced with electric actuators for ensured reliability.

## 2.2 NORTH PLANT RAW AND SETTLED WATER FLUMES

### Unit Process Description

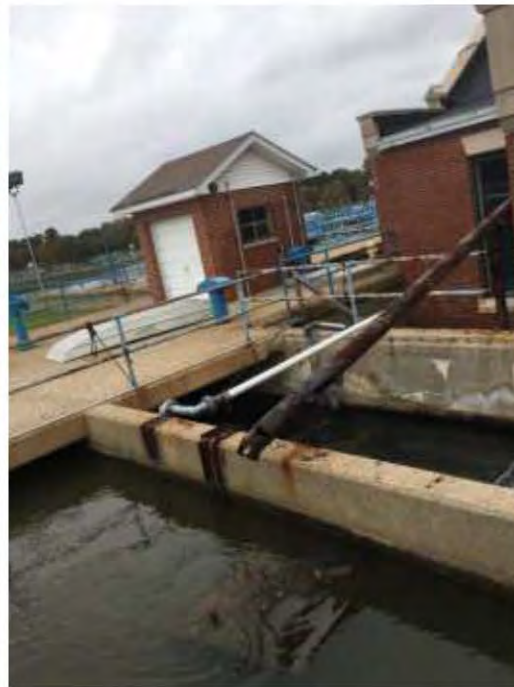
Raw water is pumped to the North Plant and first enters the raw water flume shown on **Figure 1-1, Area 8** and **Figure 2-3**, prior to flocculation and primary clarification treatment. Carbon and chlorine are fed within the channel, if needed. The concrete channel was constructed in the early 1950's as part of the North Plant expansion.

### Recommended Projects

Due to age, material, and exposure to the elements, the roof drains discharging into the raw water flume, shown in **Figure 2-4**, are heavily corroded. Staff mentioned the corrosion of the downspouts and potential replacement should be considered to avoid a possible overhead safety issue. Handrails and walkways are also showing signs of heavy corrosion and should be inspected and recoated or replaced with new to extend their useful life.



**FIGURE 2-3**  
**Raw Water Flume**



**FIGURE 2-4**  
**Corroded Roof Drain Downspout**

### **Recommended Projects**

The roofing of the fluoride room, caustic and ammonia building, the low service and intake structure, and High Service Pump Station 2 will need to be maintained and replaced as needed. These buildings were the only structures that were not rehabilitated during the 2006-2007 roof replacement project.

**Draft For Review**



## CHAPTER 3 SUMMARY AND RECOMMENDATIONS

### 3.1 DEVELOPMENT OF PLAN

The intent of this technical memorandum is to assess the current condition of the existing treatment processes and identify improvements needed for the plant to continue to meet the current and immediate future needs over a five (5) year planning period. As described in **Chapter 1**, the existing water treatment plant was evaluated based on recent visits in addition to reviewing previous reports and the rate case. Projects were prioritized on the basis of items that needs to be completed within the next five (5) years to continue plant operations. Criteria that was used to evaluate projects include: 1) Regulatory Driven 2) Safety 3) Failure Mitigation and 4) Critical Equipment Preventative Maintenance.

### 3.2 PROPOSED TREATMENT PLANT IMPROVEMENTS

As discussed in **Chapter 2**, most of the existing process infrastructure and mechanical equipment are beyond their intended service life, corroded, or pose structural integrity issues. **Chapter 2** details the evaluation of the process treatment systems and recommended projects for each system. **Table 3.1** summarizes each of the recommended projects proposed, includes the criteria in which projects were analyzed, and identifies the criticality in which projects should be completed.

**TABLE 3.1**  
**Project Summary and Recommendations**

Area	Project	Description	Project Justification Criteria				Priority	Notes
			Regulatory Driven	Safety	Failure Mitigation	Critical Equipment Preventative Maintenance		
Low Service Pump Station	Traveling Screen Rebuild	Travelling screen rebuild occurring annually				X	Critical	Rate Case Project
Low Service Pump Station	LS Pump Rebuild	Pump and motor testing and rebuild cycle occurring every 2 years				X	Critical	Rate Case Project
Low Service Pump Station	Intake Dredging	Remove sediment buildup necessary for operation of intake				X	Critical	Rate Case Project

Area	Project	Description	Project Justification Criteria				Priority	Notes
			Regulatory Driven	Safety	Failure Mitigation	Critical Equipment Preventative Maintenance		
Low Service Pump Station	Actuator Replacement	Replace existing end of life pneumatic actuators with electric actuators			X		High	Staff Request
Low Service Pump Station	Interior Process Coatings	Process piping and valves require structural inspection and coating to extend asset life			X		Low	
Low Service Pump Station	Sump Pump	Back-up sump pump needed to prevent gallery flooding			X		Medium	
Low Service Pump Station	Exterior Structural and Process Coatings	Exterior process piping and walk bridge require structural inspection and coating to extend asset life		X	X		Low	
North Plant Raw Water Flume	Exterior Structural and Process Coatings	Handrail and walk bridge require structural inspection and replacement/coating to extend asset life		X	X		Medium	
North Plant Raw Water Flume	Roof Drain Replacement	Overhead piping extending to flume exhibits severe corrosion		X	X		Medium	Staff Request
North Plant Flocculation Basins	Structural Repair	Handrail and walk bridge require structural inspection and replacement/coating to extend asset life		X	X		Medium	
North Plant Flocculation Basins	Structural Concrete Inspection and Repair	Drain, clean and inspect concrete tanks, perform repairs as necessary			X		Medium	

## Summary of AACE International Cost Classifications and Expected Ranges of Accuracy

	<i>Primary Characteristic</i>	<i>Secondary Characteristic</i>			
<b>ESTIMATE CLASS</b>	<b>LEVEL OF PROJECT DEFINITION</b> Expressed as % of complete definition	<b>END USAGE</b> Typical purpose of estimate	<b>METHODOLOGY</b> Typical estimating method	<b>EXPECTED ACCURACY RANGE</b> Typical variation in low and high ranges [a]	<b>PREPARATION EFFORT</b> Typical degree of effort relative to least cost index of 1 [b]
<b>Class 5</b>	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
<b>Class 4</b>	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +30% to +50%	2 to 4
<b>Class 3</b>	10% to 40%	Budget Authorization, or Control	Semi-Detailed Unit Cost with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
<b>Class 2</b>	30% to 70%	Control or Bid Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
<b>Class 1</b>	50% to 100%	Check Estimate or Bid Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

**OUCC DR 3-2**

10/27/2022

**DATA REQUEST**  
**City of Evansville**

**Cause No. 45545 S1**

**Information Requested:**

Reference Cover Sheet G-00 of the Water Treatment Plant Project No. U1032 drawing set marked 30% Design Documents, August 13, 2021, that were included in Attachment OUCC DR 1-5, page 18 of 24. Please state the 30% design completion date.

**Information Provided:**

Petitioner prefaces its answer by reminding why Petitioner has sought an increase in financing authority at this time. As explained in Petitioner's Exhibit No. 1, the United States economy has experienced sustained inflation at levels not seen in over two generations. This historic inflation was not anticipated at the time of the evidentiary hearing in the main docket and thus was not reflected in the earlier cost estimates. Any reasonable engineer or economist would know that the earlier estimates will be insufficient. In addition, we are currently in an environment of rapidly rising interest rates. The worst possible outcome for Evansville customers would be to wait until after the project has been completely designed before seeking additional financing authority. This would delay the closing the bond issue, which, in this environment of rising interest rates, would be imprudent if not reckless. Evansville is doing everything in its power to avoid that outcome. If Evansville must wait for additional financing authority to close, it will not be because Evansville made that choice but because it was forced to do so. Evansville would under such circumstances compute the effect on customer rates from any increase in interest rates resulting from such a delay and would inform Evansville customers who caused that increase.

*(Continued on next page)*

OUCC DR 3-2  
*(Continued from previous page)*

The only components of Evansville's request for additional financing authority that are driven by further engineering of the project are the deeper auger cast piles; environmental investigation identifying heavy metals in the soil; the river intake carbon steel piping and associated river intake costs; undercover basins; and depth of filter beds allowing for future PFAS treatment. No further changes in the estimate are proposed based upon further engineering. For any questions related to engineering components beyond these identified categories, please see the extensive evidence and discovery shared in Cause No. 45545. As indicated, before Petitioner closes on its bond issuance, engineering will have been completed. Hopefully the additional authority requested herein will allow a prompt closing on the bonds at that point.

It should be noted that this information is not relevant to the most recent revised cost estimate. However, the 30% plans were primarily developed between January and May of 2021. The 'current' 30% plans were plotted on August 13, 2021 in preparation for a Value Engineering session. The VE session occurred through September and October 2021, which included multiple phases for project presentation, design review, and comment discussion.

**OUCG DR 3-5**

**DATA REQUEST**  
**City of Evansville**

**Cause No. 45545 S1**

**Information Requested:**

Please provide copies of AECOM's 60% design drawings and detailed quantity take-off and construction cost estimate at 60% design which were due on September 30, 2022, according to the schedule in AECOM's Engineering Services Agreement Amendment No. 1, dated April 19, 2022.

**Information Provided:**

Petitioner prefaces its answer by reminding why Petitioner has sought an increase in financing authority at this time. As explained in Petitioner's Exhibit No. 1, the United States economy has experienced sustained inflation at levels not seen in over two generations. This historic inflation was not anticipated at the time of the evidentiary hearing in the main docket and thus was not reflected in the earlier cost estimates. Any reasonable engineer or economist would know that the earlier estimates will be insufficient. In addition, we are currently in an environment of rapidly rising interest rates. The worst possible outcome for Evansville customers would be to wait until after the project has been completely designed before seeking additional financing authority. This would delay the closing the bond issue, which, in this environment of rising interest rates, would be imprudent if not reckless. Evansville is doing everything in its power to avoid that outcome. If Evansville must wait for additional financing authority to close, it will not be because Evansville made that choice but because it was forced to do so. Evansville would under such circumstances compute the effect on customer rates from any increase in interest rates resulting from such a delay and would inform Evansville customers who caused that increase.

*(Continued on next page)*

OUCC DR 3-5  
*(Continued from previous page)*

The only components of Evansville's request for additional financing authority that are driven by further engineering of the project are the deeper auger cast piles; environmental investigation identifying heavy metals in the soil; the river intake carbon steel piping and associated river intake costs; undercover basins; and depth of filter beds allowing for future PFAS treatment. No further changes in the estimate are proposed based upon further engineering. For any questions related to engineering components beyond these identified categories, please see the extensive evidence and discovery shared in Cause No. 45545. As indicated, before Petitioner closes on its bond issuance, engineering will have been completed. Hopefully the additional authority requested herein will allow a prompt closing on the bonds at that point.

The 60% drawings are not complete. There have been design delays associated with re-working the project site. The Evansville Levee Authority has changed leadership recently and EWSU is now acquiring the levee authority building adjacent to the proposed site. While this has created schedule delays in the 60% deliverable, the enlarged project site offers a much better layout for the long-term operation of the facility. The 60% documents are anticipated to be submitted in mid-November. EWSU has also retained Kokosing Industrial to deliver the project through a Guaranteed Savings Contract. Kokosing will be utilizing the 60% documents to begin formal cost estimating.

**OUCC DR 1-1**

10/14/2022

**DATA REQUEST**  
**City of Evansville**

**Cause No. 45545 S1**

**Information Requested:**

Please identify the entities and provide copies of all engineering services agreements, contracts and amendments entered into since January 1, 2021, for the new Water Treatment Plant project. For purposes of this data request, please include all amendments, if any, to the Engineering Services Agreement with AECOM Technical Services, Inc. dated August 20, 2019, which was previously provided to the OUCC in response to Data Request 1-3.

**Information Provided:**

The only entity providing design engineering services for the new Water Treatment Plant is AECOM. See engineering services agreements, attached.

**Attachments:**

OUCR DR 1-1.pdf

AECOM Technical Services, Inc. Professional Services Agreement, Amendment No. 1, 04/19/2022



**PROFESSIONAL SERVICES AGREEMENT**

**AMENDMENT NUMBER 1**

**Water Filter Plant Final Design (“Project”)**

This Amendment to the Professional Services Agreement, originally dated August 20, 2019, is by and between:

**City of Evansville (“City”)**  
Water and Sewer Utility Board  
1 NW Martin Luther King Jr. Blvd.  
Evansville, Indiana 47740-0001

and,

**AECOM Technical Services, Inc (“AECOM”)**  
2450 South Tibbs Avenue  
Indianapolis, Indiana 46241

Who agree as follows:

**Whereas;** the City retained AECOM in 2019 to develop and assess long-term options to address challenges with aging infrastructure at the current Water Filter Plant, parts of which are over 100 years old, and

**Whereas;** in close coordination and cooperation with the City and following a detailed evaluation of the costs and benefits of various options, a plan was developed to design and build a new 50 MGD Water Filter Plant on a site near the existing Plant, and

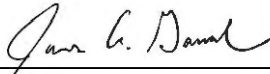
**Whereas;** the City wishes to amend the original agreement with AECOM to develop final design of a new Water Filter Plant and support the City in procuring a contractor through Indiana’s Guaranteed Savings Contract delivery method,

**Now Therefore;** this Amendment engages AECOM to perform Services described in Part I - Services and AECOM agrees to perform these Services for the compensation set forth in Part III - Compensation. AECOM shall be authorized to commence Services upon execution of this Amendment by both parties and receipt of written notice to proceed from the City. City and AECOM agree that this signature page, together with Parts I-III of this Amendment and the original Agreement, incorporated and made a part herewith, constitute the entire agreement between them relating to this project.

**Approved for City**

By: \_\_\_\_\_  
Steve Heidorn  
Title: President, Water & Sewer Utility Board  
Date: \_\_\_\_\_

**Approved for AECOM**

By:   
James A. Garrard  
Title: Indiana Water Business Lead  
Date: April 1, 2022

## **PART I SERVICES**

### **A. Amendment Description**

AECOM (Consultant) completed the Water Treatment Plant Advanced Facility Plan for the Evansville Water and Sewer Utility as part of the previous Phase 1 Services. The Advanced Facility Plan concluded that a new 50 MGD water treatment plant (WTP) be developed on a site adjacent to the existing WTP on the east side of Waterworks Road. The new facility will be constructed in place of the existing street department maintenance facility which will be relocated by the City. The proposed plant will use a limited amount of existing infrastructure of the current plant, including the raw water intake and potentially a portion of the existing south plant and/or outfall to the Ohio River depending on the residual requirements. The majority of the new plant infrastructure will be new and use 100% surface water from the Ohio River as its source. As part of the Phase 1 services, plans were prepared to approximately 30% design level.

The project services of this amendment will develop 100% design documents for the new Water Treatment Plant, requisite permitting of the new plant, and selection of a contractor for construction services via a Guaranteed Savings Approach.

### **B. Scope**

See Attachment B

### **C. Schedule**

See Attachment B

**PART II**  
**CITY'S RESPONSIBILITIES**

City shall, at its expense, do the following in a timely manner so as not to delay the services:

**A. Information/Reports**

No Change

**B. Representative**

No Change

**C. Decisions**

No Change

**PART III  
COMPENSATION**

**A. Compensation**

City shall pay Engineer for Basic Services set forth in Scope of Work Attachment B on an hourly, not-to-exceed basis, distributed as follows:

<b>Task</b>	<b>Not-To-Exceed Amount</b>
<b>1. Detailed Design and Project Management</b>	<b>\$ 5,161,789</b>
<b>2. Permitting</b>	<b>\$ 258,924</b>
<b>3. Contractor Procurement</b>	<b>\$ 230,872</b>
<b>4. Planning Street Dept Building Demolition</b>	<b>\$ 82,195</b>
<b>5. Planning Old Plant Decommissioning</b>	<b>\$ 122,243</b>
<b>Deduct: Phase 1 Remaining Fee</b>	<b>(\$ 725,000)</b>
<b>Total Not to Exceed Amount</b>	<b>\$ 5,131,023</b>

The amount paid shall be equal to the cumulative hours charged to the project times the AECOM’s Standard Hourly Rates (given in Attachment A of this Amendment) for each applicable employee classification plus reimbursable expenses for mileage, lodging, and per diem costs. AECOM may alter the distribution of compensation between individual phases noted herein to be consistent with services actually rendered but shall not exceed the total Not-To-Exceed amount unless approved in writing by the City.

The tasks and fee above do not include residuals dewatering, identified as a potential future task in the scope of services, Attachment B. If necessary, the City shall pay AECOM for that task and any additional services as authorized using the AECOM’s standard hourly rates, given in Attachment A of this Amendment.

**B. Billing and Payment – No Change**

**ATTACHMENT A**

**SCHEDULE OF GENERAL BILLING RATES**

**May 2022**  
Applicable Dates

<b><u>TITLE</u></b>	<b><u>HOURLY RATE</u></b>
Senior Technical Lead	\$280
Principle – QA/QC – AVP – DPM - Sr Process Engr	\$260
Senior Project Manager	\$225
Project Manager	\$199
Administrative/Clerical	\$75
Project Controls	\$98
Design Engineer 1	\$118
Design Engineer 2	\$130
Civil Engineer	\$122
Staff Engineer 1	\$145
Staff Engineer 2	\$155
Staff Engineer 3	\$165
Staff Engineer 4	\$175
Staff Engineer 5	\$185
Electrical – I&C	\$200
Structural	\$158
Architectural	\$116
Mechanical	\$144

Notes:

The rates in this schedule will be reviewed and adjusted as necessary but not sooner than six months after the date listed above. Rates include actual salaries or wages paid to employees of AECOM plus payroll taxes, FICA, Worker's Compensation insurance, other customary and mandatory benefits, and overhead and profit. All project related expenses and subconsultants will be billed at 100% of actual cost to cover handling and administrative expenses.

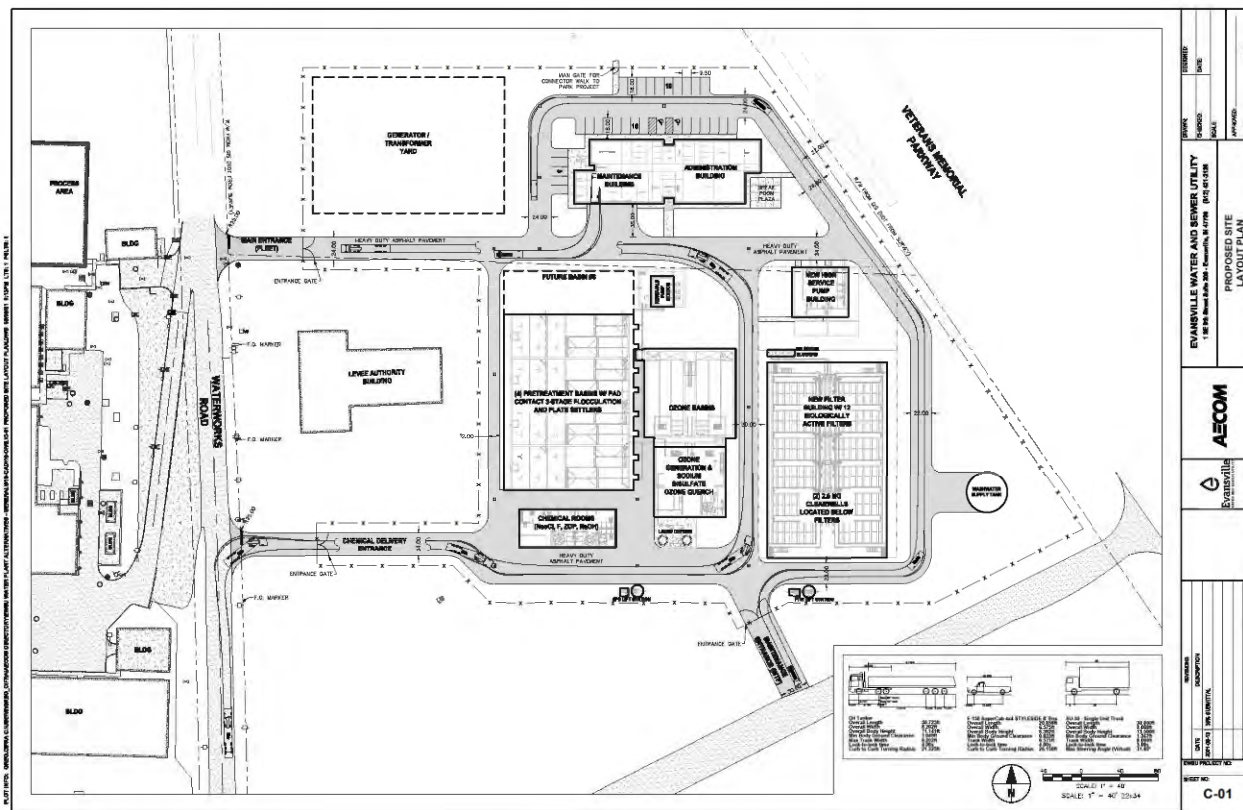
# Attachment B - Scope of Services

## Evansville Water and Sewer Utility – New Water Treatment Plant

### Phase 2: Final Design Services

#### Project Understanding

AECOM (Consultant) completed the Water Treatment Plant Advanced Facility Plan for the Evansville Water and Sewer Utility (EWSU, Owner) as part of the previous Phase 1 Services. The Advanced Facility Plan concluded that a new 50 MGD water treatment plant (WTP) be developed on a site adjacent to the existing WTP on the east side of Waterworks Road. The new facility will be constructed in place of the existing street department maintenance facility. The proposed plant will use a limited amount of existing infrastructure of the current plant, including the raw water intake and potentially a portion of the existing south plant and/or outfall to the Ohio River depending on the residual requirements. The majority of the new plant infrastructure will be new and use 100% surface water from the Ohio River as its source. As part of the Phase 1 services, plans were prepared to approximately 30% design level and the plant layout associated with that effort is shown below.



This phase of project services will produce project documents for the proposed Water Treatment Plant. The anticipated construction delivery model is a Guaranteed Savings Approach. Selection of the construction contractor is part of these services.

Design documents will include the following elements as applicable: Civil, Process, Architectural, Structural, Plumbing, HVAC, Electrical, and Instrumentation. Each discipline set shall be complete as to plans and specifications. Design will be developed using the most recent version of the Indiana Building Code, Indiana

Department of Environmental Management (IDEM), Vanderburgh / Evansville Zoning, and other applicable regulatory agencies.

## **Task 1 Detailed Design and Project Management**

### **1. General Requirements**

- a. Provide detailed design for a 50 MGD capacity surface water treatment facility having the treatment scheme as defined by the results of the previous 30% design project.
- b. The Treatment Facility will be fully automated with redundancy in the controls and networking system. Treatment equipment motors and valves will retain the ability to be operated manually with local panels.
- c. The treatment facility will be designed to accommodate future expansion as much as practicable given site conditions at the project site.
- d. Architectural concept will be further refined with EWSU and the City / community to meet the desired aesthetics of the area and allow regulated public use while retaining security.
- e. AECOM will utilize e-builder as the file management system for all major deliverables, meeting agendas and minutes, reports and technical memos, cost estimates, correspondence and letters, permit applications, and other relevant project documentation. All formal design documents and reports will be the property of EWSU and archived in e-builder.

### **2. Address value engineering items**

- a. The end of the phase 1 services included a value engineering (VE) workshop to identify strategies for cost savings. A subsequent meeting was held with EWSU and AECOM to identify key VE ideas to be considered for inclusion in the Phase 2 design. VE items that have been mutually agreed upon between OWNER and AECOM will be finalized in the Phase 2 design and included in the 60% deliverable. Major VE design concepts to be further considered for inclusion in this phase of design are as follows:
  - 1) Raise the hydraulic profile of the treatment facility.
  - 2) Utilize more common wall construction for treatment basins.
  - 3) Switch locations of the pretreatment basin with the clearwell / filter building.
  - 4) Switch from potassium permanganate to liquid sodium permanganate at the river intake onshore facility.
  - 5) Replace pretreatment rapid mix equipment with side-stream injection of coagulant.
  - 6) Consider increasing the loading rate of plate settlers and filters at the 50 MGD capacity.

### **3. Design workshops**

- a. Workshops will be held throughout the design to refine various components of the plant. It is assumed a total of four (4) in-person workshops, each one-day long will be conducted during the design. The topics of workshops will be selected as design progresses with potential topics as follows:
  - 1) Final site layout including location of access drives, buried utilities, and other structures.
  - 2) Architectural / Structural concepts for the treatment and administration buildings.
  - 3) Treatment equipment and feature selection for the unit processes.
  - 4) Electrical systems including backup power strategies.

- 5) Instrumentation and controls, SCADA system architecture, site security, and cybersecurity.
  - 6) Regulatory requirements and permitting needs.
  - 7) Construction sequencing and plant commissioning strategy.
  - 8) Review and walkthrough of 3D models.
  - 9) Review of previous design submittals.
  - 10) Additional Value Engineering Concepts.
- b. AECOM will document workshop results in memos to all affected parties. Decisions made in the workshop will be incorporated into the design.
4. Basic contract document preparation
- a. Design general, civil, process, architectural, structural, HVAC, plumbing, electrical, and instrumentation / control aspects for the project and provide detailed plans and specifications.
  - b. The design documents will incorporate all applicable EWSU standards including:
    - 1) Drawings will utilize the EWSU CAD Template(s) as the basis for CAD Standards.
    - 2) All EWSU Standard Details for Water and Sewer will be included as applicable to the components of the project.
    - 3) All EWSU Front End and Technical Specifications for Water and Sewer will be included as applicable to the components of the project.
    - 4) Tagging of Equipment and Utilities will follow the EWSU Asset Management Tagging system.
  - c. Submit interim progress sets to EWSU at the 60% and 90% milestones.
    - 1) Following each submittal, AECOM will conduct a review meeting with EWSU to walk through plans and receive commentary. Comments received by EWSU will be incorporated in the subsequent design submittal.
    - 2) EWSU may distribute such submittals to project stakeholders at their discretion (such as FM Global for coordination with safety and insurance requirements). Any such commentary approved by EWSU will be incorporated in the subsequent design submittal.
  - d. 100% Documents will be submitted to EWSU for final review with Opinion of Probable Construction Cost. AECOM will address any such final EWSU comments prior to releasing the project for construction pricing.
5. Investigate and coordinate with utility providers (electric, natural gas, telephone, internet, etc.) regarding service for the new facility.
6. Construction cost estimates
- a. Preliminary estimates as needed for workshops and meetings.
  - b. Detailed quantity take-off and construction cost estimate at 60 percent, 90 percent and final.
7. Plans and specifications submittals
- a. Prepare a Project Manual to include general and technical specifications. EWSU Standard Specifications will be utilized as applicable to the project. Special forms to be used in conjunction with funding agency requirements and State of Indiana shall be included in the Project Manual.



- b. Prepare project drawings as 22" x 34" plan sets containing detailed design of the improvements to be performed by the contractor. Native CADD / Revit files will be provided to EWSU upon request. CAD drawings will use EWSU Template(s) for standards.
  - c. Formal submittals to EWSU for review at 60 percent, 90 percent, and final stage.
8. Overall project management duties will include:
- a. Maintaining an outline/listing of anticipated plan sheets and specifications
  - b. Delineation of workload responsibility by team members and sub-consultants
  - c. Maintaining a project schedule with progress milestones, anticipated workshops, and meetings
  - d. Holding meetings with OWNER including formal progress meetings and informal meetings as required. It is assumed that one formal progress meeting will be held each month and informal meetings will be held as needed to address topics as they arise.
  - e. Implementing quality assurance/quality control of design
9. Field Investigations to be conducted following removal of the existing maintenance building:
- a. Land Surveying Services
    - 1) A topographic survey of the proposed access road and site will be performed to include all aboveground features and utilities.
    - 2) Utilities Owners and locate services shall be contacted to mark all underground utilities so they may be located by the survey.
    - 3) All property line boundaries will be surveyed within the project limits.
    - 4) All survey work shall be performed utilizing NAVD88 Datum.
    - 5) A TIN shall be created for the site.
  - b. Geotechnical Services
    - 1) Contact Indiana Underground Utility Protection Services to locate underground utilities at the test boring locations. Fees for a private utility locate have not been included.
    - 2) Perform soil borings and testing as needed within the project limits. A total of 30 soil borings ranging from 20 to 115 feet are assumed, resulting in total lineal drilling footage of 1,425 feet.
    - 3) Field and laboratory testing in accordance with ASTM specifications. Identify characteristics of subsurface conditions including soil classification(s), depth to groundwater table, and other pertinent soil characteristics including porosity, Atterberg limits, and grain size distribution.
    - 4) Develop a geotechnical report based on the findings of the soil borings and testing to document structural and foundation design requirements including allowable bearing pressures, types of foundations, estimated settlement, and other specialized subsurface recommendations.
  - c. Environmental and Hazard Assessment
    - 1) Perform Phase-1 Environmental investigation of the proposed maintenance building facility (location of new WTP) to assess the risk of contaminated soils or groundwater, presence of fuel storage tanks, etc. Produce a findings report identifying such risks and stating suitability of use of the property and/or means to address issues, if present.

## 10. Site Utility and Civil Design

- a. Provide site design of the proposed project construction including:
  - 1) Construction layout location of all structures, roadways, vaults, and other site features,
  - 2) Alignment of buried site utilities. Plan and profile drawings will be developed for larger diameter water, storm, and sanitary sewers.
  - 3) Grading and paving plans and details, including stormwater system design.
  - 4) Landscaping plans and details.
  - 5) Site lighting design.
  - 6) Site fencing and access gate design.
  - 7) Cut and fill analysis.
  - 8) Means of vehicle ingress and egress including a Truck-Turn analysis.
  - 9) Coordination with other site utilities design such as electric and communications, natural gas, and plumbing.
  - 10) Site clearing and demolition if needed.
  - 11) Standard civil details including EWSU standard details.
- b. Provide design of the raw water transmission mains between the existing intake and the new plant site including plan and profile sheet(s).
- c. Provide design of the finished water transmission mains between the new high service pump station and tie-in locations at existing waterlines including plan and profile sheet(s).
- d. Storm Water Management: A storm water management report detailing the requirements for storm water quality and quantity will be prepared in accordance with EWSU and IDEM requirements.

## 11. Treatment Process Design

- a. Prepare process design, including reasonable and customary design features for a 50 MGD surface water treatment plant as developed in the Phase 1 services. The treatment processes include the following:
  - 1) Rehabilitation of the river intake including:
    - a) Demolition and replacement of existing coarse screening systems including washing equipment and electrical and controls systems.
    - b) Demolition and replacement of vertical turbine pumping including new variable frequency drives, electrical components, and controls.
    - c) Miscellaneous rehabilitation and improvements to process equipment including valves and piping, plumbing and sump pump areas, HVAC system, and building architectural components.
  - 2) New structure and ancillary equipment near the intake to house the following:
    - a) Storage and feed system for an oxidizing chemical (sodium permanganate or potassium permanganate), fed to the intake screens for zebra mussel control.
    - b) Storage and feed system for powder activated carbon. System to be a silo type storage system with wetting cone and eductors.
    - c) Valve vault for injection of powder activated carbon and monitoring of raw water flow.
    - d) Electrical system for the intake pump station.

- e) Related site work including access road to the new structure.
- 3) New Conventional pre-treatment structure featuring:
- a) Influent flow splitting and control.
  - b) Coagulant mixing.
  - c) Multi-stage flocculation with vertical mixers having VFD control.
  - d) Sedimentation using plate settlers.
  - e) Sedimentation sludge removal system.
  - f) AECOM will test for the presence of any dissolved manganese (currently believed to be in precipitant form in the River) and identify any need to address this in the pretreatment system if detected.
- 4) New ozone facility featuring:
- a) Space to accommodate the storage and supply of liquid oxygen.
  - b) Oxygen vaporizers to supply gaseous oxygen to ozone generators,
  - c) Oxygen conditioning equipment which may include temperature monitors and trim heaters, nitrogen boost system, pre-filters, and pressure regulation.
  - d) Ozone generation equipment,
  - e) Ozone generator cooling systems,
  - f) Side stream injection of ozone solution,
  - g) Rectangular ozone contact basins with baffling, means of sampling, and means of basin access.
  - h) Ozone quenching chemical feed and storage system.
  - i) Ozone off-gas monitoring and destruct equipment.
  - j) AECOM will perform supplemental ozone dosage and transfer / decay testing to refine the anticipated ozone dosage.
- 5) New biologically active filtration featuring:
- a) Media-retaining under-drains,
  - b) Sand and GAC filter media,
  - c) Backwash collection troughs,
  - d) Air scour system,
  - e) Piping and valve gallery,
  - f) Filter-to-waste process,
  - g) Backwash supply holding tank.
- 6) New dual compartment and baffled clearwell for final disinfection and finished water storage located beneath the filter building.
- 7) New High service pumping station building constructed on top of the clearwell featuring:
- a) Vertical turbine high service pumps with VFD control,
  - b) Finished flow and pressure monitoring,
  - c) Suction well in clearwell below which can be isolated.
  - d) Finished water conveyance to the existing distribution piping.

- 8) New Chemical feed facilities not listed previously above including the following:
    - a) Coagulant fed to the pretreatment basins.
    - b) Liquid sodium hypochlorite used for disinfection and fed to clearwell inlet, raw water (emergency feed) and post-clearwell (emergency feed).
    - c) Sodium hydroxide for pH adjustment fed to clearwell inlet.
    - d) Hydrofluosilicic acid for fluoridation of finished water fed to clearwell inlet.
    - e) Sodium bisulfite fed ahead of the filters for ozone quench, fed to the backwash supply piping for backwash de-chlorination, and fed to the residuals system for process waste de-chlorination.
    - f) Ammonia for formation of chloramines fed to the high service pump discharge. Special provisions for the control and monitoring of ammonia feed to maintain a chlorine residual will be provided in the design. An auxiliary feed point for ammonia will be provided at the inlet of the clearwell and can be used when ozone is able to meet CT requirements in the contact basin.
    - g) Space and provisions for future chemical feed in the new chemical building. This space for the spare chemical would likely be used for corrosion inhibitor, which is to be determined in the corrosion control study.
    - h) A desktop corrosion control study will be performed to assess finished water quality parameters specific to corrosion and the Lead and Copper Rule. The US EPA "Optimal Corrosion Control Treatment Evaluation Technical Recommendations", latest edition, will be used as the basis of this corrosion control study. As part of the study, anticipated dosages for all chemicals will be identified.
  - 9) Disposal of treatment residuals generated from pretreatment sludge, filter backwash waste, filter-to-waste, raw water screen cleaning, and process tank drains.
    - a) The base scope of services includes a residual disposal system consistent with the Phase 1 design. This includes disposal of all liquid waste to the Ohio River by means of a submersible pump station with flow monitoring without any major treatment processes. Coordination with Army Corps of Engineers and/or Levee Authority is anticipated for the new residuals discharge pipe.
    - b) Design a new residuals treatment and dewatering facility to address mercury and suspended solids is not included in this scope of services.
  - b. Process design documents are anticipated to include the following:
    - 1) General Process Details including process pipe wall and floor penetrations, pipe hanger and support details, pipe tapping details, and equipment schedules.
    - 2) Process schematics for the overall treatment system and a basis of design summary.
    - 3) Hydraulic profiles identifying the elevations of structures, water surface elevations and varying treatment flow rates, and floodplain information.
    - 4) Plan, section, and detail drawings of process-related equipment and piping throughout the treatment facility.
12. Architectural Design
- a. Advance the basis of design report to provide a refined outline of the general framework for the architectural design of the WTP. The design approach, materials of construction, design criteria, building code requirements and energy code design criteria will be established.

- b. Develop exterior concept plans and elevation sketches of the WTP buildings to show the architectural features and the interface details between buildings on the plant campus and surrounding areas.
- c. Prepare a Building Code Study to establish the building design requirements to comply with the applicable local and state building codes. Establish the Occupancy Classification, Construction Type, Area and Height Limitations, Occupancy Separations, Fire Resistive and Material Construction Type, Automatic Sprinkler System, Fire Alarm and Detection Systems, Fire and Smoke Dampers, and Interior Finish Limitations for each building.
- d. Prepare a Building Code Chart drawing to summarize the results of the Building Code Study to be used by building code officials in the review of the contract documents. General notes, abbreviations and architectural symbols shall be included on the drawing.
- e. Prepare Code Compliance Plan drawings to show the direction, distance and egress path to code compliant exits. Room area, occupant load and load factors, resistance ratings, and fire extinguishers shall also be included on the drawings.
- f. Submit required documents to City Planning Department for Planning Commission approval.
- g. Prepare design to show the floor and roof plans, including the exterior elevations and building sections.
- h. Prepare design drawings and specifications to show the detailed wall sections, materials of construction, door and window schedules, door hardware selection, and ancillary architectural components including typical handrail and railing details.

### 13. Structural Design

- a. Advance the basis of design report to refine the general framework for the design of all structures in the project. The design approach, materials of construction, design criteria, building code requirements and seismic design criteria shall be established.
- b. Coordinate with the geotechnical recommendations to facilitate proper design of the building foundations and other subsurface structures.
- c. Prepare a drawing to summarize the results of the structural design criteria, outlining the design load data required by the Building Code to be shown on the contract documents, including the structural general notes, abbreviations, reinforcing bar lap, splice table and structural symbols.
- d. Prepare drawings to show the typical reinforced concrete details, including the details at openings, wall intersections, stairs, beams and supports for all pipes and equipment.
- e. Prepare design drawings to show the foundation and slab plans with sections and details as required for concrete thickness and reinforcing requirements.
- f. Prepare design drawings to show the building wall sections and details for the concrete thickness and reinforcing requirements, steel member design, column schedules, and related structural details.

### 14. HVAC Design

- a. For each building, outline in detail the general framework for design of the heating, ventilation and air conditioning (HVAC) systems for the project. The design approach, materials of construction, systems and equipment, ventilation rates, and basic controls approach shall be outlined. Tables shall be included to summarize the materials of construction for each area of the buildings, the atmosphere, basic equipment type and materials of construction for the equipment and ductwork. Include tables for the outdoor design criteria and mechanical system criteria. Miscellaneous design criteria for louver and ductwork sizing as well as a listing of the applicable codes and standards shall also be included.

- b. Prepare a drawing to summarize in table form the corrosion and non-corrosion areas of the WTP, including the HVAC general notes, abbreviations, legend, and HVAC symbols.
- c. Prepare drawings that show the typical HVAC mounting and support details for exhaust fans, HVAC units, unit heaters, and fire damper details, standard details on ductwork elbow and turning vanes, support details for ductwork and all other details which will be determined in the design work.
- d. Prepare drawings to provide schedules for all HVAC equipment, including but limited to, electric unit heaters, fans, H&V units, AC units, grill and registers, coils, condenser and diffusers.
- e. Prepare design drawings for ductwork and equipment plans in the WTP.
- f. Prepare schematic drawings and system control narratives for HVAC systems where appropriate.
- g. Prepare design drawings to show sections through the equipment and ductwork plans in the buildings. Details shall be provided as required to clarify in detail the HVAC work.
- h. Prepare design drawings to show the air flow and control schematics for each room where the HVAC system is provided.

#### 15. Plumbing and Fire Protection Design

- a. For each building, outline the general framework for the design of the Plumbing and Fire Protection systems for the project. The design approach, materials of construction, systems and equipment, for the potable water, sanitary drainage, and fire suppression shall be included. The design criteria for each of the systems shall be summarized. A listing of the applicable codes and standards shall also be provided.
- b. Prepare drawings for the typical plumbing details for emergency eyewash(es) / shower(s), backflow preventer, simplex and duplex pumps if required, water heaters, and tepid water mixing valve. Include details for the pipe penetrations through the wall and floor with details for support and closure. A fixture and equipment schedule shall be provided for each plumbing fixture with minimal required pipe sizes.
- c. Prepare design drawings to show the piping and accessories in the plan for each of the buildings and rooms. Enlarged plans shall be provided as required to clarify in detail the plumbing work.
- d. Prepare plumbing stack diagrams.
- e. Prepare fire protection drawings to show in the plan the area of the WTP required to be provided with a fire protection system. A table shall be provided to outline the sprinkler design criteria for each of the rooms within the buildings. The table shall specify the sprinkler head type, occupancy classification, density (gpm/sf), temperature rating, maximum sprinkler coverage, and corrosive area.

#### 16. Electrical Design

- a. Prepare the detailed design of the electrical systems and electrical components associated with the WTP including all Motor Control Centers, panel boards, and lighting sufficient for the area's activity but still compliant with energy codes.
- b. Prepare one-line diagrams.
- c. Prepare an electrical site plan(s) identifying incoming service, location of back-up power, location of transformers and other exterior features, alignment of buried and overhead electrical feeders, location of pull-boxes, and other pertinent information.
- d. Prepare grounding and lightning protection plans and details.
- e. Provide design of the back-up power system.

- f. Prepare electrical control diagrams for equipment associated with the project as necessary.
- g. Prepare load calculations, panel board schedules, riser diagrams, and MCC elevation drawings.
- h. Prepare power and lighting plans for each area of the project indicating the location of equipment requiring power, receptacles and light switches, panel boards, MCCs, control panels, and indication of conduit alignment.
- i. Provide conduit and wiring schedules.
- j. Provide electrical power system study and coordinate with electrical utility for service requirements.
- k. The Power Factor utilized as the basis of design shall be between 0.95 and 1.
- l. Coordinate with the EWSU IT Contractor during design to provide appropriate provisions for equipment needed for internal networking (equipment to be installed by the IT Contractor). This would include adequate and designated space for network cabinets, WI-FI routers and boosters, data ports, backup power supplies, spare conduit for networking and power cabling terminated at necessary locations, etc.
- m. The electrical specifications will include EWSU's standard section "Identification for Electrical Systems" to set the proper identification system used by the installing electrical contractor.

#### 17. Instrumentation Design

- a. Provide specifications and relevant system architecture drawings to identify a complete and functioning SCADA system for control and monitoring of the treatment plant. The complete plant SCADA system hardware and software will be provided by a system integrator.
- b. Develop process and instrumentation diagrams (P&IDs) identifying process schematics and equipment, instrumentation
- c. Develop a control strategy document describing manual and automatic operation of plant systems along with local and central plant Human-Machine Interface (HMI) operation.
- d. Prepare control system architecture drawings identifying networks and PLCs included in the project along with local HMIs and operator workstations.
- e. Plant Control System specifications and P&IDs will describe the requirements for integration of PLCs, instruments, manufacturer control panels, and plant equipment. The system will consist of a combination of networks and hard-wired points to integrate plant equipment into the master control system. All such PLCs, instruments, and control panels will be provided by the System Integrator.
- f. Prepare general arrangement drawings and elevation views of control panel layouts, including general panel dimensions and location of screens, switches, and buttons to be utilized by the system integrator when manufacturing panels.
- g. Prepare an I/O list for plant PLCs including the function of digital and analog signals.
- h. Perform the preliminary selection of instruments and prepare an instrumentation schedule including ranges associated with the limits of the 4-20 mA output or information available via control network interfaces on instruments and plant equipment
- i. Contribute to specifications for manufactured process equipment (e.g., ozone generator system) to define control equipment and the interface to plant control system.
- j. Support any integrator prequalification process as needed.

#### 18. Electronic Safety and Security

- a. AECOM will coordinate with EWSU to provide the desired level of site security. Such provisions may include, but are not necessarily limited to:
  - 1) Site fencing and access gate features.
  - 2) Security cameras at building interior and exterior areas with monitoring systems.
  - 3) Site and building lighting and motion sensors.
  - 4) Door access and security specifics including use of key fobs and proximity sensors, restricted access to certain areas, logging of personnel who access facilities, intrusion alarms, etc.
  - 5) Monitoring of the fire protection systems or other hazardous condition alarms.
  - 6) Cybersecurity provisions to be coordinated with the EWSU IT Contractor.

AECOM's services under the Detailed Design Phase will be considered complete on the date that the "revised" 100% submittal is provided. The "revised" 100% submittal will include any final comments received by EWSU and their stakeholders on the previous 100% design submittal.

## **DELIVERABLES**

For the 60% and 90%, and 100% milestones, electronic copies of the project plans and specification in PDF format will be provided. Native files in CAD/Revit for drawings and Word for specifications can be provided upon request. The 60% submittal will be limited specifications. The 100% deliverable will include up to three full size sets of plans and specifications if desired by EWSU. AECOM will provide project documents to the selected Contractor as needed.

## **Task 2 Permitting**

AECOM will assist EWSU to prepare and submit all required permit applications (fees to be paid by the Owner) for the Water Treatment Plant. The permits will be further established during design, but a preliminary list of permits may include the following:

- a. IDEM - Division of Drinking Water Plan Review (submitted between 60 and 90% design submittals)
- b. NPDES Permit (submitted between 60 and 90% submittals)
- c. Stormwater Pollution Prevention Plan (submitted with the 100% submittal)
- d. IDEM drinking water laboratory certification permit (submitted with 100% submittal)
- e. Building Permits (submitted with 100% submittal)
- f. Plan Approval and coordination with Vanderburgh County Area Plan Commission
- g. Applicable Vanderburgh County and City of Evansville Zoning Permits (submitted with 100% submittal)
- h. Applicable site-related permits to be determined based on limits of work, but may include Indiana State Historic Preservation, National Wetland Permit, Army Corps of Engineers, and the Department of Natural Resources. (submitted as needed for permit with anticipated time of between 60 and 90% submittals)

The consultant shall revise detailed construction plans, specifications and estimates of cost to obtain approval from all jurisdictions as required above.



## **DELIVERABLE**

AECOM will provide all necessary drawings, specifications, and permit applications to the appropriate regulatory agency. Permit fees associated with regulatory review shall be paid by EWSU.

### **Task 3 Contractor Procurement**

AECOM will assist EWSU in the prequalification process and selection of a construction contractor to build the proposed treatment plant using a Guaranteed Savings alternative delivery approach. If EWSU is not able to accept or reach an agreement with the contractor on the final maximum price for construction, AECOM will assist EWSU with traditional bidding services to select a contractor. Tasks related to this activity include the following:

1. Assist EWSU with developing a Request for Qualifications (RFQ) for a guaranteed savings/maximum price document to distribute to contractors. This RFQ process will commence at start of these Phase 2 Services using 30% design documents.
2. Assist EWSU with evaluating the Statement of Qualifications (SOQ) received from contractors. Services may include reviewing SOQs, checking project references, ranking SOQs based on pre-determined scoring criteria, and attending teleconference meetings with contractors.
3. Attending interviews with contractors.
4. Assist EWSU in reviewing and evaluating the selected Contractor's guaranteed savings and maximum price proposal and assist with any discussion/negotiations with the Contractor.
5. Contractor will be selected and retained during the 30-60% design phase to perform constructability reviews and offer value engineering ideas. AECOM will coordinate with the selected contractor to adjust the design to address constructability issues and Value Engineering ideas approved by EWSU.
6. 60% Documents will be utilized to lock in the selected Contractor's Guaranteed Maximum Price.
7. Equipment Procurement for long-lead items may begin following the Guaranteed Maximum Price. AECOM will work with the Contractor during this process to identify such equipment and produce the necessary drawings and specifications to bid the equipment.
8. If EWSU chooses to proceed with the selected Contractor based upon the proposed guaranteed savings/maximum price, assist EWSU with finalizing a guaranteed savings/maximum price agreement with the Contractor.
9. If EWSU chooses not to accept and proceed with the Contractor under a guaranteed savings/maximum price approach, assist EWSU with developing bid documents to distribute to contractors and evaluating bid package proposals from contractors.

### **Task 4 Planning Street Maintenance Building Demolition**

AECOM will develop documents to identify the work required to demolish the existing maintenance building where the new WTP is to be constructed. All such demolition work described in the documents will be performed by a Contractor and is not part of AECOM services. AECOM services will include:

1. Gathering of existing building and site information including building construction type, hazard assessments, materials and equipment to be removed, and extent of required demolition.
2. Develop demolition plans and specifications identifying limits of demolition, allowable and unallowable demolition activities, any equipment or materials to be retained and returned to the Owner, and general contract agreement requirements.

3. Assist EWSU with retaining a demolition contractor, which may be bid separately or performed as part of the Contractor performed WTP construction scope of services.

### **Task 5 Planning Old Water Treatment Plant Decommissioning**

Once construction of the new plant is complete and the facility is fully operational, decommissioning of the existing facility can commence. This tasks includes planning of existing plant decommissioning and involves the following tasks:

1. Conduct hazardous materials surveys and identify such material quantities and means of remediation and removal.
2. Identify on plans extents of buried structures including overall dimensions, materials of construction, and depth required for removal.
3. Create demolition plans and specifications showing details including complete removal of structures and / or partial removal of top slabs and walls with controlled backfill placement. Demolition sequencing plans can be included if needed. Extent of demolition to be determined based on ultimate land use and whether or not the existing south plant is to be used as a dewatering facility.
4. Identify the location and approximate depth of any onsite utilities and means of abandonment, removal or relocation.
5. Identify any existing equipment such as pumps, motors, furniture, lab equipment, computers, valves and actuators, instrumentation, etc. to be retained and returned to EWSU as part of the demolition.
6. Create site restoration plans including landscaping, site drainage and grading, or other site improvements as warranted by the ultimate land use.

### **ADDITIONAL SERVICES NOT INCLUDED**

**Additional Services Not Otherwise Provided for in this Agreement:** If authorized in writing by EWSU, AECOM shall furnish or obtain services from others. These services will be paid using the AECOM standard hourly rates, given in Attachment A. Other future services which may be performed as a separate contract and not included in this scope include the following:

1. **Residuals Dewatering:** The base scope of services includes disposal of all process waste residuals to the Ohio River. A dewatering facility may be required if TSS limits are in the new plant NPDES permit and the current mercury variance is unable to be renewed. Design of such a dewatering facility is not included in these services. A conceptual design of the new dewatering facility was included in the phase 1 services which is anticipated to include the following:
  - a. Participation in discussions with state and/or federal regulators regarding proposed TSS and mercury NPDES permit limits.
  - b. Additional assessment of mercury levels and impacts of plant processes on mercury composition in solids and liquid streams in the plant and development of treatment processes to reduce mercury levels to acceptable limits.
  - c. Recycling of backwash waste and filter-to-waste processes to the head of the plant in accordance with the Federal Backwash Recycle Rule.
  - d. Conveyance of pre-treatment sludge to the new dewatering facility via pump station and forcemain.
  - e. Partial re-use and repurposing of the existing south water treatment plant clarifier basins for new sludge thickeners. Improvements may include replacement of clarifier mechanisms and/or walkways and renovation of the sludge pumping station and piping.

- f. Thickened sludge storage tank with mixing system.
  - g. Thickened sludge transfer pumps to dewatering equipment.
  - h. Polymer storage, activation, and feed system.
  - i. Sludge dewatering equipment: Assumed to be centrifuges but an alternative technology can be utilized if desired by EWSU.
  - j. Transfer of dewatering sludge to storage and disposal areas.
  - k. Dewatering sludge storage and load-out area with truck access capabilities.
  - l. Site civil design of the dewatering facility including site utilities, access drives, fencing, site lighting, grading and drainage, stormwater management, and related infrastructure.
  - m. Architectural, structural, HVAC, plumbing, electrical, and I&C design for the complete dewatering system including a new dewatering building.
- 2. Engineering Services During Construction:** This scope of services does not include engineering services during construction. Such services may include, but are not limited to: Attending pre-construction and construction progress meetings; reviewing and approving contractor pay requests and changer orders; assisting EWSU with construction loan payment processing; reviewing contractor schedules; issuing field orders; issuing requests for pricing proposals; responding to contractor requests for information; providing resident project representation and inspection services; performing materials testing; performing contract closeout procedures; assisting with startup and commissioning of the new facility; attending equipment startup and factory witness tests; conducting water quality testing at the new facility; developing as-built drawings; and producing an operations and maintenance manual or standard operating procedure documents.

## PROJECT SCHEDULE

The proposed project schedule for the tasks described in this scope is attached at the end of this document.

## EWSU RESPONSIBILITIES

- EWSU shall designate a representative authorized, designated as the Project Manager, to act in its behalf with respect to general engineering services requested of AECOM. All direction and authorization shall be by or through such representative.
- If EWSU deems that auditing, legal, accounting, and insurance counseling services may be necessary for the Project, such services shall be furnished by EWSU.
- EWSU shall furnish any required information and services, review all submitted documents, and render decisions pertaining thereto as in a timely manner as necessary for the orderly progress of the Work.
- EWSU shall provide AECOM access to enter upon public and private land as required for the performance of the Work.
- EWSU will require any Contractor or Subcontractors performing work in connection with the Drawings and Specifications to hold harmless, indemnify and defend, EWSU and AECOM, their consultants, and each of their officers, agents, and employees from any and all liability claims, losses or damage arising out of or alleged to arise from the Contractor's (or Subcontractor's ) negligence in the performance of the Work described in the Contract Documents, but not including liability that may be due to the negligence of EWSU, AECOM, their consultants or their officers, agents and employees.

- In the event that AECOM is requested by EWSU or is required by subpoena to produce documents or give testimony in any action or proceeding to which EWSU is a party and AECOM is not a party, EWSU shall pay AECOM for any time and expenses required in connection therewith, including reasonable attorney's fees.
- EWSU shall notify AECOM of any potential hazardous substances or other health and safety hazard or condition known to EWSU existing on or near the project site.
- EWSU shall pay for the fees for all required permits and approvals to construct the Project.

Evansville Water and Sewer Utility - New Water Treatment Plant  
Phase 2 Design Services Project Schedule

Task Name	Duration	Start	Finish	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2023 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Notice to Proceed	0 days	Mon 5/2/22	Mon 5/2/22			◆ 5/2															
Contractor Procurement	60 days	Mon 5/2/22	Fri 7/22/22																		
<b>60% Design</b>	<b>166 days</b>	<b>Mon 5/2/22</b>	<b>Mon 12/19/22</b>																		
Prepare 60% Design	110 days	Mon 5/2/22	Fri 9/30/22																		
Workshop 1	0 days	Thu 6/30/22	Thu 6/30/22																		
Workshop 2	0 days	Wed 8/31/22	Wed 8/31/22																		
Submit 60% Design to EWSU	0 days	Fri 9/30/22	Fri 9/30/22																		
EWSU Review/Comment	10 days	Mon 10/3/22	Fri 10/14/22																		
EWSU Submit 60% Design Comments	0 days	Mon 10/17/22	Mon 10/17/22																		
Contractor Pricing / GMP Pricing and Review	45 days	Tue 10/18/22	Mon 12/19/22																		
<b>90% Design</b>	<b>96 days</b>	<b>Tue 10/18/22</b>	<b>Tue 2/28/23</b>																		
Prepare 90% Design	85 days	Tue 10/18/22	Mon 2/13/23																		
Workshop 3	0 days	Fri 12/16/22	Fri 12/16/22																		
Regulatory Permitting	85 days	Tue 10/18/22	Mon 2/13/23																		
Submit 90% Design to EWSU	0 days	Mon 2/13/23	Mon 2/13/23																		
EWSU Review/Comment	10 days	Tue 2/14/23	Mon 2/27/23																		
EWSU Submit 90% Design Comments	0 days	Tue 2/28/23	Tue 2/28/23																		
<b>100% Design Submittal</b>	<b>89 days</b>	<b>Wed 3/1/23</b>	<b>Mon 7/3/23</b>																		
Prepare Draft 100% Design	60 days	Wed 3/1/23	Tue 5/23/23																		
Workshop 4	0 days	Fri 4/21/23	Fri 4/21/23																		
Prepare/Submit Building Permit Application	10 days	Wed 5/10/23	Tue 5/23/23																		
Submit Draft 100% Design to EWSU	0 days	Tue 5/23/23	Tue 5/23/23																		
EWSU Review/Comment	5 days	Wed 5/24/23	Tue 5/30/23																		
EWSU Submit Draft 100% Design Comments	0 days	Wed 5/31/23	Wed 5/31/23																		
Prepare Final 100% Design, Align Funding, Prepare for Bidding or Construction	22 days	Thu 6/1/23	Fri 6/30/23																		
Submit Final 100% Design	0 days	Mon 7/3/23	Mon 7/3/23																		◆ 7/3
<b>If Necessary, Bidding Services</b>	<b>0 days</b>	<b>Mon 7/3/23</b>	<b>Mon 7/3/23</b>																		◆ 7/3
Ready for Bid	0 days	Mon 7/3/23	Mon 7/3/23																		◆ 7/3

Task 

Milestone 

Summary 