APPENDIX E:
VALIDATION REPORT

2023 – 2027

GLWA
Great Lakes Water Authority

CIP Delivery Program Management Team
27777 Franklin Road, Suite 2000
Southfield, MI 48034
248 204 5900

Technical Memorandum

Subject: GLWA CIP Validation – 111012

Project

This technical memorandum relates to the following project:

- CIP No. 111012 – Lake Huron Water Treatment Plant Flocculation Improvements

Status/Classification

CIP No. 111012 is classified as Active – Pre-Procurement – Design in the 2022-2026 Board Approved CIP.

This project is currently in the late stage of Procurement for Engineering Services for design of the improvements included in this project.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- RFP for Design Services (RFP 2004549), and associated reference material included with the RFP on GLWA Bonfire
- Discussion with Project Manager (Eric Kramp)

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

This project is currently about to begin design with an engineering consultant. One of the initial tasks for the Engineer is to perform a Study that will evaluate current technology and recommend preferred alternatives to achieve the goals of the project (Flocculation, Rapid Mix, and other miscellaneous improvements). Therefore, the scope is currently broadly defined and final scope of the project will be determined during the Design phase.

For purposes of validation of the project and cost estimation, it was necessary to make an assumption on the scope of the project. Based on discussions with the Project Manager, it was assumed that the project would involve direct replacement of the existing equipment and technologies.

Cost Validation

As part of the validation effort, the AECOM team developed a construction cost estimate with the details in Appendix A at the end of this memorandum.

CIP No.	Project Description	CIP Project Cost (Construction Only)	Validated Cost (Construction cost only)	Variance from Approved Budget
111012	Lake Huron WTP Flocculation Improvements	$24,097,000 (from 2022-2026 Board Approved CIP)	$42,985,760	$18,888,760 (78%)

The validated construction cost estimate was based on the project scope as defined in the RFP for design services and includes the following assumptions and exclusions:

Assumptions

- Construction will involve straight replacement of the flocculators and rapid mixers in-kind.
- The estimate assumes a construction start date of 1/2/2024
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner. This cost is included in the Construction Management line item.

Exclusions

- All scope outside what is stated in the estimate.
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
- Assessments, finance, legal and development charges
- Builder's risk, project wrap-up and other owner provided insurance program
- Modification to the scope of work since the date of the design documents outlined in this report
- Unforeseen subsurface conditions
- Restrictive technical specifications or excessive contract conditions
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule
- Land acquisition and real estate fees
- Owner's field inspection costs
- Off-site work
- Owner contingency
- Hazardous material abatement other than what is included in the detailed portion of the estimate
- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

Construction on this project is not anticipated to begin until early 2024, and therefore we do not anticipate any significant impact from the current market volatility.

Schedule Validation

The 2022-2026 Board Approved CIP shows the project advancing as follows:

- Design start 9/1/2021
- Construction start 4/1/2024
- Construction end 6/30/2028

In our review of the scope of work items, we observed that this project includes significant improvements to the treatment processes/equipment at Lake Huron WTP. There will be a need for coordination construction schedules with the plant operations staff in order to maintain treatment capacity at the plant throughout the duration of the project. Some of the construction activities will be prohibited during peak demand periods. Therefore, we foresee the following breakdown for the construction schedule:

- Mobilization – 3 Months
- Construction – 42 Months
- Project closeout activities – 3 months

A total construction period of 48 months is expected to be adequate to account for the quantity and complexity of the work, while taking into account the potential for high demand periods to limit construction activities.

Project Delivery System

It is our understanding that this project will be implemented by adopting a Design-Bid-Build delivery system. Due to the need for an alternatives analysis, selection of flocculation and rapid mix technology and other miscellaneous improvements requiring coordination with GLWA, our opinion is that a Design-Bid-Build approach is best suited for this project. Given that GLWA is currently in negotiations with an engineering consultant for design services, we feel GLWA has chosen the most appropriate project delivery method

Project Packaging and Sequencing

The scope for this project involves significant improvements to some of the process equipment, which has the potential to impact other projects or operations at the plant. Sequencing of construction will be critical for maintaining plant operations during peak demand periods. It is recommended that GLWA and the engineer plan accordingly as preparation of the Construction Contract documents progresses during design. It is also critical that the Contractor is fully aware of any potential impacts to their construction schedule.

At Lake Huron WTP, there are currently the following projects in the CIP:

- 111001 Lake Huron WTP Low-Lift, High-Lift, and Filter Backwash Pumping, Electrical, and Miscellaneous Chemical Improvements (In design, with construction scheduled for late 2022-2029)
- 111006 Lake Huron WTP Filter Instrumentation and Raw Water Flow Metering (Design-Build likely beginning in late 2022 and completing in 2025)
- 111007 Lake Huron WTP Raw Sludge Clarifier and Pumping System Improvements (Pending Closeout)
- 111008 Lake Huron WTP Architectural Programming for Lab and Admin Buildings (Study only, set to begin in 2027)
- 111009 Lake Huron WTP High Lift Pumping, Water Production Flow Metering and Yard Piping Improvements (Design-Build contract began in September of 2020 and is scheduled to be complete in 2024)

- 111010 Lake Huron WTP Filtration Improvements (Design is scheduled to begin in June of 2025, with construction scheduled for 2029-2036)
- 111011 Lake Huron WTP Pilot Plant (Design-Build contract began in July of 2021 and is scheduled to be complete in 2023)

Based on the current schedule, there is potential for overlap in construction with CIP Projects 111001, 111006, and 111009. With multiple construction projects occurring at the same time at one facility, there is a potential for conflicts between multiple Contractor's means and methods.

The scope of this project involves a treatment process that is not associated with any other CIP Project. Therefore, there are no major benefits from packaging this project with another project. Additionally, the treatment processes affected with this project are linked to each other and is better suited to be executed under a single construction contract, meaning there is no major benefit from splitting this work into multiple projects.

Depending on the final scope of improvements selected by the engineering consultant to be included in this project, it is recommended that any potential impacts to the plant during construction of this project be evaluated as it relates to other CIP projects. We feel this project can be implemented with a schedule as indicated above, assuming careful consideration and planning is performed during the design phase.

ROM
Cost Estimate
for
Lake Huron WTP Flocculation Improvements
Great Lakes Water Authority
CIP 111012
October 4, 2021

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Lake Huron WTP Flocculation Improvements**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 111012

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AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Lake Huron WTP Flocculation Improvements**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 111012

SCOPE OF WORK / BASIS OF ESTIMATE

1.00 Scope of Work

1.01 The summary of the scope of work to be performed on this Project includes implementing the improvements to the rapid mixers, flocculators, related building improvements, raw water conduit improvements, and miscellaneous demolition under a single, separate multi-phased construction contract.

2.00 Work Breakdown Structure (WBS)

2.01 The organization of estimates into discrete work items is essential to the perception and subsequent analysis of estimates. The estimate is organized by Construction Specification Institution (CSI) Masterformat 2004 Divisions. The CSI Divisional structure facilitates a direct comparison to the project specifications and drawings.

3.00 Estimate Classification

3.01 *Estimate Classification: Class 5*

Stage of Design: Pre-Planning/ Rough Order of Magnitude

Similar Industry Terms for this Level of Estimate:

*Screening
*Feasibility
*Top Down
*Capacity Factored

Accuracy Range: -50% to +100%

Project Definition: 0%-5%

Expected Project Contingency: 7%-25%

Background Information Used: Few or no design perimeters. Estimate based on past history data

End Use: Preliminary Project Screening, Capital Budgets, Strategic Analysis

4.00 Estimate Markups

4.01 Cost Estimate Markups

Escalation 6.90% per year to mid-point of construction per September ENR CCI for Detroit
* General Conditions 10%
* General Contractor Overhead 10.00%
* General Contractor Profit 5.00%
* Bonds and Insurance 2.00%
* Construction Contingency 25.00%

4.02 Estimate markups are indirect costs that are expressed as a lump sum or calculated as a percentage of the subtotal of the estimated construction costs. Indirect costs are costs that are required to complete a project. Direct costs are costs that are used to run the contractor's business. The following markups, at rates appropriate to the class of estimate, have been included in the cost estimate:

• Escalation: This is a provision for an increase in the cost of equipment, material, and labor above the costs specified in the contract, due to continuing price changes over time. Cost estimators analyze cost trends in local and national market conditions to temper and forecast escalation percentages. These factors are used to escalate project costs in current dollars to the expected mid-point of construction.

• General Contractor/Subcontractor Overhead: This markup accounts for costs associated with office and field employees that are engaged in daily work activities tied to the project life throughout all of the construction phases (pre-construction, construction, and close-out procedures).

• General Contractor/Subcontractor Profit: This markup includes the cost amount as compensation for risk and efforts to undertake and complete the project. This percentage will be based directly on economic conditions for the local construction industry, bidding environment, and perception of the risk of losing money on the project.

• Estimate Contingency: A percentage is added to the estimate to account for uncertainties inherent in the estimating process. As design progresses through the project design life cycle, this percentage typically decreases to 0% at design completion. This percentage is anticipated by the estimator as the relative stability of the design documents, project scope, and assumptions upon which the estimate is based are assessed. Design contingency typically accounts for costs associated with design that may not be complete enough to determine final quantities at the time of estimate preparation, items that may defy precise quantification, or as an added contingency to items that are computed by capacity factoring or other conceptual methods.

5.00 Basis of Estimate / Pricing

5.01 This cost proposal reflects the level of detail and completeness of the information provided.

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SCOPE OF WORK / BASIS OF ESTIMATE

5.02 This estimate has been prepared based on quantities and scope of work from the associated project report.

5.03 Conversations with members of the design team were also used in preparation of this estimate. Any design and engineering changes and/or additions produced subsequent to these documents are not included in this estimate.

5.04 The cost estimate is based on costs likely to be experienced in Michigan. Material and equipment costs are included. The cost of labor is based on Davis Bacon act prevailing rates for the county in which the project is to be constructed. Labor costs are based upon a 40 hour work week with the anticipation of some overtime. This estimate does not include the cost of shift work or the cost of an accelerated schedule.

5.05 This estimate has been prepared according to AACE (Association for the Advancement of Cost Engineering) standards for the estimate classification as indicated, and thus inherits an expected range of accuracy according to the classification.

5.06 This Basis of Estimate report (along with the above inclusions, exclusions, assumptions and clarifications), and the attached Cost Estimate are intended to be, and constitute a single document.

6.00 Inclusions, Exclusions, Assumptions, and Clarifications

6.01 *General Information/Notes*

- The estimate assumes a construction start date of 1/2/2024
- The estimate assumes a construction duration of 42.00 months.
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that the general building permit is included in the cost estimate.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner. This cost is included in the Construction Management line item.
- This Basis of Estimate report (along with the above inclusions, exclusions, assumptions and clarifications), and the attached Cost Estimate are intended to be, and constitute a single document.

6.02 *Exclusions*

- All scope outside what is stated in this estimate.
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
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- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

7.00 Statement of Estimated Costs

7.01 AECOM has no control over the cost of labor (Davis-Bacon prevailing wage) and material, the general contractor's or any subcontractors method of determining prices, or competitive bidding and market conditions. This opinion of probable costs of construction is made on the basis of experience, qualifications, and best judgement of professional construction cost managers familiar with the construction industry. AECOM cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from this or subsequent cost estimates.

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Project: **Lake Huron WTP Flocculation Improvements**
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SCOPE OF WORK / BASIS OF ESTIMATE

7.02 AECOM has no control over the quality, completeness, intricacy, constructability, or coordination of design documents, or over the amount of funds available for this project. AECOM is not responsible for design revision costs in the event that the estimate is in excess of the established budget.

7.03 AECOM's staff of professional cost managers has prepared this estimate in accordance with general accepted principles and practices. Our staff is available to discuss its contents with any interested party.

7.04 This estimate assumes that the general construction contract will be administered as a competitively bid/negotiated GMP with a selected construction manager / general contractor and prequalified subcontractors. Costs associated with a restrictive bidding market, including small business set-asides (minority, woman or veteran/service disabled veteran owned) and sole-sourced contractors are not included, and can cause a significant increase to the overall cost of the project.

8.00 Recommendations for Cost Control

8.01 AECOM recommends that the Owner, Architect, and Engineers carefully review this entire document to ensure that it reflects their design intent. Requests for modifications of any apparent errors or omissions to this documents should be made to AECOM within ten (10) days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred and accepted. If the project is over budget, or if there are unresolved budgeting issues, alternative systems/schemes should be evaluated before proceeding further into design.

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9.00 Quality Control

	Initial	Date
Estimator Self Check		
Arithmetic Check		
Technical Check		
Format and Presentation Check		
Authorization for Issue		

AUTHORIZATION
Approved for Issue ---------- Date: 1/0/1900

10.00 Disclaimer

This document and its contents have been prepared and are intended solely for the client's information and use in the above referenced project only. AECOM assumes no responsibility to any other party in respect of, arising out of, or in connection with this document and/or its contents.

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707 Grant Street
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Project: Lake Huron WTP Flocculation Improvements
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 111012
Building Area: 1 GSF

10/4/2021

ROM

13.00 Estimate Summary

Division	Description	% of Costs	Cost per SF	Total
1	General Conditions	0.00%	$ -	$ -
2	Existing Conditions	51.12%	$ 10,656,348.05	$ 10,656,348
3	Concrete	1.48%	$ 308,469.80	$ 308,470
4	Masonry	0.00%	$ -	$ -
5	Metals	0.37%	$ 77,151.82	$ 77,152
6	Wood, Lumber, and Composites	0.00%	$ -	$ -
7	Thermal and Moisture Protection	0.02%	$ 4,694.38	$ 4,694
8	Openings	0.01%	$ 2,699.49	$ 2,699
9	Finishes	0.00%	$ -	$ -
10	Specialties	0.00%	$ -	$ -
11	Equipment	0.00%	$ -	$ -
12	Furnishings	0.00%	$ -	$ -
13	Special Construction	0.00%	$ -	$ -
14	Conveying Systems	0.00%	$ -	$ -
21	Fire Suppression	0.00%	$ -	$ -
22	Plumbing	0.00%	$ -	$ -
23	Heating, Ventilating, and Air Conditioning	2.18%	$ 454,602.01	$ 454,602
26	Electrical	2.88%	$ 600,296.13	$ 600,296
27	Communications	0.00%	$ -	$ -
28	Electronic Safety and Security	0.00%	$ -	$ -
31	Earthwork	4.57%	$ 952,113.96	$ 952,114
32	Exterior Improvements	6.76%	$ 1,410,000.00	$ 1,410,000
33	Utilities	0.00%	$ -	$ -
40	Process Intergration	0.00%	$ -	$ -
46	Water and Wastewater Equipment	30.61%	$ 6,380,737.28	$ 6,380,737
Subtotal			**$ 20,847,112.92**	**$ 20,847,113**
General Conditions			10.00%	*$ 2,084,711*
Sales Tax			6.00%	*$ 597,581*
Security Allowance			0.25%	*$ 52,118*
Phasing Requirements			2.00%	*$ 416,942*
Subtotal			**$ 23,998,465.10**	**$ 23,998,465**
Escalation	Months to Mid-Point of Construction 36.00	6.90%	22.16%	*$ 5,318,336*
Subtotal			**$ 29,316,801.17**	**$ 29,316,801**
General Contractor Overhead			10.00%	*$ 2,931,680*
General Contractor Profit			5.00%	*$ 1,465,840*
Subtotal			**$ 33,714,321.34**	**$ 33,714,321**
Bonds and Insurance			2.00%	*$ 674,286*
Subtotal			**$ 34,388,607.77**	**$ 34,388,608**
Construction Contingency			25.00%	*$ 8,597,152*
Bidding Contingency	Not Required		0.00%	$ -
Total Construction Costs			**$ 42,985,759.71**	**$ 42,985,760**

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125789.97 Total Hours
40 Hours Per Week
3144.74917 Total Man Weeks
19 Crew Size

166 Duration (Weeks)
42 Duration (Months)

165.513114
38.19533401

8 0.004

36 months to midpoint

14.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Total Cost
002 Existing Conditions																	
02.01	Removal of all Motor Control Centers and electrical conduits and wiring associated with the Flocculators.	1.00	LS	1440.00	1440.00	ELEC	$ 84.91	$ 122,265.01	$ 122,265.01	$ -	$ -	$ 13,200.00	$ 13,200.00	$ 5,000.00	$ 5,000.00	$ 140,465.01	$ 140,465.01
02.02	Removal of the existing Flocculators, including all structural elements and lubrication stations and tubing.	20.00	EA	16.00	320.00	PLUM	$ 83.63	$ 1,338.05	$ 26,761.05	$ -	$ -	$ 300.00	$ 6,000.00	$ 500.00	$ 10,000.00	$ 2,138.05	$ 42,761.05
02.03	Demo concrete saddles for the propane tanks	14.22	CY	2.00	28.44	CONC001	$ 60.68	$ 121.36	$ 1,726.06	$ -	$ -	$ 74.47	$ 1,059.10	$ -	$ -	$ 195.83	$ 2,785.17
02.04	Remove security fencing around propane tank farm	575.00	LF	0.20	115.00	IRON	$ 79.77	$ 15.95	$ 9,174.02	$ -	$ -	$ 1.30	$ 747.50	$ -	$ -	$ 17.25	$ 9,921.52
02.05	Propane tank farm - converted into paved Contractor lay down area, Address any ponding or drainage issues	17400.00	SF	0.01	139.20	CONC001	$ 60.68	$ 0.49	$ 8,446.93	$ -	$ -	$ 0.70	$ 12,180.00	$ -	$ -	$ 1.19	$ 20,626.93
02.06	Remove abandoned in place gas lines	200.00	LF	0.25	50.00	B10M	$ 71.94	$ 17.99	$ 3,597.07	$ -	$ -	$ 17.50	$ 3,500.00	$ -	$ -	$ 35.49	$ 7,097.07
02.07	Demo the Filtration Building Expansion Tank Room	330.00	SF	0.61	200.00	B10M	$ 71.94	$ 43.60	$ 14,388.29	$ -	$ -	$ 29.92	$ 9,875.00	$ 6.06	$ 2,000.00	$ 79.59	$ 26,263.29
02.08	Any necessary demolition, structural, railing, or other building system necessary to meet current applicable codes.	1.00	LS	400.00	400.00	B10M	$ 71.94	$ 28,776.58	$ 28,776.58	$ -	$ -	$ 7,900.00	$ 7,900.00	$ -	$ -	$ 36,676.58	$ 36,676.58
02.09	Remove all abandoned assets in the Flocculator Basins, Electrical and Drive Buildings.	1.00	LS	720.00	720.00	B10M	$ 71.94	$ 51,797.84	$ 51,797.84		$ -	$ 11,850.00	$ 11,850.00	$ 3,000.00	$ 3,000.00	$ 66,647.84	$ 66,647.84
02.10	Improvements to Flocculator Electrical and Drive Building's envelope, including roofing, building structure, doors, windows, and lintels.	729.00	SF	1.50	1093.50	ROOFING	$ 75.29	$ 112.94	$ 82,334.90	$ 85.00	$ 61,965.00	$ 47.50	$ 34,627.50	$ -	$ -	$ 245.44	$ 178,927.40
02.11	As-needed correction to other architectural features of Flocculator Electrical and Drive Buildings as required – doors, stairways, windows, ladders, etc.	1.00	ALLOW		0.00	IRON	$ 79.77	$ -	$ -	$ 10,000.00	$ 10,000.00		$ -	$ -	$ -	$ 10,000.00	$ 10,000.00
02.12	RWC wall demolished for flow pattern	15.00	LF	1.10	16.50	LABOR	$ 56.19	$ 61.81	$ 927.10		$ -	$ 7.57	$ 113.57	$ -	$ -	$ 69.38	$ 1,040.67
02.13	Structural Maintenance, including inspection and cleaning of the basins	1.00	LS	120.00	120.00	IRON	$ 79.77	$ 9,572.89	$ 9,572.89		$ -	$ 2,875.00	$ 2,875.00	$ -	$ -	$ 12,447.89	$ 12,447.89
02.14	Removal of soil covering over Flocculator and Sedimentation basins, provide concrete maintenance, installation of new waterproof membrane, and improvements to drainage over structures.	235000.00	SF	0.45	105750.00	B10M	$ 71.94	$ 32.37	$ 7,607,807.64	$ 8.36	$ 1,964,130.00	$ 2.25	$ 528,750.00	$ -	$ -	$ 42.98	$ 10,100,687.64
	002 Existing Conditions Total				110392.64				$ 7,967,575.38		$ 2,036,095.00		$ 632,677.67		$ 20,000.00		**$ 10,656,348.05**
003 Concrete																	
03.01	New barrier - The natural gas feed to the plant will be protected, preventing damage from crane, forklift, or other powered equipment use.	56.86	CY	6.00	341.17	CONC001	$ 60.68	$ 364.09	$ 20,702.67	$ 295.00	$ 16,774.03	$ 40.00	$ 2,274.44	$ -	$ -	$ 699.09	$ 39,751.14
03.02	New wall separating RWCs	25.93	CY	9.00	233.33	CONC001	$ 60.68	$ 546.14	$ 14,159.13	$ 295.00	$ 7,648.15	$ 40.00	$ 1,037.04	$ -	$ -	$ 881.14	$ 22,844.31
03.03	Repairs of structural and nonstructural cracks and spalls in the drive gallery, raw water conduits, and flocculation basins (roof, floor, walls, and columns).	8500.00	SF	0.20	1700.00	CONC001	$ 60.68	$ 12.14	$ 103,159.35	$ 16.79	$ 142,715.00		$ -	$ -	$ -	$ 28.93	$ 245,874.35
	003 Concrete Total				2274.50				$ 138,021.14		$ 167,137.18		$ 3,311.48		$ -		**$ 308,469.80**
004 Masonry																	
	004 Masonry Total				0.00				$ -		$ -		$ -		$ -		**$ -**
005 Metals																	
05.01	Repainting of exposed ferrous materials in the Flocculator and Sedimentation Basins, and Electrical and Drive Buildings (piping, structural steel, crane rails, handrails, etc.).	1.00	LS	960.00	960.00	PAINT	$ 55.11	$ 52,901.82	$ 52,901.82	$ 10,000.00	$ 10,000.00	$ 14,250.00	$ 14,250.00	$ -	$ -	$ 77,151.82	$ 77,151.82
	005 Metals Total				960.00				$ 52,901.82		$ 10,000.00		$ 14,250.00		$ -		**$ 77,151.82**
006 Wood and Plastics																	
	006 Wood and Plastics Total				0.00						$ -		$ -		$ -		**$ -**
007 Thermal and Moisture Protection																	
07.01	Filtration Building new roof section over demo'd Filtration Building Expansion Tank Room	330.00	SF	0.12	39.60	ROOFING	$ 75.29	$ 9.04	$ 2,981.68	$ 5.19	$ 1,712.70	$ -	$ -	$ -	$ -	$ 14.23	$ 4,694.38
	007 Thermal and Moisture Protection Total				39.60				$ 2,981.68		$ 1,712.70		$ -		$ -		**$ 4,694.38**
008 Openings																	
08.01	Replace double door to Rapid Mixer Room	1.00	EA	8.00	8.00	IRON	$ 79.77	$ 638.19	$ 638.19	$ 1,500.00	$ 1,500.00	$ -	$ -	$ -	$ -	$ 2,138.19	$ 2,138.19
08.02	Door Hardware	1.00	EA	2.80	2.80	CARP	$ 75.46	$ 211.30	$ 211.30	$ 350.00	$ 350.00	$ -	$ -	$ -	$ -	$ 561.30	$ 561.30
	008 Openings Total				10.80						$ 1,850.00		$ -		$ -		**$ 2,699.49**
023 HVAC																	
23.01	Improvements to the building mechanical systems (such as sump pump systems) in the Flocculator Electrical and Drive Buildings.	1.00	LS	240.00	240.00	SMW	$ 84.69	$ 20,324.58	$ 20,324.58	$ 118,000.00	$ 118,000.00	$ 12,000.00	$ 12,000.00		$ -	$ 150,324.58	$ 150,324.58
23.02	Heating ventilation, and cooling systems improvements to meet current code in Flocculator Electrical and Drive Buildings.	729.00	SF		0.00	SMW	$ 84.69	$ -	$ -		$ -		$ -	$ 40.00	$ 29,160.00	$ 40.00	$ 29,160.00
23.03	Any necessary air and vacuum relief, power, control, or other systems necessary for the flocculators units to perform their intended role.	1.00	LS		0.00	SMW	$ 84.69	$ -	$ -		$ -		$ -	$ 228,800.00	$ 228,800.00	$ 228,800.00	$ 228,800.00

AECOM

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Lake Huron WTP Flocculation Improvements
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 111012

125789.97 Total Hours
40 Hours Per Week
3144.74917 Total Man Weeks
19 Crew Size

166 Duration (Weeks)
42 Duration (Months)
8 0.004

165.513114
38.19533401
36 months to midpoint

14.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Total Cost
23.04	All penetrations sealed	1.00	LS		0.00	SMW	$ 84.69	$ -	$ -		$ -		$ -	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00
23.05	Replacement of the portable flocculator air supply fans.	1.00	ALLOW	24.00	24.00	SMW	$ 84.69	$ 2,032.46	$ 2,032.46	$ 15,000.00	$ 15,000.00	$ 430.00	$ 430.00	$ -	$ -	$ 17,462.46	$ 17,462.46
23.06	HVAC Controls Allowance	1.00	ALLOW	8.00	8.00	SMW	$ 84.69	$ 677.49	$ 677.49	$ 5,000.00	$ 5,000.00	$ -	$ -	$ 2,500.00	$ 2,500.00	$ 8,177.49	$ 8,177.49
23.07	Start Up, Test & Balance	1.00	ALLOW	8.00	8.00	SMW	$ 84.69	$ 677.49	$ 677.49	$ -	$ -	$ -	$ -	$ -	$ -	$ 677.49	$ 677.49
	023 HVAC Total				280.00				$ 23,712.01		$ 138,000.00		$ 12,430.00		$ 280,460.00		**$ 454,602.01**
026 Electrical																	
26.01	Replacement of existing lighting in Rapid Mixer Room with new LED lighting, including emergency lighting	1320.00	SF	0.20	264.00	C910A	$ 84.91	$ 16.98	$ 22,415.25	$ 10.00	$ 13,200.00	$ -	$ -	$ -	$ -	$ 26.98	$ 35,615.25
26.02	Modernize house service electrical in Flocculator Electrical and Drive Buildings and on the grounds over the Flocculator Basins.	1.00	LS	180.00	180.00	C911A	$ 84.91	$ 15,283.13	$ 15,283.13	$ 49,500.00	$ 49,500.00	$ -	$ -	$ -	$ -	$ 64,783.13	$ 64,783.13
26.03	Replacement of 480/120 electrical service panels on Flocculator Basin Yard.	20.00	EA	24.00	480.00	C910A	$ 84.91	$ 2,037.75	$ 40,755.00	$ 11,500.00	$ 230,000.00	$ -	$ -	$ -	$ -	$ 13,537.75	$ 270,755.00
26.04	Replacement of existing lighting in Flocculator Electrical and Drive Buildings with new LED lighting, including emergency lighting.	729.00	SF	0.20	145.80	C911A	$ 84.91	$ 16.98	$ 12,379.33	$ 10.00	$ 7,290.00	0.00	$ -	$ -	$ -	$ 26.98	$ 19,669.33
26.05	Replacement of service outlets with GFCI outlets, as necessary	50.00	EA	2.00	100.00	C911A	$ 84.91	$ 169.81	$ 8,490.63	$ 560.00	$ 28,000.00	$ -	$ -	$ -	$ -	$ 729.81	$ 36,490.63
26.06	Add new LED lighting along walkways on flocculator roof.	750.00	LF	0.50	375.00	C911A	$ 84.91	$ 42.45	$ 31,839.85	$ 75.00	$ 56,250.00	$ -	$ -	$ -	$ -	$ 117.45	$ 88,089.85
26.07	Upgrade propane tank farm site lighting to LEDs	6.00	EA	1.90	11.40	C910A	$ 84.91	$ 161.32	$ 967.93	$ 1,500.00	$ 9,000.00	$ -	$ -	$ -	$ -	$ 1,661.32	$ 9,967.93
26.08	All electrical and mechanical lines are to be capped as far back as practicable.	1.00	LS	160.00	160.00	C911A	$ 84.91	$ 13,585.00	$ 13,585.00	$ 7,000.00	$ 7,000.00	$ -	$ -	$ -	$ -	$ 20,585.00	$ 20,585.00
26.09	SCADA Associated with the Flocculators	1.00	LS	280.00	280.00	C911A	$ 84.91	$ 23,773.75	$ 23,773.75	$ -	$ -	$ -	$ -	$ -	$ -	$ 23,773.75	$ 23,773.75
26.10	Commissioning & Testing	1.00	LS	360.00	360.00	C911A	$ 84.91	$ 30,566.25	$ 30,566.25	$ -	$ -	$ -	$ -	$ -	$ -	$ 30,566.25	$ 30,566.25
	026 Electrical Total				2356.20				$ 200,056.13		$ 400,240.00		$ -		$ -		**$ 600,296.13**
031 Earthwork																	
31.01	Soil Borings	4.00	EA		0.00	B10M	$ 71.94	$ -	$ -	$ -	$ -		$ -	$ 15,000.00	$ 60,000.00	$ 15,000.00	$ 60,000.00
31.02	Replacement of the soil covering the flocculators and sedimentation basins	17407.41	CY	0.30	5222.22	B10M	$ 71.94	$ 21.58	$ 375,694.20	$ 18.00	$ 313,333.33	$ 11.67	$ 203,086.42	$ -	$ -	$ 51.25	$ 892,113.96
	031 Earthwork Total				5222.22				$ 375,694.20		$ 313,333.33		$ 203,086.42		$ 60,000.00		**$ 952,113.96**
032 Exterior Improvements																	
32.01	Site civil including drainage, driveways, walkways, utility access holes, and hatches approaching the Flocculator Electrical and Drive Buildings and over the Flocculator and Sedimentation Basins.	235000.00	SF		0.00	B38	$ 65.04	$ -	$ -	$ -	$ -		$ -	$ 6.00	$ 1,410,000.00	$ 6.00	$ 1,410,000.00
	032 Exterior Improvements Total				0.00				$ -		$ -		$ -		$ 1,410,000.00		**$ 1,410,000.00**
046 Water and Wastewater Equipment																	
46.01	Replace the flocculators and drives in-kind (Jim Meyers and Sons, horizontal drive, paddle-type)	20.00	EA	120.00	2400.00	PLUM	$ 83.63	$ 10,035.39	$ 200,707.86	$ 242,462.00	$ 4,849,240.00	$ 1,975.00	$ 39,500.00	$ -	$ -	$ 254,472.39	$ 5,089,447.86
46.02	Replace flushing valves and appurtenances in Flocculator and Sedimentation Basins	1.00	LS	100.00	100.00	PLUM	$ 83.63	$ 8,362.83	$ 8,362.83	$ 77,147.00	$ 77,147.00	$ 2,400.00	$ 2,400.00	$ -	$ -	$ 87,909.83	$ 87,909.83
46.03	Improvements and rehabilitation to the flocculator basin baffles.	1.00	LS	400.00	400.00	PLUM	$ 83.63	$ 33,451.31	$ 33,451.31	$ 100,000.00	$ 100,000.00	$ 134,000.00	$ 134,000.00	$ -	$ -	$ 267,451.31	$ 267,451.31
46.04	Additional raw water conduit and isolation	200.00	LF	0.50	100.00	PLUM	$ 83.63	$ 41.81	$ 8,362.83	$ 35.00	$ 7,000.00	$ 12.00	$ 2,400.00	$ -	$ -	$ 88.81	$ 17,762.83
46.05	Raw Water Conduits to be inspected and cleaned, any structural maintenance necessary performed	400.00	LF	0.13	52.00	IRON	$ 79.77	$ 10.37	$ 4,148.25	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.37	$ 4,148.25
46.06	Array of small isolation valves for self flushing raw water conduits	20.00	EA	24.00	480.00	PLUM	$ 83.63	$ 2,007.08	$ 40,141.57	$ 12,000.00	$ 240,000.00	$ 1,200.00	$ 24,000.00	$ -	$ -	$ 15,207.08	$ 304,141.57
46.07	Add to perimeter drains for the Flocculator Basins, Chemical Building, and Access Passage as necessary.	100.00	LF	0.50	50.00	PLUM	$ 83.63	$ 41.81	$ 4,181.41	$ 20.00	$ 2,000.00	$ 17.50	$ 1,750.00	$ -	$ -	$ 79.31	$ 7,931.41
46.08	Rehabilitate or replace flushing water pumps used for Flocculator and sedimentation Basin cleaning	2.00	EA	160.00	320.00	PLUM	$ 83.63	$ 13,380.52	$ 26,761.05	$ 120,000.00	$ 240,000.00	$ 1,200.00	$ 2,400.00	$ -	$ -	$ 134,580.52	$ 269,161.05
46.09	New man hole for access to floc basin	1.00	EA	32.00	32.00	B10M	$ 71.94	$ 2,302.13	$ 2,302.13	$ 17,820.00	$ 17,820.00	$ 3,500.00	$ 3,500.00		$ -	$ 23,622.13	$ 23,622.13
46.10	New side gates separating raw water conduits	2.00	EA	160.00	320.00	PLUM	$ 83.63	$ 13,380.52	$ 26,761.05	$ 140,000.00	$ 280,000.00	$ 1,200.00	$ 2,400.00	$ -	$ -	$ 154,580.52	$ 309,161.05
	046 Water and Wastewater Equipment Total				4254.00				$ 355,180.28		$ 5,813,207.00		$ 212,350.00		$ -		**$ 6,380,737.28**
	Sales Tax (on Material and Rental Equipment)	6.00%									$ 8,881,575.21		$ 1,078,105.57				**$ 597,580.85**

CIP Delivery Program Management Team
27777 Franklin Road, Suite 2000
Southfield, MI 48034
248 204 5900

Technical Memorandum

Subject: GLWA CIP Validation – 115007

Project

This technical memorandum relates to the following project:

- CIP No. 115007 – Water Works Park WTP High Lift Pumping Station Modernization

Status/Classification

CIP No. 115007 is classified as Future Planned – Within 5 Year Plan in the 2022-2026 Board Approved CIP.

During the CIP Alignment process leading up to the development of the 2023-2027 CIP Draft 1, this project was pushed out to begin later in the future, outside of the 5-year plan.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- 2015 Water Master Plan Update
- Existing Reference Material for High Lift Pumping Station (O&M Manual and Record Drawings)
- Discussion with Project Manager (Michael Dunne)

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

This project was first identified in the 2015 Water Master Plan Update to address the aging equipment in the facility and to coordinate system hydraulics with the future repurposing of the Northeast WTP. This project is in the preliminary stages of planning and scope development. Based on discussions with the Project Manager, as well as review of the Business Case Evaluation for this project, there are many general scope items that have been identified to be addressed as part of this project. These include:

- Replacement or rehabilitation of the high-lift pumps and motors
- Replacement or rehabilitation of valving and piping as necessary
- Improvements to the electrical and instrumentation systems
- Other building or architectural improvements as necessary

In order to develop a firm scope for this project, it is necessary to perform a hydraulic analysis to assess the appropriate improvements to the pumping system. Details of the project scope, like number of pumps, size of pumps, and electrical requirements, can be finalized through a study phase. These details can have a large impact on the estimated cost for construction of this project.

One major consideration for this project is the impact of the future repurposing of the Northeast WTP. Once Northeast WTP is repurposed into a booster pumping station, Water Works Park will be required to supply a most of the demand previously supplied by Northeast WTP. Therefore, it is important that the pumping system be designed to handle multiple operating conditions, depending on the timing of this project versus the schedule for repurposing Northeast WTP. Another critical factor is the added reliance on Water Works Park to supply water to a larger service area, making reliability of the pump station critical.

For purposes of validation of the project, the scope definition for this project is at a level adequate for future planning. However, we recommend that GLWA perform a study or alternatives analysis to develop a Basis of Design, which will confirm project requirements, assess system hydraulics, select a preferred arrangement for the new pumping system, and determine the most the appropriate delivery method for the project. See section on Project Delivery System below for recommendations for an appropriate delivery method for this project.

Cost Validation

Due to the limited scope definition and planned schedule for execution of this project, the AECOM team did not perform a cost estimate for this project. As such, the AECOM team performed an overall assessment of the budgeted cost of this project in the CIP.

CIP No.	Project Description	CIP Project Cost (as Design-Build)	Validated Cost (Construction cost only)	Variance from Approved Budget
115007	Water Works Park WTP High-Lift Pumping Station Modernization	$88,946,247 (from 2022-2026 Board Approved CIP)*	-----	-------

*It shall be noted that the CIP Project Cost has been revised to $96,340,000 for Draft 1 of the 2023-2027 CIP

Based on discussions with the Project Manager, the estimated cost in the CIP is based on the assumed scope of a one-to-one replacement of the high-lift pumps, motors, and associated equipment. It is our understanding that the currently estimated costs for this project have been developed based on estimated equipment costs from a similar project, CS-103 Springwells WTP Low and High-Lift Pump Station Improvements (CIP 114002), which is currently in design.

The assumption of one-to-one replacement of the major pumping equipment may not be valid assumption, since new pump hydraulic requirements, based on current and future expected demands/operating scenarios, will be determined in the project design process. The pumps will need to be right-sized to meet the new hydraulic conditions with the repurposing of Northeast WTP, which can have major impacts for overall project cost, both positive and negative. Another major factor in estimating the cost for this project affects decisions that are to be made on electrical improvements to the station, as some options like Variable Frequency Drives (VFDs) can have significant cost impacts.

Another consideration to take into account when estimating construction costs for projects of this nature is construction access to the equipment. If pumps, motors, valves, or other large pieces of equipment are to be replaced, it is important to foresee any difficult access or work space limitations, as well as any ancillary building architectural/structural repairs required to complete construction. Also, since the water treatment plant will need to maintain supply capacity throughout the duration of construction, special considerations which limit the Contractor’s schedule can lead to cost implications.

Construction on this project is not anticipated to begin until post 2028, and therefore we do not anticipate any significant impact from the current market volatility.

Schedule Validation

We understand that this project is being pushed to begin further out in the future as a result of the CIP Alignment review in preparation of Draft 1 of the 2023-2027 CIP, such that budgeted costs were moved outside of the 5-year planning period. However, the schedule indicated on the Business Case Evaluation for this project shows the following:

- Design-Build Engineering start 4/27/2022
- Design-Build Construction start 10/1/2025
- Construction end 6/30/2031

This schedule does not align with the understood rationale that the project has been pushed to outside of the 5-year planning period. A more valid start date for this project is in the year 2028. The AECOM team is aware of this and will be correcting this in Draft 2 of the 2023-2027 CIP.

The actual project schedule will depend on the result of the study phase or basis of design. Many obstacles that are solved during design can have a significant impact on the project schedule. For example, this project involves the replacement of equipment, like large pumps, motors, and valves, with very long lead times. Additionally, construction of this project will require coordination with the plant operations to ensure that the treatment plant is able to supply adequacy capacity to the water system.

With an assumed scope that involves one-to-one replacement of the pumping system, we anticipate the following:

- Study and Design duration of 30 – 36 months
- Construction duration of 48 – 54 months

Therefore, the duration of the project as shown in the CIP is valid. However, the schedule needs to be shifted based on the current Alignment of the 2023-2027 CIP Draft 1. The AECOM team is aware of this and will be correcting this in Draft 2.

Project Delivery System

Based on discussions with the Project Manager, this project is being planned to be implemented with a Progressive Design-Build (PDB)delivery system. Compared to traditional delivery systems, the PDB delivery system will allow GLWA to work with a Design-Build team to develop the design with transparency on the construction costs before locking into a Guaranteed Maximum Price for construction of the project. It will also allow the project to be executed under a more compressed schedule, without the need to go through the formal bidding and procurement process for construction.

While there are benefits to Progressive Design-Build, we recommend a traditional Design-Bid-Build (DBB) delivery system for this project. Since the schedule for this project was pushed to outside of the 5-year planning period, there may not be a need to accelerate the schedule with a PDB. A traditional approach to study and design of this project, taking into account existing conditions, challenges, and operations coordination, is very beneficial for a project of this magnitude and complexity. Therefore, we recommend the DBB be preceded by a separate study/BODR phase. The DBB approach gives GLWA full control over the designer and allows time for resolution of issues prior to bringing a contractor on board. This has significant value in reducing overall costs of the project.

As planning progresses and the scope for this project is developed, we recommend an analysis of the appropriate delivery method that will provide the most benefit to GLWA. If GLWA wishes to execute this project as a design-build, it is recommended that a study or preliminary design be performed to help assist in

the development of the design criteria package. This project is a good candidate for an analysis under Task 8 Advanced Facilities Planning as part of this contract with AECOM.

Project Packaging and Sequencing

The scope for this project involves significant replacement or rehabilitation of the High-Lift Pumping System at the plant. Sequencing of construction will be critical for maintaining water supply during peak demand periods. It is recommended that GLWA plans accordingly as it relates to other associated projects that may have an impact on plant operations.

At Water Works Park WTP, there are currently the following projects in the CIP:

- 115001 Water Works Park WTP Yard Piping, Valves, and Venturi Meters Replacement (In construction, with completion currently scheduled for mid 2025)
- 115005 Water Works Park WTP Building Ventilation Improvements (In design, with construction scheduled to begin in late 2022 and be completed in 2025)
- 115006 Water Works Park WTP Site/Civil Improvements (Future Planned, currently scheduled to begin design after 2027)
- 115009 Water Works Park WTP Sedimentation Basins Structural Upgrades (Future Planned, currently scheduled to begin Design-Build after 2027)

Based on the current understanding that this project will not move forward until after the 5-year planning period, there is potential for construction of this project to overlap with projects 115006 and 115009. While it is not expected that there will be any notable conflicts between Contractors due to the locations of these projects spread throughout the Plant site/process areas, GLWA should plan accordingly to ensure there aren't any delays during construction.

As planning continues, it will be important to make considerations for sequencing of this project in coordination with the other system improvements, like the new transmission mains being built/rehabilitated between Northeast WTP and Water Works Park, as well as the future repurposing of Northeast WTP.

The scope of this project involves a process in the plant that is not associated with any other CIP Project. Therefore, there are no major benefits from packaging this project with another project. However, there are benefits to the overall project schedule for developing separate procurement packages for procuring the major pieces of equipment prior to construction due to the long lead time for these sizes of pumps, motors, and valves.

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Technical Memorandum

Subject: GLWA CIP Validation – 260204

Project

This technical memorandum relates to the following project:

- CIP No. 260204 – Conveyance System Engineering Services (Connors Creek Rehabilitation)

Status/Classification

CIP No. 260204 is classified as Project Execution – Design in the 2022-2026 Board Approved CIP.

This project is currently under active design and is at the 90% Design stage.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- CIP Portal
- 90% Design Drawings and Specifications
- Discussion with Project Manager (Mini Panicker)

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

The design development for this project is currently near completion with 90% drawings and specifications. That level of scope definition exceeds the criteria described above.

The scope of the project as currently defined in the design documents is adequate for planning purposes.

Cost Validation

As part of the validation effort, the AECOM team developed a construction cost estimate with the details in Appendix A at the end of this memorandum.

CIP No.	Project Description	CIP Project Cost (Construction Only)	Validated Cost (Construction cost only)	Variance from Approved Budget
260204	Conveyance System Engineering Services (Connors Creek Rehabilitation)	$43,868,000 (from CIP Portal)	$52,415,349	$8,547,349 (19%)

The validated construction cost estimate was based on the 90% design documents and includes the following assumptions and exclusions:

Assumptions

- The estimate assumes a notice to proceed date of 12/1/2022
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner. This cost is included in the Construction Management line item.

Exclusions

- All scope outside what is stated in the estimate.
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
- Assessments, finance, legal and development charges
- Builder's risk, project wrap-up and other owner provided insurance program
- Modification to the scope of work since the date of the design documents outlined in this report
- Unforeseen subsurface conditions
- Restrictive technical specifications or excessive contract conditions
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule
- Land acquisition and real estate fees
- Owner's field inspection costs
- Off-site work
- Owner contingency
- Hazardous material abatement other than what is included in the detailed portion of the estimate
- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

The design engineer provided a construction cost estimate for the 90% design of $44,187,114. One difference accounting for the variance in estimates is that the AECOM team estimate included 23.13% escalation to midpoint of construction, while the engineers estimate used 4.53%. Our assumed NTP date was 12/1/2022 and we used a 48-month schedule (discussed below) and the engineers estimate assumed midpoint of construction would be December 2022. Otherwise, the estimates were mostly similar.

This project does not involve the procurement of any major equipment or material, and therefore we do not anticipate any significant impact from the current market volatility.

Schedule Validation

The CIP Portal shows the construction duration as 30 months (12/1/2022 thru 6/30/2025)

Our review of the scope of work items, we observe that this project involves mainly cleaning and rehabilitation of the existing pipeline and does not involve procurement of additional right-of-way or easement, nor requires extensive traffic control. Therefore, it is our opinion the degree of difficulty for the construction of this project is medium to moderate. However, the project involves multiple setup (mobilization) and demobilizations. With that premise, we suggest the following breakdown of the construction schedule:

- Mobilization – 3 Months
- Construction – 36 Months
- Allowance for weather delay – 6 months
- Project closeout activities – 3 months

A total construction period of 48 months is expected to be adequate to account for the quantity and complexity of the work, along with any potential weather delays.

Project Delivery System

It is our understanding that this project would be implemented by adopting a Design-Bid-Build delivery system. Given that the design documents are almost fully developed and near “bid ready”, we concur with the current project delivery approach.

Project Packaging and Sequencing

The scope for this project involves intermittent sewer cleaning and repair along the Connors Creek Sewer System from 8-Mile Road to the Conner Creek CSO. Part of the sequencing of the work involves bypass pumping to divert the flow during the execution of the repair work.

This is a standalone project, and there are no major benefits from packaging this project with another or splitting this work into multiple projects.

This project is independent of any on-going or known future planned projects. Under present conditions, this project can be planned and implemented at the timeline indicated in the alignment documents.

90%
Cost Estimate
for
Rehabilitation of Conner Creek Sewer System
Great Lakes Water Authority
CIP 260208
October 4, 2021

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Rehabilitation of Conner Creek Sewer System**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
90%

TABLE OF CONTENTS

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Rehabilitation of Conner Creek Sewer System**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
90%

SCOPE OF WORK / BASIS OF ESTIMATE

1.00 Scope of Work

1.01 The summary of the scope of work to be performed on this Project includes rehabilitation of existing sewers generally along Conner Street and Outer Drive in Detroit, MI from 8 Mile Road at the north end to the location of the Connors Creek Pump Station south of East Jefferson Avenue. In addition, two segments that connect to the sewer south of the Connors Creek Pump Station will be rehabilitated:

1. The Connors Connector - from the gate structure just south of the Connors Creek Pump Station to the Connor Creek CSO Facility.
2. The Freud Connector – from the Freud Pump Station at the corner of Freud Street and Tennessee Street to the Connor Creek CSO Facility.

1.02 The work involves, but is not limited to, the following:

* Cleaning of sewer piping in preparation for the work, including Heavy Cleaning of sediment or other debris built up within the sewer piping system.
* Spot repairs including chemical grouting of leaks and patching concrete sewers with shotcrete.
* Lining of circular brick and concrete sewers using thermoset resin cured-in-place pipe liners.
* Sliplining of circular brick and concrete sewers.
* Construction of new permanent access structures.
* Cleaning of existing perimeter underdrains along Connors and Freud Connector Sewers and replacement of flow control valves.

2.00 Work Breakdown Structure (WBS)

2.01 The estimate is organized on the first level by Bid Items as identified in the Technical Specifications Section 01 22 01 - MEASUREMENT AND PAYMENT

* Bid Item 1: Lump Sum Contract Work
* Bid Item 2: Mobilization / Demobilization
* Bid Item 3: Traffic Control
* Bid Item 4: Soil Erosion and Sediment Control
* Bid Item 5: 42" Cured-in-Place Pipe Lining
* Bid Item 6: Slipline 102" with 96" Pipe
* Bid Item 7: Slipline 162" with 132" Pipe
* Bid Item 8: Chemical Grouting
* Bid Item 9: Shotcrete Spot Repairs
* Bid Item 10: Heavy Cleaning and Disposal
* Bid Item 11: Remove Obstructions
* Bid Item 12: Bypass Pumping and Flow Control
* Bid Item 13: Additional Access Structure #1
* Bid Item 14: Additional Access Structure #2
* Bid Item 15: Additional Access Structure #3
* Bid Item 16: Underdrain Cleaning
* Bid Item 17: Removal and Replacement of Underdrain Backflow Control Valves
* Bid Item 18: Post Construction CCTV Inspection
* Bid Item 19: Warranty 1-Year Post CCTV Inspection, Entire Connors Creek Sewer System
* Bid Item 20: Standby Days
* Bid Item 21: Provisional Allowance
* Bid Item 22: Cash Allowance

2.02 Costs are then organized on a second level by the Estimate Detail which is the cost build-up for the Bid Items .

2.03 The organization of estimates into discrete work items is essential to the perception and subsequent analysis of estimates. The estimate is organized by Construction Specification Institution (CSI) Masterformat 2004 Divisions. The CSI Divisional structure facilitates a direct comparison to the project specifications and drawings.

3.00 Estimate Classification

3.01 *Estimate Classification: Class 2*

Stage of Design: 90%-100% Design Estimate

Similar Industry Terms for this Level of Estimate:

*Construction Documents
*Final Estimate
*Definitive Estimate
*Detailed Estimate

Accuracy Range: -10% to +10%

Project Definition: 60%-90%

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6th Floor
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Project: **Rehabilitation of Conner Creek Sewer System**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
90%

SCOPE OF WORK / BASIS OF ESTIMATE

Expected Project Contingency: 0%-10%

Background Information Used: Detailed estimating data from plans and specifications

End Use: Project Funding, Control Estimate, Change Alert

4.00 Estimate Markups

4.01 Cost Estimate Markups

* General Conditions 10.00%
* Sales Tax 6.00%
* Permitting 0.25%
* Phasing 2.00%
* Escalation 14.21%
* General Contractor Overhead 10.00%
* General Contractor Profit 5.00%
* Bonds and Insurance 2.00%
* Estimate Contingency 10.00%

4.02 Estimate markups are indirect costs that are expressed as a lump sum or calculated as a percentage of the subtotal of the estimated construction costs. Indirect costs are costs that are required to complete a project. Direct costs are costs that are used to run the contractor's business. The following markups, at rates appropriate to the class of estimate, have been included in the cost estimate:

• Escalation: This is a provision for an increase in the cost of equipment, material, and labor above the costs specified in the contract, due to continuing price changes over time. Cost estimators analyze cost trends in local and national market conditions to temper and forecast escalation percentages. These factors are used to escalate project costs in current dollars to the expected mid-point of construction.

• General Contractor/Subcontractor Overhead: This markup accounts for costs associated with office and field employees that are engaged in daily work activities tied to the project life throughout all of the construction phases (pre-construction, construction, and close-out procedures).

• General Contractor/Subcontractor Profit: This markup includes the cost amount as compensation for risk and efforts to undertake and complete the project. This percentage will be based directly on economic conditions for the local construction industry, bidding environment, and perception of the risk of losing money on the project.

• Estimate Contingency: A percentage is added to the estimate to account for uncertainties inherent in the estimating process. As design progresses through the project design life cycle, this percentage typically decreases to 0% at design completion. This percentage is anticipated by the estimator as the relative stability of the design documents, project scope, and assumptions upon which the estimate is based are assessed. Design contingency typically accounts for costs associated with design that may not be complete enough to determine final quantities at the time of estimate preparation, items that may defy precise quantification, or as an added contingency to items that are computed by capacity factoring or other conceptual methods.

5.00 Basis of Estimate / Pricing

5.01 This cost estimate pertains to the above referenced project which is to be constructed in Wayne County, Michigan. This cost proposal reflects the level of detail and completeness of the information provided.

5.02 This estimate has been prepared based on quantities and scope of work from the associated project report.

5.03 Conversations with members of the design team were also used in preparation of this estimate. Any design and engineering changes and/or additions produced subsequent to these documents are not included in this estimate.

5.04 The cost estimate is based on costs likely to be experienced in Michigan. Material and equipment costs are included. The cost of labor is based on Davis Bacon act prevailing rates for the county in which the project is to be constructed. Labor costs are based upon a 40 hour work week with the anticipation of some overtime. This estimate does not include the cost of shift work or the cost of an accelerated schedule.

5.05 This estimate has been prepared according to AACE (Association for the Advancement of Cost Engineering) standards for the estimate classification as indicated, and thus inherits an expected range of accuracy according to the classification.

5.06 This Basis of Estimate report (along with the above inclusions, exclusions, assumptions and clarifications), and the attached Cost Estimate are intended to be, and constitute a single document.

6.00 Inclusions, Exclusions, Assumptions, and Clarifications

6.01 *General Information/Notes*

• The estimate assumes a construction start date of 7/1/2021

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SCOPE OF WORK / BASIS OF ESTIMATE

- The estimate assumes a construction duration of 30.00 months.
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner. This cost is included in the Construction Management line item.
- Bid Item 1: Lump Sum Contract Work
  - Includes a 2.5% allowance for restoration work based on previous trenchless cost estimates.
  - Includes an allowance for 100SF of brick repair. We suggest a separate contingency pay item and quantity be generated for this and any other unquantifible scope item that may be required for construction and bidding purposes.
- Bid Item 8: Chemical Grouting
  - Item quantified and costed by counting locations on the Rehabilitation Summary Table drawings (C-00-701 through C-00-703) and assuming 25 gallons per location.
- This Basis of Estimate report (along with the above inclusions, exclusions, assumptions and clarifications), and the attached Cost Estimate are intended to be, and constitute a single document.

6.02 *Exclusions*

- All scope outside what is stated in this estimate.
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
- Assessments, finance, legal and development charges
- Builder's risk, project wrap-up and other owner provided insurance program
- Modification to the scope of work since the date of the design documents outlined in this report
- Unforeseen subsurface conditions
- Restrictive technical specifications or excessive contract conditions
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule
- Land acquisition and real estate fees
- Owner's field inspection costs
- Off-site work
- Owner contingency
- Hazardous material abatement other than what is included in the detailed portion of the estimate
- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

7.00 Statement of Estimated Costs

7.01 AECOM has no control over the cost of labor (Davis-Bacon prevailing wage) and material, the general contractor's or any subcontractors method of determining prices, or competitive bidding and market conditions. This opinion of probable costs of construction is made on the basis of experience, qualifications, and best judgement of professional construction cost managers familiar with the construction industry. AECOM cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from this or subsequent cost estimates.

7.02 AECOM has no control over the quality, completeness, intricacy, constructability, or coordination of design documents, or over the amount of funds available for this project. AECOM is not responsible for design revision costs in the event that the estimate is in excess of the established budget.

7.03 AECOM's staff of professional cost managers has prepared this estimate in accordance with general accepted principles and practices. Our staff is available to discuss its contents with any interested party.

7.04 This estimate assumes that the general construction contract will be administered as a competitively bid/negotiated GMP with a selected construction manager / general contractor and prequalified subcontractors. Costs associated with a restrictive bidding market, including small business set-asides (minority, woman or veteran/service disabled veteran owned) and sole-sourced contractors are not included, and can cause a significant increase to the overall cost of the project.

8.00 Recommendations for Cost Control

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SCOPE OF WORK / BASIS OF ESTIMATE

8.01 AECOM recommends that the Owner, Architect, and Engineers carefully review this entire document to ensure that it reflects their design intent. Requests for modifications of any apparent errors or omissions to this documents should be made to AECOM within ten (10) days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred and accepted. If the project is over budget, or if there are unresolved budgeting issues, alternative systems/schemes should be evaluated before proceeding further into design.

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9.00 Quality Control

	Initial	Date
Estimator Self Check	AN/IZ	10/4/2021
Arithmetic Check	AN/IZ	10/4/2021
Technical Check	AN/IZ/KS	10/4/2021
Format and Presentation Check	AN/KS	10/4/2021
Authorization for Issue	KS	10/4/2021

AUTHORIZATION
Approved for Issue ---------- Date: 10/4/2021

10.00 Disclaimer

This document and its contents have been prepared and are intended solely for the client's information and use in the above referenced project only. AECOM assumes no responsibility to any other party in respect of, arising out of, or in connection with this document and/or its contents.

11.00 Copyright

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10/4/2021

90%

12.00 Estimate Summary

Pay Item	Description	Unit	UOM	Unit Cost w/Markups	Total w/Markups
1	Lump Sum Contract Work	1	LS	$ 1,375,021.87	$ 1,375,022
2	Mobilization / Demobilization	1	LS	$ 2,129,352.18	$ 2,129,352
3	Traffic Control	1	LS	$ 1,034,120.34	$ 1,034,120
4	Soil Erosion and Sediment Control	1	LS	$ 421,654.20	$ 421,654
5	42" Cured-in-Place Pipe Lining	987	LF	$ 514.12	$ 507,435
6	Slipline 102" with 96" Pipe	2374	LF	$ 3,795.75	$ 9,011,103
7	Slipline 162" with 132" Pipe	785	LF	$ 10,039.77	$ 7,881,219
8	Chemical Grouting	875	EA	$ 10,323.63	$ 9,033,174
9	Shotcrete Spot Repairs	5775	SF	$ 904.73	$ 5,224,796
10	Heavy Cleaning and Disposal	4826	TON	$ 895.95	$ 4,323,878
11	Remove Obstructions	11	EA	$ 7,840.89	$ 86,250
12	Bypass Pumping and Flow Control	1	LS	$ 174,456.36	$ 174,456
13	Additional Access Structure #1	1	EA	$ 1,004,234.05	$ 1,004,234
14	Additional Access Structure #2	1	EA	$ 326,505.22	$ 326,505
15	Additional Access Structure #3	1	EA	$ 727,804.92	$ 727,805
16	Underdrain Cleaning	3936	LF	$ 5.59	$ 21,993
17	Removal and Replacement of Underdrain Backflow Control Valves	9	EA	$ 6,727.37	$ 60,546
18	Post Construction CCTV Inspection	4146	LF	$ 8.60	$ 35,671
19	Warranty 1-Year Post CCTV Inspection, Entire Connors Creek Sewer System	1	LS	$ 629,878.40	$ 629,878
20	Standby Days	150	DAY	$ 4,715.36	$ 707,305
21	Provisional Allowance	1	LS	$ 2,500,000.00	$ 2,500,000
22	Cash Allowance	1	LS	$ 1,000,000.00	$ 1,000,000
Total Construction Costs					**$ 48,216,396**

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91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
PAY ITEM 01: Lump Sum Contract Work																		
01.01	***Pay Item #1: Lump Sum Contract Work***																	
01.02	Remove & Replace existing frame and cover at manhole/sewer connection to allow for CIPP liner installation along sewer route	2.00	EA	8.00	16.00	$ 79.94	$ 639.50	$ 1,279.00	$ 650.00	$ 1,300.00	$ -	$ -	$ -	$ -	$ 1,289.50	$ 2,579.00	0.00%	$ 2,579.00
01.03	Manhole modifications and repair at cone section due to bypass pumping below grade for CIPP liner work	2.00	EA	24.00	48.00	$ 83.08	$ 1,993.89	$ 3,987.78	$ 1,100.00	$ 2,200.00	$ 700.00	$ 1,400.00	$ -	$ -	$ 3,793.89	$ 7,587.78	0.00%	$ 7,587.78
01.04					0.00	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.05	Manhole Structure at Insertion Pit # 1 (4' Dia. Set on top of relined brick sewer system, 15' Deep)	1.00	EA	48.00	48.00	$ 83.08	$ 3,987.78	$ 3,987.78	$ 8,000.00	$ 8,000.00	$ 2,500.00	$ 2,500.00	$ -	$ -	$ 14,487.78	$ 14,487.78	0.00%	$ 14,487.78
01.06					0.00	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.07	Roadway, Curbs, Walks, Restoration at Pits & work areas:		LS		0.00	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.08	Assumes 2.00% of project value for trenchless project	1.00	ALLOW		0.00	$ 75.99	$ -	$ -		$ -	$ -	$ -	$ 500,000.00	$ 500,000.00	$ 500,000.00	$ 500,000.00	0.00%	$ 500,000.00
01.09					0.00	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.10	Landscape Restoration at Pits & work area:		LS		0.00	$ 106.13	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.11	Assumes 0.50% of project value for trenchless project	1.00	ALLOW		0.00	$ 75.99	$ -	$ -		$ -	$ -	$ -	$ 125,000.00	$ 125,000.00	$ 125,000.00	$ 125,000.00	0.00%	$ 125,000.00
01.12					0.00	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.13	Pre Video for 42" CIPP liner and the 102" & 162" Slip Line	4146.00	LF	0.05	207.30	$ 70.23	$ 3.51	$ 14,559.68	$ -	$ -	$ 1.60	$ 6,633.60	$ -	$ -	$ 5.11	$ 21,193.28	0.00%	$ 21,193.28
01.14					0.00	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.15	Brick repair / Replacement due to HD Cleaning of pipe		ALLOW		0.00	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ 10,000.00	$ -	#DIV/0!	$ -	0.00%	$ -
01.16	Brick Repairs	100.00	SF	1.60	160.00	$ 93.72	$ 149.96	$ 14,995.85	$ 25.00	$ 2,500.00	$ -	$ -	$ -	$ -	$ 174.96	$ 17,495.85	0.00%	$ 17,495.85
01.17					0.00	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.18	Pre & Post Photos and Inspection report of Spot Repairs	875.00	EA		0.00	$ 106.13	$ -	$ -		$ -	$ -	$ -	$ 100.00	$ 87,500.00	$ 100.00	$ 87,500.00	0.00%	$ 87,500.00
01.19	Pre & Post Photos and Inspection report of Shotcrete Repairs	411.00	EA		0.00	$ 75.99	$ -	$ -		$ -	$ -	$ -	$ 100.00	$ 41,100.00	$ 100.00	$ 41,100.00	0.00%	$ 41,100.00
	PAY ITEM 01: Lump Sum Contract Work	1.00	LS		479.30			$ 38,810.08		$ 14,000.00		$ 10,533.60		$ 753,600.00				**$ 816,943.68**
PAY ITEM 3: Traffic Control																		
03.01	Traffic control	1.00	LS	7680.00	7680.00	$ 70.23	$ 539,403.37	$ 539,403.37	$ -	$ -	$ 75,000.00	$ 75,000.00	$ -	$ -	$ 614,403.37	$ 614,403.37	0.00%	**$ 614,403.37**
	PAY ITEM 3: Traffic Control				7680.00			$ 539,403.37		$ -		$ 75,000.00		$ -				**$ 614,403.37**
PAY ITEM 5: 42" Cured-in-Place-Pipe Lining 42" Pipe																		
05.01	Sewer, Lining, CIPP, 42 inch	987.00	LF	2.12	2094.61	$ 83.08	$ 176.31	$ 174,017.62	$ 91.42	$ 90,233.51	$ 32.66	$ 32,231.97	$ -	$ -	$ 300.39	$ 296,483.09	0.00%	$ 296,483.09
05.02	Add for lateral re-instatement and 96" transition	2	EA		0.00	$ 98.34	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,500.00	$ 5,000.00	$ 2,500.00	$ 5,000.00	0.00%	$ 5,000.00
	PAY ITEM 5: 42" Cured-in-Place-Pipe Lining 42" Pipe				2094.61			$ 174,017.62		$ 90,233.51		$ 32,231.97		$ 5,000.00				**$ 301,483.09**
PAY ITEM 6: Slipline 102" with 96"																		
06.01	***96" Slipline Length***	***2374.00***	***LF***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.02	***Slipline Insertion Pit #1, 30'L x 15'W x 22'D***	***1.00***	***EA***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.03	Asphalt Demo Thickness	**0.33**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.04	Concrete Demo Thickness	**0.83**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.05	Pit Length	**30.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.06	Pit Width	**15.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.07	Pit Depth	**22.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.08	Asphalt Demo	**60.44**	SY	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.09	Sawcut Asphalt	90.00	LF	0.03	2.70	$ 82.27	$ 2.47	$ 222.13	$ 0.34	$ 30.60	$ 1.58	$ 142.20	$ -	$ -	$ 4.39	$ 394.93	0.00%	$ 394.93
06.10	Demolish Asphalt Pavement	6.72	CY	0.10	0.67	$ 77.30	$ 7.73	$ 51.92	$ -	$ -	$ 35.00	$ 235.06	$ -	$ -	$ 42.73	$ 286.98	0.00%	$ 286.98
06.11	Load/Haul/Dump Asphalt Pavement	7.39	CY	0.10	0.74	$ 72.72	$ 7.27	$ 53.72	$ -	$ -	$ 5.00	$ 36.94	$ -	$ -	$ 12.27	$ 90.66	0.00%	$ 90.66
06.12	Dispose of Debris	13.15	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.13	Concrete Demo Area	**60.44**	SY	0.00	0.00	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.14	Sawcut Concrete	168.00	LF	0.07	11.76	$ 82.27	$ 5.76	$ 967.49	$ 0.34	$ 57.12	$ 1.58	$ 265.44	$ -	$ -	$ 7.68	$ 1,290.05	0.00%	$ 1,290.05
06.15	Demolish Concrete	16.79	CY	0.09	1.43	$ 77.30	$ 6.57	$ 110.32	$ -	$ -	$ 35.00	$ 587.65	$ -	$ -	$ 41.57	$ 697.98	0.00%	$ 697.98
06.16	Load/Haul/Dump Concrete Pavement	18.47	CY	0.05	0.92	$ 72.72	$ 3.64	$ 67.15	$ -	$ -	$ 5.00	$ 92.35	$ -	$ -	$ 8.64	$ 159.50	0.00%	$ 159.50
06.17	Dispose of Debris	37.40	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.18	Excavation				0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.19	Sheet Piling	1980.00	SF	0.75	1485.00	$ 88.05	$ 66.04	$ 130,752.49	$ 25.00	$ 49,500.00	$ 25.00	$ 49,500.00	$ -	$ -	$ 116.04	$ 229,752.49	0.00%	$ 229,752.49
06.20	Excavating	347.22	CY	0.19	65.97	$ 88.05	$ 16.73	$ 5,808.78	$ -	$ -	$ 4.61	$ 1,600.69	$ -	$ -	$ 21.34	$ 7,409.47	0.00%	$ 7,409.47
06.21	Trench Backfill, Machine, granular material	341.68	CY	0.01	4.78	$ 88.05	$ 1.23	$ 421.19	$ 40.80	$ 13,940.65	$ 1.18	$ 403.19	$ -	$ -	$ 43.21	$ 14,765.02	0.00%	$ 14,765.02
06.22	Compaction	375.85	CY	0.04	13.91	$ 88.05	$ 3.26	$ 1,224.45	$ -	$ -	$ 2.26	$ 849.42	$ -	$ -	$ 5.52	$ 2,073.87	0.00%	$ 2,073.87
06.23	Haul Trench Spoils	434.03	CY	0.05	21.70	$ 72.72	$ 3.64	$ 1,578.15	$ -	$ -	$ 5.00	$ 2,170.14	$ -	$ -	$ 8.64	$ 3,748.28	0.00%	$ 3,748.28
06.24	Access Pit Pipe Crown Demo	1.00	EA	160.00	160.00	$ 70.23	$ 11,237.57	$ 11,237.57	$ 2,000.00	$ 2,000.00	$ 7,500.00	$ 7,500.00	$ -	$ -	$ 20,737.57	$ 20,737.57	0.00%	$ 20,737.57
06.25	Handle and Dispose of Debris	90.00	CY	0.050	4.50	$ 72.72	$ 3.64	$ 327.24	$ -	$ -	$ 5.00	$ 450.00	$ -	$ -	$ 8.64	$ 777.24	0.00%	$ 777.24
06.26	Dewatering	1.00	MONTH	240.000	240.00	$ 73.68	$ 17,683.07	$ 17,683.07	$ -	$ -	$ 29,000.00	$ 29,000.00	$ 3,000.00	$ 3,000.00	$ 49,683.07	$ 49,683.07	0.00%	$ 49,683.07
06.27					0.00	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.28	*12" x 12" Footing, 30' L each side of pipe*	60.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.29	Purchase Formwork Materials	60.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 210.00	$ -	$ -	$ -	$ -	$ 3.50	$ 210.00	0.00%	$ 210.00
06.30	Install Formwork	60.00	SF	0.12	7.20	$ 69.52	$ 8.34	$ 500.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 500.54	0.00%	$ 500.54
06.31	Purchase Concrete Reinforcement, Rebar	355.56	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 284.44	$ -	$ -	$ -	$ -	$ 0.80	$ 284.44	0.00%	$ 284.44
06.32	Install Rebar Reinforcement	0.18	TON	20.00	3.56	$ 91.88	$ 1,837.59	$ 326.68	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 326.68	0.00%	$ 326.68
06.33	Purchase Delievered Ready Mix Concrete	2.22	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 311.11	$ -	$ -	$ -	$ -	$ 140.00	$ 311.11	0.00%	$ 311.11
06.34	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
06.35	Place Concrete	2.22	CY	0.40	0.89	$ 69.52	$ 27.81	$ 61.79	$ -	$ -	$ -	$ -	$ -	$ -	$ 27.81	$ 61.79	0.00%	$ 61.79
06.36	Finish Concrete	360.00	SF	0.00	0.96	$ 69.52	$ 0.19	$ 66.74	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.19	$ 66.74	0.00%	$ 66.74
06.37	Purchase Concrete Cure	0.10	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.27	$ -	$ -	$ -	$ -	$ 22.65	$ 2.27	0.00%	$ 2.27
06.38	Cure and Seal Concrete	0.60	CSF	0.17	0.10	$ 70.23	$ 11.94	$ 7.16	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.94	$ 7.16	0.00%	$ 7.16
06.39	Strip Formwork	60.00	SF	0.02	1.20	$ 69.52	$ 1.39	$ 83.42	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 83.42	0.00%	$ 83.42
06.40	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 198.66	$ 198.66	$ 121.17	$ 121.17	$ 37.50	$ 37.50	$ -	$ -	$ 357.34	$ 357.34	0.00%	$ 357.34

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Conner Creek Sewer System
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
Date: 10/4/2021

91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
06.41					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.42	Drill and Grout for Dowels in Brick Sewer	68.00	EA	0.10	6.80	$ 91.88	$ 9.19	$ 624.78	$ 3.00	$ 204.00	$ -	$ -	$ -	$ -	$ 12.19	$ 828.78	0.00%	$ 828.78
06.43					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.44	*Concrete Collars*	6.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.45	Purchase Formwork Materials	214.32	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 750.12	$ -	$ -	$ -	$ -	$ 3.50	$ 750.12	0.00%	$ 750.12
06.46	Install Formwork	214.32	SF	0.12	25.72	$ 69.52	$ 8.34	$ 1,787.92	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 1,787.92	0.00%	$ 1,787.92
06.47	Purchase Concrete Reinforcement, Rebar	1238.40	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 990.72	$ -	$ -	$ -	$ -	$ 0.80	$ 990.72	0.00%	$ 990.72
06.48	Install Rebar Reinforcement	0.62	TON	20.00	12.38	$ 91.88	$ 1,837.59	$ 1,137.84	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 1,137.84	0.00%	$ 1,137.84
06.49	Purchase Delievered Ready Mix Concrete	7.74	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 1,083.60	$ -	$ -	$ -	$ -	$ 140.00	$ 1,083.60	0.00%	$ 1,083.60
06.50	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
06.51	Place Concrete	7.74	CY	0.40	3.10	$ 69.52	$ 27.81	$ 215.23	$ -	$ -	$ -	$ -	$ -	$ -	$ 27.81	$ 215.23	0.00%	$ 215.23
06.52	Finish Concrete	214.32	SF	0.00	0.57	$ 69.52	$ 0.19	$ 39.73	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.19	$ 39.73	0.00%	$ 39.73
06.53	Purchase Concrete Cure	0.13	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.83	$ -	$ -	$ -	$ -	$ 22.65	$ 2.83	0.00%	$ 2.83
06.54	Cure and Seal Concrete	0.75	CSF	0.17	0.13	$ 70.23	$ 11.94	$ 8.95	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.94	$ 8.95	0.00%	$ 8.95
06.55	Strip Formwork	214.32	SF	0.02	4.29	$ 69.52	$ 1.39	$ 297.99	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 297.99	0.00%	$ 297.99
06.56	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 564.86	$ 564.86	$ 424.09	$ 424.09	$ 37.50	$ 37.50	$ -	$ -	$ 1,026.45	$ 1,026.45	0.00%	$ 1,026.45
06.57					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.58	*Concrete Cap*	24.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.59	Purchase Formwork Materials	406.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 1,421.00	$ -	$ -	$ -	$ -	$ 3.50	$ 1,421.00	0.00%	$ 1,421.00
06.60	Install Formwork	406.00	SF	0.12	48.72	$ 69.52	$ 8.34	$ 3,386.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 3,386.97	0.00%	$ 3,386.97
06.61	Purchase Concrete Reinforcement, Rebar	8879.52	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 7,103.61	$ -	$ -	$ -	$ -	$ 0.80	$ 7,103.61	0.00%	$ 7,103.61
06.62	Install Rebar Reinforcement	4.44	TON	20.00	88.80	$ 91.88	$ 1,837.59	$ 8,158.47	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 8,158.47	0.00%	$ 8,158.47
06.63	Purchase Delievered Ready Mix Concrete	55.50	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 7,769.58	$ -	$ -	$ -	$ -	$ 140.00	$ 7,769.58	0.00%	$ 7,769.58
06.64	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
06.65	Place Concrete	55.50	CY	0.40	22.20	$ 69.52	$ 27.81	$ 1,543.24	$ -	$ -	$ -	$ -	$ -	$ -	$ 27.81	$ 1,543.24	0.00%	$ 1,543.24
06.66	Finish Concrete	406.00	SF	0.00	1.08	$ 69.52	$ 0.19	$ 75.27	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.19	$ 75.27	0.00%	$ 75.27
06.67	Purchase Concrete Cure	0.50	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 11.33	$ -	$ -	$ -	$ -	$ 22.65	$ 11.33	0.00%	$ 11.33
06.68	Cure and Seal Concrete	3.00	CSF	0.17	0.51	$ 70.23	$ 11.94	$ 35.82	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.94	$ 35.82	0.00%	$ 35.82
06.69	Strip Formwork	406.00	SF	0.02	8.12	$ 69.52	$ 1.39	$ 564.50	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 564.50	0.00%	$ 564.50
06.70	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 2,106.35	$ 2,106.35	$ 2,445.83	$ 2,445.83	$ 37.50	$ 37.50	$ -	$ -	$ 4,589.68	$ 4,589.68	0.00%	$ 4,589.68
06.71					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.72	***Slipline Insertion Pit #2, 30'L x 15'W x 22'D***	***1.00***	***EA***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.73	Asphalt Demo Thickness	**0.33**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.74	Concrete Demo Thickness	**0.83**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.75	Pit Length	**30.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.76	Pit Width	**15.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.77	Pit Depth	**22.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.78	Asphalt Demo	**60.44**	SY	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.79	Sawcut Asphalt	90.00	LF	0.03	2.70	$ 82.27	$ 2.47	$ 222.13	$ 0.34	$ 30.60	$ 1.58	$ 142.20	$ -	$ -	$ 4.39	$ 394.93	0.00%	$ 394.93
06.80	Demolish Asphalt Pavement	6.72	CY	0.10	0.67	$ 77.30	$ 7.73	$ 51.92	$ -	$ -	$ 35.00	$ 235.06	$ -	$ -	$ 42.73	$ 286.98	0.00%	$ 286.98
06.81	Load/Haul/Dump Asphalt Pavement	7.39	CY	0.10	0.74	$ 72.72	$ 7.27	$ 53.72	$ -	$ -	$ 5.00	$ 36.94	$ -	$ -	$ 12.27	$ 90.66	0.00%	$ 90.66
06.82	Dispose of Debris	13.15	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.83	Concrete Demo Area	**60.44**	SY	0.00	0.00	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.84	Sawcut Concrete	168.00	LF	0.07	11.76	$ 82.27	$ 5.76	$ 967.49	$ 0.34	$ 57.12	$ 1.58	$ 265.44	$ -	$ -	$ 7.68	$ 1,290.05	0.00%	$ 1,290.05
06.85	Demolish Concrete	16.79	CY	0.09	1.43	$ 77.30	$ 6.57	$ 110.32	$ -	$ -	$ 35.00	$ 587.65	$ -	$ -	$ 41.57	$ 697.98	0.00%	$ 697.98
06.86	Load/Haul/Dump Concrete Pavement	18.47	CY	0.05	0.92	$ 72.72	$ 3.64	$ 67.15	$ -	$ -	$ 5.00	$ 92.35	$ -	$ -	$ 8.64	$ 159.50	0.00%	$ 159.50
06.87	Dispose of Debris	37.40	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.88	Excavation				0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.89	Sheet Piling	1980.00	SF	0.75	1485.00	$ 88.05	$ 66.04	$ 130,752.49	$ 25.00	$ 49,500.00	$ 25.00	$ 49,500.00	$ -	$ -	$ 116.04	$ 229,752.49	0.00%	$ 229,752.49
06.90	Excavating	347.22	CY	0.19	65.97	$ 88.05	$ 16.73	$ 5,808.78	$ -	$ -	$ 4.61	$ 1,600.69	$ -	$ -	$ 21.34	$ 7,409.47	0.00%	$ 7,409.47
06.91	Trench Backfill, Machine, granular material	341.68	CY	0.01	4.78	$ 88.05	$ 1.23	$ 421.19	$ 40.80	$ 13,940.65	$ 1.18	$ 403.19	$ -	$ -	$ 43.21	$ 14,765.02	0.00%	$ 14,765.02
06.92	Compaction	375.85	CY	0.04	13.91	$ 88.05	$ 3.26	$ 1,224.45	$ -	$ -	$ 2.26	$ 849.42	$ -	$ -	$ 5.52	$ 2,073.87	0.00%	$ 2,073.87
06.93	Haul Trench Spoils	434.03	CY	0.05	21.70	$ 72.72	$ 3.64	$ 1,578.15	$ -	$ -	$ 5.00	$ 2,170.14	$ -	$ -	$ 8.64	$ 3,748.28	0.00%	$ 3,748.28
06.94	Access Pit Pipe Crown Demo	1.00	EA	160.00	160.00	$ 70.23	$ 11,237.57	$ 11,237.57	$ 2,000.00	$ 2,000.00	$ 7,500.00	$ 7,500.00	$ -	$ -	$ 20,737.57	$ 20,737.57	0.00%	$ 20,737.57
06.95	Handle and Dispose of Debris	90.00	CY	0.050	4.50	$ 72.72	$ 3.64	$ 327.24	$ -	$ -	$ 5.00	$ 450.00	$ -	$ -	$ 8.64	$ 777.24	0.00%	$ 777.24
06.96	Dewatering	1.00	MONTH	240.000	240.00	$ 73.68	$ 17,683.07	$ 17,683.07	$ -	$ -	$ 29,000.00	$ 29,000.00	$ 3,000.00	$ 3,000.00	$ 49,683.07	$ 49,683.07	0.00%	$ 49,683.07
06.97					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.98	*12" x 12" Footing, 30' L each side of pipe*	60.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.99	Purchase Formwork Materials	60.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 210.00	$ -	$ -	$ -	$ -	$ 3.50	$ 210.00	0.00%	$ 210.00
06.100	Install Formwork	60.00	SF	0.12	7.20	$ 69.52	$ 8.34	$ 500.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 500.54	0.00%	$ 500.54
06.101	Purchase Concrete Reinforcement, Rebar	355.56	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 284.44	$ -	$ -	$ -	$ -	$ 0.80	$ 284.44	0.00%	$ 284.44
06.102	Install Rebar Reinforcement	0.18	TON	20.00	3.56	$ 91.88	$ 1,837.59	$ 326.68	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 326.68	0.00%	$ 326.68
06.103	Purchase Delievered Ready Mix Concrete	2.22	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 311.11	$ -	$ -	$ -	$ -	$ 140.00	$ 311.11	0.00%	$ 311.11
06.104	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
06.105	Place Concrete	2.22	CY	2.00	4.44	$ 69.52	$ 139.04	$ 308.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 308.97	0.00%	$ 308.97
06.106	Finish Concrete	360.00	SF	0.01	2.00	$ 69.52	$ 0.39	$ 139.04	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 139.04	0.00%	$ 139.04
06.107	Purchase Concrete Cure	0.10	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.27	$ -	$ -	$ -	$ -	$ 22.65	$ 2.27	0.00%	$ 2.27
06.108	Cure and Seal Concrete	0.60	CSF	0.33	0.20	$ 70.23	$ 23.18	$ 13.91	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 13.91	0.00%	$ 13.91
06.109	Strip Formwork	60.00	SF	0.02	1.20	$ 69.52	$ 1.39	$ 83.42	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 83.42	0.00%	$ 83.42
06.110	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 247.60	$ 247.60	$ 121.17	$ 121.17	$ 37.50	$ 37.50	$ -	$ -	$ 406.27	$ 406.27	0.00%	$ 406.27
06.111					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.112	Drill and Grout for Dowels in Brick Sewer	68.00	EA	0.10	6.80	$ 91.88	$ 9.19	$ 624.78	$ 3.00	$ 204.00	$ -	$ -	$ -	$ -	$ 12.19	$ 828.78	0.00%	$ 828.78
06.113					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.114	*Concrete Collars*	6.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.115	Purchase Formwork Materials	214.32	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 750.12	$ -	$ -	$ -	$ -	$ 3.50	$ 750.12	0.00%	$ 750.12

AECOM
707 Grant Street
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Project: Rehabilitation of Conner Creek Sewer System
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91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
06.116	Install Formwork	214.32	SF	0.12	25.72	$ 69.52	$ 8.34	$ 1,787.92	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 1,787.92	0.00%	$ 1,787.92
06.117	Purchase Concrete Reinforcement, Rebar	1238.40	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 990.72	$ -	$ -	$ -	$ -	$ 0.80	$ 990.72	0.00%	$ 990.72
06.118	Install Rebar Reinforcement	0.62	TON	20.00	12.38	$ 91.88	$ 1,837.59	$ 1,137.84	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 1,137.84	0.00%	$ 1,137.84
06.119	Purchase Delievered Ready Mix Concrete	7.74	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 1,083.60	$ -	$ -	$ -	$ -	$ 140.00	$ 1,083.60	0.00%	$ 1,083.60
06.120	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
06.121	Place Concrete	7.74	CY	2.00	15.48	$ 69.52	$ 139.04	$ 1,076.15	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 1,076.15	0.00%	$ 1,076.15
06.122	Finish Concrete	214.32	SF	0.01	1.19	$ 69.52	$ 0.39	$ 82.77	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 82.77	0.00%	$ 82.77
06.123	Purchase Concrete Cure	0.13	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.83	$ -	$ -	$ -	$ -	$ 22.65	$ 2.83	0.00%	$ 2.83
06.124	Cure and Seal Concrete	0.75	CSF	0.33	0.25	$ 70.23	$ 23.18	$ 17.38	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 17.38	0.00%	$ 17.38
06.125	Strip Formwork	214.32	SF	0.02	4.29	$ 69.52	$ 1.39	$ 297.99	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 297.99	0.00%	$ 297.99
06.126	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 701.72	$ 701.72	$ 424.09	$ 424.09	$ 37.50	$ 37.50	$ -	$ -	$ 1,163.31	$ 1,163.31	0.00%	$ 1,163.31
06.127					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.128	*Concrete Cap*	24.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.129	Purchase Formwork Materials	406.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 1,421.00	$ -	$ -	$ -	$ -	$ 3.50	$ 1,421.00	0.00%	$ 1,421.00
06.130	Install Formwork	406.00	SF	0.12	48.72	$ 69.52	$ 8.34	$ 3,386.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 3,386.97	0.00%	$ 3,386.97
06.131	Purchase Concrete Reinforcement, Rebar	8879.52	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 7,103.61	$ -	$ -	$ -	$ -	$ 0.80	$ 7,103.61	0.00%	$ 7,103.61
06.132	Install Rebar Reinforcement	4.44	TON	20.00	88.80	$ 91.88	$ 1,837.59	$ 8,158.47	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 8,158.47	0.00%	$ 8,158.47
06.133	Purchase Delievered Ready Mix Concrete	55.50	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 7,769.58	$ -	$ -	$ -	$ -	$ 140.00	$ 7,769.58	0.00%	$ 7,769.58
06.134	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
06.135	Place Concrete	55.50	CY	2.00	110.99	$ 69.52	$ 139.04	$ 7,716.20	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 7,716.20	0.00%	$ 7,716.20
06.136	Finish Concrete	406.00	SF	0.01	2.26	$ 69.52	$ 0.39	$ 156.80	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 156.80	0.00%	$ 156.80
06.137	Purchase Concrete Cure	0.50	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 11.33	$ -	$ -	$ -	$ -	$ 22.65	$ 11.33	0.00%	$ 11.33
06.138	Cure and Seal Concrete	3.00	CSF	0.33	0.99	$ 70.23	$ 23.18	$ 69.53	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 69.53	0.00%	$ 69.53
06.139	Strip Formwork	406.00	SF	0.02	8.12	$ 69.52	$ 1.39	$ 564.50	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 564.50	0.00%	$ 564.50
06.140	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 3,049.58	$ 3,049.58	$ 2,445.83	$ 2,445.83	$ 37.50	$ 37.50	$ -	$ -	$ 5,532.91	$ 5,532.91	0.00%	$ 5,532.91
06.141					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.142	***Slipline Insertion Pit #3, 30'L x 15'W x 22'D***	***1.00***	***EA***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.143	Asphalt Demo Thickness	**0.33**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.144	Concrete Demo Thickness	**0.83**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.145	Pit Length	**30.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.146	Pit Width	**15.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.147	Pit Depth	**22.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.148	Asphalt Demo	**60.44**	SY	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.149	Sawcut Asphalt	90.00	LF	0.03	2.70	$ 82.27	$ 2.47	$ 222.13	$ 0.34	$ 30.60	$ 1.58	$ 142.20	$ -	$ -	$ 4.39	$ 394.93	0.00%	$ 394.93
06.150	Demolish Asphalt Pavement	6.72	CY	0.10	0.67	$ 77.30	$ 7.73	$ 51.92	$ -	$ -	$ 35.00	$ 235.06	$ -	$ -	$ 42.73	$ 286.98	0.00%	$ 286.98
06.151	Load/Haul/Dump Asphalt Pavement	7.39	CY	0.10	0.74	$ 72.72	$ 7.27	$ 53.72	$ -	$ -	$ 5.00	$ 36.94	$ -	$ -	$ 12.27	$ 90.66	0.00%	$ 90.66
06.152	Dispose of Debris	13.15	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.153	Concrete Demo Area	**60.44**	SY	0.00	0.00	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.154	Sawcut Concrete	168.00	LF	0.07	11.76	$ 82.27	$ 5.76	$ 967.49	$ 0.34	$ 57.12	$ 1.58	$ 265.44	$ -	$ -	$ 7.68	$ 1,290.05	0.00%	$ 1,290.05
06.155	Demolish Concrete	16.79	CY	0.09	1.43	$ 77.30	$ 6.57	$ 110.32	$ -	$ -	$ 35.00	$ 587.65	$ -	$ -	$ 41.57	$ 697.98	0.00%	$ 697.98
06.156	Load/Haul/Dump Concrete Pavement	18.47	CY	0.05	0.92	$ 72.72	$ 3.64	$ 67.15	$ -	$ -	$ 5.00	$ 92.35	$ -	$ -	$ 8.64	$ 159.50	0.00%	$ 159.50
06.157	Dispose of Debris	37.40	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ 40.00	$ 1,496.00	$ 40.00	$ 1,496.00	0.00%	$ 1,496.00
06.158	Excavation				0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.159	Sheet Piling	1980.00	SF	0.75	1485.00	$ 88.05	$ 66.04	$ 130,752.49	$ 25.00	$ 49,500.00	$ 25.00	$ 49,500.00	$ -	$ -	$ 116.04	$ 229,752.49	0.00%	$ 229,752.49
06.160	Excavating	347.22	CY	0.19	65.97	$ 88.05	$ 16.73	$ 5,808.78	$ -	$ -	$ 4.61	$ 1,600.69	$ -	$ -	$ 21.34	$ 7,409.47	0.00%	$ 7,409.47
06.161	Trench Backfill, Machine, granular material	341.68	CY	0.06	21.36	$ 88.05	$ 5.50	$ 1,880.30	$ 40.80	$ 13,940.65	$ 1.18	$ 403.19	$ -	$ -	$ 47.48	$ 16,224.13	0.00%	$ 16,224.13
06.162	Compaction	375.85	CY	0.06	23.49	$ 88.05	$ 5.50	$ 2,068.33	$ -	$ -	$ 2.26	$ 849.42	$ -	$ -	$ 7.76	$ 2,917.75	0.00%	$ 2,917.75
06.163	Haul Trench Spoils	434.03	CY	0.10	43.40	$ 72.72	$ 7.27	$ 3,156.29	$ -	$ -	$ 5.00	$ 2,170.14	$ -	$ -	$ 12.27	$ 5,326.43	0.00%	$ 5,326.43
06.164	Access Pit Pipe Crown Demo	1.00	EA	160.00	160.00	$ 70.23	$ 11,237.57	$ 11,237.57	$ 2,000.00	$ 2,000.00	$ 7,500.00	$ 7,500.00	$ -	$ -	$ 20,737.57	$ 20,737.57	0.00%	$ 20,737.57
06.165	Handle and Dispose of Debris	90.00	CY	0.100	9.00	$ 72.72	$ 7.27	$ 654.49	$ -	$ -	$ 5.00	$ 450.00	$ -	$ -	$ 12.27	$ 1,104.49	0.00%	$ 1,104.49
06.166	Dewatering	1.00	MONTH	240.000	240.00	$ 73.68	$ 17,683.07	$ 17,683.07	$ -	$ -	$ 29,000.00	$ 29,000.00	$ 3,000.00	$ 3,000.00	$ 49,683.07	$ 49,683.07	0.00%	$ 49,683.07
06.167					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.168	*12" x 12" Footing, 30' L each side of pipe*	60.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.169	Purchase Formwork Materials	60.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 210.00	$ -	$ -	$ -	$ -	$ 3.50	$ 210.00	0.00%	$ 210.00
06.170	Install Formwork	60.00	SF	0.12	7.20	$ 69.52	$ 8.34	$ 500.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 500.54	0.00%	$ 500.54
06.171	Purchase Concrete Reinforcement, Rebar	355.56	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 284.44	$ -	$ -	$ -	$ -	$ 0.80	$ 284.44	0.00%	$ 284.44
06.172	Install Rebar Reinforcement	0.18	TON	20.00	3.56	$ 91.88	$ 1,837.59	$ 326.68	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 326.68	0.00%	$ 326.68
06.173	Purchase Delievered Ready Mix Concrete	2.22	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 311.11	$ -	$ -	$ -	$ -	$ 140.00	$ 311.11	0.00%	$ 311.11
06.174	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
06.175	Place Concrete	2.22	CY	2.00	4.44	$ 69.52	$ 139.04	$ 308.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 308.97	0.00%	$ 308.97
06.176	Finish Concrete	360.00	SF	0.01	2.00	$ 69.52	$ 0.39	$ 139.04	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 139.04	0.00%	$ 139.04
06.177	Purchase Concrete Cure	0.10	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.27	$ -	$ -	$ -	$ -	$ 22.65	$ 2.27	0.00%	$ 2.27
06.178	Cure and Seal Concrete	0.60	CSF	0.33	0.20	$ 70.23	$ 23.18	$ 13.91	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 13.91	0.00%	$ 13.91
06.179	Strip Formwork	60.00	SF	0.02	1.20	$ 69.52	$ 1.39	$ 83.42	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 83.42	0.00%	$ 83.42
06.180	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 247.60	$ 247.60	$ 121.17	$ 121.17	$ 37.50	$ 37.50	$ -	$ -	$ 406.27	$ 406.27	0.00%	$ 406.27
06.181					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.182	Drill and Grout for Dowels in Brick Sewer	68.00	EA	0.10	6.80	$ 91.88	$ 9.19	$ 624.78	$ 3.00	$ 204.00	$ -	$ -	$ -	$ -	$ 12.19	$ 828.78	0.00%	$ 828.78
06.183					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.184	*Concrete Collars*	6.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.185	Purchase Formwork Materials	214.32	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 750.12	$ -	$ -	$ -	$ -	$ 3.50	$ 750.12	0.00%	$ 750.12
06.186	Install Formwork	214.32	SF	0.12	25.72	$ 69.52	$ 8.34	$ 1,787.92	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 1,787.92	0.00%	$ 1,787.92
06.187	Purchase Concrete Reinforcement, Rebar	1238.40	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 990.72	$ -	$ -	$ -	$ -	$ 0.80	$ 990.72	0.00%	$ 990.72
06.188	Install Rebar Reinforcement	0.62	TON	20.00	12.38	$ 91.88	$ 1,837.59	$ 1,137.84	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 1,137.84	0.00%	$ 1,137.84
06.189	Purchase Delievered Ready Mix Concrete	7.74	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 1,083.60	$ -	$ -	$ -	$ -	$ 140.00	$ 1,083.60	0.00%	$ 1,083.60
06.190	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Conner Creek Sewer System
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
Date: 10/4/2021

91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
06.191	Place Concrete	7.74	CY	2.00	15.48	$ 69.52	$ 139.04	$ 1,076.15	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 1,076.15	0.00%	$ 1,076.15
06.192	Finish Concrete	214.32	SF	0.01	1.19	$ 69.52	$ 0.39	$ 82.77	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 82.77	0.00%	$ 82.77
06.193	Purchase Concrete Cure	0.13	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.83	$ -	$ -	$ -	$ -	$ 22.65	$ 2.83	0.00%	$ 2.83
06.194	Cure and Seal Concrete	0.75	CSF	0.33	0.25	$ 70.23	$ 23.18	$ 17.38	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 17.38	0.00%	$ 17.38
06.195	Strip Formwork	214.32	SF	0.02	4.29	$ 69.52	$ 1.39	$ 297.99	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 297.99	0.00%	$ 297.99
06.196	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 701.72	$ 701.72	$ 424.09	$ 424.09	$ 37.50	$ 37.50	$ -	$ -	$ 1,163.31	$ 1,163.31	0.00%	$ 1,163.31
06.197					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.198	*Concrete Cap*	24.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.199	Purchase Formwork Materials	406.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 1,421.00	$ -	$ -	$ -	$ -	$ 3.50	$ 1,421.00	0.00%	$ 1,421.00
06.200	Install Formwork	406.00	SF	0.12	48.72	$ 69.52	$ 8.34	$ 3,386.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 3,386.97	0.00%	$ 3,386.97
06.201	Purchase Concrete Reinforcement, Rebar	8879.52	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 7,103.61	$ -	$ -	$ -	$ -	$ 0.80	$ 7,103.61	0.00%	$ 7,103.61
06.202	Install Rebar Reinforcement	4.44	TON	20.00	88.80	$ 91.88	$ 1,837.59	$ 8,158.47	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 8,158.47	0.00%	$ 8,158.47
06.203	Purchase Delievered Ready Mix Concrete	55.50	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 7,769.58	$ -	$ -	$ -	$ -	$ 140.00	$ 7,769.58	0.00%	$ 7,769.58
06.204	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
06.205	Place Concrete	55.50	CY	2.00	110.99	$ 69.52	$ 139.04	$ 7,716.20	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 7,716.20	0.00%	$ 7,716.20
06.206	Finish Concrete	406.00	SF	0.01	2.26	$ 69.52	$ 0.39	$ 156.80	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 156.80	0.00%	$ 156.80
06.207	Purchase Concrete Cure	0.50	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 11.33	$ -	$ -	$ -	$ -	$ 22.65	$ 11.33	0.00%	$ 11.33
06.208	Cure and Seal Concrete	3.00	CSF	0.33	0.99	$ 70.23	$ 23.18	$ 69.53	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 69.53	0.00%	$ 69.53
06.209	Strip Formwork	406.00	SF	0.02	8.12	$ 69.52	$ 1.39	$ 564.50	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 564.50	0.00%	$ 564.50
06.210	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 3,049.58	$ 3,049.58	$ 2,445.83	$ 2,445.83	$ 37.50	$ 37.50	$ -	$ -	$ 5,532.91	$ 5,532.91	0.00%	$ 5,532.91
06.211					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.212	Slipline 96" Pipe	2374.00	LF		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,600.00	$ 3,798,400.00	$ 1,600.00	$ 3,798,400.00	0.00%	$ 3,798,400.00
06.213	Annulus Blocking/Grouting				0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.214					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.215	102" Pipe ID, INCH	102.00	INCH		0.00	$ 102.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.216	102" Pipe ID, FT	8.50	FT		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.217	96" Pipe OD, INCH	99.50	INCH		0.00	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.218	96" Pipe OD, FT	8.29	FT		0.00	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.219	Delta INCH	2.50	INCH		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.220	Delta FT	0.21	FT		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.221	102" Pipe ID Radius	4.25	FT		0.00	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.222	96" Pipe ID Radius	4.15	FT		0.00	$ 94.33	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.223	Slipline Length	2374.00	LF		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.224	102" Pipe Volume	4989.36	CY		0.00	$ 102.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.225	96" Pipe Volume	4747.78	CY		0.00	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
06.226	Annulus Grout Volume	241.58	CY	15.00	3623.69	$ 69.52	$ 1,042.79	$ 251,915.57	$ 175.00	$ 42,276.35	$ 130.28	$ 31,473.70	$ -	$ -	$ 1,348.07	$ 325,665.61	0.00%	$ 325,665.61
06.227					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
06.228	Blocking Length	14244.00	LF		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	5.00	$ 71,220.00	$ 5.00	$ 71,220.00	0.00%	$ 71,220.00
	PAY ITEM 6: Slipline 102" with 96"				10679.77			$ 852,834.11		$ 308,268.52		$ 312,560.44		$ 3,880,116.00				**$ 5,353,779.08**
PAY ITEM 7: Slipline 162" with 132"																		
07.01	***132" Slipline Length***	***785.00***	***LF***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.02	***Slipline Insertion Pit #4, 30'L x 20'W x 22'D***	***1.00***	***EA***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.03	Asphalt Demo Thickness	**0.33**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.04	Concrete Demo Thickness	**0.83**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.05	Pit Length	**30.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.06	Pit Width	**20.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.07	Pit Depth	**22.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.08	Asphalt Demo	**78.22**	SY	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.09	Sawcut Asphalt	90.00	LF	0.03	2.70	$ 82.27	$ 2.47	$ 222.13	$ 0.34	$ 30.60	$ 1.58	$ 142.20	$ -	$ -	$ 4.39	$ 394.93	0.00%	$ 394.93
07.10	Demolish Asphalt Pavement	8.69	CY	0.10	0.87	$ 77.30	$ 7.73	$ 67.19	$ -	$ -	$ 35.00	$ 304.20	$ -	$ -	$ 42.73	$ 371.39	0.00%	$ 371.39
07.11	Load/Haul/Dump Asphalt Pavement	9.56	CY	0.10	0.96	$ 72.72	$ 7.27	$ 69.52	$ -	$ -	$ 5.00	$ 47.80	$ -	$ -	$ 12.27	$ 117.33	0.00%	$ 117.33
07.12	Dispose of Debris	17.01	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.13	Concrete Demo Area	**78.22**	SY	0.00	0.00	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.14	Sawcut Concrete	168.00	LF	0.07	11.76	$ 82.27	$ 5.76	$ 967.49	$ 0.34	$ 57.12	$ 1.58	$ 265.44	$ -	$ -	$ 7.68	$ 1,290.05	0.00%	$ 1,290.05
07.15	Demolish Concrete	21.73	CY	0.09	1.85	$ 77.30	$ 6.57	$ 142.77	$ -	$ -	$ 35.00	$ 760.49	$ -	$ -	$ 41.57	$ 903.27	0.00%	$ 903.27
07.16	Load/Haul/Dump Concrete Pavement	23.90	CY	0.05	1.20	$ 72.72	$ 3.64	$ 86.91	$ -	$ -	$ 5.00	$ 119.51	$ -	$ -	$ 8.64	$ 206.41	0.00%	$ 206.41
07.17	Dispose of Debris	48.40	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.18	Excavation				0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.19	Sheet Piling	2200.00	SF	0.75	1650.00	$ 88.05	$ 66.04	$ 145,280.54	$ 25.00	$ 55,000.00	$ 25.00	$ 55,000.00	$ -	$ -	$ 116.04	$ 255,280.54	0.00%	$ 255,280.54
07.20	Excavating	462.96	CY	0.19	87.96	$ 88.05	$ 16.73	$ 7,745.03	$ -	$ -	$ 4.61	$ 2,134.26	$ -	$ -	$ 21.34	$ 9,879.29	0.00%	$ 9,879.29
07.21	Trench Backfill, Machine, granular material	457.42	CY	0.01	6.40	$ 88.05	$ 1.23	$ 563.86	$ 40.80	$ 18,662.87	$ 1.18	$ 539.76	$ -	$ -	$ 43.21	$ 19,766.49	0.00%	$ 19,766.49
07.22	Compaction	503.17	CY	0.04	18.62	$ 88.05	$ 3.26	$ 1,639.22	$ -	$ -	$ 2.26	$ 1,137.15	$ -	$ -	$ 5.52	$ 2,776.37	0.00%	$ 2,776.37
07.23	Haul Trench Spoils	578.70	CY	0.05	28.94	$ 72.72	$ 3.64	$ 2,104.19	$ -	$ -	$ 5.00	$ 2,893.52	$ -	$ -	$ 8.64	$ 4,997.71	0.00%	$ 4,997.71
07.24	Access Pit Pipe Crown Demo	1.00	EA	160.00	160.00	$ 70.23	$ 11,237.57	$ 11,237.57	$ 2,000.00	$ 2,000.00	$ 7,500.00	$ 7,500.00	$ -	$ -	$ 20,737.57	$ 20,737.57	0.00%	$ 20,737.57
07.25	Handle and Dispose of Debris	90.00	CY	0.050	4.50	$ 72.72	$ 3.64	$ 327.24	$ -	$ -	$ 5.00	$ 450.00	$ -	$ -	$ 8.64	$ 777.24	0.00%	$ 777.24
07.26	Dewatering	1.00	MONTH	240.000	240.00	$ 73.68	$ 17,683.07	$ 17,683.07	$ -	$ -	$ 29,000.00	$ 29,000.00	$ 3,000.00	$ 3,000.00	$ 49,683.07	$ 49,683.07	0.00%	$ 49,683.07
07.27					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.28	*12" x 12" Footing, 30' L each side of pipe*	60.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.29	Purchase Formwork Materials	60.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 210.00	$ -	$ -	$ -	$ -	$ 3.50	$ 210.00	0.00%	$ 210.00
07.30	Install Formwork	60.00	SF	0.12	7.20	$ 69.52	$ 8.34	$ 500.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 500.54	0.00%	$ 500.54
07.31	Purchase Concrete Reinforcement, Rebar	355.56	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 284.44	$ -	$ -	$ -	$ -	$ 0.80	$ 284.44	0.00%	$ 284.44
07.32	Install Rebar Reinforcement	0.18	TON	20.00	3.56	$ 91.88	$ 1,837.59	$ 326.68	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 326.68	0.00%	$ 326.68
07.33	Purchase Delievered Ready Mix Concrete	2.22	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 311.11	$ -	$ -	$ -	$ -	$ 140.00	$ 311.11	0.00%	$ 311.11
07.34	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
07.35	Place Concrete	2.22	CY	2.00	4.44	$ 69.52	$ 139.04	$ 308.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 308.97	0.00%	$ 308.97

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Conner Creek Sewer System
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
Date: 10/4/2021

91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
07.36	Finish Concrete	360.00	SF	0.01	2.00	$ 69.52	$ 0.39	$ 139.04	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 139.04	0.00%	$ 139.04
07.37	Purchase Concrete Cure	0.10	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.27	$ -	$ -	$ -	$ -	$ 22.65	$ 2.27	0.00%	$ 2.27
07.38	Cure and Seal Concrete	0.60	CSF	0.33	0.20	$ 70.23	$ 23.18	$ 13.91	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 13.91	0.00%	$ 13.91
07.39	Strip Formwork	60.00	SF	0.02	1.20	$ 69.52	$ 1.39	$ 83.42	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 83.42	0.00%	$ 83.42
07.40	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 247.60	$ 247.60	$ 121.17	$ 121.17	$ 37.50	$ 37.50	$ -	$ -	$ 406.27	$ 406.27	0.00%	$ 406.27
07.41					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.42	Drill and Grout for Dowels in Brick Sewer	100.00	EA	0.10	10.00	$ 91.88	$ 9.19	$ 918.80	$ 3.00	$ 300.00	$ -	$ -	$ -	$ -	$ 12.19	$ 1,218.80	0.00%	$ 1,218.80
07.43					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.44	*Concrete Collars*	6.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.45	Purchase Formwork Materials	340.12	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 1,190.41	$ -	$ -	$ -	$ -	$ 3.50	$ 1,190.41	0.00%	$ 1,190.41
07.46	Install Formwork	340.12	SF	0.12	40.81	$ 69.52	$ 8.34	$ 2,837.35	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 2,837.35	0.00%	$ 2,837.35
07.47	Purchase Concrete Reinforcement, Rebar	2089.92	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 1,671.94	$ -	$ -	$ -	$ -	$ 0.80	$ 1,671.94	0.00%	$ 1,671.94
07.48	Install Rebar Reinforcement	1.04	TON	20.00	20.90	$ 91.88	$ 1,837.59	$ 1,920.21	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 1,920.21	0.00%	$ 1,920.21
07.49	Purchase Delievered Ready Mix Concrete	13.06	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 1,828.68	$ -	$ -	$ -	$ -	$ 140.00	$ 1,828.68	0.00%	$ 1,828.68
07.50	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
07.51	Place Concrete	13.06	CY	2.00	26.12	$ 69.52	$ 139.04	$ 1,816.12	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 1,816.12	0.00%	$ 1,816.12
07.52	Finish Concrete	340.12	SF	0.01	1.89	$ 69.52	$ 0.39	$ 131.36	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 131.36	0.00%	$ 131.36
07.53	Purchase Concrete Cure	0.18	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 3.96	$ -	$ -	$ -	$ -	$ 22.65	$ 3.96	0.00%	$ 3.96
07.54	Cure and Seal Concrete	1.05	CSF	0.17	0.18	$ 70.23	$ 11.94	$ 12.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.94	$ 12.54	0.00%	$ 12.54
07.55	Strip Formwork	340.12	SF	0.02	6.80	$ 69.52	$ 1.39	$ 472.89	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 472.89	0.00%	$ 472.89
07.56	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 1,120.28	$ 1,120.28	$ 704.25	$ 704.25	$ 37.50	$ 37.50	$ -	$ -	$ 1,862.03	$ 1,862.03	0.00%	$ 1,862.03
07.57					0.00	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.58	*Concrete Cap*	24.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.59	Purchase Formwork Materials	628.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 2,198.00	$ -	$ -	$ -	$ -	$ 3.50	$ 2,198.00	0.00%	$ 2,198.00
07.60	Install Formwork	628.00	SF	0.12	75.36	$ 69.52	$ 8.34	$ 5,238.96	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 5,238.96	0.00%	$ 5,238.96
07.61	Purchase Concrete Reinforcement, Rebar	19144.87	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 15,315.90	$ -	$ -	$ -	$ -	$ 0.80	$ 15,315.90	0.00%	$ 15,315.90
07.62	Install Rebar Reinforcement	9.57	TON	20.00	191.45	$ 91.88	$ 1,837.59	$ 17,590.24	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 17,590.24	0.00%	$ 17,590.24
07.63	Purchase Delievered Ready Mix Concrete	119.66	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 16,751.76	$ -	$ -	$ -	$ -	$ 140.00	$ 16,751.76	0.00%	$ 16,751.76
07.64	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
07.65	Place Concrete	119.66	CY	2.00	239.31	$ 69.52	$ 139.04	$ 16,636.69	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 16,636.69	0.00%	$ 16,636.69
07.66	Finish Concrete	628.00	SF	0.01	3.49	$ 69.52	$ 0.39	$ 242.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 242.54	0.00%	$ 242.54
07.67	Purchase Concrete Cure	0.70	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 15.86	$ -	$ -	$ -	$ -	$ 22.65	$ 15.86	0.00%	$ 15.86
07.68	Cure and Seal Concrete	4.20	CSF	0.17	0.71	$ 70.23	$ 11.94	$ 50.15	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.94	$ 50.15	0.00%	$ 50.15
07.69	Strip Formwork	628.00	SF	0.02	12.56	$ 69.52	$ 1.39	$ 873.16	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 873.16	0.00%	$ 873.16
07.70	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 6,136.47	$ 6,136.47	$ 5,142.23	$ 5,142.23	$ 37.50	$ 37.50	$ -	$ -	$ 11,316.20	$ 11,316.20	0.00%	$ 11,316.20
07.71					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.72	Slipline 132" Pipe	785.00	LF		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,000.00	$ 2,355,000.00	$ 3,000.00	$ 2,355,000.00	0.00%	$ 2,355,000.00
07.73	Annulus Blocking/Grouting				0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.74					0.00	$ 94.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.75	162" Pipe ID, INCH	162.00	INCH		0.00	$ 102.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.76	162" Pipe ID, FT	13.50	FT		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.77	132" Pipe OD, INCH (2" wall assumed)	136.00	INCH		0.00	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.78	132" Pipe OD, FT (2" wall assumed)	11.33	FT		0.00	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.79	Delta INCH	26.00	INCH		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.80	Delta FT	2.17	FT		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.81	162" Pipe ID Radius	6.75	FT		0.00	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.82	132" Pipe ID Radius	5.67	FT		0.00	$ 94.33	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.83	Slipline Length	785.00	LF		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.84	162" Pipe Volume	4161.63	CY		0.00	$ 102.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.85	132" Pipe Volume	2932.99	CY		0.00	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
07.86	Annulus Grout Volume	1228.64	CY	12.00	14743.62	$ 95.90	$ 1,150.77	$ 1,413,879.77	$ 175.00	$ 215,011.13	$ 88.14	$ 108,290.80	$ -	$ -	$ 1,413.91	$ 1,737,181.71	0.00%	$ 1,737,181.71
07.87					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
07.88	Blocking Length	4710.00	LF		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ 25.00	$ 117,750.00	$ 25.00	$ 117,750.00	0.00%	$ 117,750.00
	PAY ITEM 7: Slipline 162" with 132"				17619.55					$ 336,813.69		$ 209,447.63		$ 2,475,750.00				**$ 4,682,480.00**
PAY ITEM 8: Chemical Grouting																		
08.01	Location Quantity	875.00	EA		0.00	$ 94.33	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
08.02	25 gallons per location assumed	21875.00	GAL	0.160	3500.00	$ 95.90	$ 15.34	$ 335,642.07	$ 150.00	$ 3,281,250.00	$ 80.00	$ 1,750,000.00	$ -	$ -	$ 245.34	$ 5,366,892.07	0.00%	$ 5,366,892.07
	PAY ITEM 8: Chemical Grouting				3500.00			$ 335,642.07		$ 3,281,250.00		$ 1,750,000.00		$ -				**$ 5,366,892.07**
PAY ITEM 9: Shotcrete Spot Repairs																		
09.01	Location Quantity	415.00	EA		0.00	$ 94.33	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
09.02	6" Average repair thickness					#N/A												$ -
09.03	*High pressure wash, heavy soil, biological and mineral staining, paint, water and chemical, excludes scaffolding*	5775.00	SF	0.24	1386.00	$ 95.90	$ 23.02	$ 132,914.26	$ 0.62	$ 3,551.63	$ 2.34	$ 13,510.50	$ -	$ -	$ 25.97	$ 149,979.38	15.00%	$ 172,476.29
09.04	*Clean/grind surface(s) free of contaminants*	5775.00	LF	0.12	693.00	$ 95.90	$ 11.51	$ 66,457.13	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.51	$ 66,457.13	15.00%	$ 76,425.70
09.05	*Chip deteriorated concrete, bush hammer*	5775.00	SF	0.44	2564.10	$ 95.90	$ 42.58	$ 245,891.38	$ -	$ -	$ 2.28	$ 13,167.00	$ -	$ -	$ 44.86	$ 259,058.38	15.00%	$ 297,917.13
09.06	*6" SS Anchored Studs, drilled/doweled w/double nut head, 12" OC*	11550.00	EA	1.01	11607.75	$ 95.90	$ 96.38	$ 1,113,156.91	$ 18.00	$ 207,900.00	$ 0.75	$ 8,662.50	$ -	$ -	$ 115.13	$ 1,329,719.41	15.00%	$ 1,529,177.33
09.07	*Mesh, 2"x2"x2.9 Galv, assumed 50% of area to need application*	2887.50	SF	0.375	1082.81	$ 95.90	$ 35.96	$ 103,839.26	$ 30.00	$ 86,625.00	$ -	$ -	$ -	$ -	$ 65.96	$ 190,464.26	15.00%	$ 219,033.90
09.08	*Sand blast rebar*	5775.00	SF	0.54	3118.50	$ 95.90	$ 51.78	$ 299,057.08	$ 2.25	$ 12,993.75	$ 4.50	$ 25,987.50	$ -	$ -	$ 58.53	$ 338,038.33	15.00%	$ 388,744.08
09.09	*Shotcrete pipe repair, 6" thick*	5775.00	SF	0.42	2425.50	$ 95.90	$ 40.28	$ 232,599.95	$ 8.25	$ 47,643.75	$ 3.75	$ 21,656.25	$ -	$ -	$ 52.28	$ 301,899.95	15.00%	$ 347,184.95
09.10	*Cleaning debris*	71.30	CY	6.00	427.78	$ 95.90	$ 575.39	$ 41,022.92	$ -	$ -	$ -	$ -	$ -	$ -	$ 575.39	$ 41,022.92	15.00%	$ 47,176.36
09.11	*Epoxy coating for exposed rebar*	5775.00	SF	0.03	173.25	$ 95.90	$ 2.88	$ 16,614.28	$ 1.05	$ 6,063.75	$ -	$ -	$ -	$ -	$ 3.93	$ 22,678.03	15.00%	$ 26,079.74

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Conner Creek Sewer System
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
Date: 10/4/2021

91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
	PAY ITEM 9: Shotcrete Spot Repairs				23478.69			$ 2,251,553.18		$ 364,777.88		$ 82,986.75		$ -				**$ 3,104,215.47**
PAY ITEM 10: Heavy Cleaning and Disposal																		
10.01	Heavy cleaning	4826.00	TON	4.000	19304.00	$ 83.08	$ 332.31	$ 1,603,751.44	$ -	$ -	$ 200.00	$ 965,200.00	$ -	$ -	$ 532.31	$ 2,568,951.44	0.00%	$ 2,568,951.44
	PAY ITEM 10: Heavy Cleaning and Disposal				19304.00			$ 1,603,751.44		$ -		$ 965,200.00		$ -				**$ 2,568,951.44**
PAY ITEM 11: Remove Obstructions																		
11.01	Remove Obstructions	11.00	EA	32.00	352.00	$ 83.08	$ 2,658.52	$ 29,243.71	$ -	$ -	$ 2,000.00	$ 22,000.00	$ -	$ -	$ 4,658.52	$ 51,243.71	0.00%	$ 51,243.71
	PAY ITEM 11: Remove Obstructions				352.00			$ 29,243.71		$ -		$ 22,000.00		$ -				**$ 51,243.71**
PAY ITEM 12: Bypass Pumping and Flow Control																		
12.01	Bypass pumping allowance	4146.00	LF		0.00	$ 98.34	$ -	$ -	$ -	$ -	$ -	$ -	$ 25.00	$ 103,650.00	$ 25.00	$ 103,650.00	0.00%	$ 103,650.00
	PAY ITEM 12: Bypass Pumping and Flow Control				0.00			$ -		$ -		$ -		$ 103,650.00				**$ 103,650.00**
PAY ITEM 13: Additional Access Structure #1																		
13.01	***Pit Excavation, 25'L x 25'W x 23'D***	***1.00***	***EA***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.02	Asphalt Demo Thickness	**0.33**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.03	Concrete Demo Thickness	**0.83**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.04	Pit Length	**25.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.05	Pit Width	**25.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.06	Pit Depth	**23.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.07	Asphalt Demo	**30.00**	SY	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.08	Sawcut Asphalt	74.00	LF	0.03	2.22	$ 82.27	$ 2.47	$ 182.64	$ 0.34	$ 25.16	$ 1.58	$ 116.92	$ -	$ -	$ 4.39	$ 324.72	0.00%	$ 324.72
13.09	Demolish Asphalt Pavement	3.33	CY	0.10	0.33	$ 77.30	$ 7.73	$ 25.77	$ -	$ -	$ 35.00	$ 116.67	$ -	$ -	$ 42.73	$ 142.43	0.00%	$ 142.43
13.10	Load/Haul/Dump Asphalt Pavement	3.67	CY	0.10	0.37	$ 72.72	$ 7.27	$ 26.66	$ -	$ -	$ 5.00	$ 18.33	$ -	$ -	$ 12.27	$ 45.00	0.00%	$ 45.00
13.11	Dispose of Debris	6.53	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.12	Concrete Demo Area	**30.00**	SY	0.00	0.00	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.13	Sawcut Concrete	74.00	LF	0.07	5.18	$ 82.27	$ 5.76	$ 426.16	$ 0.34	$ 25.16	$ 1.58	$ 116.92	$ -	$ -	$ 7.68	$ 568.24	0.00%	$ 568.24
13.14	Demolish Concrete	8.33	CY	0.09	0.71	$ 77.30	$ 6.57	$ 54.76	$ -	$ -	$ 35.00	$ 291.67	$ -	$ -	$ 41.57	$ 346.42	0.00%	$ 346.42
13.15	Load/Haul/Dump Concrete Pavement	9.17	CY	0.05	0.46	$ 72.72	$ 3.64	$ 33.33	$ -	$ -	$ 5.00	$ 45.83	$ -	$ -	$ 8.64	$ 79.16	0.00%	$ 79.16
13.16	Dispose of Debris	18.56	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.17	Excavation				0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
13.18	Sheet Piling	2300.00	SF	0.75	1725.00	$ 88.05	$ 66.04	$ 151,884.20	$ 25.00	$ 57,500.00	$ 25.00	$ 57,500.00	$ -	$ -	$ 116.04	$ 266,884.20	0.00%	$ 266,884.20
13.19	Excavating	505.40	CY	0.19	96.03	$ 88.05	$ 16.73	$ 8,455.00	$ -	$ -	$ 4.61	$ 2,329.90	$ -	$ -	$ 21.34	$ 10,784.90	0.00%	$ 10,784.90
13.20	Backfill, Machine, low density fill	232.58	CY	0.01	3.26	$ 88.05	$ 1.23	$ 286.69	$ 100.00	$ 23,257.69	$ 1.18	$ 274.44	$ -	$ -	$ 102.41	$ 23,818.83	0.00%	$ 23,818.83
13.21	Compaction	255.83	CY	0.04	9.47	$ 88.05	$ 3.26	$ 833.46	$ -	$ -	$ 2.26	$ 578.19	$ -	$ -	$ 5.52	$ 1,411.65	0.00%	$ 1,411.65
13.22	Haul Trench Spoils	631.75	CY	0.05	31.59	$ 72.72	$ 3.64	$ 2,297.08	$ -	$ -	$ 5.00	$ 3,158.76	$ -	$ -	$ 8.64	$ 5,455.84	0.00%	$ 5,455.84
13.23	Access Pit Pipe Crown Demo	1.00	EA	160.00	160.00	$ 70.23	$ 11,237.57	$ 11,237.57	$ 2,000.00	$ 2,000.00	$ 7,500.00	$ 7,500.00	$ -	$ -	$ 20,737.57	$ 20,737.57	0.00%	$ 20,737.57
13.24	Handle and Dispose of Debris	75.00	CY	0.050	3.75	$ 72.72	$ 3.64	$ 272.70	$ -	$ -	$ 5.00	$ 375.00	$ -	$ -	$ 8.64	$ 647.70	0.00%	$ 647.70
13.25	Dewatering	1.00	MONTH	240.000	240.00	$ 73.68	$ 17,683.07	$ 17,683.07	$ -	$ -	$ 29,000.00	$ 29,000.00	$ 3,000.00	$ 3,000.00	$ 49,683.07	$ 49,683.07	0.00%	$ 49,683.07
13.26					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
13.27	*Helical Piles*	0.00			0.00	$ 69.52	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
13.28	Pile Contractor Mobilization	1.00	EA	24.00	24.00	$ 94.37	$ 2,264.76	$ 2,264.76	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,264.76	$ 2,264.76	0.00%	$ 2,264.76
13.29	Test Pile Install and Setup	2.00	EA	16.00	32.00	$ 94.37	$ 1,509.84	$ 3,019.68	$ 2,500.00	$ 5,000.00	$ -	$ -	$ -	$ -	$ 4,009.84	$ 8,019.68	0.00%	$ 8,019.68
13.30	Testing and Approval of Test Piles	2.00	EA	32.00	64.00	$ 94.37	$ 3,019.68	$ 6,039.36	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,019.68	$ 6,039.36	0.00%	$ 6,039.36
13.31	Install Helical Piles	8.00	EA	12.00	96.00	$ 94.37	$ 1,132.38	$ 9,059.05	$ 1,900.00	$ 15,200.00	$ 500.00	$ 4,000.00	$ -	$ -	$ 3,532.38	$ 28,259.05	0.00%	$ 28,259.05
13.32	Grout Helical Piles	8.00	EA	2.00	16.00	$ 94.37	$ 188.73	$ 1,509.84	$ 105.00	$ 840.00	$ 50.00	$ 400.00	$ -	$ -	$ 343.73	$ 2,749.84	0.00%	$ 2,749.84
13.33	Cut Excess Casing	8.00	EA	0.75	6.00	$ 94.37	$ 70.77	$ 566.19	$ -	$ -	$ 5.00	$ 40.00	$ -	$ -	$ 75.77	$ 606.19	0.00%	$ 606.19
13.34	Micropile Inspection	32.00	HRS	1.00	32.00	$ 94.37	$ 94.37	$ 3,019.68	$ -	$ -	$ -	$ -	$ -	$ -	$ 94.37	$ 3,019.68	0.00%	$ 3,019.68
13.35	Remove Excess Debris from Pile Cap Location	8.00	EA	2.00	16.00	$ 94.37	$ 188.73	$ 1,509.84	$ -	$ -	$ -	$ -	$ -	$ -	$ 188.73	$ 1,509.84	0.00%	$ 1,509.84
13.36	Layout Casings	8.00	EA	0.50	4.00	$ 94.37	$ 47.18	$ 377.46	$ -	$ -	$ 3.50	$ 28.00	$ -	$ -	$ 50.68	$ 405.46	0.00%	$ 405.46
13.37	Final Cleanup	16.00	HRS	1.00	16.00	$ 94.37	$ 94.37	$ 1,509.84	$ -	$ -	$ -	$ -	$ -	$ -	$ 94.37	$ 1,509.84	0.00%	$ 1,509.84
13.38	Pile Contractor De-Mobilization	1.00	EA	16.00	16.00	$ 94.37	$ 1,509.84	$ 1,509.84	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,509.84	$ 1,509.84	0.00%	$ 1,509.84
13.39	Helical Piles Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 4,557.83	$ 4,557.83	$ 3,156.00	$ 3,156.00	$ 670.20	$ 670.20	$ -	$ -	$ 8,384.03	$ 8,384.03	0.00%	$ 8,384.03
13.40	*3'-0" Th Pile Caps*	192.00	SF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.41	Excavate Pile Cap	40.89	CY	0.28	11.45	$ 88.05	$ 24.65	$ 1,008.06	$ -	$ -	$ 5.90	$ 241.24	$ -	$ -	$ 30.55	$ 1,249.31	0.00%	$ 1,249.31
13.42	2' Thick Sand Base	16.59	CY	0.160	2.65	$ 77.51	$ 12.40	$ 205.78	$ 58.00	$ 962.37	$ 2.47	$ 40.98	$ -	$ -	$ 72.87	$ 1,209.14	0.00%	$ 1,209.14
13.43	Purchase Formwork Materials	252.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.00	$ 756.00	$ -	$ -	$ -	$ -	$ 3.00	$ 756.00	0.00%	$ 756.00
13.44	Install Formwork	252.00	SF	0.10	25.20	$ 69.52	$ 6.95	$ 1,751.88	$ -	$ -	$ -	$ -	$ -	$ -	$ 6.95	$ 1,751.88	0.00%	$ 1,751.88
13.45	Purchase Concrete Reinforcement, Rebar	2880.00	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 2,304.00	$ -	$ -	$ -	$ -	$ 0.80	$ 2,304.00	0.00%	$ 2,304.00
13.46	Install Rebar Reinforcement	1.44	TON	13.00	18.72	$ 91.88	$ 1,194.44	$ 1,719.99	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,194.44	$ 1,719.99	0.00%	$ 1,719.99
13.47	Purchase Delievered Ready Mix Concrete	21.33	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 2,986.67	$ -	$ -	$ -	$ -	$ 140.00	$ 2,986.67	0.00%	$ 2,986.67
13.48	Concrete Pump Truck Operator/Rental	1.00	DAY	8.00	8.00	$ 69.52	$ 556.15	$ 556.15	$ -	$ -	$ 500.00	$ 500.00	$ -	$ -	$ 1,056.15	$ 1,056.15	0.00%	$ 1,056.15
13.49	Place Concrete	21.33	CY	2.00	42.67	$ 69.52	$ 139.04	$ 2,966.15	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 2,966.15	0.00%	$ 2,966.15
13.50	Finish Concrete	192.00	SF	0.01	1.07	$ 69.52	$ 0.39	$ 74.15	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 74.15	0.00%	$ 74.15
13.51	Purchase Concrete Cure	0.32	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 7.25	$ -	$ -	$ -	$ -	$ 22.65	$ 7.25	0.00%	$ 7.25
13.52	Cure and Seal Concrete	1.92	CSF	0.33	0.63	$ 69.52	$ 22.94	$ 44.05	$ -	$ -	$ -	$ -	$ -	$ -	$ 22.94	$ 44.05	0.00%	$ 44.05
13.53	Strip Formwork	252.00	SF	0.02	5.04	$ 69.52	$ 1.39	$ 350.38	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 350.38	0.00%	$ 350.38
13.54	Hand Backfill and Machine Compact	19.56	CY	0.61	11.93	$ 88.05	$ 53.71	$ 1,050.32	$ -	$ -	$ 2.50	$ 48.89	$ -	$ -	$ 56.21	$ 1,099.21	0.00%	$ 1,099.21
13.55	Haul Excess Excavated Material From Building	21.33	CY	0.20	4.27	$ 70.23	$ 14.05	$ 299.67	$ -	$ -	$ 1.25	$ 26.67	$ -	$ -	$ 15.30	$ 326.34	0.00%	$ 326.34
13.56	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 1,503.99	$ 1,503.99	$ 1,052.44	$ 1,052.44	$ 128.67	$ 128.67	$ -	$ -	$ 2,685.10	$ 2,685.10	0.00%	$ 2,685.10
13.57	*Concrete Sidewalls*	32.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.58	Purchase Formwork Materials	1264.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 4,424.00	$ -	$ -	$ -	$ -	$ 3.50	$ 4,424.00	0.00%	$ 4,424.00
13.59	Install Formwork	1264.00	SF	0.12	151.68	$ 69.52	$ 8.34	$ 10,544.66	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 10,544.66	0.00%	$ 10,544.66
13.60	Purchase Concrete Reinforcement, Rebar	7490.37	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 5,992.30	$ -	$ -	$ -	$ -	$ 0.80	$ 5,992.30	0.00%	$ 5,992.30
13.61	Install Rebar Reinforcement	3.75	TON	20.00	74.90	$ 91.88	$ 1,837.59	$ 6,882.13	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 6,882.13	0.00%	$ 6,882.13
13.62	Purchase Delievered Ready Mix Concrete	46.81	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 6,554.07	$ -	$ -	$ -	$ -	$ 140.00	$ 6,554.07	0.00%	$ 6,554.07
13.63	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08

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91947.19 Total Hours
40 Hours Per Week
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24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
13.64	Place Concrete	46.81	CY	0.40	18.73	$ 69.52	$ 27.81	$ 1,301.81	$ -	$ -	$ -	$ -	$ -	$ -	$ 27.81	$ 1,301.81	0.00%	$ 1,301.81
13.65	Finish Concrete	192.00	SF	0.00	0.51	$ 69.52	$ 0.19	$ 35.59	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.19	$ 35.59	0.00%	$ 35.59
13.66	Purchase Concrete Cure	0.32	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 7.25	$ -	$ -	$ -	$ -	$ 22.65	$ 7.25	0.00%	$ 7.25
13.67	Cure and Seal Concrete	1.92	CSF	0.17	0.33	$ 70.23	$ 11.94	$ 22.92	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.94	$ 22.92	0.00%	$ 22.92
13.68	Strip Formwork	1264.00	SF	0.02	25.28	$ 69.52	$ 1.39	$ 1,757.44	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 1,757.44	0.00%	$ 1,757.44
13.69	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 3,123.40	$ 3,123.40	$ 2,546.64	$ 2,546.64	$ 37.50	$ 37.50	$ -	$ -	$ 5,707.54	$ 5,707.54	0.00%	$ 5,707.54
13.70	*Concrete Endwalls*	32.34	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.71	Purchase Formwork Materials	711.48	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 2,490.18	$ -	$ -	$ -	$ -	$ 3.50	$ 2,490.18	0.00%	$ 2,490.18
13.72	Install Formwork	711.48	SF	0.12	85.38	$ 69.52	$ 8.34	$ 5,935.38	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 5,935.38	0.00%	$ 5,935.38
13.73	Purchase Concrete Reinforcement, Rebar	4216.18	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 3,372.94	$ -	$ -	$ -	$ -	$ 0.80	$ 3,372.94	0.00%	$ 3,372.94
13.74	Install Rebar Reinforcement	2.11	TON	20.00	42.16	$ 91.88	$ 1,837.59	$ 3,873.81	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 3,873.81	0.00%	$ 3,873.81
13.75	Purchase Delievered Ready Mix Concrete	26.35	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 3,689.16	$ -	$ -	$ -	$ -	$ 140.00	$ 3,689.16	0.00%	$ 3,689.16
13.76	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
13.77	Place Concrete	26.35	CY	0.40	10.54	$ 69.52	$ 27.81	$ 732.76	$ -	$ -	$ -	$ -	$ -	$ -	$ 27.81	$ 732.76	0.00%	$ 732.76
13.78	Finish Concrete	194.04	SF	0.00	0.52	$ 69.52	$ 0.19	$ 35.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.19	$ 35.97	0.00%	$ 35.97
13.79	Purchase Concrete Cure	0.32	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 7.33	$ -	$ -	$ -	$ -	$ 22.65	$ 7.33	0.00%	$ 7.33
13.80	Cure and Seal Concrete	1.94	CSF	0.17	0.33	$ 70.23	$ 11.94	$ 23.17	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.94	$ 23.17	0.00%	$ 23.17
13.81	Strip Formwork	711.48	SF	0.02	14.23	$ 69.52	$ 1.39	$ 989.23	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 989.23	0.00%	$ 989.23
13.82	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 1,780.26	$ 1,780.26	$ 1,433.94	$ 1,433.94	$ 37.50	$ 37.50	$ -	$ -	$ 3,251.70	$ 3,251.70	0.00%	$ 3,251.70
13.83	*Section "D" Beams @ Endwalls*	39.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.84	Purchase Formwork Materials	234.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.00	$ 702.00	$ -	$ -	$ -	$ -	$ 3.00	$ 702.00	0.00%	$ 702.00
13.85	Install Formwork	234.00	SF	0.10	23.40	$ 69.52	$ 6.95	$ 1,626.75	$ -	$ -	$ -	$ -	$ -	$ -	$ 6.95	$ 1,626.75	0.00%	$ 1,626.75
13.86	Purchase Concrete Reinforcement, Rebar	1560.00	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 1,248.00	$ -	$ -	$ -	$ -	$ 0.80	$ 1,248.00	0.00%	$ 1,248.00
13.87	Install Rebar Reinforcement	0.78	TON	13.00	10.14	$ 91.88	$ 1,194.44	$ 931.66	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,194.44	$ 931.66	0.00%	$ 931.66
13.88	Purchase Delievered Ready Mix Concrete	8.67	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 1,213.33	$ -	$ -	$ -	$ -	$ 140.00	$ 1,213.33	0.00%	$ 1,213.33
13.89	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
13.90	Place Concrete	8.67	CY	0.40	3.47	$ 69.52	$ 27.81	$ 241.00	$ -	$ -	$ -	$ -	$ -	$ -	$ 27.81	$ 241.00	0.00%	$ 241.00
13.91	Finish Concrete	231.00	SF	0.00	0.62	$ 69.52	$ 0.19	$ 42.82	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.19	$ 42.82	0.00%	$ 42.82
13.92	Purchase Concrete Cure	0.36	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 8.10	$ -	$ -	$ -	$ -	$ 22.65	$ 8.10	0.00%	$ 8.10
13.93	Cure and Seal Concrete	2.15	CSF	0.17	0.36	$ 69.52	$ 11.82	$ 25.35	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.82	$ 25.35	0.00%	$ 25.35
13.94	Strip Formwork	234.00	SF	0.02	4.68	$ 69.52	$ 1.39	$ 325.35	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 325.35	0.00%	$ 325.35
13.95	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 520.65	$ 520.65	$ 475.71	$ 475.71	$ 37.50	$ 37.50	$ -	$ -	$ 1,033.87	$ 1,033.87	0.00%	$ 1,033.87
13.96					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
13.97	*Section "A" Beams, Endwall to Endwall, 14' L x 18" W x 2' H Precast*	2.00	EA	8.00	16.00	$ 69.52	$ 556.15	$ 1,112.31	$ 5,000.00	$ 10,000.00	$ 500.00	$ 1,000.00	$ -	$ -	$ 6,056.15	$ 12,112.31	0.00%	$ 12,112.31
13.98					0.00	$ 69.52	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
13.99	*Permanent Top Slabs*	186.56	SF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
13.100	Elevated Slab Forms	91.92	SF	0.15	13.79	$ 69.52	$ 10.43	$ 958.53	$ 6.00	$ 551.52	$ -	$ -	$ -	$ -	$ 16.43	$ 1,510.05	0.00%	$ 1,510.05
13.101	Purchase Edge Formwork Materials	102.16	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.00	$ 306.49	$ -	$ -	$ -	$ -	$ 3.00	$ 306.49	0.00%	$ 306.49
13.102	Install Edge Formwork	102.16	SF	0.10	10.22	$ 69.52	$ 6.95	$ 710.24	$ -	$ -	$ -	$ -	$ -	$ -	$ 6.95	$ 710.24	0.00%	$ 710.24
13.103	Purchase Concrete Reinforcement, Rebar	3233.71	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 2,586.97	$ -	$ -	$ -	$ -	$ 0.80	$ 2,586.97	0.00%	$ 2,586.97
13.104	Install Rebar Reinforcement	1.62	TON	13.00	21.02	$ 91.88	$ 1,194.44	$ 1,931.23	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,194.44	$ 1,931.23	0.00%	$ 1,931.23
13.105	Purchase Delievered Ready Mix Concrete	8.08	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 1,131.80	$ -	$ -	$ -	$ -	$ 140.00	$ 1,131.80	0.00%	$ 1,131.80
13.106	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
13.107	Place Concrete	8.08	CY	0.32	2.59	$ 69.52	$ 22.25	$ 179.84	$ -	$ -	$ -	$ -	$ -	$ -	$ 22.25	$ 179.84	0.00%	$ 179.84
13.108	Finish Concrete	186.56	SF	0.00	0.75	$ 69.52	$ 0.28	$ 51.88	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.28	$ 51.88	0.00%	$ 51.88
13.109	Purchase Concrete Cure	0.31	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 7.04	$ -	$ -	$ -	$ -	$ 22.65	$ 7.04	0.00%	$ 7.04
13.110	Cure and Seal Concrete	1.87	CSF	0.17	0.32	$ 69.52	$ 11.82	$ 22.05	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.82	$ 22.05	0.00%	$ 22.05
13.111	Strip Formwork	194.08	SF	0.02	3.88	$ 69.52	$ 1.39	$ 269.85	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 269.85	0.00%	$ 269.85
13.112	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 619.78	$ 619.78	$ 687.57	$ 687.57	$ 37.50	$ 37.50	$ -	$ -	$ 1,344.85	$ 1,344.85	0.00%	$ 1,344.85
13.113					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
13.114	*Removable Panel. 16' x 9' x 14", Precast*	1.00	EA	24.00	24.00	$ 69.52	$ 1,668.46	$ 1,668.46	$ 20,000.00	$ 20,000.00	$ 1,000.00	$ 1,000.00	$ -	$ -	$ 22,668.46	$ 22,668.46	0.00%	$ 22,668.46
13.115					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
13.116	Allowance for Bearing Pads, Joint Sealant, Construction Joints, and Waterstop	1.00	ALLOW		0.00	$ 94.33	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	0.00%	$ 5,000.00
13.117					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
13.118	Manhole Cover/Frames	4.00	EA	4.00	16.00	$ 79.94	$ 319.75	$ 1,279.00	$ 650.00	$ 2,600.00	$ -	$ -	$ -	$ -	$ 969.75	$ 3,879.00	0.00%	$ 3,879.00
	PAY ITEM 13: Additional Access Structure #1				3323.79			$ 290,840.63		$ 187,109.08		$ 110,697.28		$ 8,000.00				**$ 596,646.99**
PAY ITEM 14: Additional Access Structure #2																		
14.01	***Pit Excavation, 20'L x 20'W x 8'D***	***1.00***	***EA***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.02	Asphalt Demo Thickness	**0.33**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.03	Concrete Demo Thickness	**0.83**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.04	Pit Length	**20.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.05	Pit Width	**20.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.06	Pit Depth	**8.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.07	Asphalt Demo	**53.78**	SY	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.08	Sawcut Asphalt	80.00	LF	0.03	2.40	$ 82.27	$ 2.47	$ 197.45	$ 0.34	$ 27.20	$ 1.58	$ 126.40	$ -	$ -	$ 4.39	$ 351.05	0.00%	$ 351.05
14.09	Demolish Asphalt Pavement	5.98	CY	0.10	0.60	$ 77.30	$ 7.73	$ 46.19	$ -	$ -	$ 35.00	$ 209.14	$ -	$ -	$ 42.73	$ 255.33	0.00%	$ 255.33
14.10	Load/Haul/Dump Asphalt Pavement	6.57	CY	0.10	0.66	$ 72.72	$ 7.27	$ 47.80	$ -	$ -	$ 5.00	$ 32.86	$ -	$ -	$ 12.27	$ 80.66	0.00%	$ 80.66
14.11	Dispose of Debris	11.70	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.12	Concrete Demo Area	**53.78**	SY	0.00	0.00	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.13	Sawcut Concrete	80.00	LF	0.07	5.60	$ 82.27	$ 5.76	$ 460.71	$ 0.34	$ 27.20	$ 1.58	$ 126.40	$ -	$ -	$ 7.68	$ 614.31	0.00%	$ 614.31
14.14	Demolish Concrete	14.94	CY	0.09	1.27	$ 77.30	$ 6.57	$ 98.16	$ -	$ -	$ 35.00	$ 522.84	$ -	$ -	$ 41.57	$ 621.00	0.00%	$ 621.00
14.15	Load/Haul/Dump Concrete Pavement	16.43	CY	0.05	0.82	$ 72.72	$ 3.64	$ 59.75	$ -	$ -	$ 5.00	$ 82.16	$ -	$ -	$ 8.64	$ 141.91	0.00%	$ 141.91
14.16	Dispose of Debris	33.28	TON	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Conner Creek Sewer System
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
Date: 10/4/2021

91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
14.17	Excavation				0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
14.18	Sheet Piling	640.00	SF	0.75	480.00	$ 88.05	$ 66.04	$ 42,263.43	$ 25.00	$ 16,000.00	$ 25.00	$ 16,000.00	$ -	$ -	$ 116.04	$ 74,263.43	0.00%	$ 74,263.43
14.19	Excavating	101.23	CY	0.19	19.23	$ 88.05	$ 16.73	$ 1,693.58	$ -	$ -	$ 4.61	$ 466.69	$ -	$ -	$ 21.34	$ 2,160.27	0.00%	$ 2,160.27
14.20	Backfill, Machine, low density fill	77.96	CY	0.01	1.09	$ 88.05	$ 1.23	$ 96.10	$ 100.00	$ 7,796.35	$ 1.18	$ 92.00	$ -	$ -	$ 102.41	$ 7,984.45	0.00%	$ 7,984.45
14.21	Compaction	85.76	CY	0.04	3.17	$ 88.05	$ 3.26	$ 279.39	$ -	$ -	$ 2.26	$ 193.82	$ -	$ -	$ 5.52	$ 473.21	0.00%	$ 473.21
14.22	Haul Trench Spoils	126.54	CY	0.05	6.33	$ 72.72	$ 3.64	$ 460.12	$ -	$ -	$ 5.00	$ 632.72	$ -	$ -	$ 8.64	$ 1,092.83	0.00%	$ 1,092.83
14.23	Access Pit Pipe Crown Demo	1.00	EA	160.00	160.00	$ 70.23	$ 11,237.57	$ 11,237.57	$ 2,000.00	$ 2,000.00	$ 7,500.00	$ 7,500.00	$ -	$ -	$ 20,737.57	$ 20,737.57	0.00%	$ 20,737.57
14.24	Handle and Dispose of Debris	60.00	CY	0.050	3.00	$ 72.72	$ 3.64	$ 218.16	$ -	$ -	$ 5.00	$ 300.00	$ -	$ -	$ 8.64	$ 518.16	0.00%	$ 518.16
14.25	Dewatering	1.00	MONTH	240.000	240.00	$ 73.68	$ 17,683.07	$ 17,683.07	$ -	$ -	$ 29,000.00	$ 29,000.00	$ 3,000.00	$ 3,000.00	$ 49,683.07	$ 49,683.07	0.00%	$ 49,683.07
14.26					0.00	$ 104.54	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
14.27	*Concrete Ring Beam*	33.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
14.28	Purchase Formwork Materials	151.58	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 530.54	$ -	$ -	$ -	$ -	$ 3.50	$ 530.54	0.00%	$ 530.54
14.29	Install Formwork	151.58	SF	0.12	18.19	$ 69.52	$ 8.34	$ 1,264.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 1,264.54	0.00%	$ 1,264.54
14.30	Purchase Concrete Reinforcement, Rebar	880.00	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 704.00	$ -	$ -	$ -	$ -	$ 0.80	$ 704.00	0.00%	$ 704.00
14.31	Install Rebar Reinforcement	0.44	TON	20.00	8.80	$ 91.88	$ 1,837.59	$ 808.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 808.54	0.00%	$ 808.54
14.32	Purchase Delievered Ready Mix Concrete	4.89	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 684.44	$ -	$ -	$ -	$ -	$ 140.00	$ 684.44	0.00%	$ 684.44
14.33	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
14.34	Place Concrete	4.89	CY	2.00	9.78	$ 69.52	$ 139.04	$ 679.74	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 679.74	0.00%	$ 679.74
14.35	Finish Concrete	198.00	SF	0.01	1.10	$ 69.52	$ 0.39	$ 76.47	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 76.47	0.00%	$ 76.47
14.36	Purchase Concrete Cure	0.33	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 7.47	$ -	$ -	$ -	$ -	$ 22.65	$ 7.47	0.00%	$ 7.47
14.37	Cure and Seal Concrete	1.98	CSF	0.33	0.65	$ 70.23	$ 23.18	$ 45.89	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 45.89	0.00%	$ 45.89
14.38	Strip Formwork	151.58	SF	0.02	3.03	$ 69.52	$ 1.39	$ 210.76	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 210.76	0.00%	$ 210.76
14.39	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 504.60	$ 504.60	$ 288.97	$ 288.97	$ 37.50	$ 37.50	$ -	$ -	$ 831.07	$ 831.07	0.00%	$ 831.07
14.40					0.00	$ 104.54	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
14.41	*Removable Panel, 10' Dia x 18", Precast*	1.00	EA	24.00	24.00	$ 69.52	$ 1,668.46	$ 1,668.46	$ 20,000.00	$ 20,000.00	$ 1,000.00	$ 1,000.00	$ -	$ -	$ 22,668.46	$ 22,668.46	0.00%	$ 22,668.46
14.42					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
14.43	Allowance for Bearing Pads, Joint Sealant, Construction Joints, and Waterstop	1.00	ALLOW		0.00	$ 94.33	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	0.00%	$ 5,000.00
14.44					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
14.45	Manhole Cover/Frames	1.00	EA	4.00	4.00	$ 79.94	$ 319.75	$ 319.75	$ 650.00	$ 650.00	$ -	$ -	$ -	$ -	$ 969.75	$ 969.75	0.00%	$ 969.75
	PAY ITEM 14: Additional Access Structure #2				997.73			$ 80,698.31		$ 48,716.17		$ 56,572.52		$ 8,000.00				**$ 193,987.01**
PAY ITEM 15: Additional Access Structure #3																		
15.01	***Pit Excavation, 33'L x 19'W x 16'D***	***1.00***	***EA***		0.00	$ 94.12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.02	Asphalt Demo Thickness	**0.00**	LF	0.00	0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.03	Concrete Demo Thickness	**0.00**	LF	0.00	0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.04	Pit Length	**33.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.05	Pit Width	**19.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.06	Pit Depth	**16.00**	LF	0.00	0.00	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.07	Asphalt Demo	**0.00**	SY	0.00	0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.08	Sawcut Asphalt	0.00	LF	0.03	0.00	$ 82.27	#DIV/0!	$ -	$ 0.34	$ -	$ 1.58	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.09	Demolish Asphalt Pavement	0.00	CY	0.10	0.00	$ 77.30	#DIV/0!	$ -	$ -	$ -	$ 35.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.10	Load/Haul/Dump Asphalt Pavement	0.00	CY	0.10	0.00	$ 72.72	#DIV/0!	$ -	$ -	$ -	$ 5.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.11	Dispose of Debris	0.00	TON	0.00	0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.12	Concrete Demo Area	**0.00**	SY	0.00	0.00	$ 88.05	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.13	Sawcut Concrete	0.00	LF	0.07	0.00	$ 82.27	#DIV/0!	$ -	$ 0.34	$ -	$ 1.58	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.14	Demolish Concrete	0.00	CY	0.09	0.00	$ 77.30	#DIV/0!	$ -	$ -	$ -	$ 35.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.15	Load/Haul/Dump Concrete Pavement	0.00	CY	0.05	0.00	$ 72.72	#DIV/0!	$ -	$ -	$ -	$ 5.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.16	Dispose of Debris	0.00	TON	0.00	0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.17	Excavation				0.00	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.18	Sheet Piling	1664.00	SF	0.75	1248.00	$ 88.05	$ 66.04	$ 109,884.92	$ 25.00	$ 41,600.00	$ 25.00	$ 41,600.00	$ -	$ -	$ 116.04	$ 193,084.92	0.00%	$ 193,084.92
15.19	Excavating	371.56	CY	0.19	70.60	$ 88.05	$ 16.73	$ 6,215.85	$ -	$ -	$ 4.61	$ 1,712.87	$ -	$ -	$ 21.34	$ 7,928.73	0.00%	$ 7,928.73
15.20	Backfill, Machine, site soil	116.71	CY	0.01	1.63	$ 88.05	$ 1.23	$ 143.87	$ -	$ -	$ 1.18	$ 137.72	$ -	$ -	$ 2.41	$ 281.59	0.00%	$ 281.59
15.21	Compaction	128.38	CY	0.04	4.75	$ 88.05	$ 3.26	$ 418.24	$ -	$ -	$ 2.26	$ 290.14	$ -	$ -	$ 5.52	$ 708.39	0.00%	$ 708.39
15.22	Haul Trench Spoils	464.44	CY	0.05	23.22	$ 72.72	$ 3.64	$ 1,688.74	$ -	$ -	$ 5.00	$ 2,322.22	$ -	$ -	$ 8.64	$ 4,010.96	0.00%	$ 4,010.96
15.23	Access Pit Pipe Crown Demo	1.00	EA	160.00	160.00	$ 70.23	$ 11,237.57	$ 11,237.57	$ 2,000.00	$ 2,000.00	$ 7,500.00	$ 7,500.00	$ -	$ -	$ 20,737.57	$ 20,737.57	0.00%	$ 20,737.57
15.24	Handle and Dispose of Debris	99.00	CY	0.050	4.95	$ 72.72	$ 3.64	$ 359.97	$ -	$ -	$ 5.00	$ 495.00	$ -	$ -	$ 8.64	$ 854.97	0.00%	$ 854.97
15.25	Dewatering	1.00	MONTH	240.000	240.00	$ 73.68	$ 17,683.07	$ 17,683.07	$ -	$ -	$ 29,000.00	$ 29,000.00	$ 3,000.00	$ 3,000.00	$ 49,683.07	$ 49,683.07	0.00%	$ 49,683.07
15.26					0.00	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.27	Drill and Epoxy for Starter Bars @ Sidewalls, Endwalls, and Divider Beam	214.00	EA	0.10	21.40	$ 91.88	$ 9.19	$ 1,966.22	$ 3.00	$ 642.00	$ -	$ -	$ -	$ -	$ 12.19	$ 2,608.22	0.00%	$ 2,608.22
15.28					0.00	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.29	*Perimeter Beams @ Sidewalls and Endwalls*	80.66	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.30	Purchase Formwork Materials	483.96	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.00	$ 1,451.88	$ -	$ -	$ -	$ -	$ 3.00	$ 1,451.88	0.00%	$ 1,451.88
15.31	Install Formwork	483.96	SF	0.10	48.40	$ 69.52	$ 6.95	$ 3,364.45	$ -	$ -	$ -	$ -	$ -	$ -	$ 6.95	$ 3,364.45	0.00%	$ 3,364.45
15.32	Purchase Concrete Reinforcement, Rebar	2694.04	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 2,155.24	$ -	$ -	$ -	$ -	$ 0.80	$ 2,155.24	0.00%	$ 2,155.24
15.33	Install Rebar Reinforcement	1.35	TON	13.00	17.51	$ 91.88	$ 1,194.44	$ 1,608.93	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,194.44	$ 1,608.93	0.00%	$ 1,608.93
15.34	Purchase Delievered Ready Mix Concrete	14.97	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 2,095.37	$ -	$ -	$ -	$ -	$ 140.00	$ 2,095.37	0.00%	$ 2,095.37
15.35	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
15.36	Place Concrete	14.97	CY	2.00	29.93	$ 69.52	$ 139.04	$ 2,080.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 2,080.97	0.00%	$ 2,080.97
15.37	Finish Concrete	231.00	SF	0.01	1.28	$ 69.52	$ 0.39	$ 89.22	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 89.22	0.00%	$ 89.22
15.38	Purchase Concrete Cure	0.74	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 16.75	$ -	$ -	$ -	$ -	$ 22.65	$ 16.75	0.00%	$ 16.75
15.39	Cure and Seal Concrete	4.44	CSF	0.33	1.46	$ 69.52	$ 22.94	$ 101.77	$ -	$ -	$ -	$ -	$ -	$ -	$ 22.94	$ 101.77	0.00%	$ 101.77
15.40	Strip Formwork	483.96	SF	0.02	9.68	$ 69.52	$ 1.39	$ 672.89	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 672.89	0.00%	$ 672.89
15.41	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 1,229.45	$ 1,229.45	$ 857.88	$ 857.88	$ 37.50	$ 37.50	$ -	$ -	$ 2,124.83	$ 2,124.83	0.00%	$ 2,124.83
15.42					0.00	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Conner Creek Sewer System
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
Date: 10/4/2021

91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
15.43	*Divider Beam*	11.67	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.44	Purchase Formwork Materials	70.02	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.00	$ 210.06	$ -	$ -	$ -	$ -	$ 3.00	$ 210.06	0.00%	$ 210.06
15.45	Install Formwork	70.02	SF	0.10	7.00	$ 69.52	$ 6.95	$ 486.77	$ -	$ -	$ -	$ -	$ -	$ -	$ 6.95	$ 486.77	0.00%	$ 486.77
15.46	Purchase Concrete Reinforcement, Rebar	310.42	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 248.34	$ -	$ -	$ -	$ -	$ 0.80	$ 248.34	0.00%	$ 248.34
15.47	Install Rebar Reinforcement	0.16	TON	13.00	2.02	$ 91.88	$ 1,194.44	$ 185.39	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,194.44	$ 185.39	0.00%	$ 185.39
15.48	Purchase Delievered Ready Mix Concrete	1.72	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 241.44	$ -	$ -	$ -	$ -	$ 140.00	$ 241.44	0.00%	$ 241.44
15.49	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
15.50	Place Concrete	1.72	CY	2.00	3.45	$ 69.52	$ 139.04	$ 239.78	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 239.78	0.00%	$ 239.78
15.51	Finish Concrete	231.00	SF	0.01	1.28	$ 69.52	$ 0.39	$ 89.22	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 89.22	0.00%	$ 89.22
15.52	Purchase Concrete Cure	0.11	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.42	$ -	$ -	$ -	$ -	$ 22.65	$ 2.42	0.00%	$ 2.42
15.53	Cure and Seal Concrete	0.64	CSF	0.33	0.21	$ 69.52	$ 22.94	$ 14.72	$ -	$ -	$ -	$ -	$ -	$ -	$ 22.94	$ 14.72	0.00%	$ 14.72
15.54	Strip Formwork	70.02	SF	0.02	1.40	$ 69.52	$ 1.39	$ 97.35	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 97.35	0.00%	$ 97.35
15.55	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 208.70	$ 208.70	$ 105.34	$ 105.34	$ 37.50	$ 37.50	$ -	$ -	$ 351.54	$ 351.54	0.00%	$ 351.54
15.56					0.00	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.57	*Concrete Sidewalls*	30.00	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.58	Purchase Formwork Materials	705.00	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 2,467.50	$ -	$ -	$ -	$ -	$ 3.50	$ 2,467.50	0.00%	$ 2,467.50
15.59	Install Formwork	705.00	SF	0.12	84.60	$ 69.52	$ 8.34	$ 5,881.32	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 5,881.32	0.00%	$ 5,881.32
15.60	Purchase Concrete Reinforcement, Rebar	3488.44	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 2,790.76	$ -	$ -	$ -	$ -	$ 0.80	$ 2,790.76	0.00%	$ 2,790.76
15.61	Install Rebar Reinforcement	1.74	TON	20.00	34.88	$ 91.88	$ 1,837.59	$ 3,205.17	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 3,205.17	0.00%	$ 3,205.17
15.62	Purchase Delievered Ready Mix Concrete	21.80	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 3,052.39	$ -	$ -	$ -	$ -	$ 140.00	$ 3,052.39	0.00%	$ 3,052.39
15.63	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
15.64	Place Concrete	21.80	CY	2.00	43.61	$ 69.52	$ 139.04	$ 3,031.42	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 3,031.42	0.00%	$ 3,031.42
15.65	Finish Concrete	180.00	SF	0.05	9.00	$ 69.52	$ 3.48	$ 625.67	$ -	$ -	$ -	$ -	$ -	$ -	$ 3.48	$ 625.67	0.00%	$ 625.67
15.66	Purchase Concrete Cure	0.30	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 6.80	$ -	$ -	$ -	$ -	$ 22.65	$ 6.80	0.00%	$ 6.80
15.67	Cure and Seal Concrete	1.80	CSF	0.33	0.59	$ 70.23	$ 23.18	$ 41.72	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 41.72	0.00%	$ 41.72
15.68	Strip Formwork	705.00	SF	0.02	14.10	$ 69.52	$ 1.39	$ 980.22	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 980.22	0.00%	$ 980.22
15.69	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 2,106.54	$ 2,106.54	$ 1,247.62	$ 1,247.62	$ 37.50	$ 37.50	$ -	$ -	$ 3,391.66	$ 3,391.66	0.00%	$ 3,391.66
15.70	*Concrete Endwalls*	50.66	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.71	Purchase Formwork Materials	1190.51	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 4,166.79	$ -	$ -	$ -	$ -	$ 3.50	$ 4,166.79	0.00%	$ 4,166.79
15.72	Install Formwork	1190.51	SF	0.12	142.86	$ 69.52	$ 8.34	$ 9,931.59	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 9,931.59	0.00%	$ 9,931.59
15.73	Purchase Concrete Reinforcement, Rebar	5890.82	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 4,712.66	$ -	$ -	$ -	$ -	$ 0.80	$ 4,712.66	0.00%	$ 4,712.66
15.74	Install Rebar Reinforcement	2.95	TON	20.00	58.91	$ 91.88	$ 1,837.59	$ 5,412.46	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 5,412.46	0.00%	$ 5,412.46
15.75	Purchase Delievered Ready Mix Concrete	36.82	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 5,154.47	$ -	$ -	$ -	$ -	$ 140.00	$ 5,154.47	0.00%	$ 5,154.47
15.76	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
15.77	Place Concrete	36.82	CY	2.00	73.64	$ 69.52	$ 139.04	$ 5,119.06	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 5,119.06	0.00%	$ 5,119.06
15.78	Finish Concrete	303.96	SF	0.01	1.69	$ 69.52	$ 0.39	$ 117.39	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 117.39	0.00%	$ 117.39
15.79	Purchase Concrete Cure	0.51	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 11.47	$ -	$ -	$ -	$ -	$ 22.65	$ 11.47	0.00%	$ 11.47
15.80	Cure and Seal Concrete	3.04	CSF	0.33	1.00	$ 70.23	$ 23.18	$ 70.45	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 70.45	0.00%	$ 70.45
15.81	Strip Formwork	1190.51	SF	0.02	23.81	$ 69.52	$ 1.39	$ 1,655.26	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 1,655.26	0.00%	$ 1,655.26
15.82	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 3,387.64	$ 3,387.64	$ 2,106.81	$ 2,106.81	$ 37.50	$ 37.50	$ -	$ -	$ 5,531.95	$ 5,531.95	0.00%	$ 5,531.95
15.83					0.00	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.84	*Concrete Divider Wall*	11.67	LF		0.00	$ 69.52	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
15.85	Purchase Formwork Materials	274.25	SF	0.00	0.00	$ 69.52	$ -	$ -	$ 3.50	$ 959.86	$ -	$ -	$ -	$ -	$ 3.50	$ 959.86	0.00%	$ 959.86
15.86	Install Formwork	274.25	SF	0.12	32.91	$ 69.52	$ 8.34	$ 2,287.83	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.34	$ 2,287.83	0.00%	$ 2,287.83
15.87	Purchase Concrete Reinforcement, Rebar	1080.73	LBS	0.00	0.00	$ 69.52	$ -	$ -	$ 0.80	$ 864.58	$ -	$ -	$ -	$ -	$ 0.80	$ 864.58	0.00%	$ 864.58
15.88	Install Rebar Reinforcement	0.54	TON	20.00	10.81	$ 91.88	$ 1,837.59	$ 992.97	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,837.59	$ 992.97	0.00%	$ 992.97
15.89	Purchase Delievered Ready Mix Concrete	6.75	CY	0.00	0.00	$ 69.52	$ -	$ -	$ 140.00	$ 945.64	$ -	$ -	$ -	$ -	$ 140.00	$ 945.64	0.00%	$ 945.64
15.90	Concrete Pump Truck Operator/Rental	0.50	DAY	8.00	4.00	$ 69.52	$ 556.15	$ 278.08	$ -	$ -	$ 500.00	$ 250.00	$ -	$ -	$ 1,056.15	$ 528.08	0.00%	$ 528.08
15.91	Place Concrete	6.75	CY	2.00	13.51	$ 69.52	$ 139.04	$ 939.14	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.04	$ 939.14	0.00%	$ 939.14
15.92	Finish Concrete	70.02	SF	0.01	0.39	$ 69.52	$ 0.39	$ 27.04	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.39	$ 27.04	0.00%	$ 27.04
15.93	Purchase Concrete Cure	0.12	GAL	0.00	0.00	$ 69.52	$ -	$ -	$ 22.65	$ 2.64	$ -	$ -	$ -	$ -	$ 22.65	$ 2.64	0.00%	$ 2.64
15.94	Cure and Seal Concrete	0.70	CSF	0.33	0.23	$ 70.23	$ 23.18	$ 16.23	$ -	$ -	$ -	$ -	$ -	$ -	$ 23.18	$ 16.23	0.00%	$ 16.23
15.95	Strip Formwork	274.25	SF	0.02	5.48	$ 69.52	$ 1.39	$ 381.31	$ -	$ -	$ -	$ -	$ -	$ -	$ 1.39	$ 381.31	0.00%	$ 381.31
15.96	Concrete Subcontractor Overhead and Profit	1.00	LS	0.00	0.00	$ 94.37	$ 738.39	$ 738.39	$ 415.91	$ 415.91	$ 37.50	$ 37.50	$ -	$ -	$ 1,191.80	$ 1,191.80	0.00%	$ 1,191.80
15.97					0.00	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.98	*Removable Panel, 14'-3 1/2" x 15' x 20", Precast*	2.00	EA	24.00	48.00	$ 69.52	$ 1,668.46	$ 3,336.92	$ 20,000.00	$ 40,000.00	$ 1,000.00	$ 2,000.00	$ -	$ -	$ 22,668.46	$ 45,336.92	0.00%	$ 45,336.92
15.99					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.100	Allowance for Bearing Pads, Joint Sealant, Construction Joints, and Waterstop	1.00	ALLOW		0.00	$ 94.33	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	0.00%	$ 5,000.00
15.101					0.00	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
15.102	Access Hatch Cover/Frames	2.00	EA	4.00	8.00	$ 79.94	$ 319.75	$ 639.50	$ 2,500.00	$ 5,000.00	$ -	$ -	$ -	$ -	$ 2,819.75	$ 5,639.50	0.00%	$ 5,639.50
	PAY ITEM 15: Additional Access Structure #3				2526.21			$ 212,383.71		$ 125,532.59		$ 86,495.46		$ 8,000.00				**$ 432,411.76**
PAY ITEM 16: Underdrain Cleaning																		
16.01	Underdrain Cleaning	3936.00	LF	0.004	15.74	$ 79.94	$ 0.32	$ 1,258.53	$ -	$ -	$ 3.00	$ 11,808.00	$ -	$ -	3.319749342	$ 13,066.53	0.00%	$ 13,066.53
	PAY ITEM 16: Underdrain Cleaning				15.74			$ 1,258.53		$ -		$ 11,808.00		$ -				**$ 13,066.53**
PAY ITEM 17: Removal and Replacement of Underdrain Backflow Control Valves																		
17.01	Replace 12" Duckbill valve	9.00	EA	12.00	108.00	$ 83.08	$ 996.94	$ 8,972.50	$ 2,500.00	$ 22,500.00	$ 500.00	$ 4,500.00	$ -	$ -	$ 3,996.94	$ 35,972.50	0.00%	$ 35,972.50
	PAY ITEM 17: Removal and Replacement of Underdrain				108.00			$ 8,972.50		$ 22,500.00		$ 4,500.00		$ -				**$ 35,972.50**
PAY ITEM 18: Post Construction CCTV Inspection																		
18.01	Sewer, video inspection, 42", 96", and 132"	4146.00	LF	0.05	207.30	$ 70.23	$ 3.51	$ 14,559.68	$ -	$ -	$ 1.60	$ 6,633.60	$ -	$ -	$ 5.11	$ 21,193.28	0.00%	$ 21,193.28
	PAY ITEM 18: Post Construction CCTV Inspection				207.30			$ 14,559.68		$ -		$ 6,633.60		$ -				**$ 21,193.28**
PAY ITEM 19: Warranty 1-Year Post Construction CCTV Inspection for Entire Connors Creek Sewer System																		
19.01	Warranty 1-Year Post CCTV Inspection, Entire Connors Creek	73210.00	LF		0.00	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
19.02	Sewer, video inspection	73210.00	LF	0.05	3660.50	$ 70.23	$ 3.51	$ 257,094.54	$ -	$ -	$ 1.60	$ 117,136.00	$ -	$ -	$ 5.11	$ 374,230.54	0.00%	$ 374,230.54

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Conner Creek Sewer System
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260208
Date: 10/4/2021

91947.19 Total Hours
40 Hours Per Week
2298.679772 Total Man Weeks
24 Crew Size

96 Duration (Weeks - Excludes Standby Days)
30 Duration (Months - Includes Standby Days)

13.00 Estimate Detail

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
	PAY ITEM 19: Warranty 1-Year Post Construction CCTV				3660.50			$ 257,094.54		$ -		$ 117,136.00		$ -				**$ 374,230.54**
PAY ITEM 20: Standby Days																		
20.01	Standby Days	150.00	DAY	24.00	3600.00	$ 95.90	$ 2,301.55	$ 345,231.84	$ -	$ -	$ 500.00	$ 75,000.00	$ -	$ -	$ 2,801.55	$ 420,231.84	0.00%	$ 420,231.84
	PAY ITEM 20: Standby Days				3600.00			$ 345,231.84		$ -		$ 75,000.00		$ -				**$ 420,231.84**
	Sales Tax (on Material and Rental Equipment)	6.00%								$ 4,779,201.45		$ 3,928,803.25						**$ 522,480.28**

CIP Delivery Program Management Team
27777 Franklin Road, Suite 2000
Southfield, MI 48034
248 204 5900

Technical Memorandum

Subject: GLWA CIP Validation – 260205

Project

This technical memorandum relates to the following project:

- CIP No. 260205 – Rehabilitation of the Northwest Interceptor from Eight Mile to Tireman

Status/Classification

CIP No. 260205 is identified as Future Planned – Within 5 Year Plan on the 2022-2026 Board Approved CIP.

This project is currently under design by FKE Engineers and is at the 100% Design stage. It is recommended the classification be updated for the next CIP.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- CIP Portal
- 100% Design Drawings and Specifications
- Discussion with Project Manager (Mini Panicker)
- Design Contract Documents available on Bonfire

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

The design development for this project is currently complete with the 100% drawings and specifications at “bid ready” level. That level of scope definition exceeds the criteria described above.

No additional scope definition is required for planning purposes.

Cost Validation

As part of the validation effort, the AECOM team developed a construction cost estimate with the details in Appendix A at the end of this memorandum.

CIP No.	Project Description	CIP Portal Project Cost	Validated Cost (Construction cost and Engineering)*	Variance from Approved Budget
260205	NWI Rehabilitation	$10,378,828	$12,820,802	$2,441,974 (24%)

*Cost does not include GLWA Salary

The validated construction cost estimate was based on the 100% design documents and includes the following assumptions and exclusions:

Assumptions

- The estimate assumes a construction start date of 7/1/22
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that the general building permit is included in the cost estimate.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants and paid for by the owner. This cost is included in the Construction Management line item.

Exclusions

- Owner supplied and installed furniture, fixtures and equipment
- Building demolition except where noted
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
- Assessments, taxes, finance, legal and development charges
- Builder's risk, project wrap-up and other owner provided insurance program
- Modification to the scope of work since the date of the design documents outlined in this report
- Unforeseen subsurface conditions
- Restrictive technical specifications or excessive contract conditions
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule
- Land acquisition and real estate fees
- Owner's field inspection costs
- Off-site work
- Owner contingency
- Hazardous material abatement other than what is included in the detailed portion of the estimate
- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

This project does not involve the procurement of any major equipment or material, and therefore we do not anticipate any significant impact from the current market volatility.

Schedule Validation

The CIP Portal shows the construction duration as 24 months (7/1/2022 thru 6/30/2024).

Our review of the scope of work items, we observe that this project involves mainly rehabilitation of the existing pipeline and does not involve procurement of additional right-of-way or easement, nor requires extensive traffic control. Therefore, it is our opinion the degree of difficulty for the construction of this project is medium to moderate. With that premise, we suggest the following breakdown of the construction schedule:

- Mobilization – 3 Months
- Construction – 24 Months
- Allowance for weather delay – 6 months
- Project closeout activities – 3 months

This construction schedule duration coincides with the timeframe indicated in the 2022-2026 Board Approved CIP. However, it should be noted that the schedule resulting from the project alignment allows only for 2 years of construction, which might not be adequate to address any weather delays.

Project Delivery System

From the discussion with the Project Manager, it is our understanding that this project would be implemented by adopting a Design-Bid-Build delivery system. Given that the design documents are almost fully developed and near “bid ready”, we concur with the current project delivery approach.

Project Sequencing

The scope for this project involves intermittent sewer repair along the Northwest Interceptor between 8-mile and Tireman Road. Part of the sequencing of the work involves diverting the flow temporarily to allow for repairs.

This project is independent of any on-going or known future planned projects. However, there are plans for adding in-system storage devices (ISDs) to the Northwest Interceptor. Completing the repairs prior to installing the ISDs will be beneficial to the operation of the ISDs and coordinating construction of the ISDs. Currently, the ISD work is not scheduled to begin construction until 2026, 2 years after this work is scheduled to be completed.

Under present conditions, this project can be planned and implemented at the timeline indicated in the alignment documents.

100%, DRAFT
Cost Estimate
for
Rehabilitation of Northwest Interceptor from Eight Mile to Tireman
Great Lakes Water Authority
CIP 260205
September 30, 2021

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Rehabilitation of Northwest Interceptor from Eight Mile to Tireman**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205
100%, DRAFT

TABLE OF CONTENTS

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Rehabilitation of Northwest Interceptor from Eight Mile to Tireman**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205
100%, DRAFT

SCOPE OF WORK / BASIS OF ESTIMATE

1.00 Scope of Work

1.01 The work included in this project generally includes the following
-Chemical Feed and Pumping System
-Storage Building and Other Miscellaneous Work

1.02 The work involves, but is not limited to, the following:

* Site Demolition
* Replacement of chemical feed piping and pumps
* Pre-Fab Storage Building
* Miscellaneous hatch replacement, exhaust fan and louver replacement & spray bar replacement

2.00 Work Breakdown Structure (WBS)

2.01 The estimate is organized on the first level by Bid Items which include:

* Bid Item 1: Mobilization
* Bid Item 2: Flow Control
* Bid Item 3: Miscellaneous Site Work
* Bid Item 4: Traffic Control
* Bid Item 5: Engineer Directed Repairs
* Bid Item 6: Shutdown Days
* Bid Item 7: Deep Concrete Repair
* Bid Item 8: Seal Infiltration with Chemical Grout
* Bid Item 9: Replace Manhole Frame and Cover
* Bid Item 10: Remove Debris
* Bid Item 11: Tuckpointing Deteriorated Mortar
* Bid Item 12: Deteriorated Brick Repairs
* Bid Item 13: Remove Mineral Deposits and Roots
* Bid Item 14: Repair Rough Taps ≤ 24”
* Bid Item 15: Repair Rough Taps > 24” and < 48”
* Bid Item 16: Repair Rough Taps ≥ 48”
* Bid Item 17: Open Joint Repair
* Bid Item 18: Epoxy Crack Repair

3.00 Estimate Classification

3.01 *Estimate Classification: Class 2*

Stage of Design: 90%-100% Design Estimate

Similar Industry Terms for this Level of Estimate:

*Construction Documents
*Final Estimate
*Definitive Estimate
*Detailed Estimate

Accuracy Range: -10% to +10%

Project Definition: 60%-90%

Expected Project Contingency: 0%-10%

Background Information Used: Detailed estimating data from plans and specifications

End Use: Project Funding, Control Estimate, Change Alert

4.00 Estimate Markups

4.01 Cost Estimate Markups

6.90% per year to mid-point of construction 12/1/21 based on September 2021 ENR Detroit area CCI.

* General Contractor Overhead 10.00%
* General Contractor Profit 5.00%
* Bonds and Insurance 2.00%
* Construction Contingency 10.00%

AECOM
707 Grant Street
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Project: **Rehabilitation of Northwest Interceptor from Eight Mile to Tireman**
Location: Detroit, Michigan
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100%, DRAFT

SCOPE OF WORK / BASIS OF ESTIMATE

4.02 Estimate markups are indirect costs that are expressed as a lump sum or calculated as a percentage of the subtotal of the estimated construction costs. Indirect costs are costs that are required to complete a project. Direct costs are costs that are used to run the contractor's business. The following markups, at rates appropriate to the class of estimate, have been included in the cost estimate:

- Escalation: This is a provision for an increase in the cost of equipment, material, and labor above the costs specified in the contract, due to continuing price changes over time. Cost estimators analyze cost trends in local and national market conditions to temper and forecast escalation percentages. These factors are used to escalate project costs in current dollars to the expected mid-point of construction.

- General Contractor/Subcontractor Overhead: This markup accounts for costs associated with office and field employees that are engaged in daily work activities tied to the project life throughout all of the construction phases (pre-construction, construction, and close-out procedures).

- General Contractor/Subcontractor Profit: This markup includes the cost amount as compensation for risk and efforts to undertake and complete the project. This percentage will be based directly on economic conditions for the local construction industry, bidding environment, and perception of the risk of losing money on the project.

- Estimate Contingency: A percentage is added to the estimate to account for uncertainties inherent in the estimating process. As design progresses through the project design life cycle, this percentage typically decreases to 0% at design completion. This percentage is anticipated by the estimator as the relative stability of the design documents, project scope, and assumptions upon which the estimate is based are assessed. Design contingency typically accounts for costs associated with design that may not be complete enough to determine final quantities at the time of estimate preparation, items that may defy precise quantification, or as an added contingency to items that are computed by capacity factoring or other conceptual methods.

5.00 Basis of Estimate / Pricing

5.01 This cost estimate pertains to the Southwest Water facility which is to be constructed in southeastern, Michigan. This cost proposal reflects the level of detail and completeness of the information provided.

5.02 This estimate has been prepared based on quantities and scope of work from the associated project report.

5.03 Conversations with members of the design team were also used in preparation of this estimate. Any design and engineering changes and/or additions produced subsequent to these documents are not included in this estimate.

5.04 The cost estimate is based on costs likely to be experienced in Michigan. Material and equipment costs are included. The cost of labor is based on Davis Bacon act prevailing rates for the county in which the project is to be constructed. Labor costs are based upon a 40 hour work week with the anticipation of some overtime. This estimate does not include the cost of shift work or the cost of an accelerated schedule.

5.05 This estimate has been prepared according to AACE (Association for the Advancement of Cost Engineering) standards for the estimate classification as indicated, and thus inherits an expected range of accuracy according to the classification.

5.06 This Basis of Estimate report (along with the above inclusions, exclusions, assumptions and clarifications), and the attached Cost Estimate are intended to be, and constitute a single document.

6.00 Inclusions, Exclusions, Assumptions, and Clarifications

6.01 *General Information/Notes*

- The estimate assumes a construction start date of 8/3/21
- The estimate assumes a construction duration of 18.00 months.
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that the general building permit is included in the cost estimate.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner. This cost is included in the Construction Management line item.
- This Basis of Estimate report (along with the above inclusions, exclusions, assumptions and clarifications), and the attached Cost Estimate are intended to be, and constitute a single document.

6.02 *Exclusions*

- All scope outside what is stated in this estimate.
- Owner supplied and installed furniture, fixtures and equipment
- Building demolition except where noted
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Rehabilitation of Northwest Interceptor from Eight Mile to Tireman**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205
100%, DRAFT

SCOPE OF WORK / BASIS OF ESTIMATE

- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
- Assessments, taxes, finance, legal and development charges
- Builder's risk, project wrap-up and other owner provided insurance program
- Modification to the scope of work since the date of the design documents outlined in this report
- Unforeseen subsurface conditions
- Restrictive technical specifications or excessive contract conditions
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule
- Land acquisition and real estate fees
- Owner's field inspection costs
- Off-site work
- Owner contingency
- Hazardous material abatement other than what is included in the detailed portion of the estimate
- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

6.03 *Clarifications/ Assumptions*

Bid Item 1: Mobilization

- The lump sum price for Bid Item 1 shall constitute full compensation for Contractor's mobilization on to and demobilization off the project site for the construction of all Work elements of the project, and shall not exceed 5% of the overall bid

Bid Item 2: Flow Control

- The lump sum price for Bid Item 2 shall constitute full compensation for flow control coordination with GLWA / DWSD as necessary for contractor to safely enter the Interceptor and complete all Work elements, including shutdown/lockout/tagout by contractor, coordination and operation of existing flow controls, temporary flow monitoring as detailed in the drawings, and specific in-pipe platforms or other measures to safely accomplish all required repairs

Bid Item 3: Miscellaneous Site Work

- The lump sum price for Bid Item 3 shall constitute full compensation for all site work such as road/curb/sidewalk removal and restoration, permits, private property site access requirements, and various site restoration

Bid Item 4: Traffic Control

- The lump sum price for Bid Item 4 shall constitute full compensation for all traffic control as necessary for contractor to complete the work as detailed in the drawings.

Bid Item 5: Engineer Directed Repairs

- The engineer directed repair allowance as shown in the Bid Form for unforeseen conditions or for any specific items shall be reserved for such use by the Owner to cover unanticipated costs and recognized additional cost beyond the contract or for other specific items. Engineer Directed Repairs items are for the sole use of the OWNER. Work under Engineer Directed Repairs Allowance will be done via written authorization by the Engineer followed by a written approval of the Contracting Officer.
Payment for Work authorized under Engineer Directed Repairs will be full compensation for providing all Work authorized by the Owner, complete as specified or directed by the Engineer/Contracting Officer. Work authorized under the allowance may be included in subsequent Application(s) for Payment, as applicable, following authorization and performance of the Work. Payment value will be in accordance with the contract.

Bid Item 6: Shutdown Days

- This item includes all costs associated with idle crews and equipment during no work due to high flow, conflicts with other contracts in the GLWA system, or other GLWA-directed activities on days that impact that work as supported by the Contractor's submitted schedule. Unit covers all costs for all effort/delays including idle equipment, general conditions, etc. Additional days beyond the unit quantity shown on the bid form shall be added to the contract completion date at no additional cost, beyond the unit cost of this item.

Bid Item 7: Deep Concrete Repair

- This item includes all work related to deep concrete repair in the Interceptor and is measured in square feet above or below existing water level. Grout, concrete, or other materials within hoses, tanks, or wasted are incidental and units for such items shall not be included.

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Rehabilitation of Northwest Interceptor from Eight Mile to Tireman**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205
100%, DRAFT

SCOPE OF WORK / BASIS OF ESTIMATE

Bid Item 8: Seal Infiltration with Chemical Grout

• This item includes all work related to sealing identified areas of infiltration and is measured in gallons of chemical grout injected. Material that is mixed but not used or that is leftover in grout hoses are incidental and units for such items shall not be included.

Bid Item 9: Replace Manhole Frame and Cover

• This item includes all work related to replacement of existing manholes with new GLWA-approved manhole frames and covers, including replacement of the upper portion of the manhole cone and all work as detailed in the drawings, and is measured per manhole.

Bid Item 10: Remove Debris

• This item includes collection and removal of debris from the Interceptor above or below existing water level. Pay quantity will be for decanted wet weight in tons for material passing the paint filter test, as evidenced by waste manifests and load tickets at a GLWA-approved disposal facility. Debris may include sludge, concrete fragments, bricks, gravel, rope, metal debris, wire,or any other material and may be cemented in place in some locations.

Bid Item 11: Tuckpointing Deteriorated Mortar

• This item includes all work related to tuckpointing of deteriorated mortar in the Interceptor and is measured in square feet of exposed brick surface above or below existing water level.

Bid Item 12: Deteriorated Brick Repairs

• This item includes all work related to repair of sections of distressed brick and is measured in square feet of brick surface as measured after the repair above or below existing water level.

Bid Item 13: Remove Mineral Deposits and Roots

• This item includes all work related to removal of mineral deposits and roots found in the Interceptor and is measured in square feet for mineral deposits or roots greater than 2 inches thick and as directed to be removed by Engineer.

Bid Item 14: Repair Rough Taps ≤ 24”

• This item includes all work related to repair of tap connections less than or equal to 24 inches in diameter into the Interceptor as shown and as specified and is measured for each tap above or below
existing water level.

Bid Item 15: Repair Rough Taps > 24” and < 48”

• This item includes all work related to repair of tap connections larger than 24 inches in diameter and smaller than 48 inches in diameter into the Interceptor as shown and as specified and is
measured for each tap above or below existing water level.

Bid Item 16: Repair Rough Taps ≥ 48”

• This item includes all work related to repair of tap connections larger than or equal to 48 inches in diameter into the Interceptor as shown and as specified and is measured for each tap above or below existing water level.

Bid Item 17: Open Joint Repair

• This item includes all work related to repair of open joints in the Interceptor and is measured in linear feet of joint repair above or below existing water level. Leak repair or mineral deposit removal (if required) is included separately in Bid Items 8 and 13, respectively.

Bid Item 18: Epoxy Crack Repair

• This item includes all work related to repair of cracks in Interceptor with epoxy grout and is measured in linear feet of crack repair above or below existing water level.

7.00 Statement of Estimated Costs

7.01 AECOM has no control over the cost of labor (Davis-Bacon prevailing wage) and material, the general contractor's or any subcontractors method of determining prices, or competitive bidding and market conditions. This opinion of probable costs of construction is made on the basis of experience, qualifications, and best judgement of professional construction cost managers familiar with the construction industry. AECOM cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from this or subsequent cost estimates.

7.02 AECOM has no control over the quality, completeness, intricacy, constructability, or coordination of design documents, or over the amount of funds available for this project. AECOM is not responsible for design revision costs in the event that the estimate is in excess of the established budget.

7.03 AECOM's staff of professional cost managers has prepared this estimate in accordance with general accepted principles and practices. Our staff is available to discuss its contents with any interested party.

AECOM
707 Grant Street
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Pittsburgh, PA 15219

SCOPE OF WORK / BASIS OF ESTIMATE

7.04 This estimate assumes that the general construction contract will be administered as a competitively bid/negotiated GMP with a selected construction manager / general contractor and prequalified subcontractors. Costs associated with a restrictive bidding market, including small business set-asides (minority, woman or veteran/service disabled veteran owned) and sole-sourced contractors are not included, and can cause a significant increase to the overall cost of the project.

8.00 Recommendations for Cost Control

8.01 AECOM recommends that the Owner, Architect, and Engineers carefully review this entire document to ensure that it reflects their design intent. Requests for modifications of any apparent errors or omissions to this documents should be made to AECOM within ten (10) days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred and accepted. If the project is over budget, or if there are unresolved budgeting issues, alternative systems/schemes should be evaluated before proceeding further into design.

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: **Rehabilitation of Northwest Interceptor from Eight Mile to Tireman**
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205
100%, DRAFT

9.00 Quality Control

	Initial	Date
Estimator Self Check	IZ	
Arithmetic Check		
Technical Check	AN	
Format and Presentation Check	KS	
Authorization for Issue	KS	

AUTHORIZATION
Approved for Issue ---------- Date: 9/28/2021

10.00 Disclaimer

This document and its contents have been prepared and are intended solely for the client's information and use in the above referenced project only. AECOM assumes no responsibility to any other party in respect of, arising out of, or in connection with this document and/or its contents.

11.00 Copyright

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AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Northwest Interceptor from
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205

100%, DRAFT

13.00 Estimate Summary - Alternative 1

9/28/2021

Pay Item	Description	Unit	UOM	Loaded Unit Cost	Total Loaded
0	General Conditions				$ -
1	Mobilization	1	LS	$ 513,252.68	$ 513,253
2	Flow Control	1	LS	$ 682,929.51	$ 682,930
3	Miscellaneous Site Work	1	LS	$ 128,306.57	$ 128,307
4	Traffic Control	1	LS	$ 800,739.10	$ 800,739
5	Engineer Directed Repairs	1	Allow	$ 400,000.00	$ 400,000
6	Shutdown Days	150	DAYS	$ 2,500.00	$ 375,000
7	Deep Concrete Repair.	880	SF	$ 607.77	$ 534,839
8	Seal Infiltration with Chemical Grout	10725	GAL	$ 244.89	$ 2,626,392
9	Replace Manhole Frame and Cover	56	EA	$ 17,710.87	$ 991,809
10	Remove Debris	2923	TON	$ 902.82	$ 2,638,940
11	Tuckpointing Deteriorated Mortar	165	SF	$ 304.00	$ 50,161
12	Deteriorated Brick Repairs	20	SF	$ 296.73	$ 5,935
13	Remove Mineral Deposits and Roots	3160	SF	$ 161.27	$ 509,627
14	Repair Rough Taps ≤ 24”	59	EA	$ 1,446.66	$ 85,353
15	Repair Rough Taps > 24” and < 48”.	4	EA	$ 2,491.48	$ 9,966
16	Repair Rough Taps ≥ 48”.	1	EA	$ 3,737.22	$ 3,737
17	Open Joint Repair	937	LF	$ 802.60	$ 752,036
18	Epoxy Crack Repair	1684	LF	$ 263.82	$ 444,279
19	Unforeseen Conditions	1	Allow	$ 500,000.00	$ 500,000
Subtotal					**$ 12,053,302**

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Northwest Interceptor from Eight Mile to Tireman
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205

28222.38 Total Hours
40 Hours Per Week
705.559423 Total Man Weeks
13 Crew Size

68.75 Duration (Weeks)
18 Duration (Months)

54.27380176
12.52472348

8 0.004

14.00 Estimate Detail - Alternative 1

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
PAY ITEM 01: Lump Sum Contract Work																			
01.01	***Pay Item #1: Lump Sum Contract Work***																		
01.02				0.00	0.00	C910A	$ 106.13	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.03				0.00	0.00	C910A	$ 106.13	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.04				0.00	0.00	PLUM	$ 104.54	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
01.05				0.00	0.00	MILL	$ 103.52	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 01: Lump Sum Contract Work	1.00	LS		0.00				$ -		$ -		$ -		$ -				**$ -**
PAY ITEM 2: Flow Control																			
02.01	General Flow control. 1 Hr/day levels monitoring and gate controls coordination	343.75	hr	1.00	343.75	LABORF	$ 73.68	$ 73.68	$ 25,327.31	$ -	$ -	$ 10.00	$ 3,437.50	$ -	$ -	$ 83.68	$ 28,764.81	0.00%	$ 28,764.81
02.02	Added crane with crew for gate control on Lahser	3.00	mo	1440.00	4320.00	B21	$ 83.08	$ 119,633.34	$ 358,900.03	$ -	$ -	$ 5,000.00	$ 15,000.00	$ -	$ -	$ 124,633.34	$ 373,900.03	0.00%	$ 373,900.03
02.03					0.00	CONC001	$ 76.43	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
02.04					0.00	CONC001	$ 76.43	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 2: Flow Control				4663.75				$ 384,227.35		$ -		$ 18,437.50		$ -				**$ 402,664.85**
PAY ITEM 3: Miscellaneous Site Work																			
33.03					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Manhole Repair A in roadway	***23.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*23.00*	*EA*																$ -
	Paving Demo																		$ -
	Asphalt Demo Thickness	**0.33**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Concrete Demo Thickness	**0.67**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Length	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Width	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Depth	**5.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Asphalt Demo	**163.56**	SY	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Sawcut Asphalt	552.00	LF	0.03	16.56	B89	$ 82.27	$ 2.47	$ 1,362.39	$ 0.34	$ 187.68	$ 1.58	$ 872.16	$ -	$ -	$ 4.39	$ 2,422.23	0.00%	$ 2,422.23
	Demolish Asphalt Pavement	18.09	CY	0.10	1.81	B38	$ 77.30	$ 7.73	$ 139.81	$ -	$ -	$ 35.00	$ 633.00	$ -	$ -	$ 42.73	$ 772.80	0.00%	$ 772.80
	Load/Haul/Dump Asphalt Pavement	22.61	CY	0.10	2.26	B34D	$ 72.72	$ 7.27	$ 164.40	$ -	$ -	$ 5.00	$ 113.03	$ -	$ -	$ 12.27	$ 277.43	0.00%	$ 277.43
	Dispose of Debris	35.40	TON	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Concrete Demo Area	**163.56**	SY	0.00	0.00	B10M	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Sawcut Concrete	552.00	LF	0.07	38.64	B89	$ 82.27	$ 5.76	$ 3,178.91	$ 0.34	$ 187.68	$ 1.58	$ 872.16	$ -	$ -	$ 7.68	$ 4,238.75	0.00%	$ 4,238.75
	Demolish Concrete	36.22	CY	0.09	3.08	B38	$ 77.30	$ 6.57	$ 238.02	$ -	$ -	$ 35.00	$ 1,267.86	$ -	$ -	$ 41.57	$ 1,505.88	0.00%	$ 1,505.88
	Load/Haul/Dump Concrete Pavement	45.28	CY	0.05	2.26	B34D	$ 72.72	$ 3.64	$ 164.64	$ -	$ -	$ 5.00	$ 226.40	$ -	$ -	$ 8.64	$ 391.05	0.00%	$ 391.05
	Dispose of Debris	91.69	TON	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Manhole Repair A in driveway	***2.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*2.00*	*EA*																$ -
	Paving Demo																		$ -
	Asphalt Demo Thickness	**0.42**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Concrete Demo Thickness	**0.00**	LF	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Pit Length	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Width	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Depth	**5.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Asphalt Demo	**14.22**	SY	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Sawcut Asphalt	48.00	LF	0.03	1.44	B89	$ 82.27	$ 2.47	$ 118.47	$ 0.34	$ 16.32	$ 1.58	$ 75.84	$ -	$ -	$ 4.39	$ 210.63	0.00%	$ 210.63
	Demolish Asphalt Pavement	1.87	CY	0.10	0.19	B38	$ 77.30	$ 7.73	$ 14.43	$ -	$ -	$ 35.00	$ 65.32	$ -	$ -	$ 42.73	$ 79.74	0.00%	$ 79.74
	Load/Haul/Dump Asphalt Pavement	2.33	CY	0.10	0.23	B34D	$ 72.72	$ 7.27	$ 16.96	$ -	$ -	$ 5.00	$ 11.66	$ -	$ -	$ 12.27	$ 28.63	0.00%	$ 28.63
	Dispose of Asphalt Debris	3.65	TON	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Concrete Demo Area	0.00	SY	0.00	0.00	B10M	$ 88.05	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Sawcut Concrete	0.00	LF	0.07	0.00	B89	$ 82.27	#DIV/0!	$ -	$ 0.34	$ -	$ 1.58	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Demolish Concrete	0.00	CY	0.09	0.00	B38	$ 77.30	#DIV/0!	$ -	$ -	$ -	$ 35.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Load/Haul/Dump Concrete Pavement	0.00	CY	0.05	0.00	B34D	$ 72.72	#DIV/0!	$ -	$ -	$ -	$ 5.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Dispose of Concrete Debris	0.00	TON	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Manhole Repair B in roadway	***9.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*9.00*	*EA*																$ -
	Paving Demo																		$ -
	Asphalt Demo Thickness	**0.33**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Concrete Demo Thickness	**0.67**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Length	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Width	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Depth	**5.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Asphalt Demo	**64.00**	SY	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Sawcut Asphalt	216.00	LF	0.03	6.48	B89	$ 82.27	$ 2.47	$ 533.11	$ 0.34	$ 73.44	$ 1.58	$ 341.28	$ -	$ -	$ 4.39	$ 947.83	0.00%	$ 947.83
	Demolish Asphalt Pavement	7.02	CY	0.10	0.70	B38	$ 77.30	$ 7.73	$ 54.30	$ -	$ -	$ 35.00	$ 245.83	$ -	$ -	$ 42.73	$ 300.13	0.00%	$ 300.13
	Load/Haul/Dump Asphalt Pavement	8.78	CY	0.10	0.88	B34D	$ 72.72	$ 7.27	$ 63.85	$ -	$ -	$ 5.00	$ 43.90	$ -	$ -	$ 12.27	$ 107.75	0.00%	$ 107.75
	Dispose of Debris	13.75	TON	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Concrete Demo Area	**64.00**	SY	0.00	0.00	B10M	$ 88.05	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Sawcut Concrete	216.00	LF	0.07	15.12	B89	$ 82.27	$ 5.76	$ 1,243.92	$ 0.34	$ 73.44	$ 1.58	$ 341.28	$ -	$ -	$ 7.68	$ 1,658.64	0.00%	$ 1,658.64
	Demolish Concrete	14.10	CY	0.09	1.20	B38	$ 77.30	$ 6.57	$ 92.66	$ -	$ -	$ 35.00	$ 493.54	$ -	$ -	$ 41.57	$ 586.19	0.00%	$ 586.19
	Load/Haul/Dump Concrete Pavement	17.63	CY	0.05	0.88	B34D	$ 72.72	$ 3.64	$ 64.09	$ -	$ -	$ 5.00	$ 88.13	$ -	$ -	$ 8.64	$ 152.22	0.00%	$ 152.22
	Dispose of Debris	35.69	TON	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Manhole Repair B in Driveway	***1.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*1.00*	*EA*																$ -
	Paving Demo																		$ -
	Asphalt Demo Thickness	**0.42**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Concrete Demo Thickness	**0.00**	LF	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Pit Length	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Width	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Depth	**5.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Northwest Interceptor from Eight Mile to Tireman
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205

28222.38	Total Hours	68.75	Duration (Weeks) 54.27380176
40	Hours Per Week	18	Duration (Months) 12.52472348
705.559423	Total Man Weeks		
13	Crew Size	8	0.004

14.00 Estimate Detail - Alternative 1

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
	Asphalt Demo	**7.11**	SY	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Sawcut Asphalt	24.00	LF	0.03	0.72	B89	$ 82.27	$ 2.47	$ 59.23	$ 0.34	$ 8.16	$ 1.58	$ 37.92	$ -	$ -	$ 4.39	$ 105.31	0.00%	$ 105.31
	Demolish Asphalt Pavement	0.88	CY	0.10	0.09	B38	$ 77.30	$ 7.73	$ 6.79	$ -	$ -	$ 35.00	$ 30.75	$ -	$ -	$ 42.73	$ 37.54	0.00%	$ 37.54
	Load/Haul/Dump Asphalt Pavement	1.10	CY	0.10	0.11	B34D	$ 72.72	$ 7.27	$ 7.99	$ -	$ -	$ 5.00	$ 5.49	$ -	$ -	$ 12.27	$ 13.48	0.00%	$ 13.48
	Dispose of Debris	1.72	TON	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Concrete Demo Area	**0.00**	SY	0.00	0.00	B10M	$ 88.05	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Sawcut Concrete	0.00	LF	0.07	0.00	B89	$ 82.27	#DIV/0!	$ -	$ 0.34	$ -	$ 1.58	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Demolish Concrete	0.00	CY	0.09	0.00	B38	$ 77.30	#DIV/0!	$ -	$ -	$ -	$ 35.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Load/Haul/Dump Concrete Pavement	0.00	CY	0.05	0.00	B34D	$ 72.72	#DIV/0!	$ -	$ -	$ -	$ 5.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Dispose of Debris	0.00	TON	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
33.02	Landscape Restoration at MH non-road Work Area	21.00	EA	2.00	42.00	B89B	$ 82.27	$ 164.54	$ 3,455.34	$ 15.00	$ 315.00	$ 4.00	$ 84.00	$ -	$ -	$ 183.54	$ 3,854.34	0.00%	$ 3,854.34
33.03	Driveway Restoration at MH rehab work area	3.00	EA	4.00	12.00	B89B	$ 82.27	$ 329.08	$ 987.24	$ 75.00	$ 225.00	$ 90.00	$ 270.00	$ -	$ -	$ 494.08	$ 1,482.24	0.00%	$ 1,482.24
33.04	Roadway Asphalt Restoration at MH Rehab work area in roadway	32.00	EA	6.00	192.00	B13	$ 75.99	$ 455.97	$ 14,590.90	$ 200.00	$ 6,400.00	$ 120.00	$ 3,840.00	$ -	$ -	$ 775.97	$ 24,830.90	0.00%	$ 24,830.90
33.04	Roadway Concrete Base for Asphalt Restoration at MH Rehab work area in roadway	32.00	EA	2.00	64.00	B13	$ 75.99	$ 151.99	$ 4,863.63	$ 200.00	$ 6,400.00	$ 12.00	$ 384.00	$ -	$ -	$ 363.99	$ 11,647.63	0.00%	$ 11,647.63
33.02	ROW Permitting	1.00			0.00	ELEC	$ 106.13	$ -	$ -		$ -	$ -	$ -	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	0.00%	$ 20,000.00
					0.00	D8	$ 84.52	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	**$ -**
					0.00	D8	$ 84.52	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	**$ -**
					0.00	D8	$ 84.52	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	**$ -**
					0.00	D8	$ 84.52	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	**$ -**
	PAY ITEM 3: Miscellaneous Site Work				402.65				$ 31,421.08		$ 13,886.72		$ 10,343.56		$ 20,000.00				**$ 75,651.36**
PAY ITEM 4: Traffic Control																			
	Traffic control	1.00	LS	4125.00	4125.00	LABOR	$ 70.23	$ 289,718.61	$ 289,718.61	$ -	$ -	$ -	$ -	$ -	$ -	$ 289,718.61	$ 289,718.61	0.00%	**$ 289,718.61**
	Construction Traffic Plan	1.00	LS	40.00	40.00	Engineer	$ 120.00	$ 4,800.00	$ 4,800.00	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,800.00	$ 4,800.00	0.00%	$ 4,800.00
	Emergency And Public Works departments coordination (Allow 4 hrs/week)	69.00	Week	4.00	276.00	SKILL	$ 95.90	$ 383.59	$ 26,467.77	$ -	$ -	$ -	$ -	$ -	$ -	$ 383.59	$ 26,467.77	0.00%	$ 26,467.77
					0.00	E4	$ 100.58	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Total Days for MH Rehab work in Roadway	39	day		0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Total Days Restoration after MH Rehab Work in Roadway	10	day		0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	**$ -**
	Duration for interceptor work with access in Roadway	258	day		0.00	IRON001	$ 98.34	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
					0.00	IRON001	$ 98.34	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Barricades install and rental	307	day	4.00	1228.00	B21	$ 83.08	$ 332.31	$ 102,020.66	$ 60.00	$ 18,420.00	$ 100.00	$ 30,700.00	$ -	$ -	$ 492.31	$ 151,140.66	0.00%	**$ 151,140.66**
					0.00	IRON001	$ 98.34	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	IRON001	$ 98.34	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	IRON001	$ 98.34	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	IRON001	$ 98.34	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 4: Traffic Control				5669.00				$ 423,007.04		$ 18,420.00		$ 30,700.00		$ -				**$ 472,127.04**
PAY ITEM 5: Engineer Directed Repairs																			
			LF	0.00	0.00	B21	$ 83.08	#DIV/0!	$ -	$ 91.42	$ -	$ 32.66	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
			EA		0.00	IRON001	$ 98.34	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ 2,500.00	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	IRON001	$ 98.34	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	IRON001	$ 98.34	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	**$ -**
	PAY ITEM 5: Engineer Directed Repairs				0.00				$ -		$ -		$ -		$ -				**$ -**
PAY ITEM 6: Shutdown Days																			
	Shutdown Days	150.00	DAY	0.00	0.00	SKILL	$ 95.90	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
					0.00	SMW	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	SMW	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	INSL	$ 102.12	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 6: Shutdown Days				0.00				$ -		$ -		$ -		$ -				**$ -**
PAY ITEM 7: Deep Concrete Repair																			
	4" Average repair thickness																		$ -
	High pressure wash, heavy soil, biological and mineral staining, paint, water and chemical, excludes scaffolding	880.00	SF	0.16	140.80	SKILL	$ 95.90	$ 15.34	$ 13,502.40	$ 0.41	$ 360.80	$ 1.56	$ 1,372.80	$ -	$ -	$ 17.31	$ 15,236.00	15.00%	$ 17,521.40
	Clean/grind surface(s) free of contaminants	880.00	LF	0.08	70.40	SKILL	$ 95.90	$ 7.67	$ 6,751.20	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.67	$ 6,751.20	15.00%	$ 7,763.88
	Chip deteriorated concrete, bush hammer	880.00	SF	0.30	260.48	SKILL	$ 95.90	$ 28.39	$ 24,979.44	$ -	$ -	$ 1.52	$ 1,337.60	$ -	$ -	$ 29.91	$ 26,317.04	15.00%	$ 30,264.60
	6" SS Anchored Studs, drilled/doweled w/double nut head, 12" OC	1760.00	EA	0.67	1179.20	SKILL	$ 95.90	$ 64.25	$ 113,082.61	$ 12.00	$ 21,120.00	$ 0.50	$ 880.00	$ -	$ -	$ 76.75	$ 135,082.61	15.00%	$ 155,345.00
	Mesh, 2"x2"x2.9 Galv, assumed 50% of area to need application	440.00	SF	0.25	110.00	SKILL	$ 95.90	$ 23.97	$ 10,548.75	$ 20.00	$ 8,800.00	$ -	$ -	$ -	$ -	$ 43.97	$ 19,348.75	15.00%	$ 22,251.06
	Sand blast rebar	880.00	SF	0.36	316.80	SKILL	$ 95.90	$ 34.52	$ 30,380.40	$ 1.50	$ 1,320.00	$ 3.00	$ 2,640.00	$ -	$ -	$ 39.02	$ 34,340.40	15.00%	$ 39,491.46
	Shotcrete pipe repair, 4" thick	880.00	SF	0.28	246.40	SKILL	$ 95.90	$ 26.85	$ 23,629.20	$ 5.50	$ 4,840.00	$ 2.50	$ 2,200.00	$ -	$ -	$ 34.85	$ 30,669.20	15.00%	$ 35,269.58
	Cleaning debris	10.86	CY	4.00	43.46	SKILL	$ 95.90	$ 383.59	$ 4,167.41	$ -	$ -	$ -	$ -	$ -	$ -	$ 383.59	$ 4,167.41	15.00%	$ 4,792.52
	Epoxy coating for exposed rebar	880.00	SF	0.02	17.60	SKILL	$ 95.90	$ 1.92	$ 1,687.80	$ 0.70	$ 616.00	$ -	$ -	$ -	$ -	$ 2.62	$ 2,303.80	15.00%	$ 2,649.37
					0.00	SMW	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 7: Deep Concrete Repair				2385.14						$ 37,056.80		$ 8,430.40		$ -				**$ 315,348.87**
PAY ITEM 8: Seal Infiltration with Chemical Grout																			
	Seal infiltrations in pipe 5' Dia and smaller (1.5 Crew hours ea)	25.00	EA	6.00	150.00	SKILL	$ 95.90	$ 575.39	$ 14,384.66	$ 2,500.00	$ 62,500.00	$ 250.00	$ 6,250.00	$ -	$ -	$ 3,325.39	$ 83,134.66	15.00%	$ 95,604.86
	25 gallons per location assumed	625.00	GAL		0.00	SKILL	$ 95.90	$ -	$ -		$ -		$ -	$ -	$ -	$ -	$ -	15.00%	$ -
	Seal infiltrations in pipe over 5' Diameter (1 Crew Hours ea)	404.00	EA	4.00	1616.00	CARP	$ 94.33	$ 377.32	$ 152,437.11	$ 2,500.00	$ 1,010,000.00	$ 250.00	$ 101,000.00	$ -	$ -	$ 3,127.32	$ 1,263,437.11	15.00%	$ 1,452,952.67
	25 gallons per location assumed	10100.00	GAL		0.00	CARP	$ 94.33	$ -	$ -		$ -		$ -	$ -	$ -	$ -	$ -	15.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	15.00%	$ -
	IN PROGRESS				0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	15.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	15.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	15.00%	$ -
					0.00	PAINT	$ 68.88	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	15.00%	$ -

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Northwest Interceptor from Eight Mile to Tireman
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205

28222.38 Total Hours
40 Hours Per Week
705.559423 Total Man Weeks
13 Crew Size

68.75 Duration (Weeks)
18 Duration (Months)

54.27380176
12.52472348
8
0.004

14.00 Estimate Detail - Alternative 1

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
	PAY ITEM 8: Seal Infiltration with Chemical Grout	Per Gal			1766.00				$ 166,821.77		$ 1,072,500.00		$ 107,250.00		$ -				**$ 1,548,557.53**
PAY ITEM 9: Replace Manhole Frame and Cover																			
	Manhole Repair A in roadway	***23.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*23.00*	*EA*																$ -
	Paving Demo																		$ -
	Excavation of pit																		$ -
	Shoring	2760.00	SF	0.01	23.00	B10M	$ 88.05	$ 0.73	$ 2,025.12	$ 0.50	$ 1,380.00	$ 1.25	$ 3,450.00	$ -	$ -	$ 2.48	$ 6,855.12	0.00%	$ 6,855.12
	Excavating	98.58	CY	0.50	49.29	B10M	$ 88.05	$ 44.02	$ 4,339.98	$ -	$ -	$ 30.00	$ 2,957.43	$ -	$ -	$ 74.02	$ 7,297.41	0.00%	$ 7,297.41
	Pit Backfill, Machine, granular material	98.58	CY	0.01	1.38	B10M	$ 88.05	$ 1.23	$ 121.52	$ 40.80	$ 4,022.11	$ 1.18	$ 116.33	$ -	$ -	$ 43.21	$ 4,259.95	0.00%	$ 4,259.95
	Compaction	108.44	CY	0.04	4.01	B10M	$ 88.05	$ 3.26	$ 353.27	$ -	$ -	$ 2.26	$ 245.07	$ -	$ -	$ 5.52	$ 598.35	0.00%	$ 598.35
	Haul Trench Spoils	123.23	CY	0.05	6.16	B34D	$ 72.72	$ 3.64	$ 448.06	$ -	$ -	$ 5.00	$ 616.13	$ -	$ -	$ 8.64	$ 1,064.19	0.00%	$ 1,064.19
	Demo of existing MH Frame, Cover and Chimney to 4' below grade.	23.00	EA	8.00	184.00	B6	$ 77.51	$ 620.10	$ 14,262.28	$ -	$ -	$ 100.00	$ 2,300.00	$ -	$ -	$ 720.10	$ 16,562.28	0.00%	$ 16,562.28
	Handle and Dispose of Debris	7.81	CY	0.050	0.39	B34D	$ 72.72	$ 3.64	$ 28.38	$ -	$ -	$ 5.00	$ 39.03	$ -	$ -	$ 8.64	$ 67.41	0.00%	$ 67.41
33.03	Manhole modifications and repair at cone section	23.00	EA	4.00	92.00	B22	$ 83.08	$ 332.31	$ 7,643.24	$ 200.00	$ 4,600.00	$ 100.00	$ 2,300.00	$ -	$ -	$ 632.31	$ 14,543.24	0.00%	$ 14,543.24
33.02	New MH frame and cover	23.00	EA	4.00	92.00	B20	$ 79.94	$ 319.75	$ 7,354.23	$ 650.00	$ 14,950.00	$ -	$ -	$ -	$ -	$ 969.75	$ 22,304.23	0.00%	$ 22,304.23
33.02	4' I.D. Precast Concrete Riser and top slab w/MH steps 16" OC set on top of stabilized MH walls	23.00	EA	8.00	184.00	B22	$ 83.08	$ 664.63	$ 15,286.48	$ 1,500.00	$ 34,500.00	$ 300.00	$ 6,900.00	$ -	$ -	$ 2,464.63	$ 56,686.48	0.00%	$ 56,686.48
					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Manhole Repair A in landscaping/gravel shoulder	***19.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*19.00*	*EA*																$ -
	Paving Demo																		$ -
	Asphalt Demo Thickness	**0.00**	LF	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Concrete Demo Thickness	**0.00**	LF	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Pit Length	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Width	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Depth	**5.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Asphalt Demo	**0.00**	SY	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Sawcut Asphalt	0.00	LF	0.03	0.00	B89	$ 82.27	#DIV/0!	$ -	$ 0.34	$ -	$ 1.58	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Demolish Asphalt Pavement	0.00	CY	0.10	0.00	B38	$ 77.30	#DIV/0!	$ -	$ -	$ -	$ 35.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Load/Haul/Dump Asphalt Pavement	0.00	CY	0.10	0.00	B34D	$ 72.72	#DIV/0!	$ -	$ -	$ -	$ 5.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Dispose of Debris	0.00	TON	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Concrete Demo Area	**0.00**	SY	0.00	0.00	B10M	$ 88.05	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Sawcut Concrete	0.00	LF	0.07	0.00	B89	$ 82.27	#DIV/0!	$ -	$ 0.34	$ -	$ 1.58	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Demolish Concrete	0.00	CY	0.09	0.00	B38	$ 77.30	#DIV/0!	$ -	$ -	$ -	$ 35.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Load/Haul/Dump Concrete Pavement	0.00	CY	0.05	0.00	B34D	$ 72.72	#DIV/0!	$ -	$ -	$ -	$ 5.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Dispose of Debris	0.00	TON	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Excavation of pit																		$ -
	Shoring	2280.00	SF	0.01	19.00	B10M	$ 88.05	$ 0.73	$ 1,672.93	$ 0.50	$ 1,140.00	$ 1.25	$ 2,850.00	$ -	$ -	$ 2.48	$ 5,662.93	0.00%	$ 5,662.93
	Excavating	106.77	CY	0.50	53.38	B10M	$ 88.05	$ 44.02	$ 4,700.48	$ -	$ -	$ 30.00	$ 3,203.10	$ -	$ -	$ 74.02	$ 7,903.58	0.00%	$ 7,903.58
	Pit Backfill, Machine, granular material	106.77	CY	0.01	1.49	B10M	$ 88.05	$ 1.23	$ 131.61	$ 40.80	$ 4,356.21	$ 1.18	$ 125.99	$ -	$ -	$ 43.21	$ 4,613.81	0.00%	$ 4,613.81
	Compaction	117.45	CY	0.04	4.35	B10M	$ 88.05	$ 3.26	$ 382.62	$ -	$ -	$ 2.26	$ 265.43	$ -	$ -	$ 5.52	$ 648.05	0.00%	$ 648.05
	Haul Trench Spoils	133.46	CY	0.05	6.67	B34D	$ 72.72	$ 3.64	$ 485.28	$ -	$ -	$ 5.00	$ 667.31	$ -	$ -	$ 8.64	$ 1,152.59	0.00%	$ 1,152.59
	Demo of existing MH Frame, Cover and Chimney to 4' below grade.	19.00	EA	8.00	152.00	B6	$ 77.51	$ 620.10	$ 11,781.88	$ -	$ -	$ 100.00	$ 1,900.00	$ -	$ -	$ 720.10	$ 13,681.88	0.00%	$ 13,681.88
	Handle and Dispose of Debris	6.45	CY	0.050	0.32	B34D	$ 72.72	$ 3.64	$ 23.45	$ -	$ -	$ 5.00	$ 32.24	$ -	$ -	$ 8.64	$ 55.69	0.00%	$ 55.69
33.03	Manhole modifications and repair at cone section	19.00	EA	4.00	76.00	B22	$ 83.08	$ 332.31	$ 6,313.98	$ 200.00	$ 3,800.00	$ 100.00	$ 1,900.00	$ -	$ -	$ 632.31	$ 12,013.98	0.00%	$ 12,013.98
33.02	New MH frame and cover	19.00	EA	4.00	76.00	B20	$ 79.94	$ 319.75	$ 6,075.24	$ 650.00	$ 12,350.00	$ -	$ -	$ -	$ -	$ 969.75	$ 18,425.24	0.00%	$ 18,425.24
33.02	4' I.D. Precast Concrete Riser and top slab w/MH steps 16" OC set on top of stabilized MH walls	19.00	EA	8.00	152.00	B22	$ 83.08	$ 664.63	$ 12,627.96	$ 1,500.00	$ 28,500.00	$ 300.00	$ 5,700.00	$ -	$ -	$ 2,464.63	$ 46,827.96	0.00%	$ 46,827.96
33.03					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Manhole Repair A in driveway	***2.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*2.00*	*EA*																$ -
	Paving Demo																		$ -
	Excavation of pit																		$ -
	Shoring	240.00	SF	0.01	2.00	B10M	$ 88.05	$ 0.73	$ 176.10	$ 0.50	$ 120.00	$ 1.25	$ 300.00	$ -	$ -	$ 2.48	$ 596.10	0.00%	$ 596.10
	Excavating	10.13	CY	0.50	5.06	B10M	$ 88.05	$ 44.02	$ 445.87	$ -	$ -	$ 30.00	$ 303.83	$ -	$ -	$ 74.02	$ 749.71	0.00%	$ 749.71
	Pit Backfill, Machine, granular material	10.13	CY	0.01	0.14	B10M	$ 88.05	$ 1.23	$ 12.48	$ 40.80	$ 413.22	$ 1.18	$ 11.95	$ -	$ -	$ 43.21	$ 437.65	0.00%	$ 437.65
	Compaction	11.14	CY	0.04	0.41	B10M	$ 88.05	$ 3.26	$ 36.29	$ -	$ -	$ 2.26	$ 25.18	$ -	$ -	$ 5.52	$ 61.47	0.00%	$ 61.47
	Haul Trench Spoils	12.66	CY	0.05	0.63	B34D	$ 72.72	$ 3.64	$ 46.03	$ -	$ -	$ 5.00	$ 63.30	$ -	$ -	$ 8.64	$ 109.33	0.00%	$ 109.33
	Demo of existing MH Frame, Cover and Chimney to 4' below grade.	2.00	EA	8.00	16.00	B6	$ 77.51	$ 620.10	$ 1,240.20	$ -	$ -	$ 100.00	$ 200.00	$ -	$ -	$ 720.10	$ 1,440.20	0.00%	$ 1,440.20
	Handle and Dispose of Debris	0.68	CY	0.050	0.03	B34D	$ 72.72	$ 3.64	$ 2.47	$ -	$ -	$ 5.00	$ 3.39	$ -	$ -	$ 8.64	$ 5.86	0.00%	$ 5.86
33.03	Manhole modifications and repair at cone section	2.00	EA	4.00	8.00	B22	$ 83.08	$ 332.31	$ 664.63	$ 200.00	$ 400.00	$ 100.00	$ 200.00	$ -	$ -	$ 632.31	$ 1,264.63	0.00%	$ 1,264.63
33.02	New MH frame and cover	2.00	EA	4.00	8.00	B20	$ 79.94	$ 319.75	$ 639.50	$ 650.00	$ 1,300.00	$ -	$ -	$ -	$ -	$ 969.75	$ 1,939.50	0.00%	$ 1,939.50
33.02	4' I.D. Precast Concrete Riser and top slab w/MH steps 16" OC set on top of stabilized MH walls	2.00	EA	8.00	16.00	B22	$ 83.08	$ 664.63	$ 1,329.26	$ 1,500.00	$ 3,000.00	$ 300.00	$ 600.00	$ -	$ -	$ 2,464.63	$ 4,929.26	0.00%	$ 4,929.26
33.03					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Manhole Repair B in roadway	***9.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*9.00*	*EA*																$ -
	Paving Demo																		$ -
	Excavation of pit																		$ -
	Shoring	1080.00	SF	0.01	9.00	B10M	$ 88.05	$ 0.73	$ 792.44	$ 0.50	$ 540.00	$ 1.25	$ 1,350.00	$ -	$ -	$ 2.48	$ 2,682.44	0.00%	$ 2,682.44
	Excavating	38.58	CY	0.50	19.29	B10M	$ 88.05	$ 44.02	$ 1,698.25	$ -	$ -	$ 30.00	$ 1,157.26	$ -	$ -	$ 74.02	$ 2,855.51	0.00%	$ 2,855.51
	Pit Backfill, Machine, granular material	38.58	CY	0.01	0.54	B10M	$ 88.05	$ 1.23	$ 47.55	$ 40.80	$ 1,573.87	$ 1.18	$ 45.52	$ -	$ -	$ 43.21	$ 1,666.94	0.00%	$ 1,666.94
	Compaction	42.43	CY	0.04	1.57	B10M	$ 88.05	$ 3.26	$ 138.24	$ -	$ -	$ 2.26	$ 95.90	$ -	$ -	$ 5.52	$ 234.14	0.00%	$ 234.14
	Haul Trench Spoils	48.22	CY	0.05	2.41	B34D	$ 72.72	$ 3.64	$ 175.33	$ -	$ -	$ 5.00	$ 241.10	$ -	$ -	$ 8.64	$ 416.42	0.00%	$ 416.42

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Project: Rehabilitation of Northwest Interceptor from Eight Mile to Tireman
Location: Detroit, Michigan
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CIP #: 260205

28222.38 Total Hours
40 Hours Per Week
705.559423 Total Man Weeks
13 Crew Size

68.75 Duration (Weeks)
18 Duration (Months)

54.27380176
12.52472348
8
0.004

14.00 Estimate Detail - Alternative 1

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
	Demo of existing MH Frame, Cover and Chimney to 4' below grade.	9.00	EA	8.00	72.00	B6	$ 77.51	$ 620.10	$ 5,580.89	$ -	$ -	$ 100.00	$ 900.00	$ -	$ -	$ 720.10	$ 6,480.89	0.00%	$ 6,480.89
	Handle and Dispose of Debris	3.05	CY	0.050	0.15	B34D	$ 72.72	$ 3.64	$ 11.11	$ -	$ -	$ 5.00	$ 15.27	$ -	$ -	$ 8.64	$ 26.38	0.00%	$ 26.38
33.03	Manhole chimney modifications and repair at cone section	9.00	EA	4.00	36.00	B22	$ 83.08	$ 332.31	$ 2,990.83	$ 200.00	$ 1,800.00	$ 100.00	$ 900.00	$ -	$ -	$ 632.31	$ 5,690.83	0.00%	$ 5,690.83
33.03	Concrete Chimney Collar, form and pour	9.00	EA	4.00	36.00	B22	$ 83.08	$ 332.31	$ 2,990.83	$ 250.00	$ 2,250.00	$ 100.00	$ 900.00	$ -	$ -	$ 682.31	$ 6,140.83	0.00%	$ 6,140.83
33.02	New MH frame and cover	9.00	EA	4.00	36.00	B20	$ 79.94	$ 319.75	$ 2,877.74	$ 650.00	$ 5,850.00	$ -	$ -	$ -	$ -	$ 969.75	$ 8,727.74	0.00%	$ 8,727.74
33.02	4' I.D. Precast Concrete Riser and top slab w/MH steps 16" OC set on top of stabilized MH walls	9.00	EA	8.00	72.00	B22	$ 83.08	$ 664.63	$ 5,981.67	$ 1,500.00	$ 13,500.00	$ 300.00	$ 2,700.00	$ -	$ -	$ 2,464.63	$ 22,181.67	0.00%	$ 22,181.67
33.03					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Manhole Repair B in Lawn/gravel shoulder	***2.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*2.00*	*EA*																$ -
	Paving Demo																		$ -
	Asphalt Demo Thickness	**0.00**	LF	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Concrete Demo Thickness	**0.00**	LF	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Pit Length	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Width	**6.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Pit Depth	**5.00**	LF	0.00	0.00	LABOR	$ 70.23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Asphalt Demo	**0.00**	SY	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Sawcut Asphalt	0.00	LF	0.03	0.00	B89	$ 82.27	#DIV/0!	$ -	$ 0.34	$ -	$ 1.58	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Demolish Asphalt Pavement	0.00	CY	0.10	0.00	B38	$ 77.30	#DIV/0!	$ -	$ -	$ -	$ 35.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Load/Haul/Dump Asphalt Pavement	0.00	CY	0.10	0.00	B34D	$ 72.72	#DIV/0!	$ -	$ -	$ -	$ 5.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Dispose of Debris	0.00	TON	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Concrete Demo Area	**0.00**	SY	0.00	0.00	B10M	$ 88.05	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Sawcut Concrete	0.00	LF	0.07	0.00	B89	$ 82.27	#DIV/0!	$ -	$ 0.34	$ -	$ 1.58	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Demolish Concrete	0.00	CY	0.09	0.00	B38	$ 77.30	#DIV/0!	$ -	$ -	$ -	$ 35.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Load/Haul/Dump Concrete Pavement	0.00	CY	0.05	0.00	B34D	$ 72.72	#DIV/0!	$ -	$ -	$ -	$ 5.00	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Dispose of Debris	0.00	TON	0.00	0.00	LABOR	$ 70.23	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Excavation of pit																		$ -
	Shoring	240.00	SF	0.01	2.00	B10M	$ 88.05	$ 0.73	$ 176.10	$ 0.50	$ 120.00	$ 1.25	$ 300.00	$ -	$ -	$ 2.48	$ 596.10	0.00%	$ 596.10
	Excavating	11.24	CY	0.50	5.62	B10M	$ 88.05	$ 44.02	$ 494.79	$ -	$ -	$ 30.00	$ 337.17	$ -	$ -	$ 74.02	$ 831.96	0.00%	$ 831.96
	Pit Backfill, Machine, granular material	11.24	CY	0.01	0.16	B10M	$ 88.05	$ 1.23	$ 13.85	$ 40.80	$ 458.55	$ 1.18	$ 13.26	$ -	$ -	$ 43.21	$ 485.66	0.00%	$ 485.66
	Compaction	12.36	CY	0.04	0.46	B10M	$ 88.05	$ 3.26	$ 40.28	$ -	$ -	$ 2.26	$ 27.94	$ -	$ -	$ 5.52	$ 68.22	0.00%	$ 68.22
	Haul Trench Spoils	14.05	CY	0.05	0.70	B34D	$ 72.72	$ 3.64	$ 51.08	$ -	$ -	$ 5.00	$ 70.24	$ -	$ -	$ 8.64	$ 121.33	0.00%	$ 121.33
	Demo of existing MH Frame, Cover and Chimney to 4' below grade.	2.00	EA	8.00	16.00	B6	$ 77.51	$ 620.10	$ 1,240.20	$ -	$ -	$ 100.00	$ 200.00	$ -	$ -	$ 720.10	$ 1,440.20	0.00%	$ 1,440.20
	Handle and Dispose of Debris	0.68	CY	0.050	0.03	B34D	$ 72.72	$ 3.64	$ 2.47	$ -	$ -	$ 5.00	$ 3.39	$ -	$ -	$ 8.64	$ 5.86	0.00%	$ 5.86
33.03	Manhole chimney modifications and repair at cone section	2.00	EA	4.00	8.00	B22	$ 83.08	$ 332.31	$ 664.63	$ 200.00	$ 400.00	$ 100.00	$ 200.00	$ -	$ -	$ 632.31	$ 1,264.63	0.00%	$ 1,264.63
33.03	Concrete Chimney Collar, form and pour	2.00	EA	4.00	8.00	B22	$ 83.08	$ 332.31	$ 664.63	$ 250.00	$ 500.00	$ 100.00	$ 200.00	$ -	$ -	$ 682.31	$ 1,364.63	0.00%	$ 1,364.63
33.02	New MH frame and cover	2.00	EA	4.00	8.00	B20	$ 79.94	$ 319.75	$ 639.50	$ 650.00	$ 1,300.00	$ -	$ -	$ -	$ -	$ 969.75	$ 1,939.50	0.00%	$ 1,939.50
33.02	4' I.D. Precast Concrete Riser and top slab w/MH steps 16" OC set on top of stabilized MH walls	2.00	EA	8.00	16.00	B22	$ 83.08	$ 664.63	$ 1,329.26	$ 1,500.00	$ 3,000.00	$ 300.00	$ 600.00	$ -	$ -	$ 2,464.63	$ 4,929.26	0.00%	$ 4,929.26
33.03					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Manhole Repair B in Driveway	***1.00***	***EA***																$ -
	MH Cone Access Pit, 6x6x5	*1.00*	*EA*																$ -
	Paving Demo																		$ -
	Excavation of pit																		$ -
	Shoring	120.00	SF	0.01	1.00	B10M	$ 88.05	$ 0.73	$ 88.05	$ 0.50	$ 60.00	$ 1.25	$ 150.00	$ -	$ -	$ 2.48	$ 298.05	0.00%	$ 298.05
	Excavating	5.06	CY	0.50	2.53	B10M	$ 88.05	$ 44.02	$ 222.94	$ -	$ -	$ 30.00	$ 151.92	$ -	$ -	$ 74.02	$ 374.85	0.00%	$ 374.85
	Pit Backfill, Machine, granular material	5.06	CY	0.01	0.07	B10M	$ 88.05	$ 1.23	$ 6.24	$ 40.80	$ 206.61	$ 1.18	$ 5.98	$ -	$ -	$ 43.21	$ 218.83	0.00%	$ 218.83
	Compaction	5.57	CY	0.04	0.21	B10M	$ 88.05	$ 3.26	$ 18.15	$ -	$ -	$ 2.26	$ 12.59	$ -	$ -	$ 5.52	$ 30.74	0.00%	$ 30.74
	Haul Trench Spoils	6.33	CY	0.05	0.32	B34D	$ 72.72	$ 3.64	$ 23.02	$ -	$ -	$ 5.00	$ 31.65	$ -	$ -	$ 8.64	$ 54.67	0.00%	$ 54.67
	Demo of existing MH Frame, Cover and Chimney to 4' below grade.	1.00	EA	8.00	8.00	B6	$ 77.51	$ 620.10	$ 620.10	$ -	$ -	$ 100.00	$ 100.00	$ -	$ -	$ 720.10	$ 720.10	0.00%	$ 720.10
	Handle and Dispose of Debris	0.34	CY	0.050	0.02	B34D	$ 72.72	$ 3.64	$ 1.23	$ -	$ -	$ 5.00	$ 1.70	$ -	$ -	$ 8.64	$ 2.93	0.00%	$ 2.93
33.03	Manhole chimney modifications and repair at cone section	1.00	EA	4.00	4.00	B22	$ 83.08	$ 332.31	$ 332.31	$ 200.00	$ 200.00	$ 100.00	$ 100.00	$ -	$ -	$ 632.31	$ 632.31	0.00%	$ 632.31
33.03	Concrete Chimney Collar, form and pour	1.00	EA	4.00	4.00	B22	$ 83.08	$ 332.31	$ 332.31	$ 250.00	$ 250.00	$ 100.00	$ 100.00	$ -	$ -	$ 682.31	$ 682.31	0.00%	$ 682.31
33.02	New MH frame and cover	1.00	EA	4.00	4.00	B20	$ 79.94	$ 319.75	$ 319.75	$ 650.00	$ 650.00	$ -	$ -	$ -	$ -	$ 969.75	$ 969.75	0.00%	$ 969.75
33.02	4' I.D. Precast Concrete Riser and top slab w/MH steps 16" OC set on top of stabilized MH walls	1.00	EA	8.00	8.00	B22	$ 83.08	$ 664.63	$ 664.63	$ 1,500.00	$ 1,500.00	$ 300.00	$ 300.00	$ -	$ -	$ 2,464.63	$ 2,464.63	0.00%	$ 2,464.63
33.03					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
33.03	Tree/root removal and disposal for MH access	1.00	EA	16.00	16.00	B13	$ 75.99	$ 1,215.91	$ 1,215.91	$ 50.00	$ 50.00	$ 1,500.00	$ 1,500.00	$ -	$ -	$ 2,765.91	$ 2,765.91	0.00%	$ 2,765.91
33.03					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
33.02	Pre & Post Photos and Inspection report of MH Rehabilitation	82.00	EA		0.00	ELEC	$ 106.13	$ -	$ -		$ -	$ -	$ -	$ 100.00	$ 8,200.00	$ 100.00	$ 8,200.00	0.00%	$ 8,200.00
33.03	MH Taps including 4" up to and including 10", assuming avg 20' height	51.00	EA		0.00	B89A	$ 83.07	$ -	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	MH Riser Core Drilling	51.00	EA	2.00	102.00	SKILL	$ 95.90	$ 191.80	$ 9,781.57	$ 5.00	$ 255.00	$ 12.00	$ 612.00	$ -	$ -	$ 208.80	$ 10,648.57	0.00%	$ 10,648.57
	Pipe Mortar	51.00	EA	0.50	25.50	SKILL	$ 95.90	$ 47.95	$ 2,445.39	$ 20.00	$ 1,020.00	$ -	$ -	$ -	$ -	$ 67.95	$ 3,465.39	0.00%	$ 3,465.39
	Encasement in Concrete, incl form and pour	18.70	CY	3.75	70.13	SKILL	$ 95.90	$ 359.62	$ 6,724.83	$ -	$ -	$ -	$ -	$ -	$ -	$ 359.62	$ 6,724.83	0.00%	$ 6,724.83
	Drop Bowl	51.00	EA	0.50	25.50	SKILL	$ 95.90	$ 47.95	$ 2,445.39	$ 300.00	$ 15,300.00	$ -	$ -	$ -	$ -	$ 347.95	$ 17,745.39	0.00%	$ 17,745.39
	PVC Pipe, strapped 4' OC w/SS straps	1020.00	LF	0.10	102.00	SKILL	$ 95.90	$ 9.59	$ 9,781.57	$ 52.50	$ 53,550.00	$ -	$ -	$ -	$ -	$ 62.09	$ 63,331.57	0.00%	$ 63,331.57
33.03	MH Taps including 12" to 18", assuming avg 20' height	25.00	EA																$ -
	MH Riser Core Drilling	25.00	EA	2.25	56.25	SKILL	$ 95.90	$ 215.77	$ 5,394.25	$ 5.00	$ 125.00	$ 16.00	$ 400.00	$ -	$ -	$ 236.77	$ 5,919.25	0.00%	$ 5,919.25
	Pipe Mortar	25.00	EA	0.70	17.50	SKILL	$ 95.90	$ 67.13	$ 1,678.21	$ 30.00	$ 750.00	$ -	$ -	$ -	$ -	$ 97.13	$ 2,428.21	0.00%	$ 2,428.21
	Encasement in Concrete, incl form and pour	9.17	CY	3.75	34.38	SKILL	$ 95.90	$ 359.62	$ 3,296.48	$ -	$ -	$ -	$ -	$ -	$ -	$ 359.62	$ 3,296.48	0.00%	$ 3,296.48
	Drop Bowl	25.00	EA	0.75	18.75	SKILL	$ 95.90	$ 71.92	$ 1,798.08	$ 540.00	$ 13,500.00	$ -	$ -	$ -	$ -	$ 611.92	$ 15,298.08	0.00%	$ 15,298.08
	PVC Pipe, strapped 4' OC w/SS straps	500.00	LF	0.20	100.00	SKILL	$ 95.90	$ 19.18	$ 9,589.77	$ 85.00	$ 42,500.00	$ -	$ -	$ -	$ -	$ 104.18	$ 52,089.77	0.00%	$ 52,089.77

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Northwest Interceptor from Eight Mile to Tireman
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205

28222.38 Total Hours
40 Hours Per Week
705.559423 Total Man Weeks
13 Crew Size

68.75 Duration (Weeks) 54.27380176
18 Duration (Months) 12.52472348
8 0.004

14.00 Estimate Detail - Alternative 1

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
33.04	MH Taps 12"-24", assuming avg 20' height	6.00	EA																$ -
	MH Riser Core Drilling	6.00	EA	2.50	15.00	SKILL	$ 95.90	$ 239.74	$ 1,438.47	$ 8.00	$ 48.00	$ 20.00	$ 120.00	$ -	$ -	$ 267.74	$ 1,606.47	0.00%	$ 1,606.47
	Pipe Mortar	6.00	EA	1.00	6.00	SKILL	$ 95.90	$ 95.90	$ 575.39	$ 40.00	$ 240.00	$ -	$ -	$ -	$ -	$ 135.90	$ 815.39	0.00%	$ 815.39
	Encasement in Concrete, incl form and pour	2.93	CY	3.00	8.80	SKILL	$ 95.90	$ 287.69	$ 843.90	$ -	$ -	$ -	$ -	$ -	$ -	$ 287.69	$ 843.90	0.00%	$ 843.90
	Drop Bowl	6.00	EA	1.00	6.00	SKILL	$ 95.90	$ 95.90	$ 575.39	$ 750.00	$ 4,500.00	$ -	$ -	$ -	$ -	$ 845.90	$ 5,075.39	0.00%	$ 5,075.39
	PVC Pipe, strapped 4' OC w/SS straps	120.00	LF	0.25	30.00	SKILL	$ 95.90	$ 23.97	$ 2,876.93	$ 127.50	$ 15,300.00	$ -	$ -	$ -	$ -	$ 151.47	$ 18,176.93	0.00%	$ 18,176.93
33.03					0.00	B13	$ 75.99	#DIV/0!	$ -		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Deteriorated manhole steps demo - assume 5 in every MH	280.00	EA	0.25	70.00	B20	$ 79.94	$ 19.98	$ 5,595.61	$ -	$ -	$ 1.00	$ 280.00	$ -	$ -	$ 20.98	$ 5,875.61	0.00%	$ 5,875.61
	Replace Deteriorated Steps @16" OC, assumed 5 for every MH	280.00	EA	0.50	140.00	SKILL	$ 95.90	$ 47.95	$ 13,425.68	$ 40.00	$ 11,200.00	$ 2.00	$ 560.00	$ -	$ -	$ 89.95	$ 25,185.68	0.00%	$ 25,185.68
	Cleanup at each MH demo location	56.00	EA	1.00	56.00	LABOR	$ 70.23	$ 70.23	$ 3,933.15	$ -	$ -	$ -	$ -	$ -	$ -	$ 70.23	$ 3,933.15	0.00%	$ 3,933.15
	Miss Dig utility location	1.00	LS		0.00	SMW	$ 105.86	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	0.00%	$ 2,000.00
	PAY ITEM 9: Replace Manhole Frame and Cover	Total			2515.61				$ 215,297.20		$ 307,328.56		$ 51,958.59		$ 10,200.00				**$ 584,784.35**
	PAY ITEM 9: Replace Manhole Frame and Cover	Per EA			44.92				$ 3,844.59		$ 5,488.01		$ 927.83		$ 30.79		$ 10,291.23		**$ 584,784.35**
PAY ITEM 10: Remove Debris																			
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	MILL	$ 103.52	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	IRON	$ 99.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	Heavy cleaning and disposal	2923.00	TON	4.000	11692.00	B21	$ 83.08	$ 332.31	$ 971,356.29	$ -	$ -	$ 200.00	$ 584,600.00	$ -	$ -	$ 532.31	$ 1,555,956.29	0.00%	$ 1,555,956.29
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	IRON	$ 99.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	IRON	$ 99.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 10: Remove Debris				11692.00				$ 971,356.29		$ -		$ 584,600.00		$ -				**$ 1,555,956.29**
PAY ITEM 11: Tuckpointing Deteriorated Mortar																			
	Tuckpoint Deteriorated Mortar	165.00	SF														$ -	0.00%	$ -
	Unit masonry stabilization, structural repointing method, cut/grind mortar joint	990.00	LF	0.099	98.01	BRICK	$ 93.72	$ 9.28	$ 9,185.89	$ -	$ -	$ -	$ -	$ -	$ -	$ 9.28	$ 9,185.89	0.00%	$ 9,185.89
	Unit masonry stabilization, structural repointing method, clean and mask joint	990.00	LF	0.009	8.91	BRICK	$ 93.72	$ 0.84	$ 835.08	$ 0.20	$ 198.00	$ -	$ -	$ -	$ -	$ 1.04	$ 1,033.08	0.00%	$ 1,033.08
	Unit masonry stabilization, structural repointing method, epoxy paste and 3/8" FRP rod	990.00	LF	0.150	148.50	BRICK	$ 93.72	$ 14.06	$ 13,918.02	$ 4.00	$ 3,960.00	$ -	$ -	$ -	$ -	$ 18.06	$ 17,878.02	0.00%	$ 17,878.02
	Unit masonry stabilization, structural repointing method, remove masking	990.00	LF	0.003	2.97	BRICK	$ 93.72	$ 0.28	$ 278.36	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.28	$ 278.36	0.00%	$ 278.36
	Scaffolding	1.00	LS		0.00	CARP	$ 94.33	$ -	$ -	$ -	$ -	$ -	$ 1,200.00	$ -	$ -	$ 1,200.00	$ 1,200.00	0.00%	$ 1,200.00
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 11: Tuckpointing Deteriorated Mortar				258.39				$ 24,217.36		$ 4,158.00		$ 1,200.00		$ -				**$ 29,575.36**
PAY ITEM 12: Deteriorated Brick Repairs																			
	Brick Repairs	20.00	SF	1.60	32.00	BRICK	$ 93.72	$ 149.96	$ 2,999.17	$ 25.00	$ 500.00	$ -	$ -	$ -	$ -	$ 174.96	$ 3,499.17	0.00%	$ 3,499.17
					0.00	BRICK	$ 93.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	BRICK	$ 93.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	BRICK	$ 93.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	BRICK	$ 93.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	BRICK	$ 93.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	BRICK	$ 93.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	BRICK	$ 93.72	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 12: Deteriorated Brick Repairs				32.00				$ 2,999.17		$ 500.00		$ -		$ -				**$ 3,499.17**
PAY ITEM 13: Remove Mineral Deposits and Roots																			
	Remove Mineral Deposits and Roots	3160.00	SF		0.00	B20	$ 79.94	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.00%	$ -
	Encrustation Removal	3160.00	SF	1	3160.00	B20	$ 79.94	$ 79.94	$ 252,601.98	$ -	$ -	$ 10.00	$ 31,600.00	$ -	$ -	$ 89.94	$ 284,201.98	0.00%	$ 284,201.98
	Handle and Dispose of Debris	97.53	CY	1	97.53	B20	$ 79.94	$ 79.94	$ 7,796.36	$ -	$ -	$ 87.00	$ 8,485.19	$ -	$ -	$ 166.94	$ 16,281.54	0.00%	$ 16,281.54
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	E4	$ 100.58	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	CARP	$ 94.33	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 13: Remove Mineral Deposits and Roots				3257.53				$ 260,398.34		$ -		$ 40,085.19		$ -				**$ 300,483.52**
PAY ITEM 14: Repair Rough Taps ≤ 24”																			
	Repair Rough Taps ≤ 24” in Sewer less than 6' Diameter	11.00	EA	11.00	121.00	B20	$ 79.94	$ 879.31	$ 9,672.42	$ 20.00	$ 220.00	$ 100.00	$ 1,100.00	$ -	$ -	$ 999.31	$ 10,992.42	0.00%	$ 10,992.42
	Repair Rough Taps ≤ 24” in Sewer 6' Diameter or larger	48.00	EA	9.00	432.00	B20	$ 79.94	$ 719.44	$ 34,532.93	$ 20.00	$ 960.00	$ 80.00	$ 3,840.00	$ -	$ -	$ 819.44	$ 39,332.93	0.00%	$ 39,332.93
					0.00	PLUM	$ 104.54	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	PLUM	$ 104.54	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	PLUM	$ 104.54	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	PLUM	$ 104.54	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	PLUM	$ 104.54	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 14: Repair Rough Taps ≤ 24”				553.00				$ 44,205.35		$ 1,180.00		$ 4,940.00		$ -				**$ 50,325.35**
PAY ITEM 15: Repair Rough Taps > 24” and < 48"																			
	Repair Rough Taps > 24” and < 48”.	4.00	EA	15.75	63.00	B20	$ 79.94	$ 1,259.01	$ 5,036.05	$ 35.00	$ 140.00	$ 175.00	$ 700.00	$ -	$ -	$ 1,469.01	$ 5,876.05	0.00%	$ 5,876.05
					0.00	SMW	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	SMW	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	SMW	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	SMW	$ 105.86	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 15: Repair Rough Taps > 24” and < 48"				63.00				$ 5,036.05		$ 140.00		$ 700.00		$ -				**$ 5,876.05**
PAY ITEM 16: Repair Rough Taps ≥ 48”.																			

AECOM
707 Grant Street
6th Floor
Pittsburgh, PA 15219

Project: Rehabilitation of Northwest Interceptor from Eight Mile to Tireman
Location: Detroit, Michigan
Client: Great Lakes Water Authority
CIP #: 260205

28222.38 Total Hours
40 Hours Per Week
705.559423 Total Man Weeks
13 Crew Size

68.75 Duration (Weeks) 54.27380176
18 Duration (Months) 12.52472348
8 0.004

14.00 Estimate Detail - Alternative 1

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
	Repair Rough Taps ≥ 48".	1.00	EA	23.625	23.63	B20	$ 79.94	$ 1,888.52	$ 1,888.52	$ 52.50	$ 52.50	$ 262.50	$ 262.50	$ -	$ -	2203.519551	$ 2,203.52	0.00%	$ 2,203.52
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	0.00%	$ -
	PAY ITEM 16: Repair Rough Taps ≥ 48".				23.63				$ 1,888.52		$ 52.50		$ 262.50		$ -				**$ 2,203.52**
PAY ITEM 17: Open Joint Repair																			
	Open Joint Repair, pipe less than 6' Dia, 5" Avg depth, 1' avg	13.00	LF	0.00	0.00	B21	$ 83.08	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	15.00%	$ -
	High pressure wash, heavy soil, biological and mineral staining, paint, water and chemical, excludes scaffolding	39.00	SF	0.20	7.80	SKILL	$ 95.90	$ 19.18	$ 748.00	$ 0.41	$ 15.99	$ 1.95	$ 76.05	$ -	$ -	$ 21.54	$ 840.04	15.00%	$ 966.05
	Clean/grind surface(s) free of contaminants	13.00	LF	0.10	1.30	SKILL	$ 95.90	$ 9.59	$ 124.67	$ -	$ -	$ -	$ -	$ -	$ -	$ 9.59	$ 124.67	15.00%	$ 143.37
	Chip deteriorated concrete, bush hammer	13.00	SF	0.37	4.81	SKILL	$ 95.90	$ 35.48	$ 461.27	$ -	$ -	$ 1.52	$ 19.76	$ -	$ -	$ 37.00	$ 481.03	15.00%	$ 553.18
	6" SS Anchored Studs, drilled/doweled w/double nut head, 12" OC	26.00	EA	0.75	19.50	SKILL	$ 95.90	$ 71.92	$ 1,870.01	$ 12.00	$ 312.00	$ 0.50	$ 13.00	$ -	$ -	$ 84.42	$ 2,195.01	15.00%	$ 2,524.26
	Sand blast rebar	13.00	SF	0.45	5.85	SKILL	$ 95.90	$ 43.15	$ 561.00	$ 1.50	$ 19.50	$ 3.00	$ 39.00	$ -	$ -	$ 47.65	$ 619.50	15.00%	$ 712.43
	Shotcrete pipe repair, 5" thick	13.00	SF	0.38	4.88	SKILL	$ 95.90	$ 35.96	$ 467.50	$ 6.00	$ 78.00	$ 3.75	$ 48.75	$ -	$ -	$ 45.71	$ 594.25	15.00%	$ 683.39
	Cleaning of debris	0.20	CY	4.00	0.80	SKILL	$ 95.90	$ 383.59	$ 76.95	$ -	$ -	$ -	$ -	$ -	$ -	$ 383.59	$ 76.95	15.00%	$ 88.50
	Epoxy coating for exposed rebar	13.00	SF	0.02	0.26	SKILL	$ 95.90	$ 1.92	$ 24.93	$ 0.70	$ 9.10	$ -	$ -	$ -	$ -	$ 2.62	$ 34.03	15.00%	$ 39.14
	Open Joint repair, pipe 6' to 9' Dia	155.00	LF		0.00	SKILL	$ 95.90	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	15.00%	$ -
	High pressure wash, heavy soil, biological and mineral staining, paint, water and chemical, excludes scaffolding	465.00	SF	0.16	74.40	SKILL	$ 95.90	$ 15.34	$ 7,134.79	$ 0.41	$ 190.65	$ 1.56	$ 725.40	$ -	$ -	$ 17.31	$ 8,050.84	15.00%	$ 9,258.47
	Clean/grind surface(s) free of contaminants	155.00	LF	0.08	12.40	SKILL	$ 95.90	$ 7.67	$ 1,189.13	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.67	$ 1,189.13	15.00%	$ 1,367.50
	Chip deteriorated concrete, bush hammer	155.00	SF	0.30	45.88	SKILL	$ 95.90	$ 28.39	$ 4,399.79	$ -	$ -	$ 1.52	$ 235.60	$ -	$ -	$ 29.91	$ 4,635.39	15.00%	$ 5,330.70
	6" SS Anchored Studs, drilled/doweled w/double nut head, 12" OC	310.00	EA	0.67	207.70	SKILL	$ 95.90	$ 64.25	$ 19,917.96	$ 12.00	$ 3,720.00	$ 0.50	$ 155.00	$ -	$ -	$ 76.75	$ 23,792.96	15.00%	$ 27,361.90
	Sand blast rebar	155.00	SF	0.36	55.80	SKILL	$ 95.90	$ 34.52	$ 5,351.09	$ 1.50	$ 232.50	$ 3.00	$ 465.00	$ -	$ -	$ 39.02	$ 6,048.59	15.00%	$ 6,955.88
	Shotcrete pipe repair, 5" thick	155.00	SF	0.30	46.50	SKILL	$ 95.90	$ 28.77	$ 4,459.24	$ 6.00	$ 930.00	$ 3.00	$ 465.00	$ -	$ -	$ 37.77	$ 5,854.24	15.00%	$ 6,732.38
	Cleaning of debris	2.39	CY	4.00	9.57	SKILL	$ 95.90	$ 383.59	$ 917.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 383.59	$ 917.54	15.00%	$ 1,055.17
	Epoxy coating for exposed rebar	155.00	SF	0.02	3.10	SKILL	$ 95.90	$ 1.92	$ 297.28	$ 0.70	$ 108.50	$ -	$ -	$ -	$ -	$ 2.62	$ 405.78	15.00%	$ 466.65
	Open Joint repair, pipe over 9' Dia	769.00	LF		0.00	SKILL	$ 95.90	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	15.00%	$ -
	High pressure wash, heavy soil, biological and mineral staining, paint, water and chemical, excludes scaffolding	2307.00	SF	0.20	461.40	SKILL	$ 95.90	$ 19.18	$ 44,247.21	$ 0.41	$ 945.87	$ 1.95	$ 4,498.65	$ -	$ -	$ 21.54	$ 49,691.73	15.00%	$ 57,145.49
	Clean/grind surface(s) free of contaminants	769.00	LF	0.10	76.90	SKILL	$ 95.90	$ 9.59	$ 7,374.54	$ -	$ -	$ -	$ -	$ -	$ -	$ 9.59	$ 7,374.54	15.00%	$ 8,480.72
	Chip deteriorated concrete, bush hammer	769.00	SF	0.37	284.53	SKILL	$ 95.90	$ 35.48	$ 27,285.78	$ -	$ -	$ 1.52	$ 1,168.88	$ -	$ -	$ 37.00	$ 28,454.66	15.00%	$ 32,722.86
	6" SS Anchored Studs, drilled/doweled w/double nut head, 12" OC	1538.00	EA	0.75	1153.50	SKILL	$ 95.90	$ 71.92	$ 110,618.04	$ 12.00	$ 18,456.00	$ 0.50	$ 769.00	$ -	$ -	$ 84.42	$ 129,843.04	15.00%	$ 149,319.49
	Sand blast rebar	769.00	SF	0.45	346.05	SKILL	$ 95.90	$ 43.15	$ 33,185.41	$ 1.50	$ 1,153.50	$ 3.00	$ 2,307.00	$ -	$ -	$ 47.65	$ 36,645.91	15.00%	$ 42,142.80
	Shotcrete pipe repair, 5" thick	769.00	SF	0.38	288.38	SKILL	$ 95.90	$ 35.96	$ 27,654.51	$ 6.00	$ 4,614.00	$ 3.75	$ 2,883.75	$ -	$ -	$ 45.71	$ 35,152.26	15.00%	$ 40,425.10
	Cleaning of debris	11.87	CY	4.00	47.47	SKILL	$ 95.90	$ 383.59	$ 4,552.18	$ -	$ -	$ -	$ -	$ -	$ -	$ 383.59	$ 4,552.18	15.00%	$ 5,235.01
	Epoxy coating for exposed rebar	769.00	SF	0.02	15.38	SKILL	$ 95.90	$ 1.92	$ 1,474.91	$ 0.70	$ 538.30	$ -	$ -	$ -	$ -	$ 2.62	$ 2,013.21	15.00%	$ 2,315.19
	Scaffolding/Mobility rack	20.00	week	5.00	100.00	B20	$ 79.94	$ 399.69	$ 7,993.73	$ 800.00	$ 16,000.00	$ -	$ -	$ -	$ -	$ 1,199.69	$ 23,993.73	15.00%	$ 27,592.79
	Air Supply	20.00	Week	5.00	100.00	B20	$ 79.94	$ 399.69	$ 7,993.73	$ 200.00	$ 4,000.00	$ -	$ -	$ -	$ -	$ 599.69	$ 11,993.73	15.00%	$ 13,792.79
					0.00	SKILL	$ 95.90	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	15.00%	$ -
	PAY ITEM 17: Open Joint Repair				3374.15				$ 320,381.21		$ 51,323.91		$ 13,869.84		$ -				**$ 443,411.20**
PAY ITEM 18: Epoxy Crack Repair																			
	Epoxy Crack Repair in pipe less than 6' Dia	615.00	LF	0.00	0.00	B21	$ 83.08	$ -	$ -	$0.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	15.00%	$ -
	High pressure wash, heavy soil, biological and mineral staining, paint, water and chemical, excludes scaffolding	1230.00	SF	0.20	246.00	SKILL	$ 95.90	$ 19.18	$ 23,590.84	$ 0.41	$ 504.30	$ 1.95	$ 2,398.50	$ -	$ -	$ 21.54	$ 26,493.64	15.00%	$ 30,467.69
	Concrete crack repair, structural repair by epoxy injection (ACI RAP-1), suitable for horizontal, vertical and overhead repairs, install surface-mounted entry ports	615.00	LF	0.15	92.25	SKILL	$ 95.90	$ 14.38	$ 8,846.57	$ 2.98	$ 1,832.70	$ -	$ -	$ -	$ -	$ 17.36	$ 10,679.27	15.00%	$ 12,281.16
	Clean/grind surface(s) free of contaminants	615.00	LF	0.10	61.50	SKILL	$ 95.90	$ 9.59	$ 5,897.71	$ -	$ -	$ -	$ -	$ -	$ -	$ 9.59	$ 5,897.71	15.00%	$ 6,782.37
	Concrete crack repair, rout crack with v-notch crack chaser if needed	615.00	LF	0.14	83.03	SKILL	$ 95.90	$ 12.95	$ 7,961.91	$ 0.03	$ 18.45	$ 1.00	$ 615.00	$ -	$ -	$ 13.98	$ 8,595.36	15.00%	$ 9,884.66
	Concrete crack repair, blow out crack with oil-free dry compressed air	615.00	LF	0.02	9.23	SKILL	$ 95.90	$ 1.44	$ 884.66	$ -	$ -	$ 0.05	$ 30.75	$ -	$ -	$ 1.49	$ 915.41	15.00%	$ 1,052.72
	Concrete crack repair, structural repair by epoxy neumatic injection with 2-part bulk epoxy	615.00	LF	0.25	153.75	SKILL	$ 95.90	$ 23.97	$ 14,744.28	$ 1.00	$ 615.00	$ 12.30	$ 7,564.50	$ -	$ -	$ 37.27	$ 22,923.78	15.00%	$ 26,362.34
	Concrete crack repair, cap crack at surface with epoxy gel (per side/face)	615.00	LF	0.10	61.50	SKILL	$ 95.90	$ 9.59	$ 5,897.71	$ 0.44	$ 270.60	$ -	$ -	$ -	$ -	$ 10.03	$ 6,168.31	15.00%	$ 7,093.56
	Epoxy Crack Repair in pipe 6' to 9' Dia and higher	684.00	LF	0.00	0.00	B21	$ 83.08	$ -	$ -	$0.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	15.00%	$ -
	High pressure wash, heavy soil, biological and mineral staining, paint, water and chemical, excludes scaffolding	1368.00	SF	0.16	218.88	SKILL	$ 95.90	$ 15.34	$ 20,990.10	$ 0.41	$ 560.88	$ 1.56	$ 2,134.08	$ -	$ -	$ 17.31	$ 23,685.06	15.00%	$ 27,237.81

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Project: Rehabilitation of Northwest Interceptor from Eight Mile to Tireman
Location: Detroit, Michigan
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CIP #: 260205

28222.38 Total Hours
40 Hours Per Week
705.559423 Total Man Weeks
13 Crew Size

68.75 Duration (Weeks)
18 Duration (Months)

54.27380176
12.52472348

8 0.004

14.00 Estimate Detail - Alternative 1

Item #	Description	Quantity	UOM	MH/Unit	Tot. Hours	Crew	$/MH	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Other	Other Total	Unit Cost	Subtotal	Sub Markups	Total Cost
	Concrete crack repair, structural repair by epoxy injection (ACI RAP-1), suitable for horizontal, vertical and overhead repairs, install surface-mounted entry ports	684.00	LF	0.12	82.08	SKILL	$ 95.90	$ 11.51	$ 7,871.29	$ 2.98	$ 2,038.32	$ -	$ -	$ -	$ -	$ 14.49	$ 9,909.61	15.00%	$ 11,396.05
	Clean/grind surface(s) free of contaminants	684.00	LF	0.08	54.72	SKILL	$ 95.90	$ 7.67	$ 5,247.52	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.67	$ 5,247.52	15.00%	$ 6,034.65
	Concrete crack repair, rout crack with v-notch crack chaser if needed	684.00	LF	0.11	73.87	SKILL	$ 95.90	$ 10.36	$ 7,084.16	$ 0.03	$ 20.52	$ 0.80	$ 547.20	$ -	$ -	$ 11.19	$ 7,651.88	15.00%	$ 8,799.66
	Concrete crack repair, blow out crack with oil-free dry compressed air	684.00	LF	0.01	8.21	SKILL	$ 95.90	$ 1.15	$ 787.13	$ -	$ -	$ 0.04	$ 27.36	$ -	$ -	$ 1.19	$ 814.49	15.00%	$ 936.66
	Concrete crack repair, structural repair by epoxy neumatic injection with 2-part bulk epoxy	684.00	LF	0.20	136.80	SKILL	$ 95.90	$ 19.18	$ 13,118.81	$ 1.00	$ 684.00	$ 9.84	$ 6,730.56	$ -	$ -	$ 30.02	$ 20,533.37	15.00%	$ 23,613.38
	Concrete crack repair, cap crack at surface with epoxy gel (per side/face)	684.00	LF	0.08	54.72	SKILL	$ 95.90	$ 7.67	$ 5,247.52	$ 0.44	$ 300.96	$ -	$ -	$ -	$ -	$ 8.11	$ 5,548.48	15.00%	$ 6,380.76
	Epoxy Crack Repair in pipe over 9' diameter	385.00	LF	0.00	0.00	B21	$ 83.08	$ -	$ -	$0.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	15.00%	$ -
	High pressure wash, heavy soil, biological and mineral staining, paint, water and chemical, excludes scaffolding	770.00	SF	0.20	154.00	SKILL	$ 95.90	$ 19.18	$ 14,768.25	$ 0.41	$ 315.70	$ 1.95	$ 1,501.50	$ -	$ -	$ 21.54	$ 16,585.45	15.00%	$ 19,073.27
	Concrete crack repair, structural repair by epoxy injection (ACI RAP-1), suitable for horizontal, vertical and overhead repairs, install surface-mounted entry ports	385.00	LF	0.15	57.75	SKILL	$ 95.90	$ 14.38	$ 5,538.09	$ 2.98	$ 1,147.30	$ -	$ -	$ -	$ -	$ 17.36	$ 6,685.39	15.00%	$ 7,688.20
	Clean/grind surface(s) free of contaminants	385.00	LF	0.10	38.50	SKILL	$ 95.90	$ 9.59	$ 3,692.06	$ -	$ -	$ -	$ -	$ -	$ -	$ 9.59	$ 3,692.06	15.00%	$ 4,245.87
	Concrete crack repair, rout crack with v-notch crack chaser if needed	385.00	LF	0.14	51.98	SKILL	$ 95.90	$ 12.95	$ 4,984.28	$ 0.03	$ 11.55	$ 1.00	$ 385.00	$ -	$ -	$ 13.98	$ 5,380.83	15.00%	$ 6,187.96
	Concrete crack repair, blow out crack with oil-free dry compressed air	385.00	LF	0.02	5.78	SKILL	$ 95.90	$ 1.44	$ 553.81	$ -	$ -	$ 0.05	$ 19.25	$ -	$ -	$ 1.49	$ 573.06	15.00%	$ 659.02
	Concrete crack repair, structural repair by epoxy neumatic injection with 2-part bulk epoxy	385.00	LF	0.25	96.25	SKILL	$ 95.90	$ 23.97	$ 9,230.16	$ 1.00	$ 385.00	$ 12.30	$ 4,735.50	$ -	$ -	$ 37.27	$ 14,350.66	15.00%	$ 16,503.26
	Concrete crack repair, cap crack at surface with epoxy gel (per side/face)	385.00	LF	0.10	38.50	SKILL	$ 95.90	$ 9.59	$ 3,692.06	$ 0.44	$ 169.40	$ -	$ -	$ -	$ -	$ 10.03	$ 3,861.46	15.00%	$ 4,440.68
					0.00	ELEC	$ 106.13	#DIV/0!	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	15.00%	$ -
	Scaffolding/Mobility rack	12.00	week	5.00	60.00	B20	$ 79.94	$ 399.69	$ 4,796.24	$ 800.00	$ 9,600.00	$ -	$ -	$ -	$ -	$ 1,199.69	$ 14,396.24	15.00%	$ 16,555.68
	Air Supply	12.00	Week	5.00	60.00	B20	$ 79.94	$ 399.69	$ 4,796.24	$ 200.00	$ 2,400.00	$ -	$ -	$ -	$ -	$ 599.69	$ 7,196.24	15.00%	$ 8,275.68
	PAY ITEM 18: Epoxy Crack Repair				1899.28				$ 180,221.40		$ 20,874.68		$ 26,689.20		$ -				**$ 261,953.07**

CIP Delivery Program Management Team
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Technical Memorandum

Subject: GLWA CIP Validation – 260701

Project

This technical memorandum relates to the following project:

- CIP No. 260701 – Conveyance System Infrastructure Improvements (Phase 1 Improvements)

Status/Classification

CIP No. 260701 was included in the 2022-2026 Board Approved CIP under the CIP No. 222004. The project is currently listed as Active – Procurement - Construction on the CIP Portal.

This project is currently under the procurement process for construction of the first phase of the project. With that understanding, the classification in the CIP Portal is accurate.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- CIP Portal
- 100% Design Drawings and Specifications
- Discussion with Project Manager (Mini Panicker)

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

The design development for Phase 1 of this project is currently complete with the 100% drawings and specifications at “bid ready” level. That level of scope definition exceeds the criteria described above.

No additional scope definition is required for planning purposes.

Cost Validation

As part of the validation effort, the AECOM team reviewed the Engineer's Opinion of Probable Construction Cost (OPCC) and compared it to the information in the CIP Portal. This project was not selected for the AECOM team to develop an independent cost estimate.

CIP No.	Project Description	CIP Portal Construction Cost	Design Engineer OPCC
260701	Conveyance System Infrastructure Improvements (Phase 1 Improvements)	$38,808,000	$39,800,000

The difference between the CIP Portal construction budget and the Design Engineer OPCC is minimal, at 2.5%. It is undetermined why a different cost is used in the Portal vs the Engineers OPCC.

The Engineers OPCC used a 30% contingency in their cost estimate. Typically, when the design documents are 100% complete, the cost estimate derived is Class 1 or 2 and the contingency is between 10-15%.

It is observed that the design engineer OPCC did not utilize American Association of Cost Estimators (AACE) methodology to develop the cost estimate. We recommended GLWA require AACE methodology for projects of this magnitude and complexity.

Since this project is with procurement and scheduled for bidding soon, no updates to the cost are recommended.

Schedule Validation

The CIP Portal shows the construction duration as 33 months (6/1/2022 thru 2/28/2025).

Our review of the scope of work items, we observe that this project involves mainly rehabilitation of outfalls including structures, gates, manholes and instrumentation. This project does not involve procurement of additional right-of-way or easement and has moderate traffic control. Therefore, it is our opinion the degree of difficulty for the construction of this project is medium to moderate. Since this project has many locations of work, there will be multiple mobilizations and demobilizations at different sites, lengthening the schedule. Given the size and complexity of this project, we estimate a minimum 42-months construction duration. With this premise, we suggest the following breakdown of the construction schedule:

- Mobilization – 3 Months
- Construction – 30 Months
- Allowance for weather delay – 6 months
- Project closeout activities – 3 months

A total construction period of 42 months is expected to be adequate to account for the quantity and complexity of the work, along with any potential weather delays.

Project Delivery System

It is our understanding that this project would be implemented by adopting a Design-Bid-Build delivery system. Given that the design documents are almost fully developed and near "bid ready", we concur with the current project delivery approach.

Project Packaging and Sequencing

The scope for this project involves rehabilitation of outfalls along the Detroit and Rouge Rivers, including structures, gates, manholes and instrumentation. Part of the sequencing of the work involves providing uninterrupted sanitary service through the outfalls at all times.

This is already a conglomerate of outfall repairs, and there are no major benefits from packaging this project with another or splitting this work into multiple projects.

This project is independent of any on-going or known future planned projects, and hence can be implemented with a schedule indicated in the alignment documents.